

VOLUME 2

FINAL ENVIRONMENTAL IMPACT STATEMENT Eagle Shadow Mountain 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

Estimated Lead Agency
Total Costs Associated with
Developing and Producing This EIS
\$ 1,782,000



November 2019

**FINAL
ENVIRONMENTAL IMPACT STATEMENT
(FEIS)**

**EAGLE SHADOW MOUNTAIN
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

November 2019

VOLUME 2

Table of Contents

Appendix A – Figures

Appendix B – Scoping Report

Appendix C – Project Design Features / Best Management Practices (BMPs)

Appendix D – Bird and Bat Conservation Strategy (BBCS)

Appendix E – Gen-Tie Plan of Development (POD)

Appendix F – Traffic Plan

Appendix G – Integrated Weed Management Plan

Appendix H – Decommissioning Plan

Appendix I – Jurisdictional Waters Report

Appendix J – Site Restoration Plan

Appendix K – Raven Control Plan

Appendix L – Biological Assessment

Appendix M – Cultural Consultation Letters

Appendix N – List of Acronyms

Appendix O – References

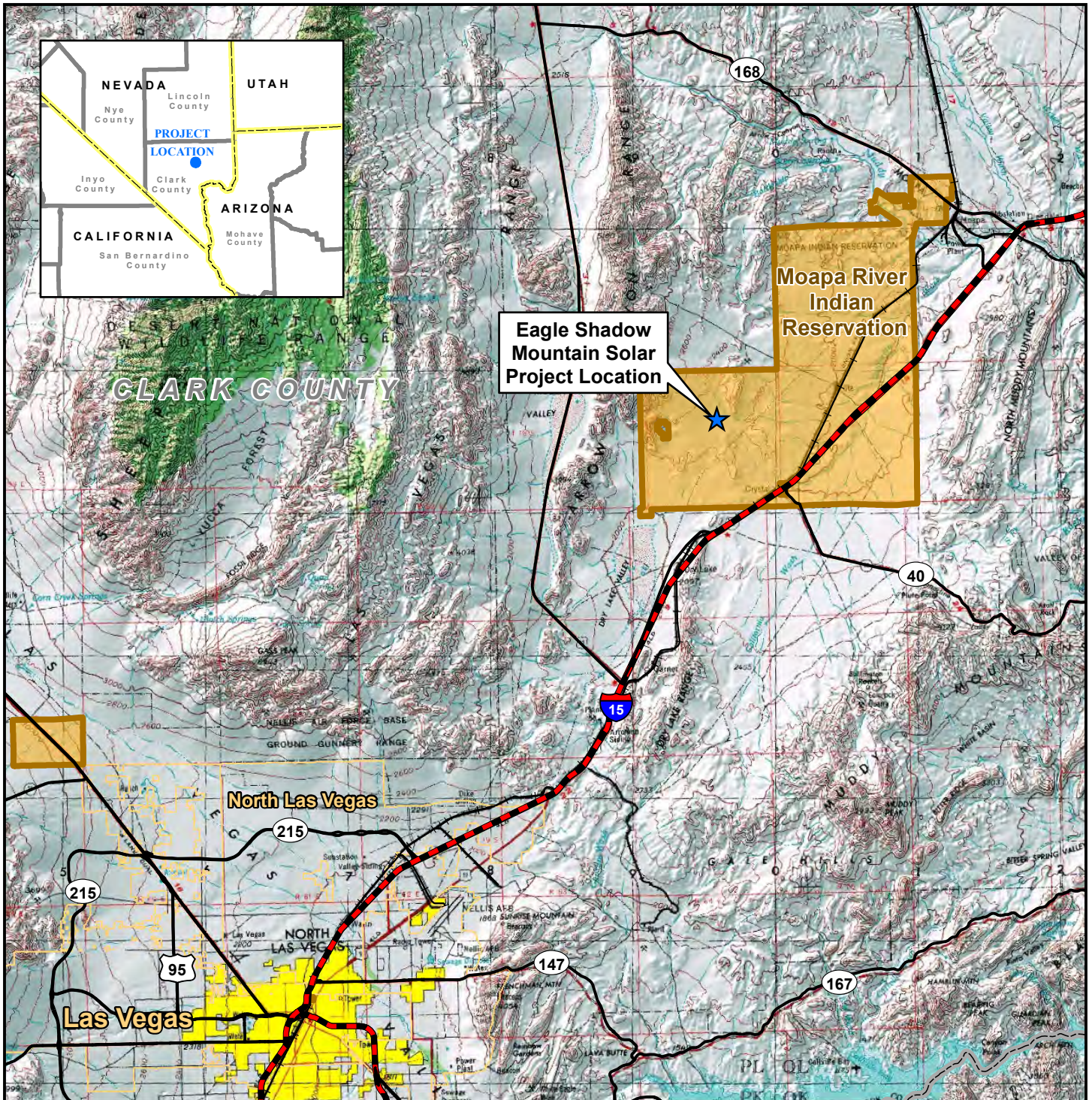
Appendix P – Biological Opinion

Appendix Q – Preliminary Hydrology Report

Appendix R – Response to Comments on the DEIS

Appendix A

Figures

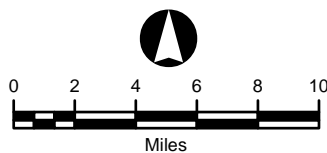


Legend

- Solar Project Location
- Interstate
- US/ State Highway
- Railroad
- Municipal Boundary

Jurisdictional Land Ownership

- Indian Reservation



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

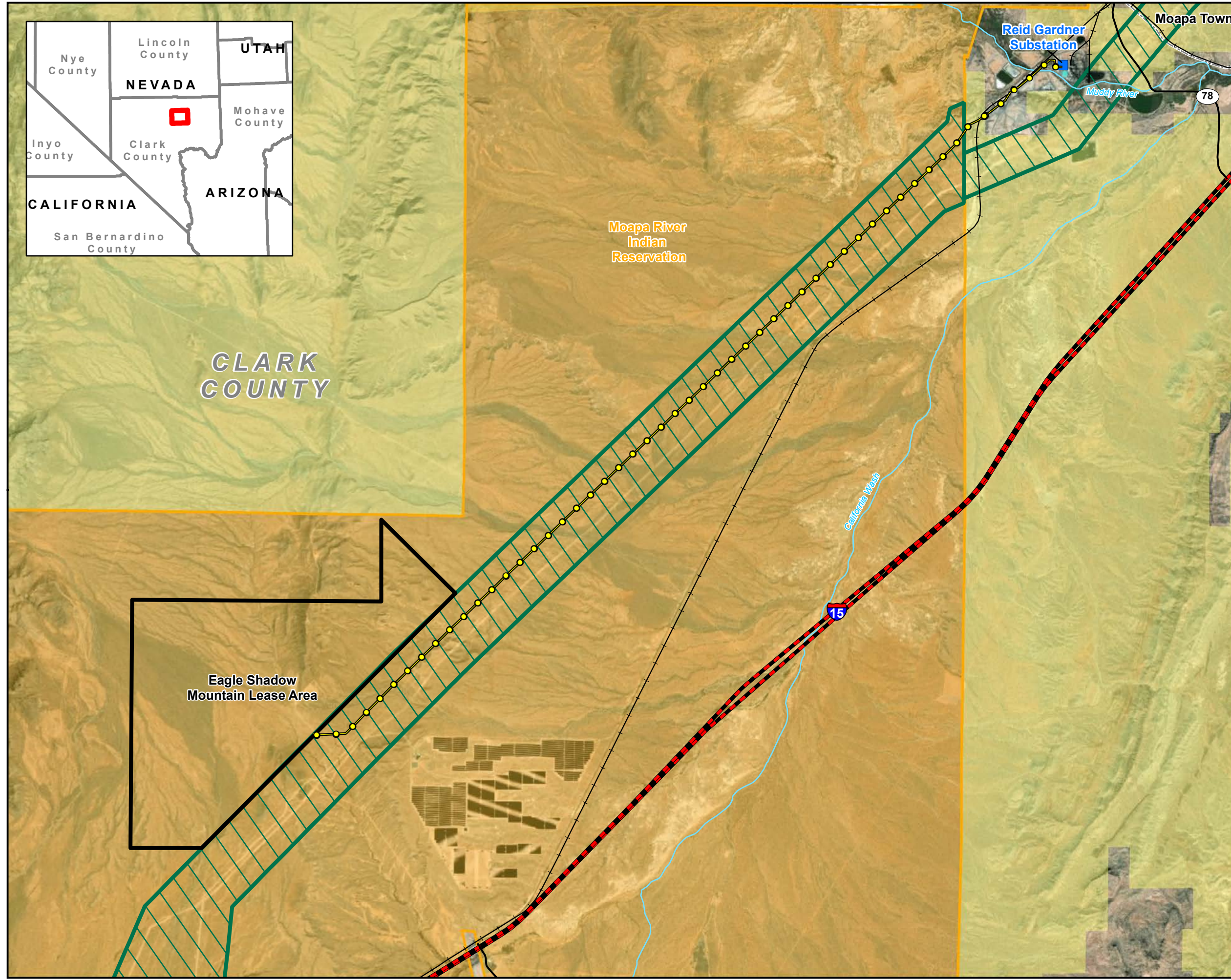
Eagle Shadow Mountain Solar Project

**FIGURE 1-1
 PROJECT LOCATION**

Map Extent: Clark County, Nevada

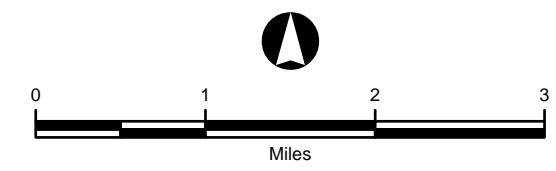
Date: 11-06-18	Author: rnc
----------------	-------------

G:\Eagle Shadow Mountain Solar Project\MXD's\Project Location 8.5x11 110618.mxd



Legend

- Project Components**
 - ESM Gen-Tie - Alternative
 - Eagle Shadow Mountain Solar Project Area
- 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



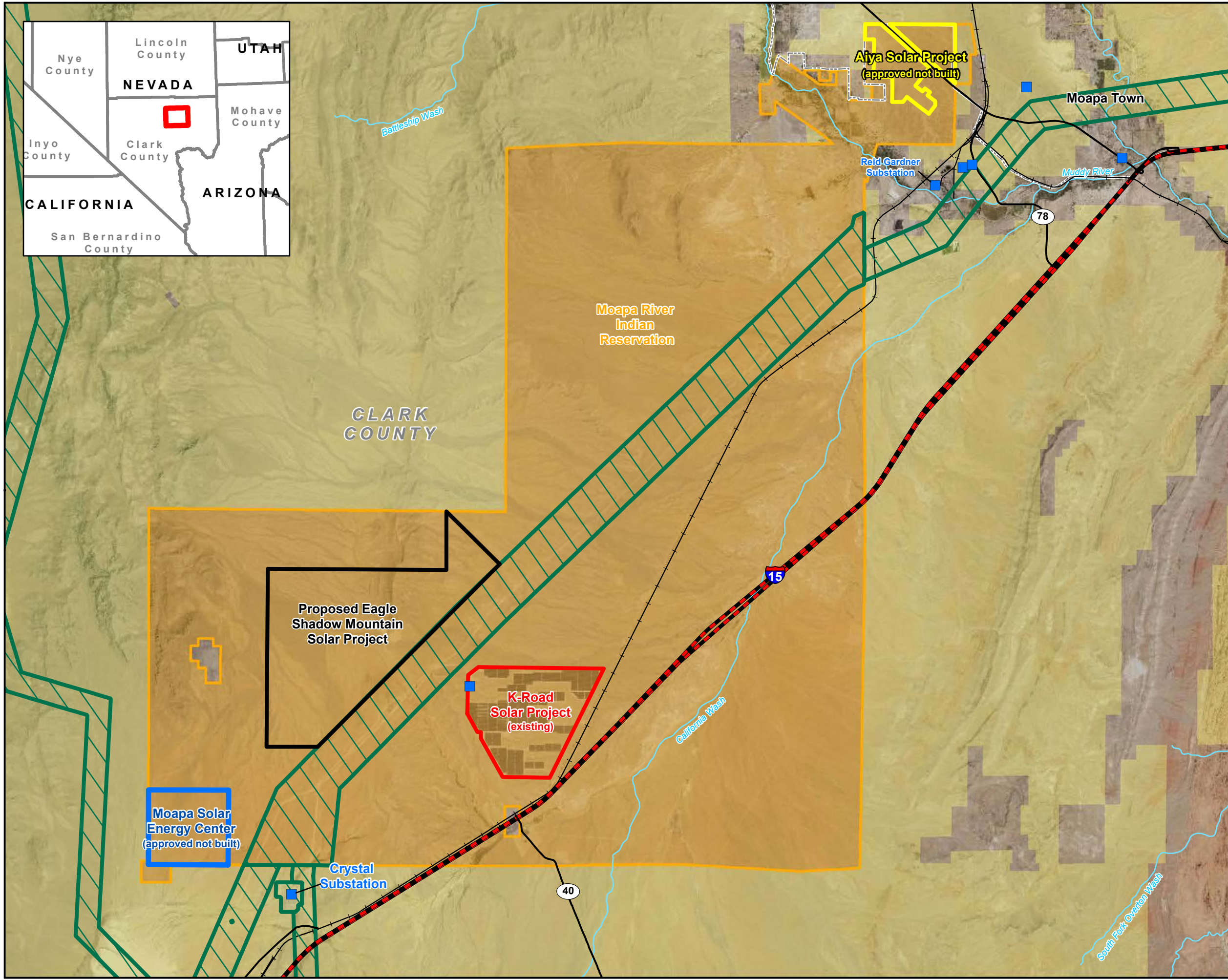
Universal Transverse Mercator
 North American Datum 1983
 Zone 11 North, Meters

Eagle Shadow Mountain Solar Project

Figure 1-2
ESM Solar Project Components

Map Extent: Clark County, Nevada

Date: 03-20-19	Author: mc
G:\ESM\MXD's\Project Location_032019.mxd	



Legend

- Proposed Project
 - Eagle Shadow Mountain Solar Project Area
- Solar Projects
 - Aiya Solar Project (approved not built)
 - K-Road Solar Project (existing)
 - Moapa Solar Energy Center (approved not built)
- 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

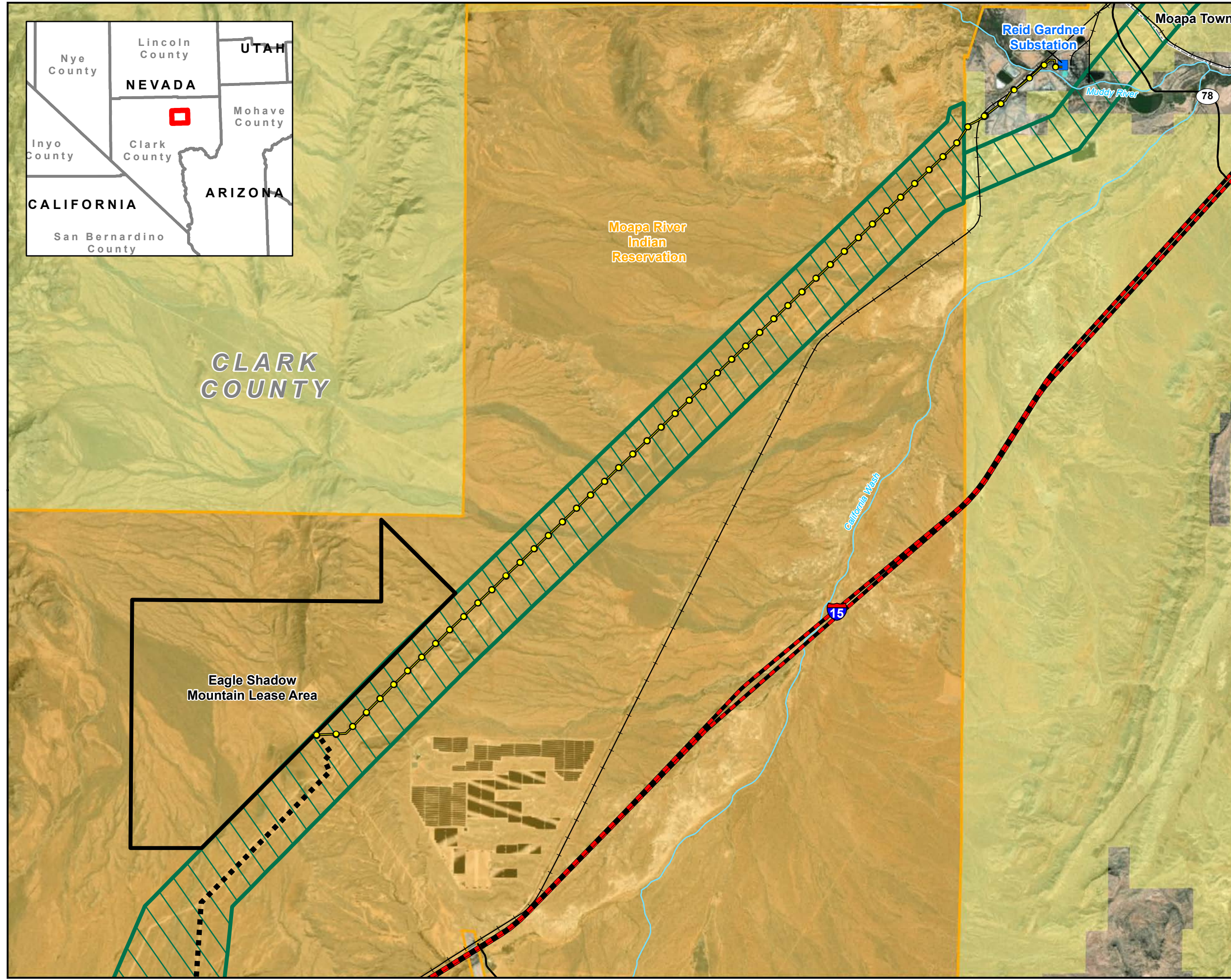


Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Eagle Shadow Mountain Solar Project

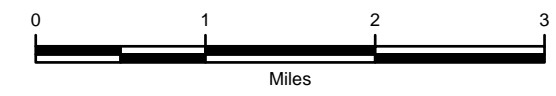
**Figure 1-3
Solar Projects on the
Moapa Reservation**

Map Extent: Clark County, Nevada	
Date: 03-20-19	Author: mc
G:\ESM\MXD's\Project Location_032019.mxd	



Legend

- Project Components**
- ESM Gen-Tie - Alternative
- Eagle Shadow Mountain Solar Project Area
- 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
- Existing Access Road



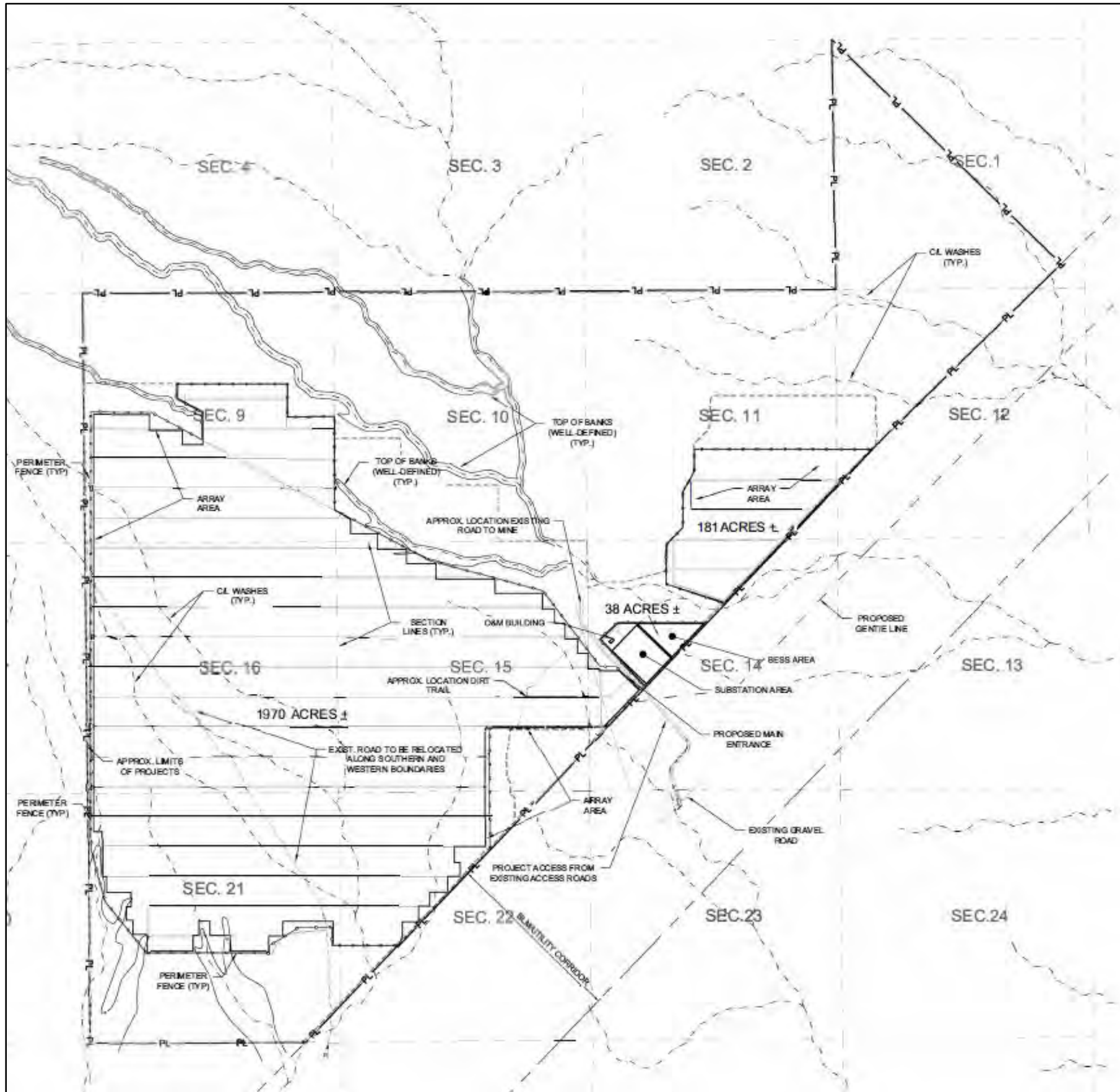
Universal Transverse Mercator
North American Datum 1983
Zone 11 North, Meters

Eagle Shadow Mountain Solar Project

**Figure 2-1
ESM Solar Project Components**

Map Extent: Clark County, Nevada

Date: 03-20-19	Author: mrc
G:\ESM\MXD's\Project Location_032019.mxd	



GENERAL NOTES

1. ALL DIMENSIONS SHOWN ARE APPROXIMATE AND SUBJECT TO CHANGE.
2. ALL EQUIPMENT SELECTION AND SPECIFICATIONS SUBJECT TO CHANGE WITH FINAL DESIGN.

LEGEND

<u>EXISTING</u>	<u>NEW</u>

PRELIMINARY

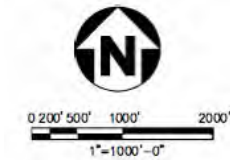


Figure 2-2
 Conceptual Site Plan
 Eagle Shadow Mountain Solar Project

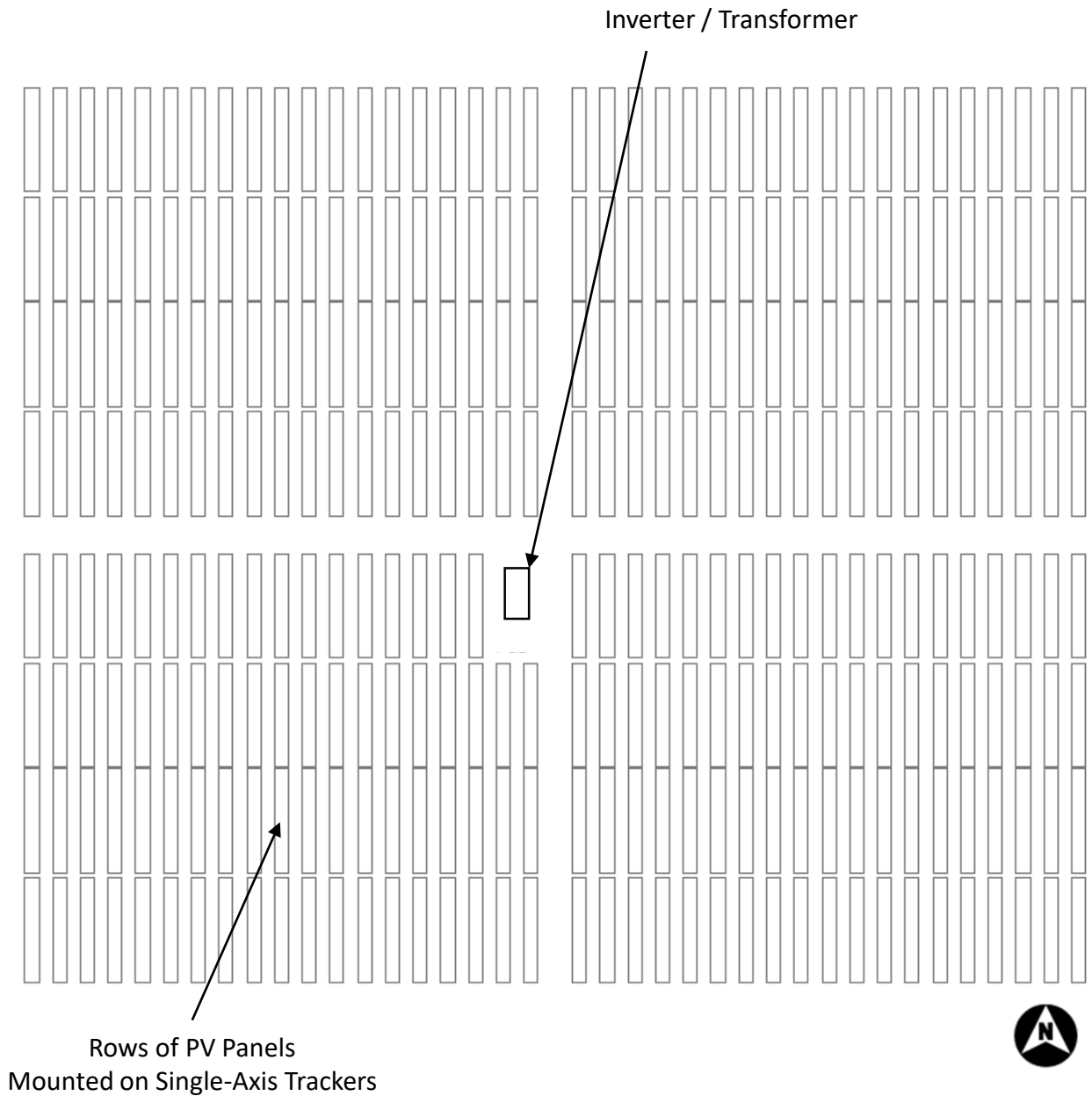


Figure 2-3
Typical Single-Axis Tracker Array Layout

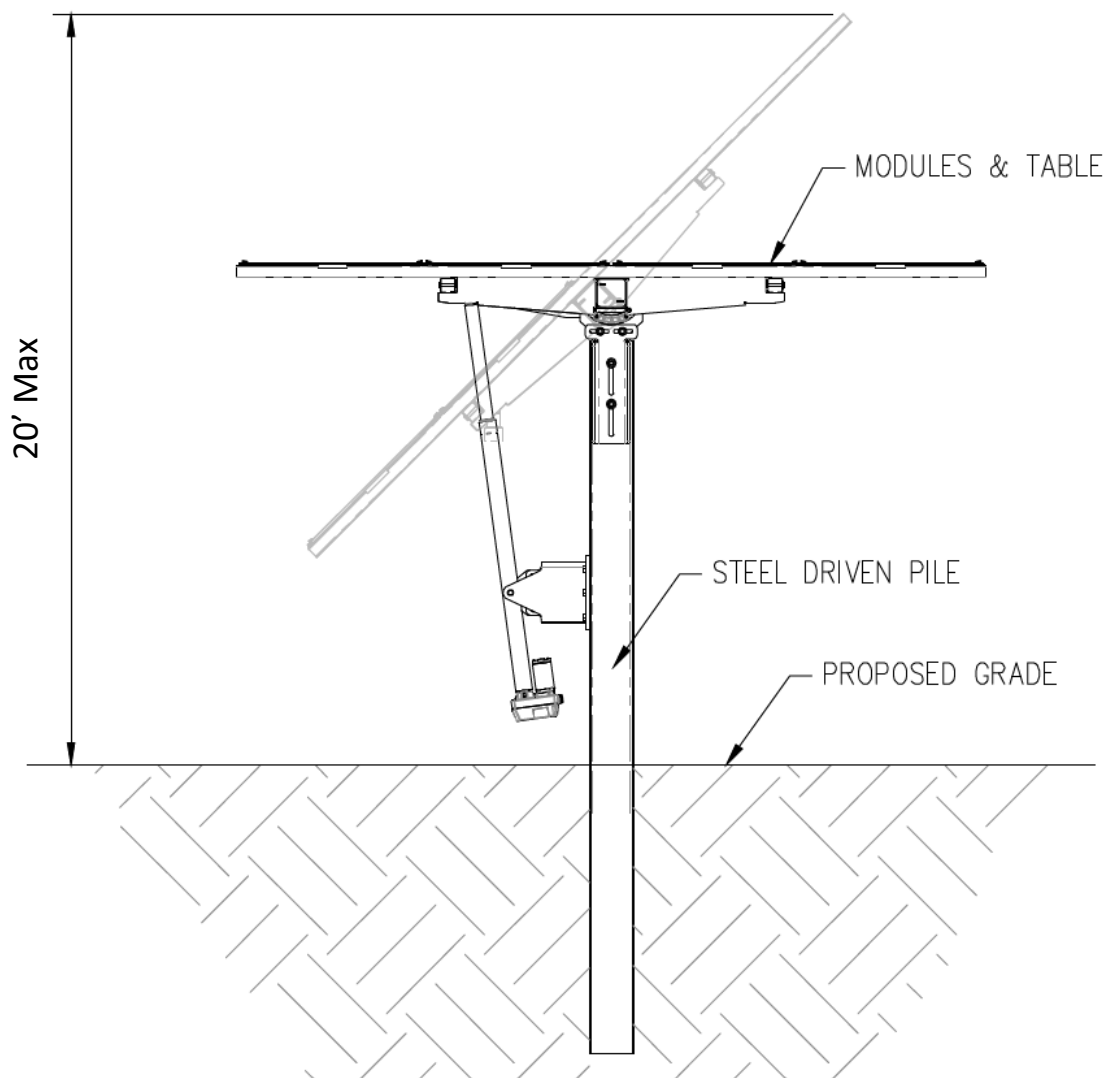
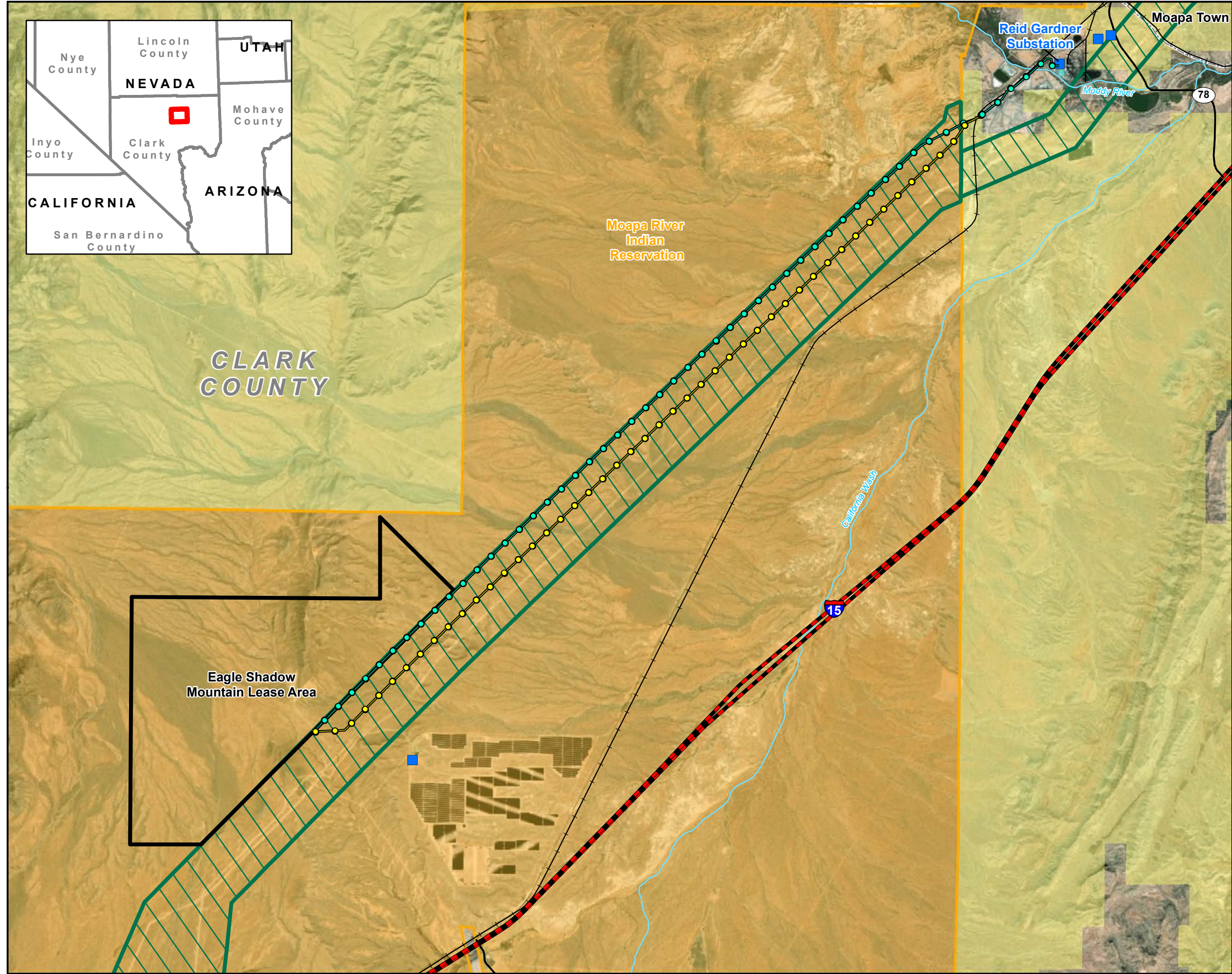


Figure 2-4
Typical Single-Axis Tracker Cross Sectional View



Legend

Project Components

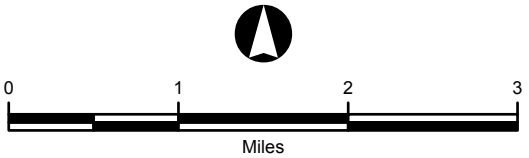
- ESM Gen-Tie – Proposed
- ESM Gen-Tie - Alternative
- Eagle Shadow Mountain Project Area

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 Land
- Private Lands



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

Eagle Shadow Mountain Solar Project

Figure 2-5 Proposed and Alternative Gen-Tie Routes

Map Extent: Clark County, Nevada

Date: 04-08-19 Author: mc
G:\ESM\MXD's\Project Location_040819.mxd

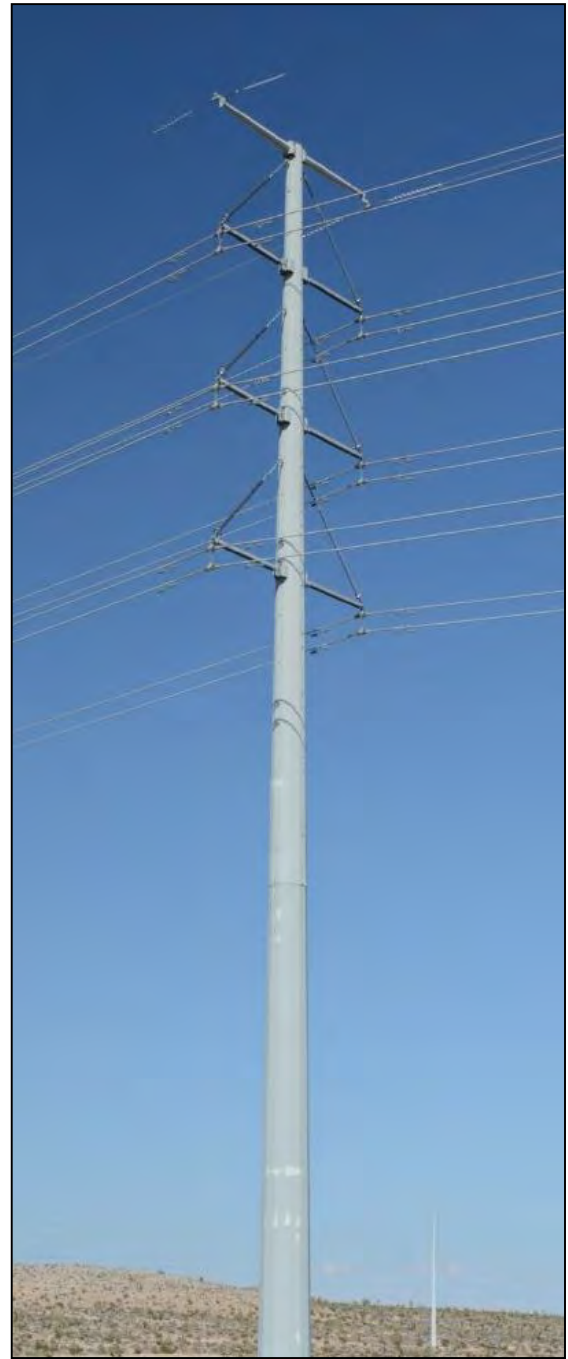
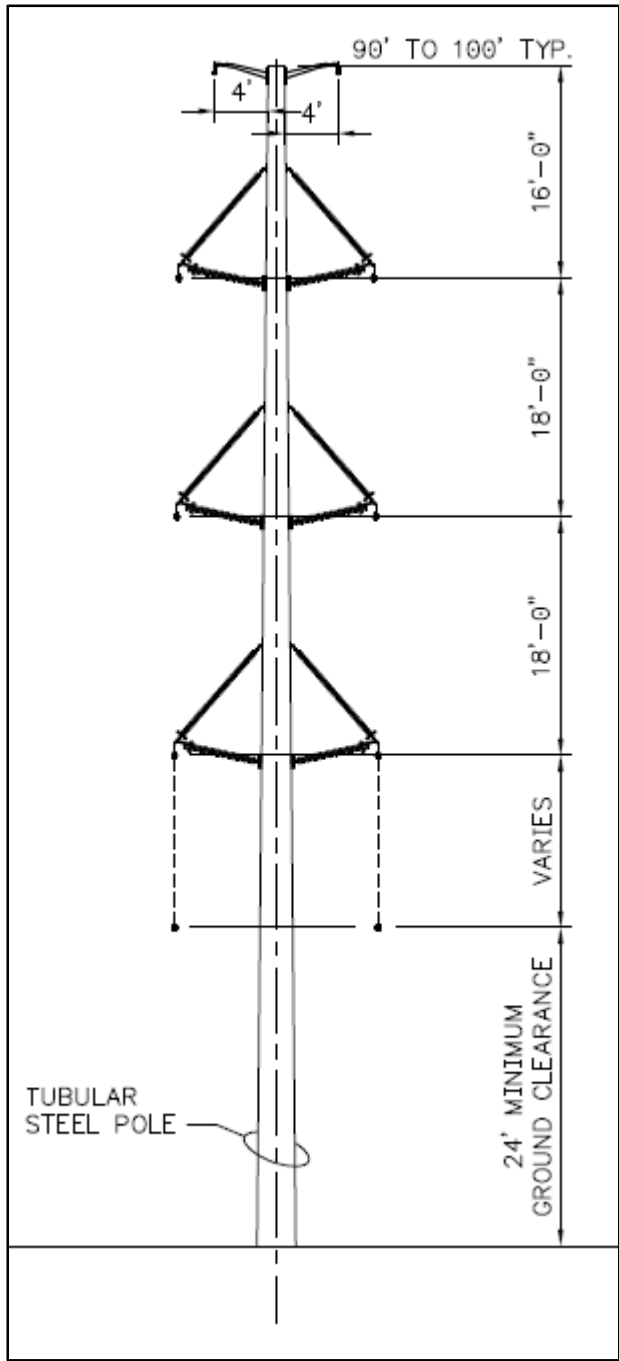
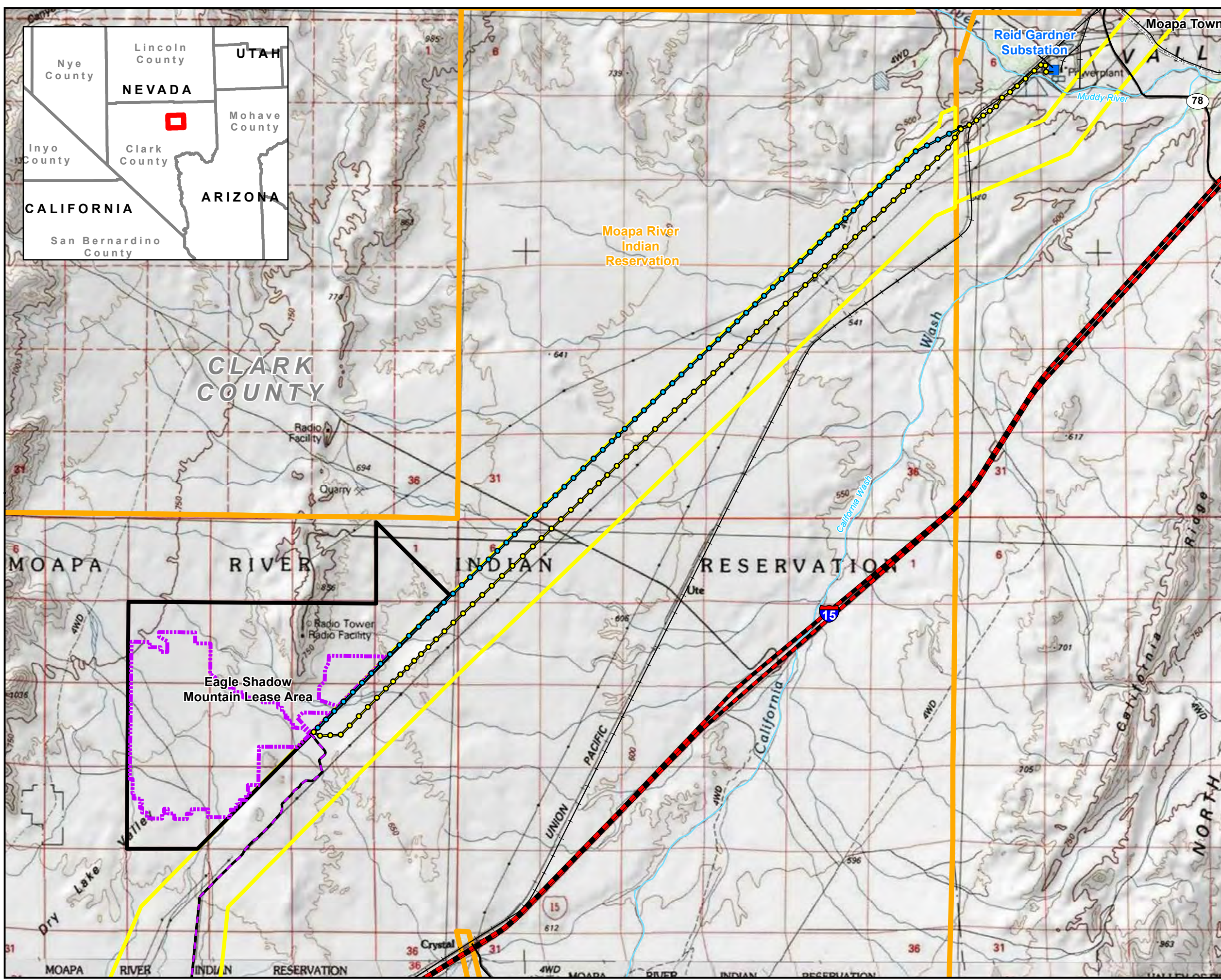


Figure 2-6
 Typical Gen-Tie Transmission Structure



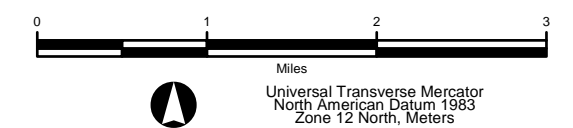
Legend

Project Components

- ESM Gen-Tie - Proposed
- ESM Gen-Tie - Alternative
- Solar Facility Access Road
- Eagle Shadow Mountain Project Area
- Eagle Shadow Mountain Fence Line

General Features

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

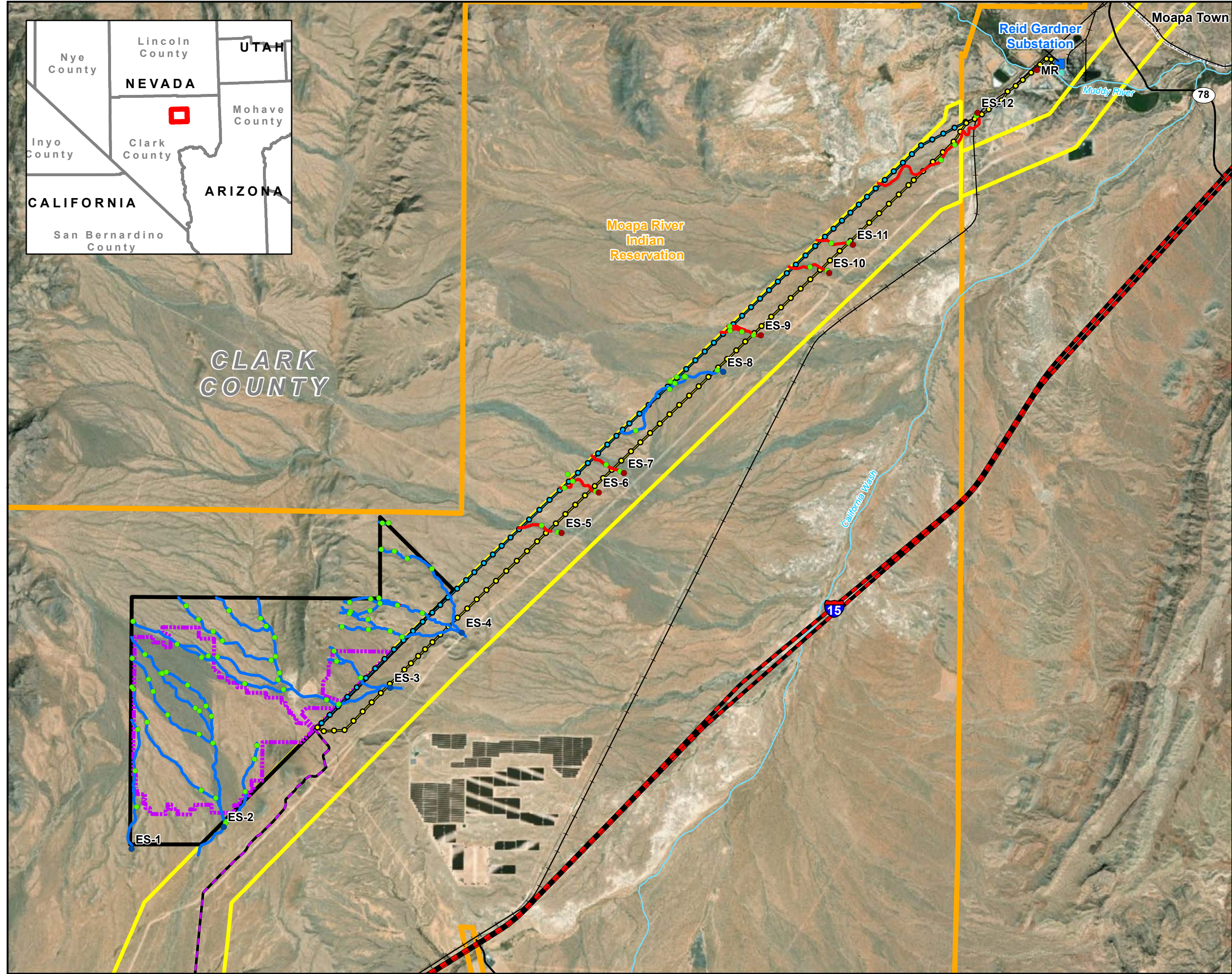


Eagle Shadow Mountain Solar Project

Figure 3-1
Topography of Project Area

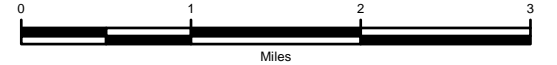
Map Extent: Clark County, Nevada

Date: 06-07-19	Author: mc
G:\ESM\MXD's\Project Location_060719.mxd	



Legend

- Project Components**
- ESM Gen-Tie - Proposed
 - ESM Gen-Tie - Alternative
 - Solar Facility Access Road
 - Eagle Shadow Mountain Project Area
 - Eagle Shadow Mountain Fence Line
- General Features**
- Existing Substation
 - Interstate
 - Major Highway
 - Railroad
 - Stream or River
 - Designated Utility Corridor
 - Municipal Boundary
- Vegetation Cover Types**
- JD Sample Points
 - Non-Jurisdictional Drainage Outfall
 - WOUS Jurisdictional Drainage Outfall
 - Non-Jurisdictional Drainage
 - WOUS Jurisdictional Drainage



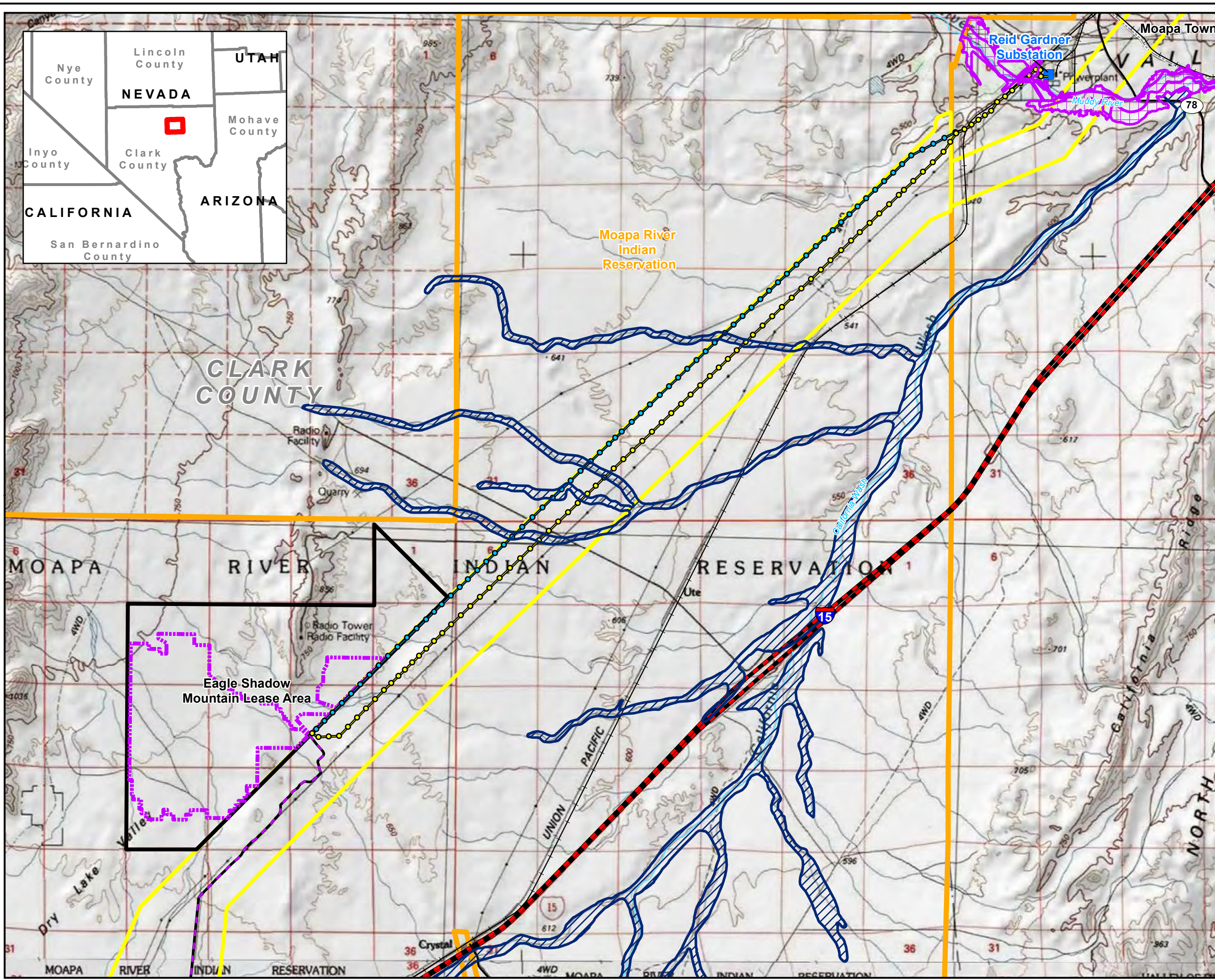
Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

Eagle Shadow Mountain Solar Project

Figure 3-2a
Ephemeral Drainages on the Solar Site Study Area and Along the Gen-tie Routes

Map Extent: Clark County, Nevada

Date: 06-07-19	Author: mrc
G:\ESM\MXD's\Project Location_060719.mxd	



Legend

Project Components

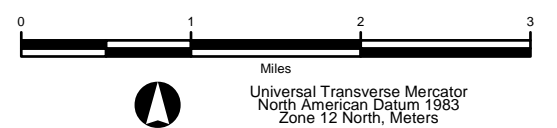
- ESM Gen-Tie - Proposed
- ESM Gen-Tie - Alternative
- Solar Facility Access Road
- Eagle Shadow Mountain Project Area
- Eagle Shadow Mountain Fence Line

General Features

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

FEMA Floodplain

- 100 Year Floodplain - Zone A
- 100 Year Floodplain - Zone AE



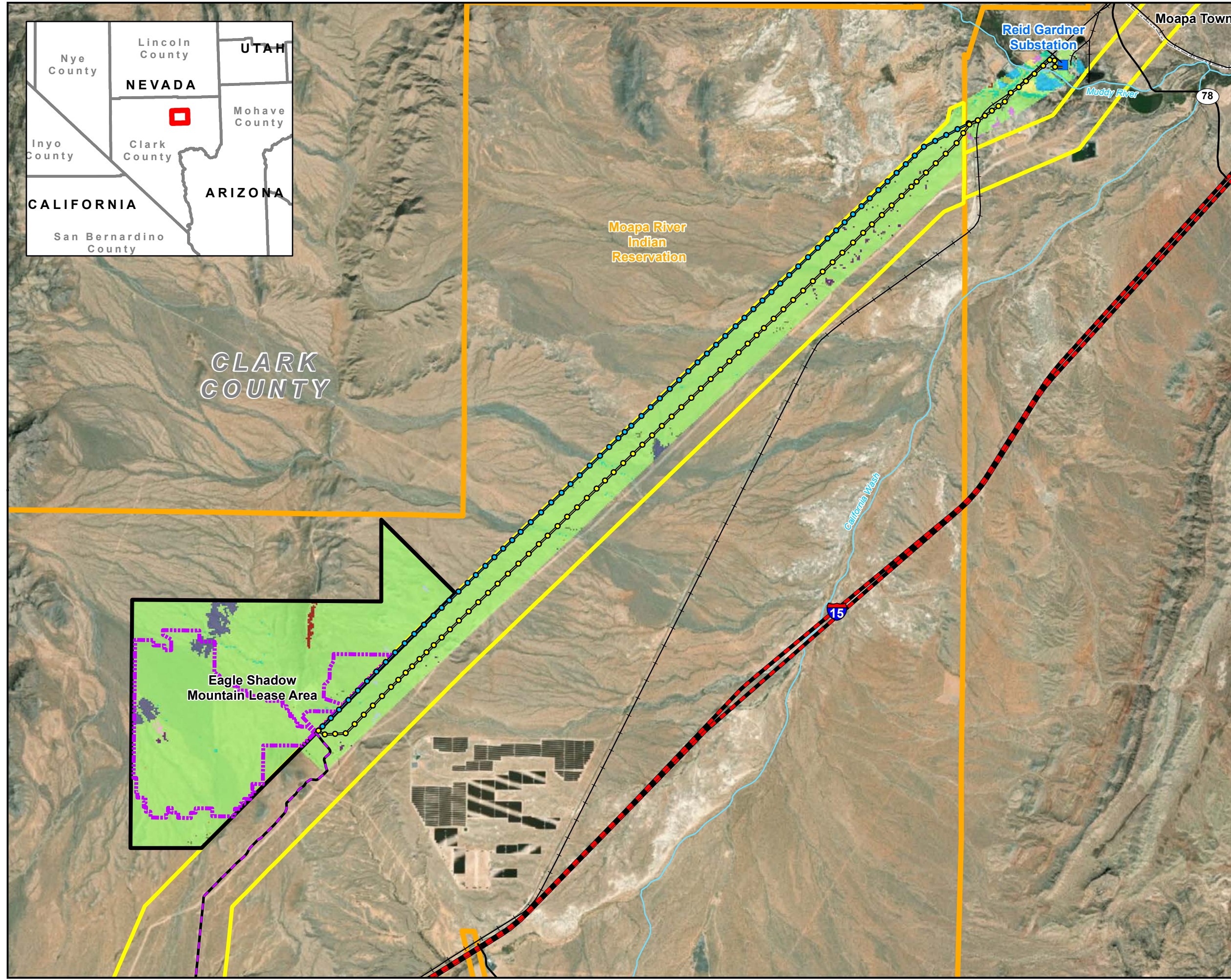
Eagle Shadow Mountain Solar Project

Figure 3-2b
Floodplains in Project Area

Map Extent: Clark County, Nevada

Date: 06-07-19 | Author: mc

G:\ESM\MXD's\Project Location_060719.mxd



Legend

- Project Components**
- ESM Gen-Tie - Proposed
 - ESM Gen-Tie - Alternative
 - Solar Facility Access Road
 - Eagle Shadow Mountain Project Area
 - Eagle Shadow Mountain Fence Line
- General Features**
- Existing Substation
 - Interstate
 - Major Highway
 - Railroad
 - Stream or River
 - Designated Utility Corridor
 - Municipal Boundary
- Vegetation Cover Types**
- Agriculture-Cultivated Crops and Irrigated Agriculture
 - Developed, Low Intensity
 - Developed, Medium Intensity
 - Developed, High Intensity
 - Developed, Open Space
 - Introduced Riparian Vegetation
 - Microphytic Playa Sparse Vegetation
 - North American Warm Desert Badland
 - North American Warm Desert Bedrock Cliff and Outcrop
 - North American Warm Desert Pavement
 - North American Warm Desert Riparian Mesquite Bosque
 - North American Warm Desert Riparian Systems
 - North American Warm Desert Sparsely Vegetated Systems
 - Open Water or Aquatic Vegetation
 - Sonora-Mojave Creosotebush-White Bursage Desert Scrub
 - Sonora-Mojave Mixed Salt Desert Scrub



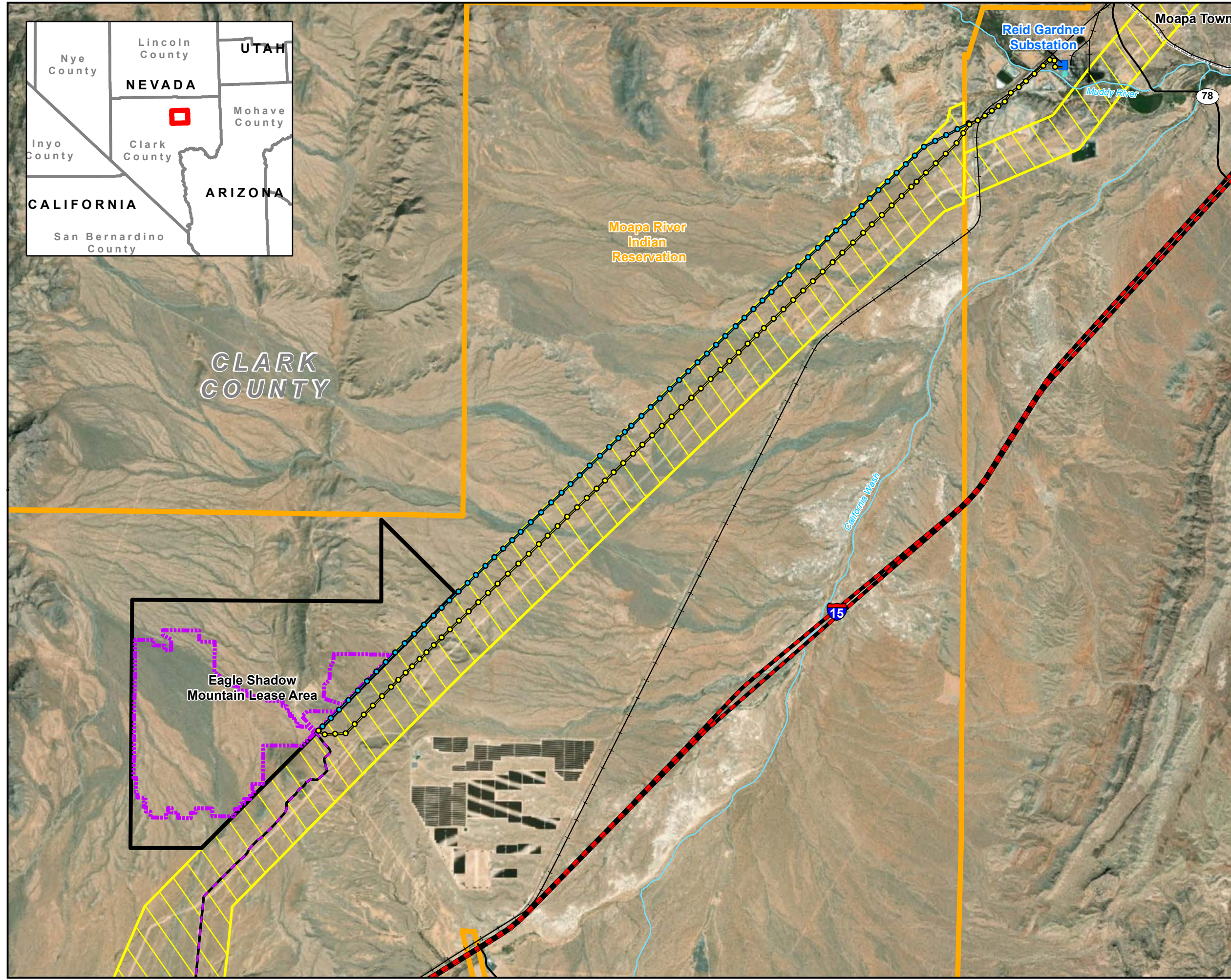
Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

Eagle Shadow Mountain Solar Project

Figure 3-3
Vegetative Cover Types
with the Project Area

Map Extent: Clark County, Nevada

Date: 06-07-19 Author: mnc
G:\ESM\MXD's\Project Location_060719.mxd



Legend

- Project Components**
- ESM Gen-Tie - Proposed
 - ESM Gen-Tie - Alternative
 - Solar Facility Access Road
 - Eagle Shadow Mountain Project Area
 - Eagle Shadow Mountain Fence Line
- General Features**
- Existing Substation
 - Interstate
 - Major Highway
 - Railroad
 - Stream or River
 - Designated Utility Corridor
 - Municipal Boundary



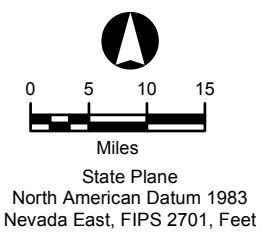
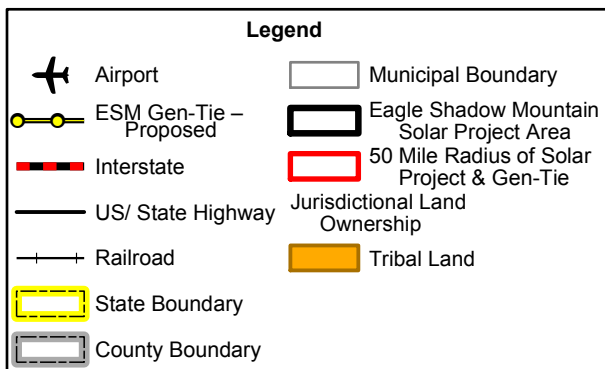
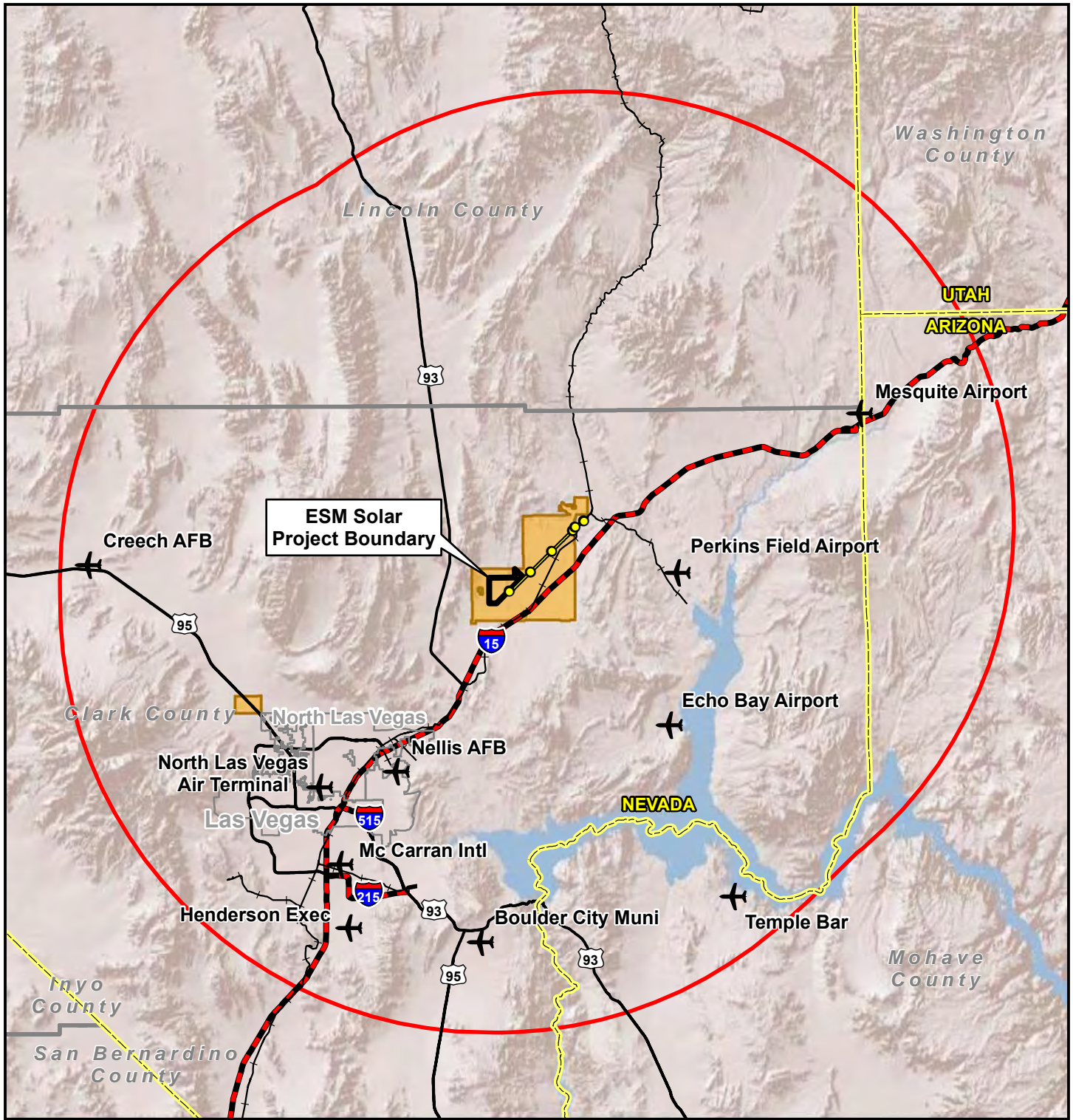
Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

**Eagle Shadow Mountain
Solar Project**

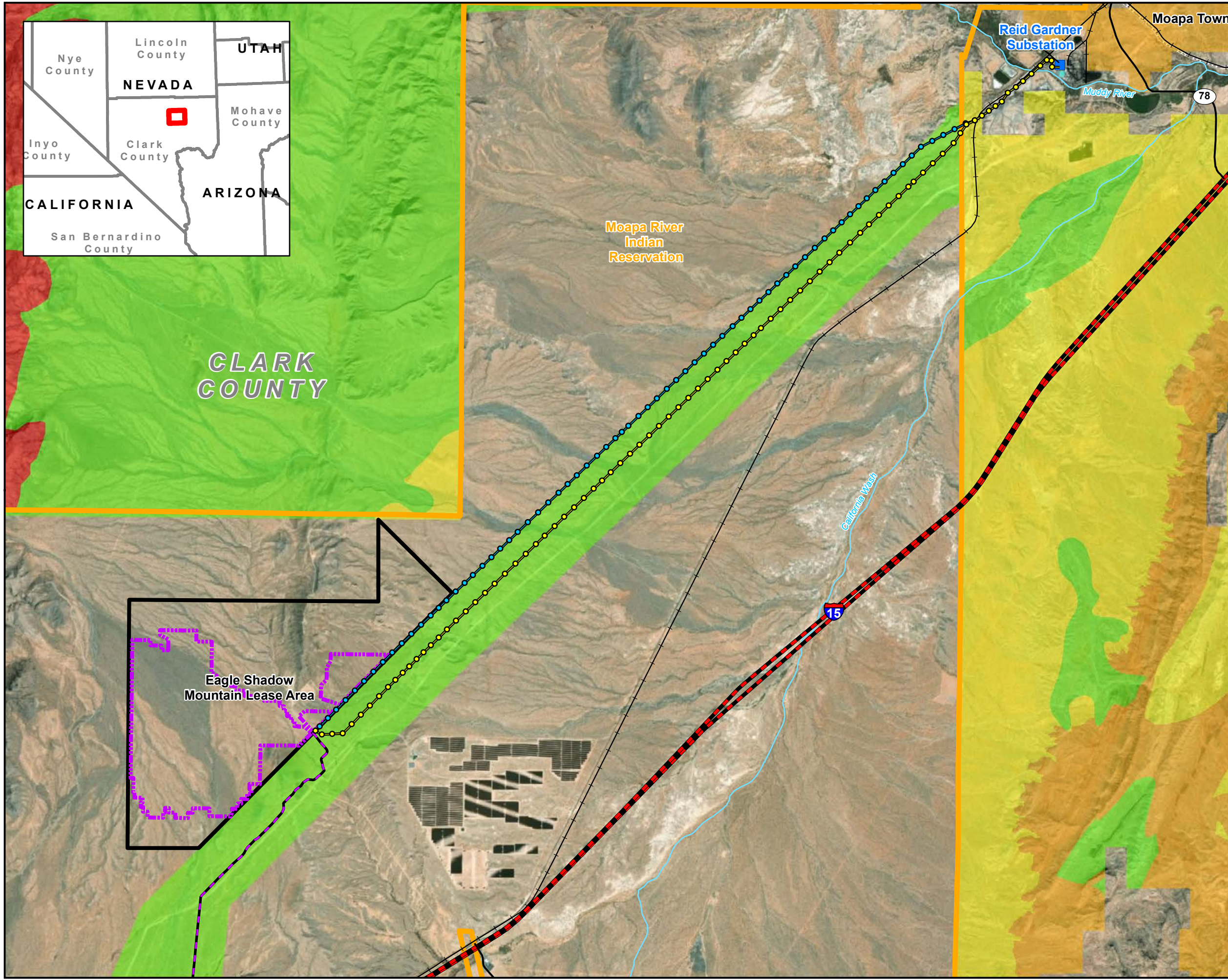
**Figure 3-4
Location of Designated
Utility Corridor**

Map Extent: Clark County, Nevada

Date: 06-07-19 Author: mrc
G:\ESM\MXD's\Project Location_060719.mxd



Eagle Shadow Mountain Solar Project		
Figure 3-5		
Airports in the Vicinity of the Project		
Map Extent: Clark County and Lincoln County, Nevada		
Date: 06-06-19		Author: mc
H:\ESM Solar\MXD's\Airports 8.5x11 060619.mxd		



Legend

- Project Components**
- ESM Gen-Tie - Proposed
- ESM Gen-Tie - Alternative
- Solar Facility Access Road
- Eagle Shadow Mountain Project Area
- Eagle Shadow Mountain Fence Line
- General Features**
- Existing Substation
- Interstate
- Major Highway
- Railroad
- Stream or River
- Municipal Boundary
- Visual Resource Inventory Classes**
- VRI Class I
- VRI Class II
- VRI Class III
- VRI Class IV



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

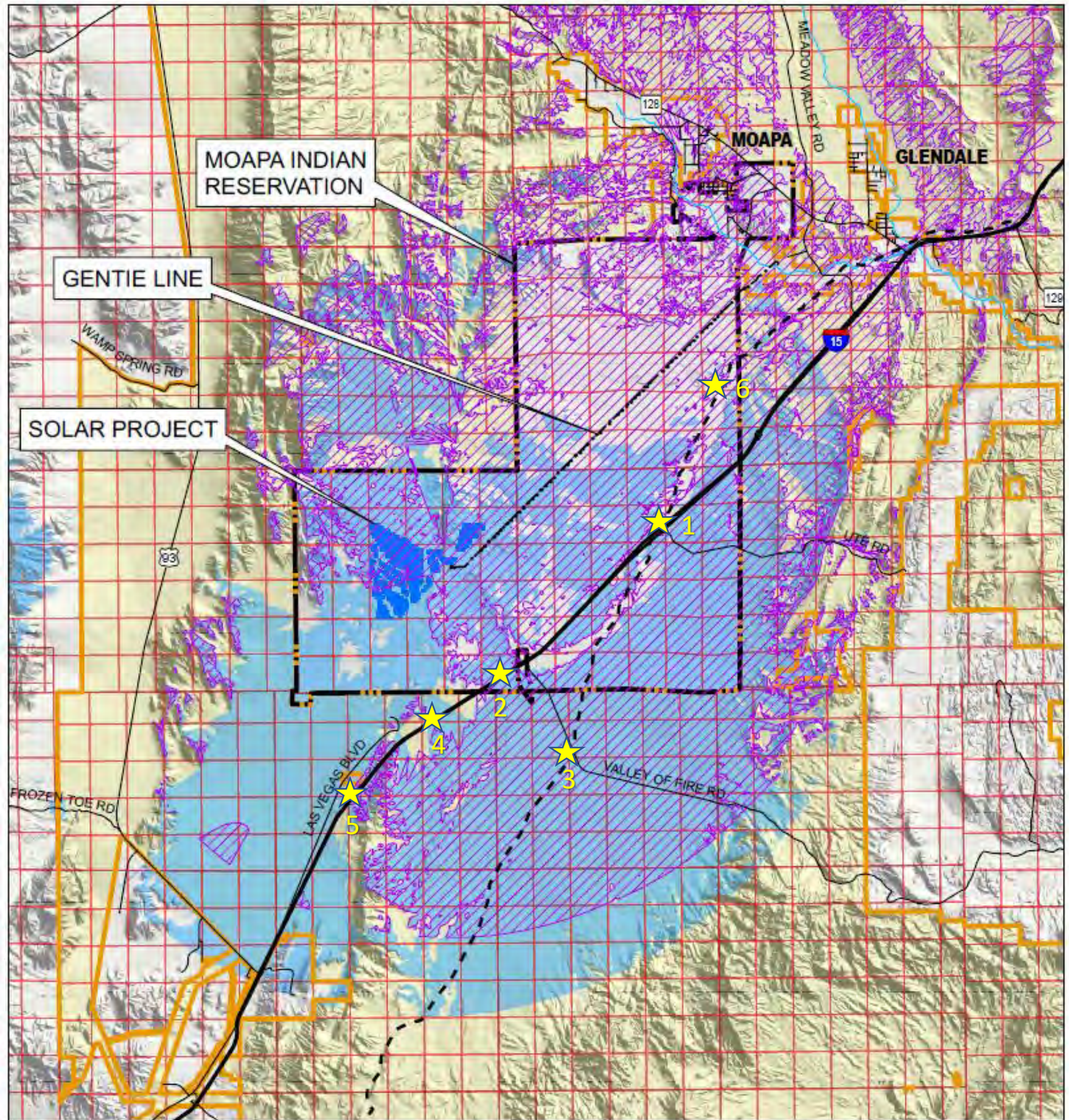
Eagle Shadow Mountain Solar Project

**Figure 3-6
VRM Cases on
BLM-administered Lands**

Map Extent: Clark County, Nevada

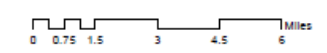
Date: 06-07-19 Author: mrc

G:\ESM\MXD's\Project Location_060719.mxd



Legend

- PROJECT_EXTENTS - 2,600 ACRES
- PROJECT VISIBILITY - 10 MILE RADIUS
- PROJECT GENTIE ROUTE - 12 MILES
- PROJECT GENTIE LINE VISIBILITY 10 MILE RADIUS
- RESERVATION BOUNDARY LINE
- FEDERAL BLM LAND
- OLD SPANISH TRAIL
- LOCAL ROADS/STREETS
- INTERSTATE HIGHWAY
- STREAMS
- SECTION LINES
- TOWNSHIP LINES
- KOP LOCATIONS



EAGLE SHADOW MOUNTAIN SOLAR PROJECT

Figure 3-7
Visibility Analysis and KOP Locations



Figure 3-8

Existing View from KOP 1

Looking West from Point where I-15 and the OSNHT intersect about 5.2 miles East of Solar Site



Figure 3-9
Existing View from KOP 2
Looking Northwest from I-15 about 3.2 miles Southeast of Solar Site



Figure 3-10

Existing View from KOP 3

Looking West from Point where the OSNHT crosses the Valley of Fire Road about 6.2 miles Southeast of Solar Site

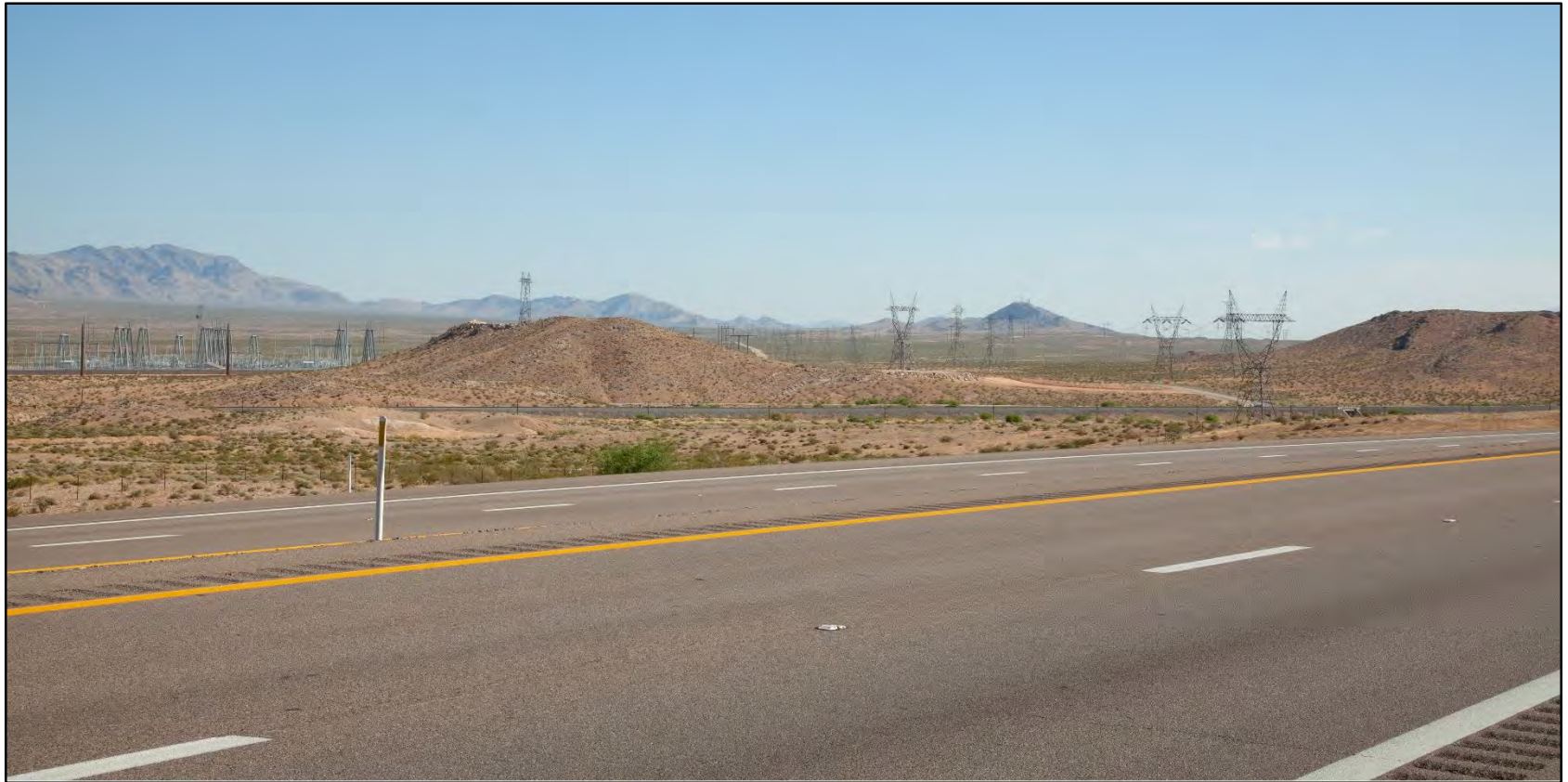


Figure 3-11
Existing View from KOP 4
Looking North from I-15 about 3.6 miles South of Solar Site



Figure 3-12
Existing View from KOP 5
Looking North from I-15 about 5.2 miles South of Solar Site



Figure 3-13

Existing View from KOP 6

Looking West from Point on the OSNHT about 1.3 miles East of Gen-Tie within Utility Corridor



Figure 3-14

Visual Simulation from KOP 1

Looking West from Point where I-15 and the OSNHT intersect about 5.2 miles East of Solar Site



Figure 3-15
Visual Simulation from KOP 2
Looking Northwest from I-15 about 3.2 miles Southeast of Solar Site



Figure 3-16

Visual Simulation from KOP 3

Looking West from Point where the OSNHT crosses the Valley of Fire Road about 6.2 miles Southeast of Solar Site

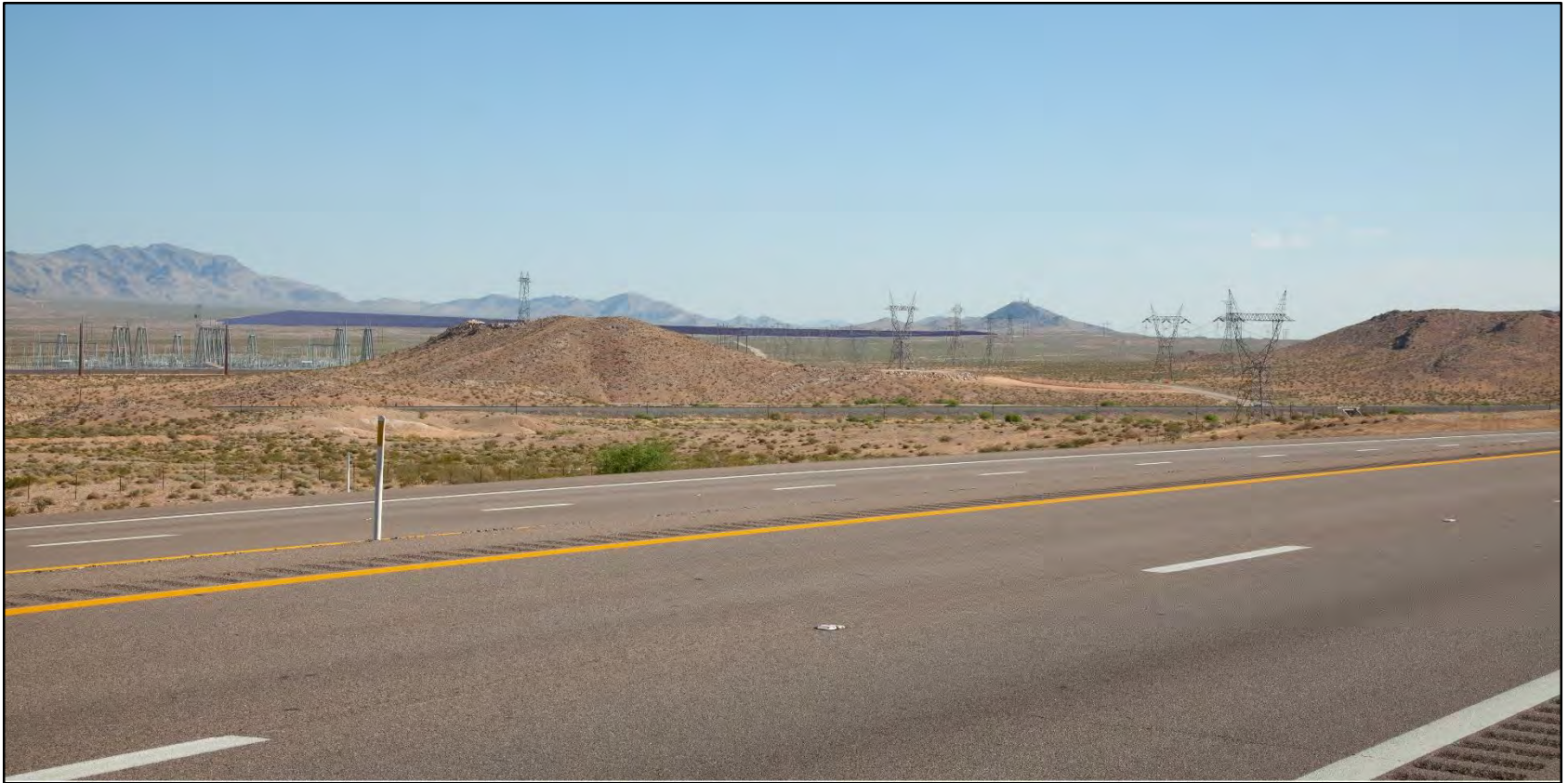


Figure 3-17
Visual Simulation from KOP 4
Looking North from I-15 about 3.6 miles South of Solar Site



Figure 3-18
Visual Simulation from KOP 5
Looking North from I-15 about 5.2 miles South of Solar Site



Figure 3-19

Visual Simulation from KOP 6

Looking West from Point on the OSNHT about 1.3 miles East of Gen-Tie within Utility Corridor

Appendix B

Scoping Report



**EAGLE SHADOW MOUNTAIN SOLAR PROJECT
ENVIRONMENTAL IMPACT STATEMENT**

SCOPING REPORT

Prepared for:

Bureau of Indian Affairs
Western Regional Office
2600 North Central Avenue
Phoenix, AZ 85004

April 2019

TABLE OF CONTENTS

1.0	INTRODUCTION	1
	PROJECT DESCRIPTION.....	1
2.0	SCOPING PROCESS AND SOLICITATION OF COMMENTS	2
	FEDERAL REGISTER.....	2
	PROJECT WEBSITE	2
	SCOPING NOTIFICATION LETTER.....	2
	NEWSPAPER ADVERTISEMENTS	2
	METHODS FOR SUBMITTING COMMENTS.....	3
3.0	PUBLIC SCOPING MEETINGS	4
	HAND-OUTS	4
	PRESENTATION	4
	INFORMATION STATIONS	5
4.0	COMMENT EVALUATION	6
	COMMENTS RECEIVED.....	6
	PROCESSING COMMENTS.....	6
	SUMMARIZATION	6
5.0	ISSUES SUMMARY	7
6.0	NEXT STEPS	8

APPENDICES

- APPENDIX A – NOTICE OF INTENT
- APPENDIX B – SCOPING NOTIFICATIONS
- APPENDIX C – MEETING MATERIALS
- APPENDIX D – COMMENTS RECEIVED

1.0 INTRODUCTION

The Bureau of Indian Affairs (BIA) is the lead Federal agency responsible for the National Environmental Policy Act (NEPA) process for the proposed Eagle Shadow Mountain Solar Project (Project). Additionally, BIA is the lead Federal agency coordinating and assuring compliance with the Endangered Species Act (ESA) and the National Historic Preservation Act (NHPA). The Moapa Band of Paiute Indians (Moapa Band), Bureau of Land Management (BLM), U.S. Environmental Protection Agency (EPA), U.S. Air Force, U.S. Fish and Wildlife Service (USFWS), and Nevada Department of Wildlife (NDOW) are cooperating agencies for the Environmental Impact Study (EIS). Collectively, these agencies intend to prepare an Environmental Impact Statement (EIS) for the proposed Eagle Shadow Mountain Solar Project located on the Moapa River Indian Reservation (Reservation) in Clark County, Nevada.

The NEPA scoping process is designed to encourage involvement by all interested parties and to help agencies make better-informed decisions. This report summarizes all comments received during the scoping period for the EIS. The BIA and cooperating agencies will fully analyze the issues raised by these scoping comments to help shape the environmental analysis and alternatives to be considered in the Draft EIS.

The purpose of this report is to summarize issues raised by individuals, organizations and agencies during the scoping comment period for this project. This report also describes methods used for soliciting input, as well as how comments received were categorized by resource topic. A copy of each individual comment received is contained in Appendix E of this report.

PROJECT DESCRIPTION

325MK 8me, LLC (a 8minuteenergy) has entered into an agreement with the Moapa Band of Paiute Indians (Moapa Band) to lease land, up to 50 years, on the Moapa River Indian Reservation (Reservation) to construct and operate an up-to 300 megawatt (MW) alternating current solar photovoltaic (PV) electricity generation facility on up to 2,300 acres located entirely on the Reservation and specifically on lands held in trust by the Bureau of Indian Affairs (BIA) for the Moapa Band. The proposed project would be located west of I-15 and east of U.S. Highway 93, about 30 miles northeast of Las Vegas in Clark County.

Project infrastructure would include a 230 kilovolt (kV) electric transmission line (gen-tie) that would interconnect the solar generation facility to the electrical grid at or near the existing Reid-Gardner Substation. The proposed gen-tie line would be located on Tribal lands, Federal lands administered and managed by the Bureau of Land Management (BLM), and private lands. Together, the proposed solar energy facility, transmission line, and other associated facilities will make up the proposed solar project.

2.0 SCOPING PROCESS AND SOLICITATION OF COMMENTS

During the scoping period, the BIA informed the public, landowners, Government agencies, tribes and interested stakeholders about the proposed Eagle Shadow Mountain Solar Project and solicited their comments.

The BIA announced the project and scoping process, held public scoping meetings, and invited the public to comment and ask questions. The project and public scoping meetings were publicized in the Federal Register, on the project website, in letters mailed to interested stakeholders, and through public notices/news releases published in local newspapers. These outreach and notification activities are described in more detail in the following subsections.

FEDERAL REGISTER

The public scoping period officially began with the publication of the Notice of Intent (NOI) to prepare an EIS, which described the project, announced the public scoping meetings, and outlined the ways to provide comments for the Eagle Shadow Mountain Solar Project. The NOI was published in the Federal Register on February 4, 2019 and can be found in **Appendix A**.

PROJECT WEBSITE

A project website was established for access by anyone at any time during the EIS process. It provides project information and an opportunity to submit comments. The website will remain active for the duration of the EIS process and can be accessed at <http://www.ESMSolarEIS.com>.

SCOPING NOTIFICATION LETTER

Scoping notification letters were sent by the BIA to Government agencies, elected officials, property owners near the proposed project, various non-Governmental organizations, and other interested stakeholders. The scoping letter briefly explained the project, identified the Federal review process, announced the public scoping meetings, and described the various ways to provide comments. Included with the scoping notification letter were two maps displaying the project location and project area.

Over 70 scoping letters and maps were mailed on February 12, 2019. The scoping letter, maps and the project mailing list can be found in **Appendix B**.

NEWSPAPER ADVERTISEMENTS

A legal notice/public notice announcing the public scoping meetings was published in two local newspapers on February 17, 20, 24 and 27, 2019. The publications included:

- Las Vegas Review Journal
- Moapa Valley Progress

Copies of the published legal notices/public notices can be viewed in **Appendix B**.

METHODS FOR SUBMITTING COMMENTS

The BIA encouraged interested parties to submit comments through a variety of methods:

Individual letters could be hand delivered or mailed via the U.S. Postal Service to Mr. Chip Lewis, Regional Environmental Protection Officer, BIA Western Regional Office, 2600 North Central Avenue, 4th Floor Mailroom, Phoenix, AZ 85004.

Comments could be submitted on the “Getting involved” tab on the project website via the “Submit Your Comment Here” comment form at <http://www.ESMSolarEIS.com> .

Comments could be provided via email to Mr. Chip Lewis at chip.lewis@bia.gov.

Comments could be provided at the public scoping meetings either orally or by filling out a comment form provided at the meetings (that could be handed in at the meeting or mailed in at a later date). A copy of the comment form is provided in **Appendix C**. See below for the details of the scoping meetings.

3.0 PUBLIC SCOPING MEETINGS

The BIA hosted two public information and scoping meetings – one on the Moapa River Indian Reservation and the other in Las Vegas at the Painted Desert Golf Club. These meetings provided a description of the NEPA process, information on the proposed project, and the opportunity to provide public comments. The two public scoping meetings were held at the times and locations listed below.

Meeting Date and Time	City/State/Zip Code	Address	Attendance
March 5, 2019, 5:30PM to 7:30PM	Moapa, NV 89025-0340	Moapa River Indian Reservation Tribal Hall One Lincoln Street	34*
March 6, 2019, 5:30PM to 7:30PM	Las Vegas, NV 89149	Painted Desert Golf Club 5555 Painted Mirage Road North	10*
Total Attendance			44

**Note: These attendance numbers include individuals from BIA, BLM and 8Minuteenergy.*

The public scoping meetings were conducted as a combination of open house and formal presentation. Attendees were greeted at the entrance and asked to sign in. Handouts were available and posters were on display that described the project and NEPA process. Attendees were able to ask questions to the agency and project representatives during the presentation and before/after while viewing posters.

HAND-OUTS

The following handouts were available at the public meetings:

- Two-page Eagle Shadow Mountain Solar Project fact sheet with project area and project location maps
- Comment form

Copies of the handouts available at the meetings can be found in **Appendix C**.

PRESENTATION

At approximately 5:30 pm, a formal presentation was provided followed by time for questions and answers and ending with an open house. Both scoping meetings followed the same agenda.

Each program opened with a welcome and introductions by Mr. Chip Lewis, acting Environmental Protection Officer for the Bureau of Indian Affairs, and project manager for the Eagle Shadow Mountain Solar Project EIS. Ms. Vickie Simmons, Chairwoman of the Moapa Band of Paiute Indians, offered opening remarks at the meeting on the Reservation introducing the Council members and welcoming all visitors. Ms. Simmons also asked everyone in the room to introduce themselves. Mr. Lewis introduced Mr. Jim Williams, the Superintendent for the BIA Southern Paiute agency who welcomed attendees. Next, Mr. Lewis provided an overview of the NEPA process followed by Randy Schroeder of ENValue (the project EIS consultant team) who presented the proposed project with an overview of the technical

aspects and a summary of the environmental issues identified to date. Following the presentation, attendees were invited to provide verbal comments or ask questions about the proposed project.

A court reporter was present at both meetings to record the presentation and the public comments expressed. The scoping meeting presentation and transcripts are provided in **Appendix C**.

INFORMATION STATIONS

Both public meetings included the following posters/ stations arranged around the room:

- Proposed Action
- EIS Process/Schedule
- How to Participate
- Project Location
- Proposed Project Area
- Project Components
- Potentially Impacted Resources

Display boards presented at these stations are included in **Appendix C**.

4.0 COMMENT EVALUATION

COMMENTS RECEIVED

The scoping period began on February 4, 2019, the date the NOI was published in the Federal Register. In addition to comments received at the two scoping meetings and an interagency meeting, there were 6 comment letters/forms received through a variety of means (see “Methods for Submitting Comments” for more details). All comments were reviewed and categorized and are contained in **Appendix D**.

PROCESSING COMMENTS

Each comment letter was read to identify key issues. Commenter contact information and comments were recorded.

SUMMARIZATION

This report summarizes issue areas identified from the scoping comments received. For the purposes of this summary, all comments were given equal weight, regardless of whether they were mentioned once or mentioned several times. This report does not prioritize issue areas or track the number of comments each issue category received. The identified issues and areas of concern will be used to guide the environmental analysis for the EIS.

5.0 ISSUE SUMMARY

This section provides a summary of the key issues identified by the comments provided during scoping for the Eagle Shadow Mountain Solar Project. These issues will be addressed in 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 source of the water to be used during construction and operation
Soils	Should include measures to minimize 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	Configure the project layout to avoid or minimize potentials effects to significant cultural sites in the lease area
	Determine whether the project could impact the Old Spanish National Historic Trail
Land / Resource Use	Need to evaluate the potential impact of development of the Project and associated linear facilities on other existing and planned transmission and pipeline facilities within the designated utility corridor
	Consider the impact of precluding other uses by the Band and its members on these lands for the duration of the Project
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
	Describe the potential impacts to avian species from construction and operation of the project
Visual Resources	Evaluate the impact the project could have on views of the landscape
Air Quality	Measures should be implemented to control and minimize fugitive dust
Cumulative Impacts	Identify impacts from other solar projects and other developments in the area
	Discuss trends of and cumulative impacts to key resources including desert tortoise and desert washes

6.0 NEXT STEPS

The BIA will develop the Draft EIS (DEIS) focusing on the identified issues including evaluating a range of reasonable alternatives, assessing potential impacts, and identifying possible mitigation measures.

Once complete, the BIA will publicly circulate the Draft EIS for review and comment. During this period, the BIA will notify the public of the DEIS availability via a Notice of Availability (NOA) published in the Federal Register and public notices in the local papers. There will also be another round of public meetings.

Any public or stakeholder comments received on the Draft EIS will be addressed in the Final EIS (FEIS). The availability of the FEIS will also be announced via an NOA published in the Federal Register and public notices in the local papers.

The BIA anticipates providing periodic status updates as needed and publishing all project documents on the project website at www.ESMSolarEIS.com.

Appendix A

Notice of Intent

products for customs purposes, in accordance with the provisions of 19 CFR 151.12 and 19 CFR 151.13.
 Intertek USA, Inc. (Texas City, TX) is approved for the following gauging procedures for petroleum and certain petroleum products from the American Petroleum Institute (API):

API chapters	Title
3	Tank gauging.
7	Temperature determination.
8	Sampling.
12	Calculations.
17	Maritime measurement.

Intertek USA, Inc. (Texas City, TX) is accredited for the following laboratory analysis procedures and methods for petroleum and certain petroleum products set forth by the U.S. Customs and Border Protection Laboratory Methods (CBPL) and American Society for Testing and Materials (ASTM):

CBPL No.	ASTM	Title
27-01	D287	Standard Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method).
27-02	D1298	Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method.
27-03	D4006	Standard Test Method for Water in Crude Oil by Distillation.
27-04	D95	Standard Test Method for Water in Petroleum Products and Bituminous Materials by Distillation.
27-05	D4928	Standard Test Method for Water in Crude Oils by Coulometric Karl Fischer Titration.
27-06	D473	Standard Test Method for Sediment in Crude Oils and Fuel Oils by the Extraction Method.
27-07	D4807	Standard Test Method for Sediment in Crude Oil by Membrane Filtration.
27-08	D86	Standard Test Method for Distillation of Petroleum Products.
27-11	D445	Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids.
27-13	D4294	Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy-Dispersive X-ray Fluorescence Spectrometry.
27-46	D5002	Standard Test Method for Density and Relative Density of Crude Oils by Digital Density Analyzer.
27-48	D4052	Standard Test Method for Density and Relative Density of Liquids by Digital Density Meter.
27-50	D93	Standard Test Methods for Flash-Point by Pensky-Martens Closed Cup Tester.
27-53	D2709	Standard Test Method for Water and Sediment in Middle Distillate Fuels by Centrifuge.
27-54	D1796	Standard Test Method for Water and Sediment in Fuel Oils by the Centrifuge Method.
	D70	Density of Semi-solid Bituminous Materials (Pycnometer method).
	D97	Standard Test Method for Pour Point of Petroleum Products.
	D4007	Standard Test Method for Water and Sediment in Crude Oil by the Centrifuge Method (Laboratory Procedure).

Anyone wishing to employ this entity to conduct laboratory analyses and gauger services should request and receive written assurances from the entity that it is accredited or approved by the U.S. Customs and Border Protection to conduct the specific test or gauger service requested. Alternatively, inquiries regarding the specific test or gauger service this entity is accredited or approved to perform may be directed to the U.S. Customs and Border Protection by calling (202) 344-1060. The inquiry may also be sent to CBPGaugersLabs@cbp.dhs.gov. Please reference the website listed below for a complete listing of CBP approved gaugers and accredited laboratories. <http://www.cbp.gov/about/labs-scientific/commercial-gaugers-and-laboratories>.

Dated: January 11, 2019.

Patricia Hawes Coleman,
 Acting Executive Director, Laboratories and Scientific Services.

[FR Doc. 2019-00915 Filed 2-1-19; 8:45 am]

BILLING CODE 9111-14-P

DEPARTMENT OF THE INTERIOR

Bureau of Indian Affairs

[190A2100DD/AAKC001030/
 A0A501010.999900253G]

Notice of Intent To Prepare an Environmental Impact Statement for the Eagle Shadow Mountain Solar Project on the Moapa River Indian Reservation, Clark County, Nevada

AGENCY: Bureau of Indian Affairs, Interior.

ACTION: Notice of intent.

SUMMARY: The Bureau of Indian Affairs (BIA), as lead agency in cooperation with the Moapa Band of Paiute Indians (Moapa Band), the Bureau of Land Management (BLM), and other agencies, intend to prepare an Environmental Impact Statement (EIS) that will evaluate a photovoltaic (PV) solar energy generation project on the Moapa River Indian Reservation and a transmission line located on Tribal lands, Federal lands administered and managed by BLM, and land owned by NV Energy in Clark County, Nevada. This notice announces the beginning of the scoping process to solicit public comments and identify potential issues related to the EIS. It also announces that two public scoping meetings will be held in Nevada to identify potential issues, alternatives, and mitigation to be considered in the EIS.

DATES: Written comments on the scope of the EIS or implementation of the proposal must arrive by March 6, 2019. The dates and locations of the public scoping meetings will be published in the *Las Vegas Sun*, *Las Vegas Review-Journal*, and *Moapa Valley Progress* 15 days before the scoping meetings.

ADDRESSES: You may mail, email, or hand carry written comments to Mr. Chip Lewis, BIA Western Regional Office, 2600 North Central Avenue, 4th Floor Mailroom, Phoenix, Arizona 85004; telephone: (602) 379-6750; email: Chip.Lewis@bia.gov.

SUPPLEMENTARY INFORMATION: The proposed Federal action, taken under 25 U.S.C. 415, is BIA's approval of a solar energy ground lease and associated agreements entered into by the Moapa Band with 325MK 8me LLC (Applicant), a subsidiary of 8minutenergy. The agreements provide for construction, operation and maintenance (O&M), and decommissioning of a 300-megawatt (MW) alternating current solar photovoltaic (PV) electricity generation facility located entirely on the Moapa River Indian Reservation and specifically on lands held in trust by BIA for the Moapa Band. A proposed 230 kilovolt (kV) generation-tie transmission line required for interconnection of the solar project would be located on Tribal lands, Federal lands administered and managed by BLM, and private lands.

The BIA and BLM would approve rights-of-way (ROWs) authorizing the construction and operation of the transmission line. Together, the proposed solar energy facility, transmission line, and other associated facilities will make up the proposed solar project (Project).

The Project would be constructed on up to 2,300 acres located within a 4,770-acre lease area in Township 16 South, Range 64 East that includes all or parts of Sections 9, 10, 11, 12, 14, 15, 16, 21, and 22 Mount Diablo Meridian, Nevada. Access to the Project would be provided by I-15, US-93, and North Las Vegas Boulevard. The overhead 230kV generation-tie transmission line would be approximately 10 miles long and would connect the solar project to NV Energy's Reid-Gardner 230kV substation.

Construction of the Project is expected to take approximately 16 to 18 months. The Applicant is expected to operate the energy facility for up to 50 years under the terms of the lease. The Project is expected to be built in one phase of 300 MW to meet an existing Power Purchase Agreement (PPA) for the output of the Project. Major onsite facilities include multiple blocks of solar PV panels mounted on fixed tilt or tracking systems, pad mounted inverters and transformers, collection lines, battery storage facilities, project substation, access roads, and O&M facilities. Water will be needed during construction for dust control and a minimal amount will be needed during operations for administrative and sanitary water use and possibly for panel washing. The water supply required for the Project would be leased from the Moapa Band.

The purposes of the proposed Project are, among other things, to: (1) Help to provide a long-term, diverse, and viable economic revenue base and job opportunities for the Moapa Band; (2) help Nevada and neighboring states to meet their State renewable energy needs; and (3) 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 Tribe.

BIA will prepare the EIS in cooperation with the Moapa Band, BLM, Environmental Protection Agency (EPA), US Air Force (USAF), and Nevada Department of Wildlife (NDOW) and possibly the U.S. Army Corps of Engineers. In addition, the U.S. Fish and Wildlife Service (USFWS) and National Park Service (NPS) will provide input on the analysis. The resulting EIS will aim to (1) provide agency decision makers, the Moapa Band, and the

general public with a comprehensive understanding of the impacts of the proposed Project and alternatives on the Reservation; (2) describe the cumulative impacts of increased development on the Reservation; and (3) identify and propose mitigation measures that would minimize or prevent significant adverse impacts. Consistent with these objectives, the EIS will analyze the proposed Project and appurtenant features, viable alternatives including generation-tie routing options, modified footprint alternatives, alternate routing for other Project ROWs, and the No Action alternative. Other alternatives may be identified in response to issues raised during the scoping process.

The EIS will provide a framework for BIA and BLM to make determinations and to decide whether to take the aforementioned Federal actions. In addition, BIA will use and coordinate the NEPA commenting process to satisfy its obligations under Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. 470f) as provided for in 36 CFR 800.2(d)(3). Native American Tribal consultations will be conducted in accordance with policy, and Tribal concerns will be given due consideration, including impacts on Indian trust assets. Other Federal agencies may rely on the EIS to make decisions under their authority and the Moapa Band may also use the EIS to make decisions under their Tribal Environmental Policy Ordinance. USFWS will review the EIS for consistency with the Endangered Species Act, as amended, and other implementing acts, and may rely on the EIS to support its decisions and opinions regarding the Project.

Issues to be addressed in the EIS analysis may include, but would not be limited to, Project impacts on water resources, biological resources, threatened and endangered species, cultural resources, Native American religious concerns, and aesthetics. In addition to those resource topics identified above, Federal, State, and local agencies, along with other stakeholders that may be interested or affected by the BIA's decision on the proposed Project, are invited to participate in the scoping process to identify additional issues to be addressed.

Submission of Public Comments

Please include your name, return address, and the caption "EIS, Eagle Shadow Mountain Solar Project," on the first page of any written comments. You may also submit comments at the public scoping meetings.

The public scoping meetings will be held to further describe the Project and identify potential issues and alternatives to be considered in the EIS. The first public scoping meeting will be held on the Reservation and the other public scoping meeting will be held in Las Vegas, Nevada. The dates of the public scoping meetings will be included in notices to be posted in the *Las Vegas Sun*, *Las Vegas Review-Journal*, and *Moapa Valley Progress* 15 days before the meetings.

Public Comment Availability

Comments, including names and addresses of respondents, will be available for public review at the mailing address shown in the **ADDRESSES** section during regular business hours, 8 a.m. to 4:30 p.m., Monday through Friday, except holidays. Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time.

Authority

This notice is published in accordance with 40 CFR 1501.7 of the Council of Environmental Quality regulations and 43 CFR 46.235 of the Department of the Interior Regulations implementing the procedural requirements of the NEPA (42 U.S.C. 4321 *et seq.*), and in accordance with the exercise of authority delegated to the Principal Deputy Assistant Secretary—Indian Affairs by part 209 of the Department Manual.

Dated: December 21, 2018.

Tara Sweeney,

Assistant Secretary—Indian Affairs.

[FR Doc. 2019-00899 Filed 2-1-19; 8:45 am]

BILLING CODE 4337-15-P

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[LLWY-957000-18-L13100000-PP0000]

Notice of Stay of Filing of Plat of Survey, Wyoming

AGENCY: Bureau of Land Management, Interior.

ACTION: Notice of stay of filing of plat of survey, Wyoming.

SUMMARY: The Bureau of Land Management (BLM) has placed a stay on the filing of a plat of survey of the following described land, pending consideration of the protest and/or appeal that was filed within 30 calendar

Appendix B

Scoping Notifications and Mailing List

Appendix B – Scoping Notifications and Mailing List

In addition to the NOI, the public was formed about the scoping period and public meetings by one or more of the following notifications:

- Public notification via U.S. Mail:
 - Mailing list
 - Scoping letter
 - Project overview maps
- Newspaper advertisements
 - Las Vegas Review Journal
 - Moapa Valley Progress

Scoping Letter



United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
Western Region
2600 N. Central Avenue, Fourth Floor Mailroom
Phoenix, AZ 85004-3050

DEPARTMENT OF THE INTERIOR
Bureau of Indian Affairs

Notice of Intent to Prepare an Environmental Impact Statement for the Proposed Eagle Shadow Mountain Solar Project on the Moapa River Indian Reservation, Clark County, NV

AGENCY: Bureau of Indian Affairs, Interior

ACTION: Notice

SUMMARY: The Bureau of Indian Affairs (BIA), as lead agency in cooperation with the Moapa Band of Paiute Indians (Moapa Band), the Bureau of Land Management (BLM), and other agencies, intend to prepare an Environmental Impact Statement (EIS) that will evaluate a photovoltaic (PV) solar energy generation project on the Moapa River Indian Reservation and a transmission line located on Tribal lands, Federal lands administered and managed by BLM, and land owned by NV Energy in Clark County, Nevada.

This notice announces the beginning of the scoping process to solicit public comments and identify potential issues related to the EIS. It also announces that two public scoping meetings will be held in Nevada to identify potential issues, alternatives, and mitigation to be considered in the EIS.

DATES: Written comments on the scope of the EIS or implementation of the proposal must arrive by March 6, 2019. The public scoping meeting on the Moapa River Indian Reservation will be held on March 5, 2019 and the public scoping meeting at the Painted Desert Golf Club in Las Vegas will be held on March 6, 2019.

ADDRESSES: You may mail, email, or hand carry written comments to Mr. Chip Lewis, BIA Western Regional Office, 2600 North Central Avenue, 4th Floor Mailroom, Phoenix, Arizona 85004; telephone: (602) 379-6750; email: Chip.Lewis@bia.gov.

Both public meetings will be held from 5:30 to 7:30 pm. The March 5th public scoping meeting will be held in the Tribal Hall on the Moapa River Indian Reservation, 1 Lincoln Street, Moapa, NV 89025. The March 6th public scoping meeting will be held at the Painted Desert Golf Club, 5555 Painted Mirage Road, Las Vegas, NV 89149. Each meeting is anticipated to last approximately two hours, with a presentation starting at 5:45 pm, and light refreshments provided.

SUPPLEMENTARY INFORMATION: The proposed Federal action, taken under 25 U.S.C. 415, is the BIA approval of a solar energy ground lease for approximately 2,300 acres and associated agreements entered into by the Moapa Band with 325MK 8me LLC (Applicant), a subsidiary of 8minutenergy, for the construction and operation of a 300 megawatt (MW) solar project using PV technology. The solar project would be located entirely on Moapa tribal lands. The project would also include an approximately 10-mile long electric transmission line that would cross Tribal lands, Federal lands administered by the BLM, and private lands owned by NVE to interconnect the project to the regional grid. The EIS will provide a framework for the BIA and the BLM to make determinations and take their respective federal actions. The federal action for the BIA would be to approve or deny a lease and any associated rights-of-way (ROW) on tribal lands for the proposed solar facility, and for the BIA and BLM to approve or deny grants of ROW for the proposed transmission line. Together, the proposed solar energy facility, transmission line, and other associated facilities will make up the proposed solar project (Project). The EPA may adopt the documentation to make decisions under their authority and the Moapa Band may also use the EIS to make decisions under their Tribal Environmental Policy Ordinance. The U.S. Fish and Wildlife Service will review the document for consistency with the Endangered Species Act, as amended and other implementing acts.

AUTHORITY: This notice is published in accordance with 40 CFR 1501.7 of the Council of Environmental Quality regulations and 43 CFR 46.235 of the Department of the Interior Regulations implementing the procedural requirements of the NEPA (42 U.S.C. 4321 et seq.), and in accordance with the exercise of authority delegated to the Principal Deputy Assistant Secretary-Indian Affairs by part 209 of the Department Manual.

Mr. Bryan Bowker
Director, Western Region
Bureau of Indian Affairs

Date: 2/12/19

Mailing List

First	Last	Title	Organization/Affiliation	Address 1	Address 2	City	State	Zip	Notes			
			Center for Biological Diversity	PO Box 710		Tucson	AZ	85702-0710				
			Center for Energy Efficiency and Renewable	1100 11th Street, Suite 311		Sacramento	CA	95814				
		Community Development	City of Mesquite	10 E. Mesquite Blvd.		Mesquite	NV	89027				
			Clark County Department of Comprehensive	Clark County Government Ce	500 South Grand Central Parkw	Las Vegas	NV	89155				
			Clark County Regional Flood Control District	600 South Grand Central Park	Suite 300	Las Vegas	NV	89106-4511				
			Conservation District of Southern Nevada	5820 South Pecos Road A-400		Las Vegas	NV	89120				
			Department of Air Quality and Environment	Clark County Desert Conserva	500 South Grand Central Parkw	Las Vegas	NV	89155-5201				
			Desert Tortoise Council	4654 East Avenue S	#257B	Palmdale	CA	93552				
			Environmental Defense Fund	1107 9th Street	Suite 1070	Sacramento	CA	95814				
Daniel	Shoemaker		Federal Aviation Administration	Air Traffic Airspace Branch, A	2601 Meacham Blvd.	Fort Worth	TX	76137-0520				
		President	Friends of Gold Butte	PO Box 3664		Mesquite	NV	89024				
			Friends of Nevada Wilderness	PO Box 33155		Las Vegas	NV	89133				
			FTV Comm C/O Level 3		1025 Eldorado Way	Broomfield	CO	80023				
			Great Basin Resource Watch	85 Keystone Avenue	#1	Reno	NV	89503				
			Great Basin Transmission, LLC	400 Chesterfield Center	Suite 110	St. Louis	MO	63017				
			Holly Energy Partners	P.O. Box 1260		Artesia	NM	88211				
			Intermountain Power Project	P.O. Box 111		Los Angeles	CA	90051				
			Kern River Gas Transmission Company	P.O. Box 71400		Salt Lake City	UT	84171				
		Attn: Real Estate Gr	KRoad Moapa Solar, LLC	c/o First Solar Electric, LLC	135 Main St. 6th Floor	San Francisco	CA	94105				
			Lahontan Audubon Society	Board of Trustees	P.O. Box 2304	Reno	NV	89505				
			Natural Resource Conservation Service	5820 South Pecos Road	Building A, Suite 400	Las Vegas	NV	89120				
			Natural Resources Defense Council	1314 Second Street		Santa Monica	CA	90401				
			Nellis Air Force Base	6020 Beale Ave	Suite 135	Nellis AFB	NV	89191				
			Nevada Clean Energy Campaign	250 Bell Street		Reno	NV	89503				
			Nevada Conservation League	2275 Renaissance Drive	Suite A	Las Vegas	NV	89128				
			Nevada Department of Air Quality and Envir	Clark County Government Ce	500 South Grand Central Parkw	Las Vegas	NV	89156				
			Nevada Department of Conservation and Na	Carson City	901 S. Stewart St., suite 1003	Carson City	NV	89701				
			Nevada Department of Transportation		1263 South Stewart Street	Carson City	NV	89712				
			Nevada Department of Wildlife	Southern Region	4747 Vegas Drive	Las Vegas	NV	89108				
			Nevada Division of Environmental Protection	901 South Stewart Street, Suite	4001	Carson City	NV	89701-5249				
			Nevada Energy	Environmental Department	PO Box 98910	Las Vegas	NV	89151-0001				
			Nevada Energy	Corporate Headquarters	6226 West Sahara Avenue	Las Vegas	NV	89146				
			Nevada Environmental Coalition, Inc	10720 Button Willow Drive		Las Vegas	NV	89134				
			Nevada Natural Heritage Program	901 South Stewart Street	Suite 5002	Carson City	NV	89701-5245				
			Nevada Natural Resource Education Council	PO Box 4741		Carson City	NV	89702-4741				
			Nevada Power Company		6226 West Sahara Avenue	Las Vegas	NV	89146				
			Nevada State Historic Preservation Office	100 North Stewart Street		Carson City	NV	89701-4285				
			Nevada Wilderness Project	Southern Nevada Office	7465 West Lake Mead Blvd Suit	Las Vegas	NV	89128				
			Nevada Wildlife Federation	PO Box 71238		Reno	NV	89570				
			NV Department of Transportation		1263 S. Stewart St	Carson City	NV	89712				
			NV Energy		P.O. Box 98910 MS # 9	Las Vegas	NV	89151				
			NV Power Company		P.O. Box 98910	Las Vegas	NV	89151				
		Conservation Comm	Red Rock Audubon Society	PO Box 96691		Las Vegas	NV	89193				
			Sierra Club	732 South 6th Street		Las Vegas	NV	89101-6948				
			Sierra Nevada Alliance	PO Box 7989		South Lake Tahoe	CA	96158				
			Sierra Pacific Power Company		P.O. Box 10100	Reno	NV	89520				
			Southern Nevada Water Authority	1001 S. Valley View Blvd		Las Vegas	NV	89153				
			The Conservation Alliance	PO Box 1275		Bend	OR	97709				
			The Nature Conservancy	1771 East Flamingo Road	Suite 104 A	Las Vegas	NV	89199				
The Honorable Dina	Titus	Nevada District 1	U S HOUSE OF REPRESENTATIVES	495 South Main Street	3rd Floor	Las Vegas	NV	89101				
The Honorable Steve	Horsford	Nevada District 4	U S HOUSE OF REPRESENTATIVES	2250 Las Vegas Blvd. North	Suite 500	Las Vegas	NV	89030				
The Honorable Susie	Lee	Nevada District 3	U S HOUSE OF REPRESENTATIVES	8872 S. Eastern Ave.	Suites 210 & 220	Las Vegas	NV	89123				
The Honorable Mark	Amodei	Nevada District 2	U S HOUSE OF REPRESENTATIVES	5310 Kietzke Lane	Suite 103	Reno	NV	89511				
The Honorable Dina	Titus	Nevada District 1	U S HOUSE OF REPRESENTATIVES	401 Cannon House Office Building		Washington	DC	20515				
The Honorable Steve	Horsford	Nevada District 4	U S HOUSE OF REPRESENTATIVES	1330 Longworth House Office Building		Washington	DC	25015				
The Honorable Susie	Lee	Nevada District 3	U S HOUSE OF REPRESENTATIVES	132 Cannon House Office Building		Washington	DC	20515				
The Honorable Mark	Amodei	Nevada District 2	U S HOUSE OF REPRESENTATIVES	222 Cannon House Office Building		Washington	DC	20515				

First	Last	Title	Organization/Affiliation	Address 1	Address 2	City	State	Zip	Notes			
			Union Pacific Railroad Company	1400 Douglas Street		Omaha	NE	68179				
The Honorable Cath	Masto	Senior Senator	UNITED STATES SENATE	333 Las Vegas Boulevard Sou	Suite 8016	Las Vegas	NV	89101				
The Honorable Jack	Rosen	Junior Senator	UNITED STATES SENATE	8930 West Sunset Road	Suite 230	Las Vegas	NV	89148				
The Honorable Cath	Masto	Senior Senator	UNITED STATES SENATE	204 Russell Senate Office Building		Washington	DC	20510				
The Honorable Jack	Rosen	Junior Senator	UNITED STATES SENATE	324 Hart Senate Office Building		Washington	DC	20510				
			US Army Corps of Engineers	St. George Regulatory Office	321 N Mall Drive, Suite L-101	St. George	UT	84790				
			Western Resource Advocates	204 North Minnesota Street	Suite A	Carson City	NV	89703				
			Friends of Nevada Wilderness	8180 Placid St.		Las Vegas	NV	89123				
Glenn	Shaw	Nevada Director	Old Spanish Trail Association	P.O.Box 68		Blue Diamond	NV	89004				
Lynn	Brittner	Executive Director	Old Spanish Trail Association	P.O.Box 909		Las Vegas	NM	87701				
Vicki	Felmlee	President	Old Spanish Trail Association	178 Glory View Drive		Grand Junction	CO	81503				

Newspaper Notices

AFFIDAVIT OF PUBLICATION

STATE OF NEVADA)
COUNTY OF CLARK) SS:

**ENVALUE LLC
2514 TOURNAMENT DR
CASTLE ROCK CO 80108**

**Account # 179051
Ad Number 0001034315**

Leslie McCormick, being 1st duly sworn, deposes and says: That she is the Legal Clerk for the Las Vegas Review-Journal and the Las Vegas Sun, daily newspapers regularly issued, published and circulated in the City of Las Vegas, County of Clark, State of Nevada, and that the advertisement, a true copy attached for, was continuously published in said Las Vegas Review-Journal and / or Las Vegas Sun in 2 edition(s) of said newspaper issued from 02/17/2019 to 02/24/2019, on the following days:

02 / 17 / 19
02 / 24 / 19

**Public Meeting
Announcement**

The U.S. Bureau of Indian Affairs (BIA) and the Moapa Band of Paiute Indians invite you to attend a scoping meeting to help identify the range and scope of issues related to the proposed Eagle Shadow Mountain Solar Project. The issues identified during the scoping process will be considered and addressed during preparation of the Environmental Impact Statement (EIS).

Please plan to attend one of the following meetings:

Tuesday, March 5, 2019
Moapa River Indian
Reservation Tribal Hall
One Lincoln Street, Moapa, NV
89025-0340

Wednesday, March 6, 2019
Painted Desert Golf Club
5555 Painted Mirage Road,
Las Vegas, NV 89149

Both meetings will be held between 5:30 pm and 7:30 pm with a brief presentation at 5:45 pm. Light refreshments will be served.

The proposed Eagle Shadow Mountain Solar Project will utilize photovoltaic (PV) technology and have a capacity of 300 MW. It will be located within the Moapa River Indian Reservation in Clark County, Nevada, west of Interstate 15 and approximately 40 miles northeast of Las Vegas. The project would also include an approximately 10-mile long electric transmission line that would cross Tribal lands, Federal lands administered by the BLM, and private lands owned by NV Energy to interconnect the project to the regional grid.

For more information on how to participate, contact:
Mr. Chip Lewis,
Regional Environmental
Protection Officer,
at Chip.Lewis@bia.gov
(602.379.6750) -or-
Mr. Randy Schroeder
at rschroeder@envalue.us.

PUB: February 17, 24, 2019
LV Review-Journal

[Signature]
/s/ _____
LEGAL ADVERTISEMENT REPRESENTATIVE

Subscribed and sworn to before me on this 25th day of February, 2019

Notary *[Signature]*



Moapa Valley PROGRESS

Laura Robison
Office Manager
PO BOX 430
Overton, NV 89040
Office: (702) 397-6246
Fax: (702) 397-6247
progress2@mvdsl.com

AFFIDAVIT OF PUBLICATION

State of Nevada, Clark County

- I, Laura R. Robison, Office Manager of the Moapa Valley Progress, a weekly newspaper published in Moapa Valley, Clark County, Nevada, being duly sworn hereby certify that the following advertisement appeared in the Moapa Valley Progress:

public meeting announcement
Eagle Shadow Mountain Solar Project
(ENValue LLC)

A copy of the above described advertising is hereon attached.
It was published in the Moapa Valley Progress on this date(s):

Feb 20, 2019 + Feb 27, 2019

Signed before a Notary Public:

Signature: Laura R Robison Date: 3-6-19

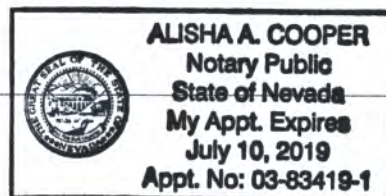
State of Nevada, County of Clark

This instrument was acknowledged before me Alisha A Cooper (notary public)

On 6 March 2019 (date) by Laura R. Robison (person signing

document)

Alisha A. Cooper
Notary Public Signature



Valentine's Day brings friends together

By CATHERINE ELLERTON

Moapa Valley Progress

February 14 was a gloomy day outside, but as visitors approached the Moapa Valley Recreation/Sr. Center the warmth of friendship, love and memories brightened the atmosphere as folks gathered in celebration of the holiday.

From Okotoks in Alberta, Canada, Gary and Tonia Bills have been coming south for eight years. They attended the dinner along with Bill Young from Panguitch Lake, Utah who came bearing chocolate strawberries for his good friend Deanna Wiley from Moapa Valley.

Wiley said a special of Valentine's Day was having good friends and being with them.

Sandie Buchholtz from Cheyenne, Wyoming and Neldon Lloyd from Sandy, Utah, agreed that Valentine's Day brought out memories and love in others.



Line dancers entertain diners at the Valentine's Day fundraiser dinner held by United Seniors, Inc at the Moapa Valley Recreation/Sr. Center last week.

As all anxiously awaited for dinner to be served, they were entertained by a western band made up of Lloyd and Carol Oster of Montana, Ken Brown from Wyoming, Lyle Lilienthal from Montana and Jason Ham from the Moapa Valley. These musicians entertain at local events and retirement homes.

MVHS National Honor So-

ciety members Katelyn Garlick, Daisy Parra and Ashlyn Western served a delicious meal of beef medallions, shrimp, salad, vegetables and garlic potatoes. Chef Raegan Whited said that her kitchen helpers were Jack and Nikki Bill that evening. She laughingly stated

that the dessert Raspberry Lemon Cake was a fast substitution, as she had no lemon pudding for the recipe so she used Jello instead.

Following dinner the Senior Center Line Dancers took to the to entertain guests. This group meets every Tuesday and Thursday from 9 to 11 a.m. to work on their routines. It is open to all and beginners meet at the 9 a.m. time.

One of the highly anticipated events during the evening was the drawing for gifts donated by local merchants. That evening the prizes that were drawn were from

The evening concluded with the band playing and Valentine's Day celebrants dancing - an evening of shared laughter and good times to the strains of some of the oldies but goodies.

Mayor

from page A1

out the years," he said. "We will continue to move forward."

He noted that the current full-time population is now 22,500.

"A city does not run itself," Litman said. "If it is to run correctly and smoothly, the must be dedicated to the betterment of the city."

He described the intense dedication and loyalty to the city required by city and city council members as well as the city's various departments.

He praised the department and recognized new Fire Chief Jason Andrus. He noted that a new engine was placed into service and that reserve grew from two to 10.

Litman discussed the undertaking of a natural gas project and said that the department will be working with Southwest Gas to provide tactical procedures in responding to any natural gas emergency.

Regarding the Department of Athletics and Leisure Services, Litman commended Director Nick Montoya on a job well done. He noted that the department has moved the city's parks and facilities to a new water control system, saving the city water, money and time.

Litman described the completion of the Town Square Park and noted that the city has acquired a Silver Sneaker Contract that will pay the city to keep seniors healthy and active.

He noted that the department has plans to refurbish the S.E.C. Splash Pad in 2019 as well as obtain grant money for new park projects.

Litman credited City Clerk Tracy Beck with successful preparation and execution of local elections as well as the numerous other tasks performed by Beck.

Regarding the police department, Litman noted the designation of Mesquite as the safest city in Nevada.

"This honor the department's strong relationship with the community and the combined of our citizens and in creating a proactive policing policy," he said.

The mayor detailed the many achievements accomplished by the Public Works Department under the direction of Billy Tanner including the upcoming installation.

Litman spoke about many other invaluable departments and employees prior to noting recent city growth. In 2018, the city issued 338 single family residential building permits.

"That is the highest since 2008," he said. "Our growth is about 4.25 percent annually."

Litman said that an additional 19 commercial building permits, 40 commercial remodel permits and 52 new business permits were issued for a total of just under \$100 million. He said that 339 new businesses licenses were issued last year which was the most in any year ever.

Due to population growth the mayor said that the goal is to create a planning and zoning commission and that the city council will start that process.

In conclusion, Litman detailed his goals for the city including improved public safety regarding better planning and action for future power outages and city-wide emergencies.

"I don't want us to just talk about this and hope we do not have an emergency beyond our control," he said. "We need a real plan that will be in place and publicized to every home in the city."

He spoke about improvements he hopes to make in community health care, job creation, political leadership and stability, planned, quality growth, sensibility and more.

"I conclude as I began today," Litman said. "Mesquite is Mesquite is well. Our future is bright. Embrace it for all it has to ."

Public Meeting Announcement

The U.S. Bureau of Indian Affairs (BIA) and the Moapa Band of Paiute Indians invite you to attend a scoping meeting to help identify the range and scope of issues related to the proposed Eagle Shadow Mountain Solar Project. The issues identified during the scoping process will be considered and addressed during preparation of the Environmental Impact Statement (EIS).

Please plan to attend one of the following meetings:

Tuesday, March 5, 2019

Moapa River Indian Reservation Tribal Hall
One Lincoln Street, Moapa, NV 89025-0340

Wednesday, March 6, 2019

Painted Desert Golf Club
5555 Painted Mirage Road, Las Vegas, NV 89149

Both meetings will be held between 5:30 pm and 7:30 pm with a brief presentation at 5:45 pm. Light refreshments will be served.

The proposed Eagle Shadow Mountain Solar Project will utilize photovoltaic (PV) technology and have a capacity of 300 MW. It will be located within the Moapa River Indian Reservation in Clark County, Nevada, west of Interstate 15 and approximately 40 miles northeast of Las Vegas. The project would also include an approximately 10-mile long electric transmission line that would cross Tribal lands, Federal lands administered by the BLM, and private lands owned by NV Energy to interconnect the project to the regional grid.

For more information on how to participate, contact Mr. Chip Lewis, Regional Environmental Protection Officer, at Chip.Lewis@bia.gov (602.379.6750) or Mr. Randy Schroeder at rschroeder@envalue.us.

Family History Fair

Saturday, March 9 | 9:00 am - 12:30 pm
Logandale Stake Center 2555 N. St. Joseph Street

Fairy Tales and Phonetics

The problems you face with names

Are you stuck on a family line because you can't trace a surname back? Sometimes the spelling of the name was changed or written in different ways over the years. Sometimes the surname was changed when the family moved to another country. In some countries (not just Scandinavia) last names change from generation to generation.

What's in a name?



Your name may have an origin completely different from what you think it is.

This class, being taught at the Logandale Stake Family History Fair, might provide answers you need to trace a family line back more generations.

Town & Country in Overton, Nv!

128 N MOAPA BLVD

2017 Ford Expedition XLT 4X4
Duel Turbo Eco boost 8 Passenger
Towing Package & More
\$23,995

2016 Ford Fusion SE
Loaded Tinted Windows
only 33,000 Miles
\$13,495

2017 Chevy Cruze LT
1.4 Turbo Backup-Cam
Custom Tinted Windows
\$11,995

\$23,995

WE'RE THE LITTLE LOT WITH THE LITTLE PRICES!

Call (702) 397-2400

Prices do not include applicable Fees. Must present this card to get prices advertised. Subject to errors & admissions.

Moapa Valley Community Resources Fair

Informational

Saturday February 23, 2019
Fine Arts Building Clark County Fair Grounds
9:00 am to 1:00 pm
Free Admission

Who Can Benefit From These Services?

Children Veterans Caregivers
Young Adults Seniors

No Insurance And I need A Doctor!

Job Training

I'm a caregiver and I really need a break!!

Counseling Services for my Family

Supported Living Arrangements?

Autism

Respite for Caregiver

Is there help with my taxes?

Nursing Services

My son needs help badly!

Nutrition Counseling Services

I need a ride to the doctor!

Please Take The Survey

Come to the Fair and Learn about these Programs!

A Free Mobile Pediatric Medical Clinic will be available for fair attendees

Bring your le ones to see the doctor!

Representatives From • Federal • State • Local Agencies • Non-Profit Organizations • Service Groups
will be at the fair to provide information and answer questions about low or no cost services like the ones above and others.

Sponsored By:
Cappalappa Family Resource Center
and
Moapa Valley Revitalization Project

Appendix C

Meeting Materials

Appendix C – Meeting Materials and Sign-In Sheets

Appendix C contains materials available at the public scoping meetings including transcripts:

- Fact Sheets (two pages) plus project map
- Comment forms
- Sign-In sheets from meetings:
 - Moapa River Indian Reservation, Nevada
 - Painted Desert Golf Club, Las Vegas, Nevada
- Display Boards
- Presentation
- Transcripts

Project Fact Sheet



ENVIRONMENTAL IMPACT STATEMENT (EIS)

Fact Sheet

EAGLE SHADOW MOUNTAIN SOLAR PROJECT

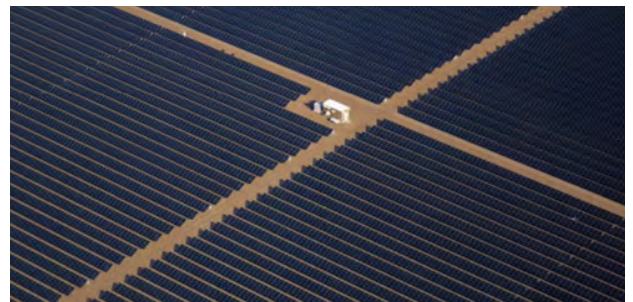
PROJECT OVERVIEW

The Eagle Shadow Mountain (ESM) Solar Project would generate 300MWs of energy using photovoltaic (PV) technology on tribal lands held in trust by the Bureau of Indian Affairs (BIA) within the Moapa River Indian Reservation (Reservation). The Project would lease up to 2,300 acres of land on the Reservation currently under option with the Moapa Band of Paiutes (Moapa Band). The Project also will require a gen-tie line, approximately 10 miles in length, to interconnect to the regional electric grid at NV Energy's Reid Gardner Substation. The gen-tie would be located within an existing utility corridor located on the Reservation but managed by the Bureau of Land Management (BLM) as well as BLM and private land (NV Energy).



PURPOSE AND NEED

The ESM Solar Project would help to provide a long-term, diverse, and viable economic revenue base and job opportunities for the Moapa Band while assisting Nevada and neighboring states to meet their renewable energy needs. The Project would allow the Moapa Band, in partnership with the developer, to optimize the use of the lease site while maximizing the potential economic benefit to the Tribe.



LEAD AND COOPERATING AGENCIES

The BIA is the lead federal agency preparing an Environmental Impact Statement (EIS) that will evaluate the proposed PV solar project on the Reservation in Clark County, Nevada. The Moapa Band, BLM, Environmental Protection Agency (EPA), US Air Force, US Fish and Wildlife Service (USFWS), and Nevada Department of Wildlife will be involved as cooperating agencies for the EIS.





FEDERAL ACTIONS REQUIRED

Below is a summary of the Federal actions required for the Project:

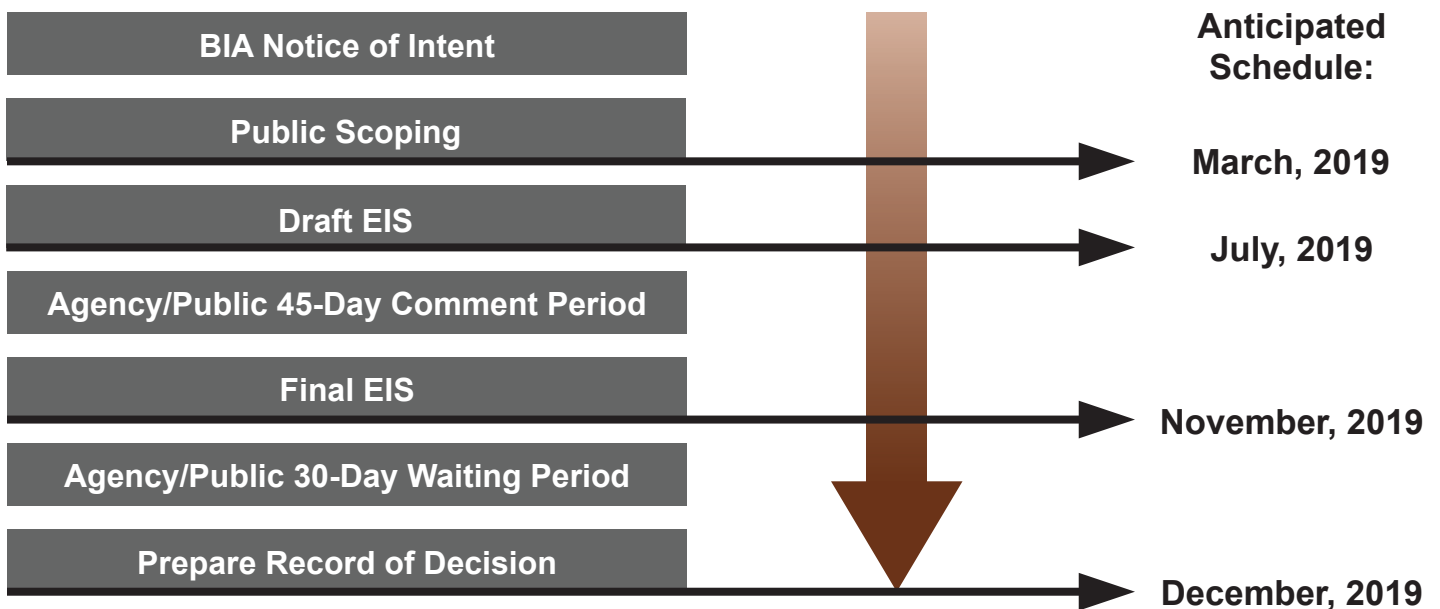
- The BIA’s Federal action is the approval or denial of a ground lease and associated rights-of-way (ROW) and other agreements entered into by the Moapa Band for the construction and operation of the portions of the Project that would be located on Moapa tribal lands.
- The BLM’s Federal action is to approve or deny grants of ROW for the proposed transmission line.
- The USFWS will issue a Biological Opinion regarding the Project’s consistency with the Endangered Species Act, as amended and other implementing acts.
- The EPA may adopt the documentation to make decisions under their authority under the Clean Air and Clean Water Acts.

PUBLIC AND STAKEHOLDER INPUT

There are multiple opportunities for the public and interested stakeholders to provide input as part of the EIS process. Early in the process, the BIA will hold public scoping meetings and request written comments to solicit information on project benefits and impacts, resources of concern, and alternatives that should be considered.

Written comments can be sent to either Mr. Chip Lewis, Regional Environmental Protection Officer, BIA Western Regional Office Branch of Environmental Quality Services, 2600 North Center Avenue, 4th Floor Mail Room, Phoenix, AZ 85004-3008; telephone: (602) 379-6750; fax (602) 379-3833; email: chip.lewis@bia.gov. In addition, comments can be provided directly via the EIS website at www.esmsolareis.com.

EIS PROCESS / SCHEDULE



Meeting Presentation

Eagle Shadow Mountain
Solar Project
Environmental Impact Statement
(EIS)



Scoping Meetings
March 5 and 6, 2019



The NEPA Process



- Chip Lewis
 - Regional Environmental Protection Officer
 - Bureau of Indian Affairs (Western Region)

- Contact Information:
 - BIA
 - Western Region
 - Branch of Environmental Quality Services (EQS)
 - 2600 North Central Avenue
 - 4th Floor Mailroom
 - Phoenix, AZ 85004
 - (602) 379-6750
 - chip.lewis@bia.gov*



Proposed Action



- **Who has proposed:**
 - 325MK 8me LLC and Moapa Band
- **What is proposed:**
 - Up to 50-year land lease on Reservation for operation of up to 300MW photovoltaic solar generation facility and ROWs on Tribal lands, Federal lands administered and managed by BLM, and private land (NV Energy) for transmission
- **Where:** Clark County, NV on Moapa River Indian Reservation and nearby BLM-administered lands and private land
- **Why:** Provide economic development and other benefits such as jobs and a revenue source for the Moapa Band of Paiute Indians and help meet goals for renewable energy



Environmental Impact Statement



EIS Process

Public input and documentation of environmental impacts that would result from implementation of the Proposed Action (Eagle Shadow Mountain Solar Project) to meet the requirements of the National Environmental Policy Act (NEPA) – published in Code of Federal Regulations (CFR 1500-1508). In addition this analysis could be used to satisfy the requirements of other relevant environmental and cultural resource laws and requirements.



Involved Agencies

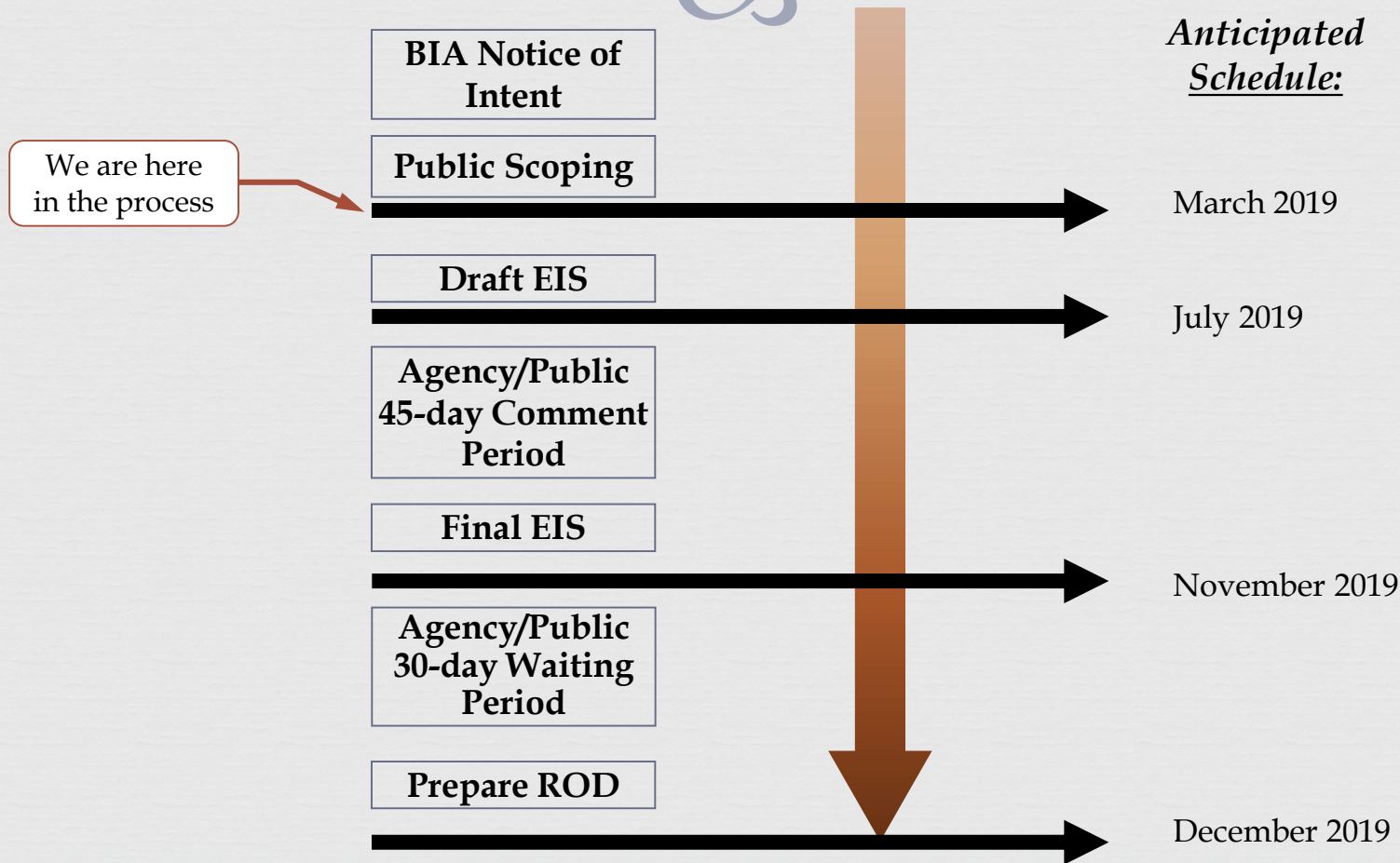


- **Lead Federal Agency**
 - U.S. Department of the Interior, Bureau of Indian Affairs
- **Cooperating Agencies**
 - Moapa Band of Paiute Indians (Moapa Band)
 - Bureau of Land Management (BLM)
 - Environmental Protection Agency (EPA)
 - US Air Force
 - US Fish and Wildlife Service (USFWS)
 - Nevada Department of Wildlife





EIS Process / Schedule





How to Participate



- Submit comment verbally at the end of the presentation
- Submit comment via comment form (leave behind or mail)
- Submit comment directly to court reporter
- Submit comment via email to:
 - chip.lewis@bia.gov
- Submit comment via the Project Website at:
 - www.ESMSolarEIS.com



Project Description



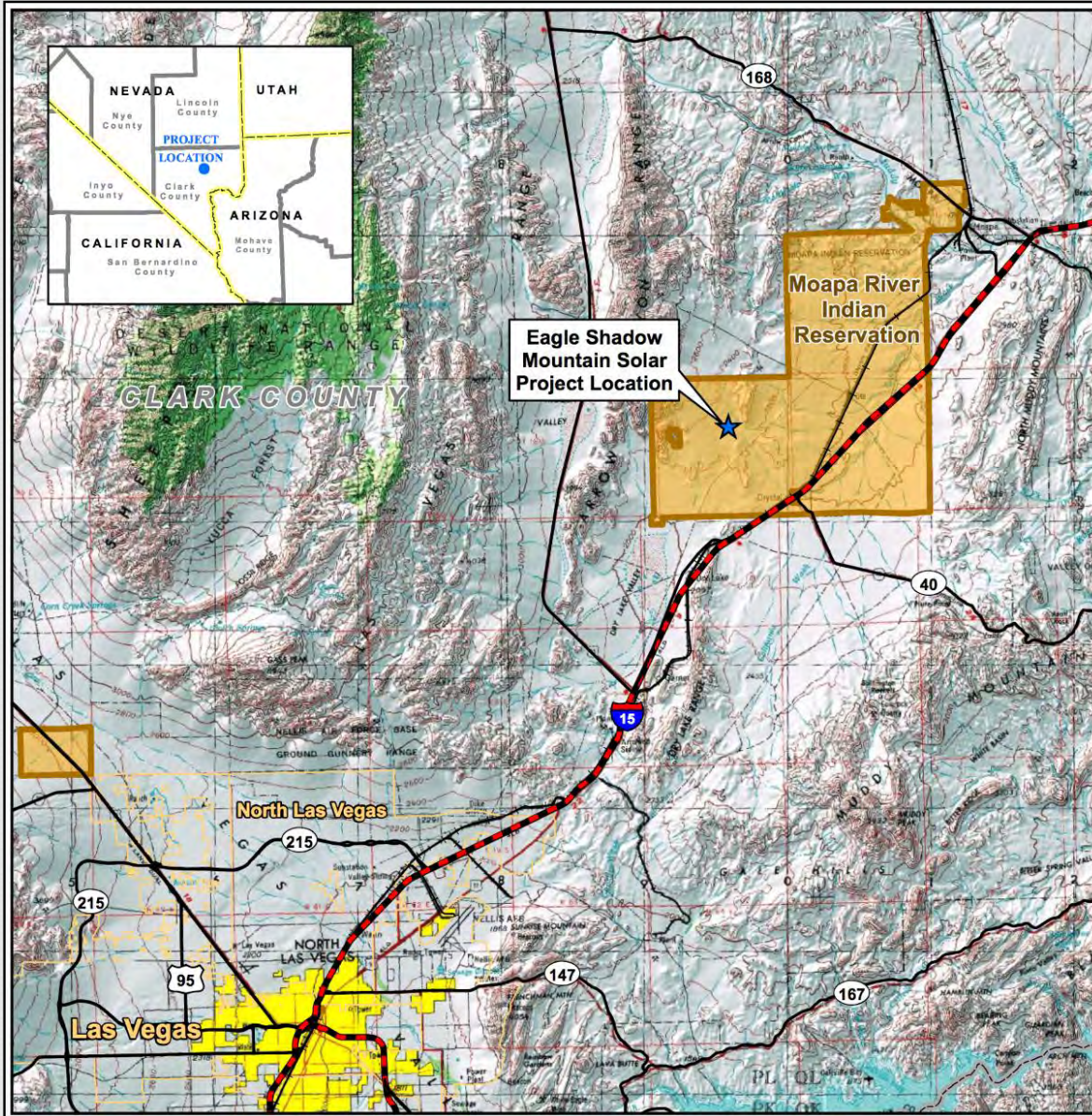
Randy Schroeder, ENValue

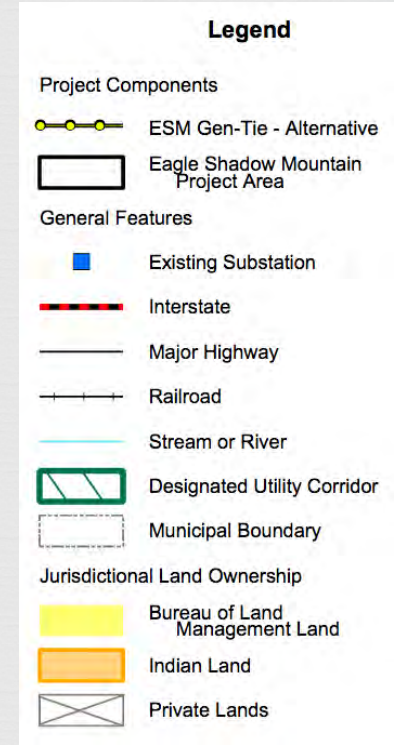
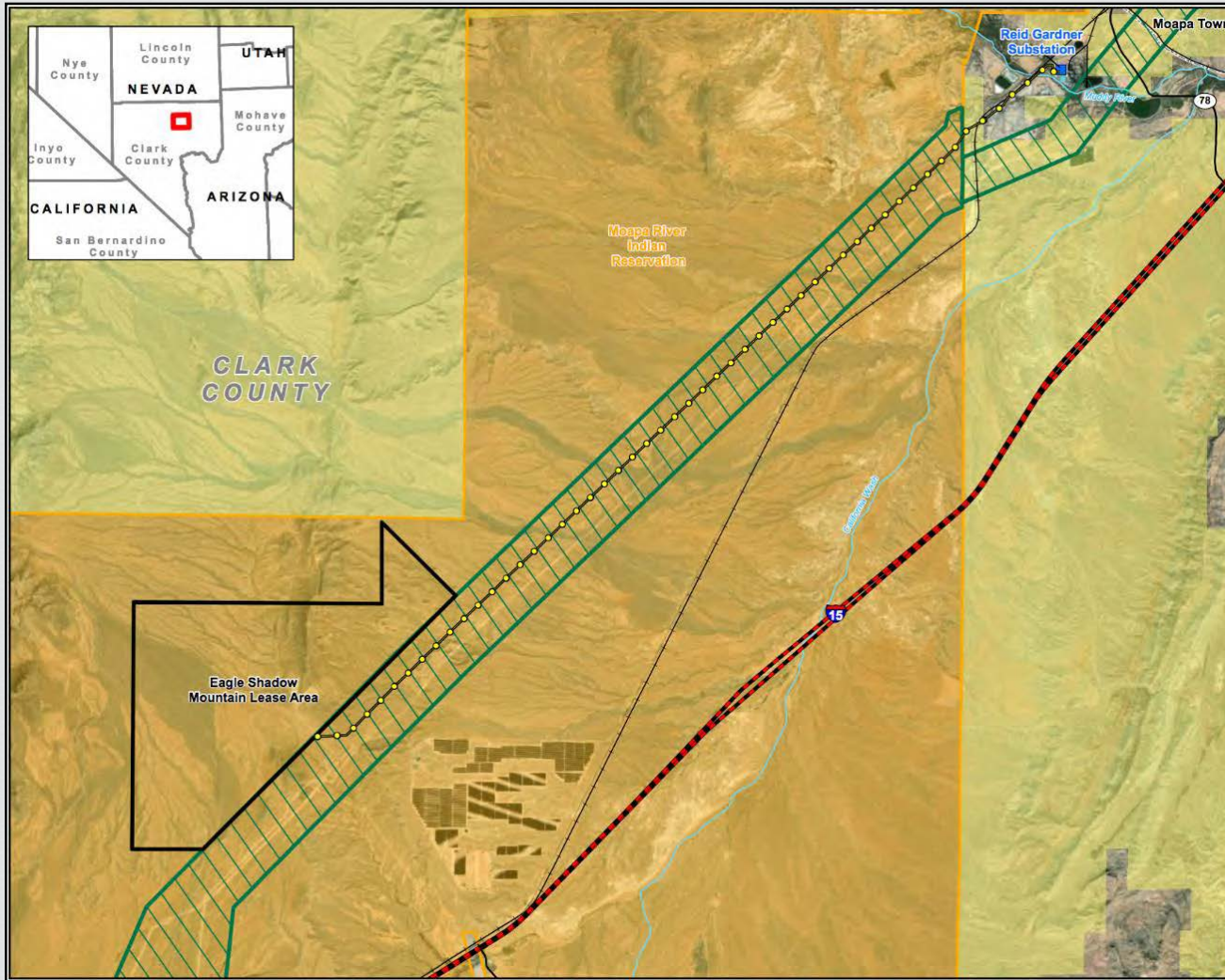
Eagle Shadow Mountain Solar Project

Project Location

Clark County, Nevada

Approximately 40 miles northeast of Las Vegas





- Up to 2,300-acre solar site on Reservation
- 230kV transmission line on Reservation, BLM, and private
- Water from existing wells
- Existing access from I-15

Proposed Project Area



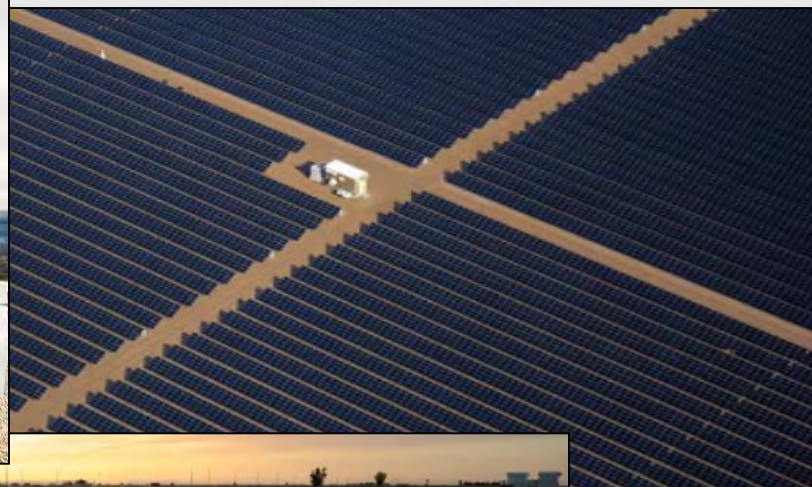
Eagle Shadow Mountain Solar Project Description



- Up to 2,300 acres (on Reservation) plus additional acreage of Right-of-Way for a transmission line on Tribal, BLM, and private lands
- Up to 300 Megawatts
 - Using Solar Photovoltaic (PV) Technology
 - Mounted on Single-Axis Tracking structures



Photovoltaic (PV) Panels





PV Solar Farm



- Solar arrays
- Inverters (converts DC to AC current)
- Electrical collection system
- Operation & Maintenance Building on site
- Fencing around the solar project perimeter
- No water used to generate electricity

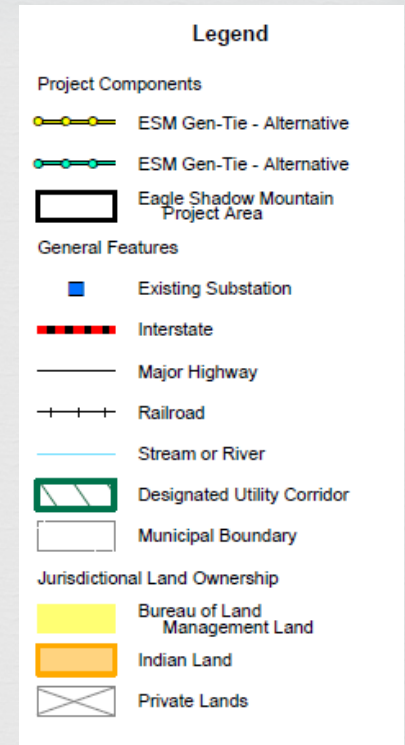
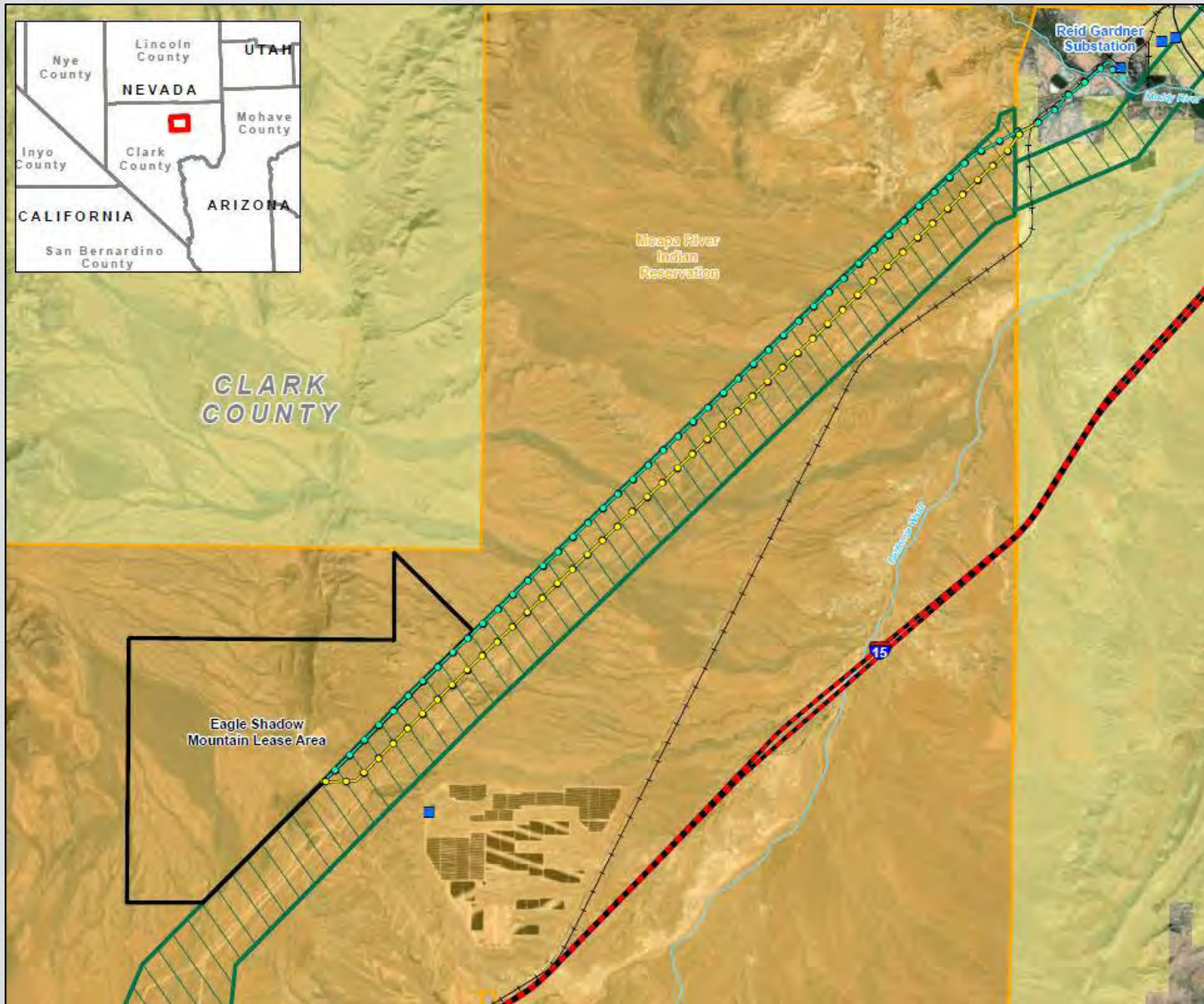


Associated Facilities



- Gen-Tie Transmission Line
 - Within an existing federally designated utility corridor managed by the BLM
 - 230kV line about 10 miles to NV Energy's existing Reid-Gardner Substation
 - Crosses Reservation (within an existing federally designated utility corridor managed by the BLM), BLM lands, and private lands owned by NV Energy
- Water provided by Moapa Band from wells adjacent to site on Reservation
- Existing access from I-15





Gen-Tie Alternative



Potentially Impacted Resources



- Biological Resources
 - Desert Tortoise
 - Desert Vegetation
 - Avian Species
- Cultural Resources
- Visual Resources
- Water Resources
- Socioeconomics



Comments / Questions



? ? ? ? ? ?

- Contact Information:
Chip Lewis
BIA
Western Region
Branch of Environmental
Quality Services (EQS)
2600 North Central Avenue
4th Floor Mailroom
Phoenix, AZ 85004
(602) 379-6750
chip.lewis@bia.gov
- Project Website:
www.ESMSolarEIS.com

Public Comment Form



PUBLIC COMMENT FORM
Bureau of Indian Affairs

EAGLE SHADOW MOUNTAIN SOLAR PROJECT
www.esmsolareis.com/
Scoping Comments

NAME: _____

ADDRESS: _____

- I have no comments, please keep me informed.
- Please remove me from your mailing list for this Project.
- I have the following comments about the Eagle Shadow Mountain Solar Project:

Return to: Mr. Chip Lewis, Regional Environmental Protection Officer, BIA Western Regional Office, 2600 North Central Avenue, 4th Floor Mailroom, Phoenix, AZ 85004 Email: chip.lewis@bia.gov

(Or fold, seal, and add a stamp to the back of the sheet)

.....

.....

place
stamp
here

Mr. Chip Lewis
Regional Environmental Protection Officer
BIA Western Regional Office
2600 North Central Avenue
4th Floor Mailroom
Phoenix, AZ 85004

Meeting Posters

Eagle Shadow Mountain
Solar Project
Environmental Impact Statement
(EIS)



Scoping Meetings
March 5 and 6, 2019



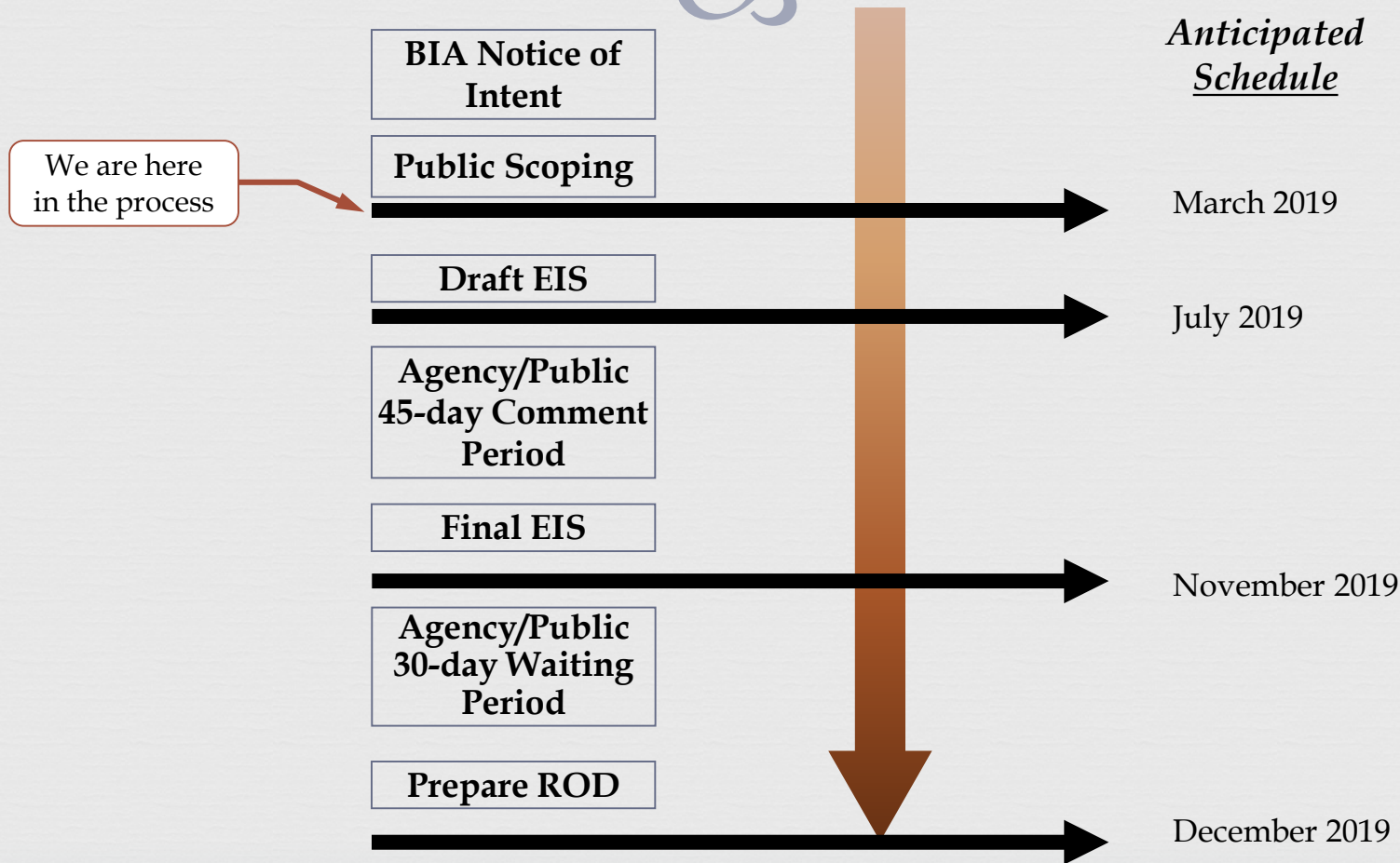
Proposed Action



- **Who has proposed:**
 - 325MK 8me LLC and Moapa Band
- **What is proposed:**
 - Up to 50-year land lease on Reservation for operation of up to 300MW photovoltaic solar generation facility and ROWs on Tribal lands, Federal lands administered and managed by BLM, and private land (NV Energy) for transmission
- **Where:** Clark County, NV on Moapa River Indian Reservation and nearby BLM-administered lands and private land
- **Why:** Provide economic development and other benefits such as jobs and a revenue source for the Moapa Band of Paiute Indians and help meet goals for renewable energy



EIS Process / Schedule





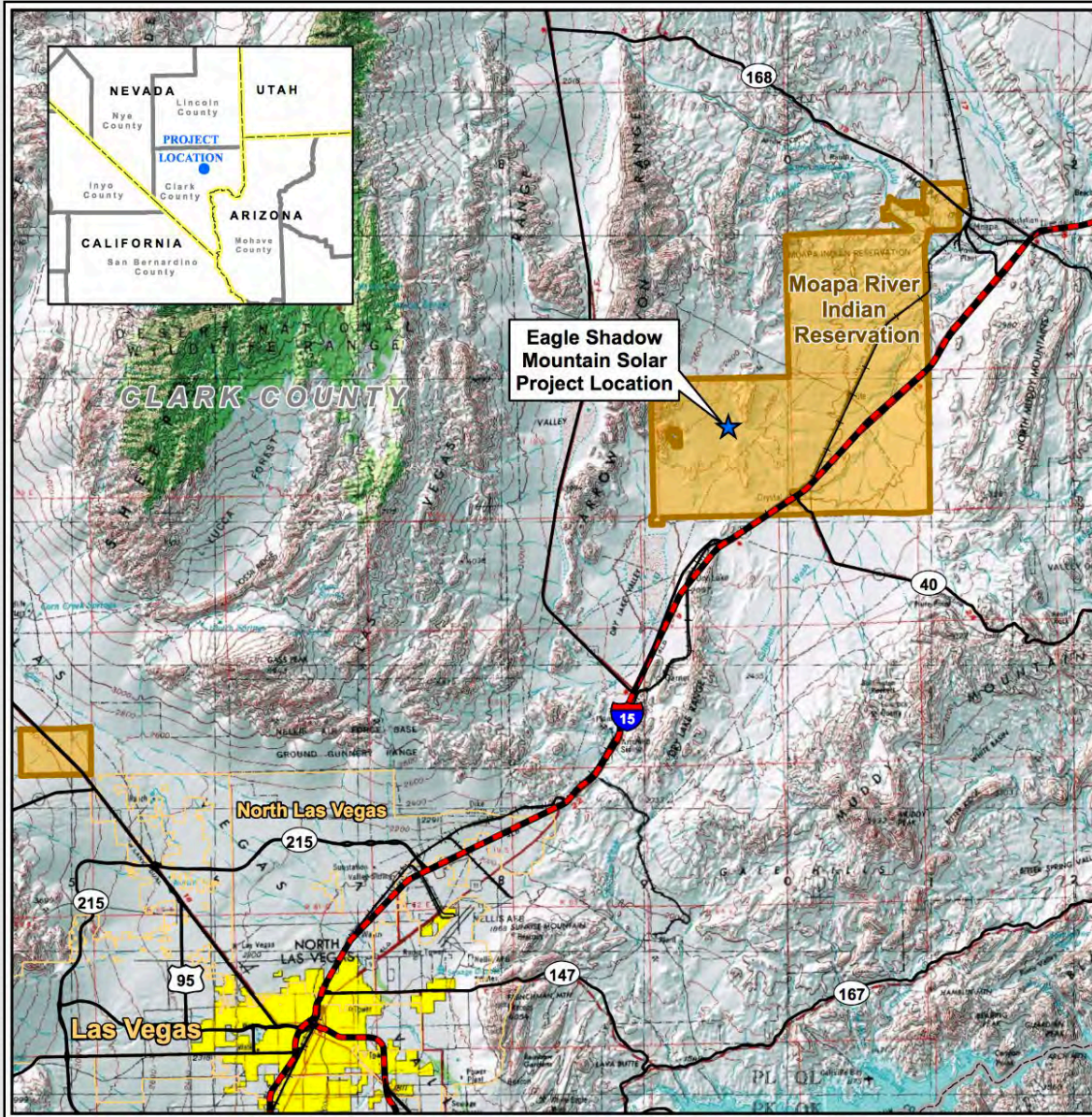
How to Participate

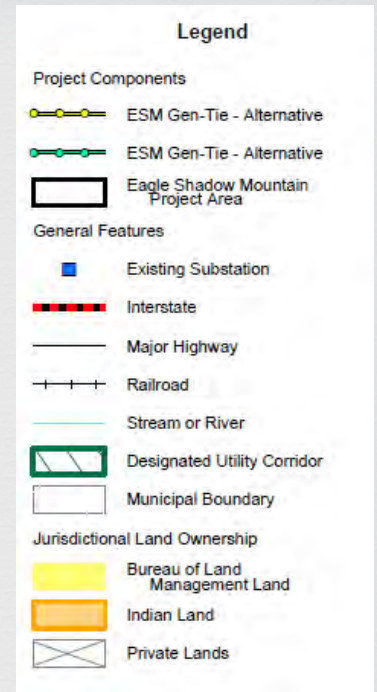
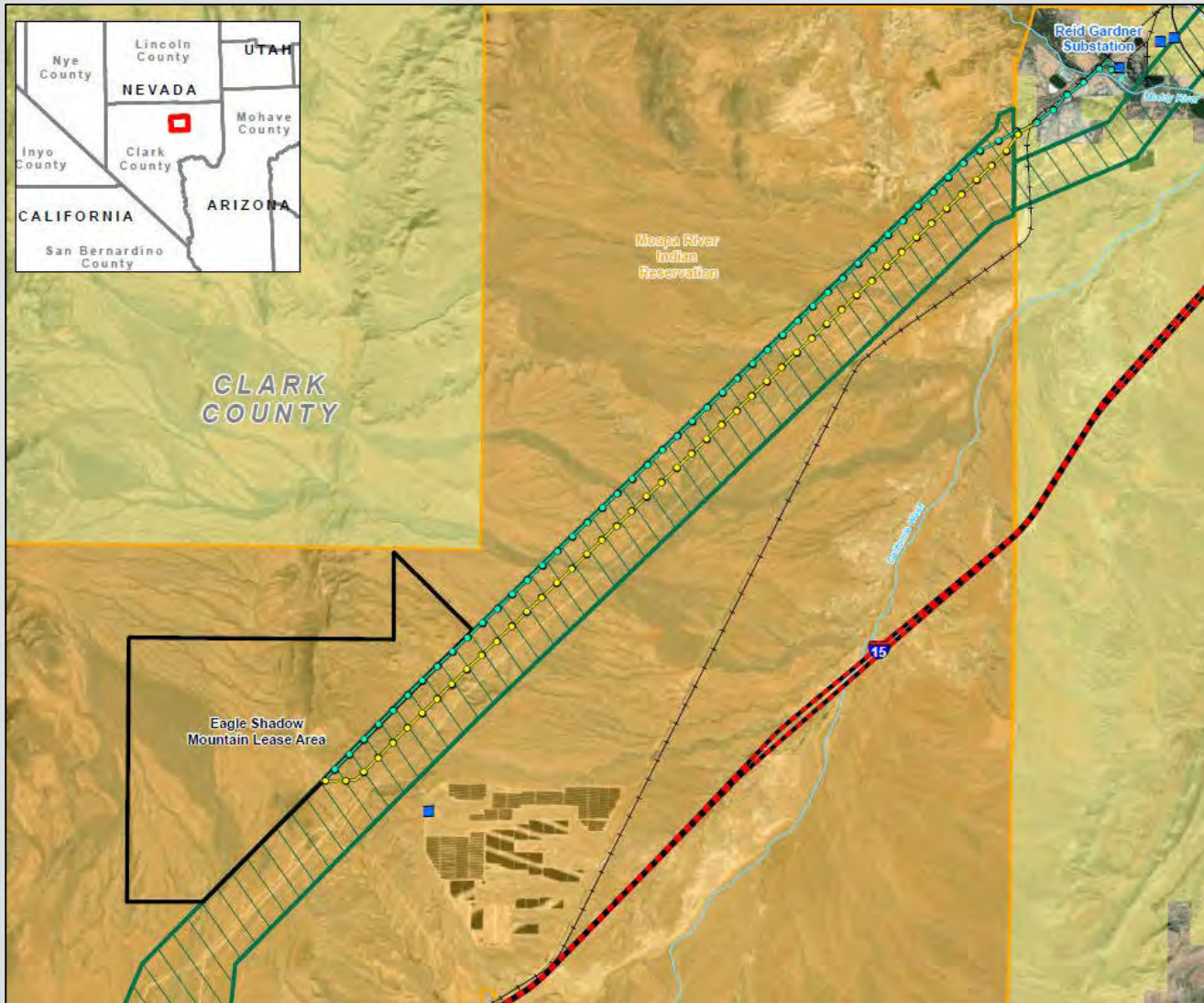


- Submit comment verbally at the end of the presentation
- Submit comment via comment form (leave behind or mail)
- Submit comment directly to court reporter
- Submit comment via email to:
 - chip.lewis@bia.gov
- Submit comment via the Project Website at:
 - www.ESMSolarEIS.com

Project Location

Approximately 40 miles northeast of Las Vegas (I-15)



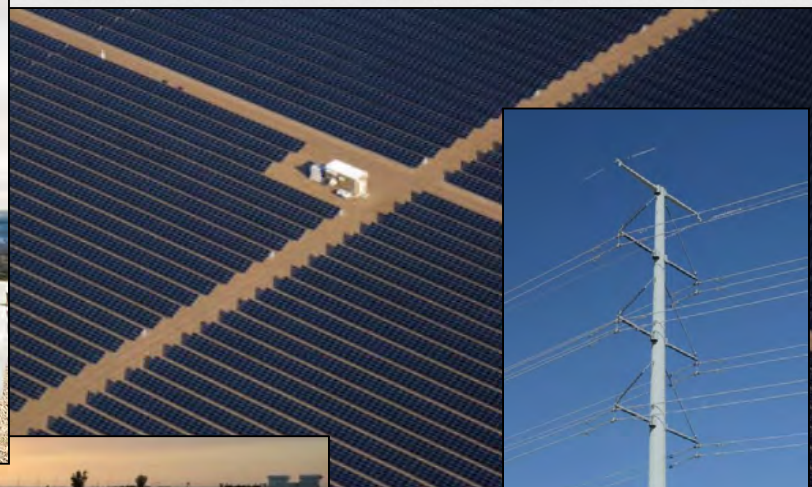


- Up to 2,300-acre solar site on Reservation
- 230kV transmission line on Reservation, BLM, and private
- Water from existing wells
- Existing access from I-15

Proposed Project Area



Project Components





Potentially Impacted Resources



- Biological Resources
 - Desert Tortoise
 - Desert Vegetation
 - Avian Species
- Cultural Resources
- Visual Resources
- Water Resources
- Socioeconomics

Public Scoping Meeting Sign-In Sheets



SIGN-IN SHEET: EAGLE SHADOW MOUNTAIN SOLAR PROJECT

Environmental Impact Statement Scoping Public Meeting – March 5, 2019

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
Bambercentral Business Services	P.O. Box 234 Moapa NV 89025	OKTE87@gmail.com
Jim Williams	BIA	James.williams@bia.gov
Jason Moretz	8minutenergy	jmoretz@8minutenergy.com
Helsey Jones	8minutenergy	h.jones@8minutenergy.com
Luke Shillington	8minutenergy	lshillington@8minutenergy.com
Chip Lewis	BIA	chip.lewis@bia.gov
Tamera Dawe	BIA	tamera.dawe@bia.gov
Christina Varela	BIA	Christina.Varela@bia.gov



SIGN-IN SHEET: EAGLE SHADOW MOUNTAIN SOLAR PROJECT

Environmental Impact Statement Scoping Public Meeting – March 5, 2019

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
PATRICIA MCABE LOGAN SIMPSON	51 WEST THIRD ST. #10 TEMPE AZ 85281	PMCCABE@LOGANSIMPSON.COM
Melissa Mayo	PO Box 325 Moapa NV 89025	
Stephanie Osborne	P.O. Box 401 Moapa, NV 89025	
Phil Swai	Moapa Nev	
Randall Simms	Moapa, NV	
Derrick N. Ohte	Moapa, NV	
VERNON LEE MOAPA BAND MEMBER	N/A	—
Clay Bushhead	Moapa, NV	



SIGN-IN SHEET: EAGLE SHADOW MOUNTAIN SOLAR PROJECT

Environmental Impact Statement Scoping Public Meeting – March 5, 2019

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
ORION & MARGE SHERWOOD	1055 EASTGATE RD. SALT LAKE CITY, UT 84117-5778	margesher@men.com
Neal O'NE	_____	Bombercentral 000 00. Com
Brett Gale Overton Power District #5	bgale@opd5.com	Same
_____	MBOP	
Vickie Simmons	PO BOX 340 Moapa, NV 89025	chair. mbop @moapabandofprimitives.org
Shane Tom	PO Box 547 Moapa NV 89025	_____
Laloni Miller	PO Box 391 Moapa, NV 89025	
Brandy Tom	PO Box 547 Moapa, NV 89025	



SIGN-IN SHEET: EAGLE SHADOW MOUNTAIN SOLAR PROJECT

Environmental Impact Statement Scoping Public Meeting – March 5, 2019

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
Ashly M. Osborne Tribal Member	1116 E Ogden Ave. Apt. 8 LV, NV 89101	missbandst@hotmail.com
Patrick Golden EnvValue	8071 E. 33rd Ave Denver, CO 80238	pgolden@heritage-ec.com
Emily Critchfield ICP/EnvValue	1501 E. 4th St. Long Beach, CA 90802	ecritchfield@Kpenvironmental.com
Sherryl Patterson Business Enterprises	PO Box 427 Moapa, NV. 89025	BEasst@moapabandofpautes.org
Karen Vitruano USEPA		
L&B concrete Const. Eric Lee Sr. - Tribal member	3744 W 625 E Cedar City UT 84721	LandBconcrete construction@gmail.com
ARLAW LEVI MOAPA BAND OF PAUTE	P.O. Box 216 MOAPA NV	
Betty Henry	P.O. Box 142 Moapa NV 89025	



SIGN-IN SHEET: EAGLE SHADOW MOUNTAIN SOLAR PROJECT

Environmental Impact Statement Scoping Public Meeting – March 5, 2019

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
Lanita Bushhead	P.O. BOX 246 MOAPA NV 89025	—
Jennifer Samson	P.O. BOX 26 moapa, NV, 89025	—



SIGN-IN SHEET: EAGLE SHADOW MOUNTAIN SOLAR PROJECT

Environmental Impact Statement Scoping Public Meeting – March 5, 2019

Moapa River Indian Reservation Tribal Hall, One Lincoln Street, Moapa, NV 89025-0340

Name/Organization	Mailing Address	Email
Eric Lee Jr.	P.O. BOX 413	



SIGN-IN SHEET: EAGLE SHADOW MOUNTAIN SOLAR PROJECT
 Environmental Impact Statement Scoping Public Meeting – March 6, 2019

Painted Desert Golf Club, 5555 Painted Mirage Road, Las Vegas, NV 89149

Name/Organization	Mailing Address	Email
Christina Varela BIA	St-George UT	christina.varela @bia.gov
BILL CONNORS MDU CONSTRUCTION SERVICES GROUP / BOMBARD	ISSAQUAH, WA	BILL.CONNORS@MDU.COM
ALAN BROOKS BOMBARD ELECTRIC	LAS VEGAS, NV	ALAN.BROOKS@ BOMBARDELEC.COM
PATRICIA MCABE LOGAN SIMPSON	51 WEST THIRD ST. 450 TEMPE AZ 85281	PMCCABE@ LOGANSIMPSON.COM
Mary Berger ENVALUE	Box 1005 Laveen, AZ 85339	berger@enval.com
Jim Williams BIA	13067 E. Highway 66 Valentine, AZ 86437	James.williams@bia.gov
GARRY CANTLEY BLA WRO	2600 N. CENTRAL AVE PHX, AZ 85003	Garry.Cantley@bia.gov



SIGN-IN SHEET: EAGLE SHADOW MOUNTAIN SOLAR PROJECT
Environmental Impact Statement Scoping Public Meeting – March 6, 2019

Painted Desert Golf Club, 5555 Painted Mirage Road, Las Vegas, NV 89149

Name/Organization	Mailing Address	Email
Tamera Dawes WFO-BIA	2600 N. Central Ave Phoenix AZ 85004	tamera.dawes@bia.gov
Glen Knowler FWS	4701 Torrey Pines Ln NV 89130	glen-knowler@fws.gov
Patrick Golde ENWales	8071 E. 33rd Ave Denver, CO 80238	pgolde@heritage-ec.com
Chip Lewis BIA	2600 N. Central Ave 4 th Floor Mailroom Phx, AZ 85004	chip.lewis@bia.gov
Luke Shillington 8minutenergy Renewables	250 Sutter St., Suite 600 San Francisco, CA 94108	lshillington@8minutenergy.com

Appendix D

Scoping Comments Received

Appendix D – Scoping Comments Received

This Appendix contains all scoping comments received.

Public Meeting Transcripts

Environmental Impact Statement Scoping Meeting

Eagle Shadow Mountain Solar Project

03/05/2019



OASIS
REPORTING SERVICES

400 South Seventh Street • Suite 400, Box 7 • Las Vegas, NV 89101
702-476-4500 | www.oasisreporting.com | info@oasisreporting.com

COURT REPORTING | NATIONAL SCHEDULING | VIDEOCONFERENCING | VIDEOGRAPHY

	Page 1	Page 3
<p>1 EAGLE SHADOW MOUNTAIN SOLAR PROJECT</p> <p>2 ENVIRONMENTAL IMPACT STATEMENT</p> <p>3 (EIS)</p> <hr/> <p>6 SCOPING MEETING</p> <p>8 MARCH 5, 2019</p> <p>9 5:30 P.M.</p> <p>11 MOAPA RIVER INDIAN RESERVATION TRIBAL HALL</p> <p>12 ONE LINCOLN STREET</p> <p>13 MOAPA, NEVADA</p> <p>15 MODERATOR: CHIP LEWIS</p> <p>16 ENVIRONMENTAL PROTECTION OFFICER FOR THE WESTERN</p> <p>17 REGIONAL OFFICE OF THE BUREAU OF INDIAN AFFAIRS</p> <p>25 REPORTED BY: KEVIN WM. DANIEL, FAPR, RDR, CRR, CCR 711</p>		<p>1 I, too, am with the Bureau of Indian Affairs. I'm the</p> <p>2 regional archeologist out of Phoenix.</p> <p>3 MARY BARGER: I'm Mary Barger. I'm an</p> <p>4 archeologist, and I'm assisting Gary Cantley.</p> <p>5 PATRICIA McCABE: I'm Patricia McCabe, and I'm</p> <p>6 helping Chip.</p> <p>7 TAMARA DAWES: Good evening. I'm Tamara</p> <p>8 Dawes. I'm your regional realty specialist for the BIA</p> <p>9 in Phoenix.</p> <p>10 CHRISTINA VARELA: I'm Christina Varela. I'm</p> <p>11 the realty specialist at Southern Paiute agency.</p> <p>12 JIM WILLIAMS: Good evening. I'm Jim</p> <p>13 Williams. I'm the Agency Superintendent for the</p> <p>14 Southern Paiute and Truxton Canon agencies.</p> <p>15 BRETT GALE: Brett Gale, Overton Power</p> <p>16 District.</p> <p>17 DEBBIE OSBORNE: Debbie Osborne, member.</p> <p>18 ASHLEY OSBORNE: Ashley Osborne, Tribal</p> <p>19 member.</p> <p>20 BRANDY TOM: Brandy Tom, wife.</p> <p>21 (Laughter)</p> <p>22 MARTHA MAYO: Martha Mayo, member.</p> <p>23 MARGE SHERWOOD: Marge Sherwood. I'm a</p> <p>24 snowbird from Mesquite.</p> <p>25 ORION SHERWOOD: I'm Orion Sherwood. My</p>
<p>1 P-R-O-C-E-E-D-I-N-G-S</p> <p>2 VICKIE SIMMONS: Good evening, everybody.</p> <p>3 We'll get started right now, so I'm going to say a few</p> <p>4 words before they get the video started.</p> <p>5 Council, we'd like to welcome all visitors</p> <p>6 here. The entire Council is here tonight. There's</p> <p>7 Randall Simmons in the background. Randall? Tyler</p> <p>8 Samson, Vice Chairman. There's Shane Tom, Councilman.</p> <p>9 There's Kami Miller, Council, and I believe Laurie Kay</p> <p>10 is in the red jacket. She's in the office there. So I</p> <p>11 welcome all the dignitaries here.</p> <p>12 I would like, if you don't mind, to hurry up</p> <p>13 and pass the mic around so we can see who everybody is,</p> <p>14 if that won't take too long.</p> <p>15 RANDY SCHROEDER: My name is Randy Schroeder,</p> <p>16 assisting the Bureau of Indian Affairs with the</p> <p>17 Environmental Impact Statement.</p> <p>18 CHIP LEWIS: My name is Chip Lewis. I'm with</p> <p>19 the Bureau of Indian Affairs in the Western Region in</p> <p>20 Phoenix, and I'm the Project Manager for the</p> <p>21 Environmental Impact Statement.</p> <p>22 PATRICK GOLDEN: Pat Golden, also with</p> <p>23 ENValue, assisting BIA with the Environmental Impact</p> <p>24 Statement.</p> <p>25 GARY CANTLEY: Good afternoon. Gary Cantley.</p>	<p>1 Page 2</p>	<p>1 Page 4</p> <p>1 interest in solar goes back to about 1956 when I did a</p> <p>2 mechanical engineering thesis on solar energy</p> <p>3 utilization in heating and cooling, and I followed this</p> <p>4 as electric solar panels have developed. I do have 26</p> <p>5 panels on a triplex that I own in Salt Lake City. So</p> <p>6 I'm here very much interested in how these solar panel</p> <p>7 projects can really make the Southwest, particularly,</p> <p>8 an energy producer for the nation.</p> <p>9 LALLOVI MILLER: Lalovi Miller, Tribal member.</p> <p>10 VERNON LEE: Vernon Lee, Tribal member.</p> <p>11 PHIL SWAIN: Jose Canseco, retired ballplayer.</p> <p>12 (Laughter)</p> <p>13 LUKE SHILLINGTON: I am Luke Shillington. I'm</p> <p>14 with 8minutenergy, project performance. I am doing</p> <p>15 all the permitting on the projects. I've been working</p> <p>16 with consultants and the BIA.</p> <p>17 KELSEY JONAS: Kelsey Jonas with</p> <p>18 8minutenergy as well, working for our team.</p> <p>19 JASON MORETZ: Jason Moretz with 8minutenergy,</p> <p>20 and I'm the Project Manager for the project.</p> <p>21 DENNIS HARPER: Good evening. I'm Dennis</p> <p>22 Harper with 8minutenergy. I handle the real estate</p> <p>23 acquisition work for 8minutenergy.</p> <p>24 VICKIE SIMMONS: I think everybody knows</p> <p>25 Cheryl back there. She's been working for the business</p>

Page 5

1 management for a while.
 2 CHERYL PATTERSON: Cheryl Patterson. Again,
 3 most of you all know me. Thank you for coming.
 4 VICKIE SIMMONS: Okay. We're ready. Thank
 5 you, everybody, for participating.
 6 CHIP LEWIS: In place of an invocation, we'd
 7 just like to have a moment of silence, if we can,
 8 please.
 9 (Moment of silence observed.)
 10 Thank you very much.
 11 JIM WILLIAMS: Welcome. Once again, I'm Jim
 12 Williams. I'm the agency superintendent, and just
 13 welcoming everybody to the public scoping meeting for
 14 your chance to comment on the EIS program or paper. I
 15 find I learn something all the time, so welcome. If
 16 you want to comment, there's plenty of places to do
 17 this. There's another scoping meeting tomorrow evening
 18 in Las Vegas as well. Thank you.
 19 CHIP LEWIS: Thanks, Jim. I'm just going to
 20 forget the mic, so hopefully you all can hear me. I'll
 21 stand up here and wave around and do my thing, I guess.
 22 So the Federal Government is required to
 23 prepare what's called an Environmental Impact
 24 Statement. That arises out of the National
 25 Environmental Policy Act, and it's basically an

Page 6

1 environmental report that we have to prepare that
 2 analyzes the impacts of a decision we have to make or
 3 if we're funding, the Federal Government is funding a
 4 project or issuing a permit.
 5 In this case, the Tribe has approached the
 6 BIA, saying they'd like to engage with the company,
 7 8minute solar, to build a solar project on Tribal lands
 8 to generate income and serve the Tribe, and so we're
 9 preparing this document.
 10 We also have some partners on board, because
 11 it's kind of a communal, multi-agency document.
 12 So first and foremost, the first partner and
 13 cooperator in this effort to prepare the document is
 14 the Moapa Band as a government agency. Moapa Band has
 15 opted to help in the preparation and review of the
 16 document. We also have the BLM involved, because the
 17 big corridor that has all the power lines is managed by
 18 BLM, and also a little tiny piece of the project does
 19 go on BLM land, so they have something before them they
 20 have to do, which is issuing the right-of-way for that
 21 line. EPA is also, they're always involved in
 22 Environmental Impact Statements because they have a
 23 reviewing commitment to just participation because
 24 they're the EPA and help protecting the environmental.
 25 We also have the Air Force say they wanted to

Page 7

1 be involved, although I don't think they're here. They
 2 might be coming to tomorrow's meeting. The Fish and
 3 Wildlife Service, because of the endangered species
 4 that are located on the Reservation. They'll be
 5 working with us to come up with ways to protect those
 6 species as much as we can.
 7 Nevada's Department of Wildlife is on board
 8 for the same reason, the non-named species like the
 9 tortoise that's involved, and since the project does
 10 slightly leave the Reservation, is on BLM land, then
 11 they would actually have the authority for the
 12 tortoises on that BLM land, so they're partners in the
 13 preparation of the big environmental report that we'll
 14 be doing.
 15 So the proposal that came to us, to BIA from
 16 the Tribe and 8Minute, is, as you see here, Randy, do
 17 you want to take this part over and talk about it, or
 18 Luke, or do you just want me to keep going, summarize?
 19 RANDY SCHROEDER: Go ahead. I'll provide more
 20 detail.
 21 CHIP LEWIS: Okay. So what it amounts to, for
 22 our purposes here, is the lease, so the second bullet
 23 there, the 50-year lease on the Reservation, that's the
 24 last full action before the BIA that requires approval
 25 out of realty, and that's what's triggering having to

Page 8

1 prepare the environmental document under all the
 2 various environmental laws. So that's why we're here,
 3 to start that process of a preparation of the document.
 4 As you know, of course, the project's here on
 5 the Reservation to provide economic benefit for the
 6 Tribe, so it's not off, like the Gemini project, a few
 7 miles away. It's on the Reservation, for folks that
 8 aren't Tribal members, and its obvious purpose is to
 9 provide economic benefit to the Tribe.
 10 Like I said, I'm the manager for the BIA
 11 that's managing the process of preparing the document,
 12 making sure that BIA complies with all the federal
 13 environmental regulations that are driving the
 14 preparation of the document. So we're, BIA people move
 15 to all the federal environmental laws, and so therefore
 16 we have to go ahead and go through this process.
 17 The EIS process is really a public process.
 18 It's a process of discovery. We know what the project
 19 is to build a solar project. It has some certain
 20 amount of impact, and, of course, it has benefits. And
 21 so the EIS process, the National Environmental Policy
 22 Act, requires us to explore those impacts and benefits
 23 and disclose them and help them, help us make the best
 24 decision we can moving forward, and that all has to be
 25 done before the actual document like the lease can be

Page 9

1 approved.

2 The EIS process starts out with scoping, which

3 is interaction with the public to find out what issues

4 anybody might have or opportunities, concerns, anything

5 you might think about it. And so the BIA is holding a

6 series of public meetings, one here on the Reservation

7 tonight, and one tomorrow down in Las Vegas, with the

8 whole point being, we want to share the information of

9 what's proposed and what we're doing, and then really

10 getting input from you all. So we want to know what

11 you think about it, if you have any ideas, if there's

12 some issue.

13 We've tried to think of everything we know

14 about that might arise from building the solar project,

15 but you all live here and know what is here, know the

16 scenery, know what plants and animals are here, or know

17 how, in your mind, or as a community, this project

18 might affect you, good or bad.

19 And so what we're doing tonight is really

20 asking for your input and comment, and I think, in a

21 slide or two we'll tell you how you can do that.

22 So like I said, we're kind of in the

23 beginning. The first box or two are just the

24 formalities of publishing in kind of the official

25 government newspaper, our declaration and intent to

Page 10

1 prepare this document, because it is mandated to be

2 public. We had to do that to let everybody in the

3 country know that we're going to prepare this document.

4 And now we're literally at the second box,

5 which is public scoping, and we're kicking that off

6 here tonight.

7 After we gather all the information we can,

8 we'll proceed on preparing a draft EIS, it's called,

9 where we put together the whole document as best we

10 can, and then we put it out for public comment again.

11 Like I said, the idea is to involve the

12 public, so this document will be made available for you

13 all to review and comment on.

14 We'll have another round of meetings after

15 appropriate time is given to allow for that review, and

16 we'll get your comments once again on whether or not we

17 got everything right in that document.

18 And then, after that, we proceed on with the

19 final publication after any comments or address or

20 corrections made or anything that might need to be done

21 to make the document as good as it can be.

22 Then once again, we have to post a notice in

23 that federal paper, the Federal Register, declaring

24 we're done, we have the final document, and we're about

25 to make our decision to go ahead and approve the lease

Page 11

1 functionally. And that's basically the process in a

2 nutshell.

3 How to participate: We have a court reporter

4 here. He is recording everything we say, and he's

5 especially reporting what you all have to say or your

6 comments, because they are, indeed, the most important.

7 That's what we're here for. So you can, when we're

8 kind of done with the presentation, you can stand up or

9 stay sitting down, whatever your preference is, and

10 talk to us about whatever it is you want to say, and it

11 will be recorded for the official record and become

12 part of this document.

13 If you're a little bit too shy to do that, you

14 can fill out a comment form. You can also e-mail me.

15 I think my e-mail address is up there, or you can go

16 onto the project website and also leave a comment

17 there. So we're trying to make it easy as we can to

18 make sure that we are inclusive and get as much input

19 as we can from the public.

20 I'll turn it over to Randy now. He's going to

21 go into the detail a little bit more on the actual

22 project.

23 PHIL SWAIN: Question?

24 CHIP LEWIS: Yes, sir.

25 PHIL SWAIN: I'm confused. I haven't been to

Page 12

1 many meetings about the project. So looking at this

2 map, what is all this dark figures here?

3 CHIP LEWIS: That's the existing other Moapa

4 solar project, the one that was already built, the

5 K Road Moapa solar project. And then this is all the

6 power lines, that corridor where they are. And this is

7 the new area that encompasses where it's proposed to be

8 in this area.

9 PHIL SWAIN: So this is a new solar project?

10 CHIP LEWIS: Correct.

11 PHIL SWAIN: So you're starting the whole

12 project over.

13 CHIP LEWIS: At the very beginning, from the

14 very beginning. I think we have the map, which he'll

15 be talking about that here on the screen.

16 PHIL SWAIN: I guess I'm confused.

17 CHIP LEWIS: All right. Well, we'll see if we

18 can get you unconfused.

19 RANDY SCHROEDER: I just want to run through a

20 real quick summary of the project and what it is.

21 Basically this just shows the general location

22 and where it's at on the Reservation. You'll see that

23 it's there in kind of the northwest corner of the

24 southern quadrant of the Reservation there. We're

25 currently right up here at this meeting location, and

Page 13

1 that just gives you kind of the general sense of where
 2 it sits on the Reservation itself.
 3 PHIL SWAIN: So how many acres?
 4 RANDY SCHROEDER: So this right here will show
 5 you where the lease area is. This lease area here is
 6 roughly 5,000 acres.
 7 PHIL SWAIN: Wait, wait, wait. Project will
 8 be 2300 acres --
 9 RANDY SCHROEDER: Okay.
 10 PHIL SWAIN: -- land on the Reservation.
 11 The lease area here is approximately
 12 5,000 acres, within which the project will be located.
 13 And the project will basically cover around 2300 acres,
 14 or a little less than half of this leased area. But
 15 this is --
 16 PHIL SWAIN: But you have 2300 acres here --
 17 RANDY SCHROEDER: That's correct.
 18 PHIL SWAIN: -- on this sheet.
 19 RANDY SCHROEDER: It is going to be
 20 2300 acres, within this 5,000-acre area. So not, not
 21 even half of this area will be used ultimately for the
 22 project. But this is the area that's being evaluated
 23 for the best place to locate that 2300-acre project.
 24 And then, in addition to the solar project,
 25 and then this here was just mentioned by Chip a moment

Page 14

1 ago, this is the existing K Road or First Solar
 2 project, that's located here, just immediately west of
 3 the highway. This is I-15 here.
 4 And then this project is on the other side of
 5 this transmission corridor where all those existing
 6 transmission lines are located. That's where this
 7 lease area is located.
 8 And as another point of reference, roughly
 9 this area right here is where the Tribal has well
 10 locations and also an aggregate operation right in that
 11 area as well, for those of you who might be familiar
 12 with it.
 13 So in addition to the solar field, which would
 14 be located within this overall lease area, there is
 15 also a proposed transmission line that would
 16 interconnect the solar project to the existing
 17 substation up here at Reid Gardner. And so you'll see
 18 this yellow line, basically, is within this utility
 19 corridor, which as Chip mentioned a moment ago, this
 20 utility corridor, this portion of it, is located on the
 21 Reservation but it's managed by the Bureau of Land
 22 Management.
 23 And this line that's proposed for this project
 24 would actually follow and be adjacent to some of those
 25 existing transmission lines, and follow them all the

Page 15

1 way up north to where it leaves the Reservation there
 2 for a short distance on BLM land, and then on private
 3 land owned by NV Energy near the Reid Gardner power
 4 plant and substation.
 5 Access to the project is actually on an
 6 existing access road that goes here to the gravel
 7 operation, and the wells also provides access to the
 8 existing K Road solar project. And so this existing
 9 access goes south, follows Las Vegas Boulevard frontage
 10 road next to the highway, and so that's how access
 11 would be provided.
 12 So those are the primary components of the
 13 project. The solar project, within this area, using
 14 about half of this area; a transmission line
 15 approximately 10 miles or so up here to the existing
 16 Reid-Gardner Substation, and existing access provided
 17 off of I-15.
 18 PHIL SWAIN: Well, you know, I've been looking
 19 at that annual report that's given out to the Tribal
 20 members, and there's like a little checkerboard that
 21 comes down like this, and there's another line that
 22 goes over that says they need an additional 2,000 more
 23 acres, because the Power Purchase Agreement was only
 24 for that one section of 2300 acres.
 25 It's my understanding -- I can't speak for the

Page 16

1 Tribe -- but my understanding that the Tribe said no
 2 more leases unless you have approved purchase
 3 agreement. So you went out and got one for that one
 4 particular area. So what you did is you went out and
 5 got it for the 5,000 acres, but you didn't have that
 6 included in your lease, so now you want more land to be
 7 attached to this Eagle project.
 8 That's what I understand. That's why I was
 9 questioning that, why do you want 5,000 more acres,
 10 when actually you needed to have that Power Purchase
 11 Agreement. And the Tribe's experience is that, you
 12 know, with several projects saying that, "Oh, we need a
 13 six-month delay," or, "We're still working on that
 14 agreement," that agreement never materializes, but yet
 15 that firm is still holding onto that lease. And we're
 16 saying it's okay, you know, and we may have somebody
 17 else in there.
 18 So that's, now, see that's my understanding.
 19 That's why I'm looking at this thing and I'm saying,
 20 "Why do you want 5,000 more acres when you already have
 21 this in place?" And I asked Vernon, and like the
 22 gentleman said, they already started that process, you
 23 know the EIS and everything else like this, that has
 24 already been done on the previous project.
 25 And so now, because your Power Purchase

Page 17

1 Agreement included 5,000 acres, you wanted 5,000 more
 2 acres, and another 500 acres of water to work on that
 3 project.
 4 And that's where my confusion came in, because
 5 I was sitting over there eating lunch and I was looking
 6 at that map. In fact, I had asked the Chairman today
 7 for a copy of all the maps that the Tribe negotiated
 8 with the various firms, starting with First Solar and
 9 all the way up, and I'm wondering how many are
 10 overlapping? Or are they overlapping?
 11 RANDY SCHROEDER: No.
 12 PHIL SWAIN: I'm saying, you know, maybe
 13 they're not, if I looked at that map. In fact, I did
 14 ask Gary Bose for a copy of that map, which he hasn't
 15 produced yet, and so I'm still wondering now. But what
 16 I seen was that's where my confusion came in.
 17 RANDY SCHROEDER: No, I understand that. And
 18 I went back to this map, because I think you were
 19 talking about this extreme southwest corner of the
 20 Reservation?
 21 PHIL SWAIN: No.
 22 RANDY SCHROEDER: There is a project that was
 23 previously approved there.
 24 PHIL SWAIN: Well, when I looked at that
 25 map -- see we had planned a cement plant up there on

Page 18

1 that mountain, and it was kind of right up from where
 2 the proposed project is now and it went around that
 3 mountain. And it went back away, and there, when they
 4 did the testing and drilling, they found the gypsum
 5 they needed, but for other reasons it fell through.
 6 But, it covered that area north of the signal
 7 plant and such. And I'm saying well that, that would
 8 be okay. I don't have a problem with that.
 9 My problem is that, you know, if you're asking
 10 for more land, then the question came up, if you're
 11 asking for more land, then you have to go through the
 12 whole EIS process all through again. So I'm assuming
 13 that's what's happening now with this arrow, whatever,
 14 piece. And I'm saying, well -- and I guess to me
 15 that's -- I don't know. I just -- it's like somebody's
 16 pulling a fast one, and my leg hurts already. And
 17 that's my concern.
 18 RANDY SCHROEDER: Sure. And I'll say just one
 19 thing, and maybe 8minute can speak to one of the
 20 questions you asked.
 21 PHIL SWAIN: Well, I can go out and get my map
 22 on my report.
 23 RANDY SCHROEDER: Okay. This project, as I
 24 said, has an opportunity to lease 2300 acres from the
 25 Tribe for this project. But to do that the most

Page 19

1 effectively, they were looking at this larger area to
 2 find the best place to suit the 2300 acres. So they're
 3 out doing all sorts of environmental studies, cultural
 4 resource studies, species studies, and using that to
 5 best define the best area for the project. So at the
 6 end of the day, they're only allowed to, and will only
 7 utilize 2300 acres. But to your question about a Power
 8 Purchase Agreement, is that something that --
 9 PHIL SWAIN: I don't know. That's just
 10 speculation. That's -- there's no validity --
 11 VICKIE SIMMONS: Phil? You know, they were
 12 going to have that vote -- oh, Jose. When they were
 13 first looking at having the vote for Nevada to go to a
 14 higher renewable portfolio, and so we did get
 15 approached by a lot of companies at that time.
 16 8minute wanted to be a little bit closer to
 17 Nevada Power because the power was going to run from
 18 there to Nevada Power. And where they wanted to locate
 19 was too close to, it was covering the turtle habitat,
 20 and so then we said, "Hey, you can't do it there,
 21 because that's where our tortoise" -- in that vicinity.
 22 So this made them go further south. So I think that's
 23 where the acreage increased, because we said, "This is
 24 where you could start. Here's no good, but right here
 25 is where you could start." So that land is very -- has

Page 20

1 a lot of caliche or it's bad, really hard rock there.
 2 So I think that would be the reason for the increase
 3 amount of acres because of the bad terrain.
 4 So that was Eagle Shadow Mountain 1, they
 5 call, that's the name of the plant, and the company is
 6 8minutenergy.
 7 But there's another one, the very first one
 8 that we did was RES Americas. RES Americas turned into
 9 EDF. EDF has, it has everything done, but no Power
 10 Purchase Agreement. And then this one, we said we want
 11 a Power Purchase Agreement and we got one for this
 12 Eagle Shadow Mountain 1 made by 8minutenergy. So
 13 we're just at the very beginning process of the
 14 Environmental Impact Statement. So that's called Eagle
 15 Shadow Mountain 1.
 16 If there's another one from the same company,
 17 we have to call it a different name. It can't be Eagle
 18 Shadow Mountain 2. It has to have a different name, so
 19 the Tribe will be needing another name should we go
 20 forward with another project.
 21 RANDY SCHROEDER: Okay. So those are the
 22 primary components of the project. As we discussed,
 23 the project will impact up to 2300 acres within that
 24 larger potential lease area.
 25 Then in addition to the lease on those

Page 21

1 2300 acres, there will also be rights-of-way for the
 2 transmission line that we looked at, and then there
 3 will also be a right-of-way on the transmission line
 4 from both the Tribe -- or excuse me -- the BIA, the
 5 BLM, and there will be a right-of-way from the private
 6 land where it crosses NV Energy's land.
 7 So the project in total will produce about
 8 300 megawatts of power using photovoltaic technology,
 9 PV panels, and they're going to be mounted on
 10 single-axis trackers. And what that means is the
 11 existing project that's out there now is fixed-tilt,
 12 where all the rows are lined east-west and the panels
 13 south face into the southern sky.
 14 On a single-axis tracking project, the panels
 15 are mounted on a rotating axis in rows that go north
 16 and south, and every morning they start tilted and
 17 facing east, and then they rotate to follow the sun
 18 during the course of the day, until the evening, and
 19 then at night they go back again to the east so that
 20 they track the sun each day, sunrise to sunset.
 21 These are just some photographs kind of
 22 showing what that technology looks like. These are
 23 kind of close-ups of the panels. You'll see these are
 24 in the flat position. These are single-axis trackers,
 25 and they're stowed flat. A lot of times they're stowed

Page 22

1 that way at night because you don't want the panels
 2 tilted to catch the wind.
 3 And here you'll see the tracking units. So
 4 these panels are just on this rotating, has a
 5 rotational motor, and they just rotate again from east
 6 to west every day.
 7 And so this is what an overall project looks
 8 like. This is a collection of panels in the various
 9 rows, referred to as an array, and that solar array
 10 collects all of the DC power generated by these panels
 11 into an inverter and transformer where it's transformed
 12 to AC power, which eventually makes its way to the grid
 13 and is transmitted on the transmission line.
 14 But that's basically what it looks like, what
 15 a single-axis tracker, PV installation looks like.
 16 So as we said, that solar farm, or the solar
 17 project itself has the solar arrays or groups of panels
 18 that goes to the inverters. That converts the DC
 19 energy the panels create to AC. Then there's a
 20 collection system within the solar project, the solar
 21 field, and it's collected to an on-site substation.
 22 From that on-site substation it's transmitted via the
 23 transmission line.
 24 There would be a small operation maintenance
 25 building on the site, and it will be fenced. There

Page 23

1 will be a fence around the perimeter of the project,
 2 and obviously PV panels and photovoltaic technology
 3 takes no water to generate electricity. So the only
 4 water really used during the project is during
 5 construction for dust control, and a little bit for
 6 operations and maintenance and perhaps occasional panel
 7 washing.
 8 So the associated facilities: As we
 9 mentioned, the transmission line will go from the solar
 10 site up to the existing Reid-Gardner Substation. That
 11 will be a 230kV line, a single steel pole very similar
 12 to this, and similar to some of the other lines that
 13 are already out there. And as we said, it crosses
 14 Tribal land, BLM land, and private land, as you get
 15 close to Reid-Gardner. And even where it crosses
 16 Tribal land, it's within that designated utility
 17 corridor that's managed by the BLM.
 18 The water that we talk about for construction
 19 will be provided as part of the contract by the Tribe
 20 from the wells that are located nearby, and as we
 21 mentioned earlier, the existing access is via the
 22 existing roads that exist there from I-15 on up to the
 23 site.
 24 So there is one alternative that's been
 25 identified to date. As we talked about this yellow

Page 24

1 line is the proposed transmission line or gen-tie line,
 2 generation tie, and it basically follows and parallels
 3 adjacent to those existing lines.
 4 Another one that's been asked to be evaluated
 5 is one that stays within this designated utility
 6 corridor, but just hugs the western edge of the
 7 corridor. So basically very, very similar to the
 8 proposed line, but slightly different in its position
 9 within that designated utility corridor.
 10 So as far as developing the environmental
 11 impact analysis, through this process and other
 12 communications with other agencies and whatnot, here's
 13 what's been identified to date as the topics of focus
 14 of the EIS that will be evaluated.
 15 Biological resources we talked about. There's
 16 Desert Tortoise out there, which occur on the site and
 17 in the area. There's desert vegetation and cacti out
 18 there, which will be evaluated and the potential
 19 impacts to those, and then the potential impact of
 20 birds and other avian species out there as well.
 21 Also, cultural resources. We mentioned that
 22 there have been surveys done already. Those are being
 23 used to define the final footprint of the project so
 24 that they can be successfully avoided to the extent
 25 possible.

Page 25

1 Visual resources. We'll be looking at that to
 2 see what impact that might have and how visible it
 3 might be from identified key locations.
 4 Water resources. Fairly straightforward here,
 5 given the fact that the Tribe's going to provide the
 6 water from their existing wells, but that will also
 7 include an evaluation of the arroyos and washes and
 8 potential flood events and how that could affect the
 9 project or be affected by the project.
 10 And then socio-economics. Again, that's the
 11 biggest driver of the project, it's providing economic
 12 benefit to the Tribe. But that will be identified and
 13 evaluated in the EIS.
 14 Okay. With that, that's pretty much the end
 15 of the presentation. We'd just like to open it up here
 16 for questions that anyone might have, and we do have a
 17 microphone that can come around to help the court
 18 reporter hear your questions. And then, again, this is
 19 Chip's contact information, should you want to contact
 20 him with any comments or questions you might have.
 21 That's up here on the screen. So any comments?
 22 GARY CANTLEY: Make note of the posters.
 23 RANDY SCHROEDER: Oh, yes. Thanks, Gary.
 24 Yes, we do have posters. Some of these slides are
 25 around the room on posters, so if you want to go get a

Page 26

1 closer look, particularly at some of the maps to get a
 2 better idea of where this is located relative to some
 3 of the other features. And we also talk through the
 4 schedule and the process of some of these boards to,
 5 and the different ways to make comments.
 6 RANDALL SIMMONS: Is there any comment we can
 7 do online?
 8 RANDY SCHROEDER: Yes. Yes, you can.
 9 Basically you can send an e-mail directly to Chip, if
 10 you would prefer, but there's also a private website
 11 that's been developed for this EIS, and you can go to
 12 that, and as we publish documents, there are already a
 13 few documents, and some of these maps are already on
 14 the website, but there's also a comment location on the
 15 website where you can actually make a comment right
 16 there.
 17 CHIP LEWIS: And also, when we're done with
 18 the presentation and maybe some of the comments
 19 immediately from folks in attendance, we also are going
 20 to be here for a while. So we can split up into
 21 groups. You know, there's a biologist here, there are
 22 archeologists here. The 8minute people that know about
 23 the actual building of it, the electricity. So we can
 24 go to any of the boards, or we can just be available
 25 individually and privately to talk to and ask questions

Page 27

1 or get clarification, so we can do that too.
 2 RANDALL SIMMONS: Just, could you amplify or
 3 explain further potential, what potential mitigation
 4 plans that you have for endangered species, the
 5 turtles? Because I'm not sure -- of course, I was with
 6 you guys this afternoon, and I just want to know what
 7 the plans are for any type of -- because they are an
 8 endangered species, so I'm just wondering, what -- I
 9 heard something like you might plan to leave them in
 10 place or within their existing natural habitat versus
 11 mitigation. Can you amplify or discuss that?
 12 CHIP LEWIS: Sure. So first off, when the
 13 construction is going on, we know we could maybe run
 14 over some, or when we're clearing a little bit or doing
 15 the actual construction. So before construction, we'll
 16 actually have biologists go in and survey and find as
 17 many or all of the tortoises that are in the
 18 construction area, and they will be lifted out and
 19 taken out of harm's way, and they'll either be put
 20 somewhere to go on their way wherever they want to, or
 21 we'll hold them somewhere safe until we're done.
 22 We're also looking at having monitors that
 23 escort in the vehicles, because they'll be going across
 24 the access road, because lots of construction vehicles
 25 and all, they could run over some, because the

Page 28

1 tortoises don't know. They'll just go on the road.
 2 The vehicles are escorted, I think, every
 3 morning, every evening, and in intervals in between. A
 4 biologist does make a check. And if there's one in the
 5 road, they'll move them out of harm's way.
 6 We're also looking at some design features.
 7 We're exploring and we'll be meeting with U.S. Fish and
 8 Wildlife Service to perhaps make the whole project area
 9 be conducive to the tortoises where we leave vegetation
 10 and cover for them and allow them to still be able to
 11 move through the site and go wherever they want to go
 12 naturally.
 13 We're not sure of all of the mitigating
 14 measures. We're in the process of working those out.
 15 But those are some of the main ones.
 16 RANDALL SIMMONS: What you plan on reservation
 17 mitigation or reservation -- preservation of the
 18 tortoise, are you going to apply that same plan to the
 19 corridor?
 20 CHIP LEWIS: Well, limited. Only inasmuch as
 21 it addresses construction, for the most part, because
 22 the corridor, the only actual impact, I mean when you
 23 go out there now, you just see the tower is on a
 24 concrete pedestal, so each of those pedestals, once
 25 it's all said and done, tortoises can still roam back

Page 29

1 and forth. It's not a barrier. So the mitigation is
 2 during construction. So it will be the same thing.
 3 Someone will be out there surveying, making sure that
 4 they're not right in the area where you're building the
 5 actual tower.
 6 RANDALL SIMMONS: I'm just curious about the
 7 corridor tortoises. Because I'm wondering what the
 8 existing mitigation plans are for them right now.
 9 CHIP LEWIS: As it exists now?
 10 RANDALL SIMMONS: Is there anything?
 11 CHIP LEWIS: I don't think there is, other
 12 than -- I think any time there seems to be activity
 13 going on, there's some kind of monitor maybe or
 14 escorting.
 15 RANDALL SIMMONS: There seem to be some people
 16 just zipping right through there. This is a
 17 BLM-maintained road. And I was just saying, well, if
 18 we're going to do all this stuff on Reservation for
 19 making sure that we preserve and take care of the
 20 tortoise. But what's going on right now in the
 21 corridor? These guys are just racing through there.
 22 CHIP LEWIS: Okay. That's good for us to
 23 know. That's exactly what we're asking for. So that
 24 can be something we address as part of the process with
 25 BLM.

Page 30

1 RANDALL SIMMONS: Of course, additional
 2 construction will increase all that traffic. You'll
 3 address that, but I don't know if the BLM, what they're
 4 doing right now for the existing corridor. And just
 5 maintain a speed area, or any type of -- I've seen
 6 Desert Tortoise signs, but does the BLM that you work
 7 for -- and they might have some representatives here --
 8 can they do anything to slow down the speed of the cars
 9 just blazing through this BLM corridor? Is there
 10 anything that can be done?
 11 CHIP LEWIS: I do not know, sir. That is
 12 certainly, that's what we'll explore with them for, or
 13 during this process.
 14 RANDALL SIMMONS: Because I'm wondering -- so
 15 I'm kind of wondering if this will address the
 16 long-term impact. If they built something, how is that
 17 going to impact the existing tortoises within the
 18 corridor?
 19 CHIP LEWIS: Thank you.
 20 RANDALL SIMMONS: Question for -- that's a
 21 question.
 22 UNIDENTIFIED SPEAKER: I got a question. What
 23 if I got a threat from a terrorist? Who do I call?
 24 CHIP LEWIS: As it relates to a threat against
 25 the solar project?

Page 31

1 UNIDENTIFIED SPEAKER: Well, the technology.
 2 I heard a terrorist (inaudible).
 3 CHIP LEWIS: I guess I would say the same
 4 thing.
 5 UNIDENTIFIED SPEAKER: Who do I call? I mean,
 6 if anyone was planning to shut the power plant down.
 7 (inaudible) How do I keep a terrorist off? So we got
 8 solar -- eyes burned out of his head -- (inaudible) So
 9 who do I call?
 10 VICKIE SIMMONS: We can write that up and ask
 11 it for you. Find out.
 12 UNIDENTIFIED SPEAKER: Can I get a card?
 13 CHIP LEWIS: Sure.
 14 RANDALL SIMMONS: Do you have an e-mail
 15 address?
 16 CHIP LEWIS: Sure. My e-mail address.
 17 RANDY SCHROEDER: On the screen, it's also on
 18 the boards in the back.
 19 TYLER SAMSON: So like this other solar
 20 project, they had a turtle fence around it. You're
 21 thinking about not doing that?
 22 JASON MORETZ: One of the things that U.S.
 23 Wildlife Services asked us to explore is putting up
 24 Desert Tortoise exclusion fence during construction,
 25 moving the tortoises out of harm's way, and then after

Page 32

1 construction having that perimeter fence be permeable
 2 or semi-permeable, have holes cut in it, or maybe in
 3 intervals, or maybe bending back the bottom of it to
 4 allow tortoises to use the site.
 5 CHIP LEWIS: Or there will be like a little
 6 opening, you know, they hit the fence, go along it and
 7 they'll come to the opening and they can continue on,
 8 hit the other side, go to the opening and continue on.
 9 TYLER SAMSON: The ones that are already in
 10 the burrows though, you got to go and excavate them
 11 out, right? So you'd be in there, probably, maybe, I
 12 don't know how many burrows you'd destroy by
 13 excavating, but you'd probably take 20 homes.
 14 CHIP LEWIS: I think you know a little bit
 15 more about that and what actually goes on, right? They
 16 try and pretty much make sure we get them out or know
 17 which ones are active. You can tell whether a tortoise
 18 is actually in one and it's active and being used. And
 19 some of these hardcore tortoise biologists guys know
 20 what to do. They can recognize them in an instant, and
 21 then they excavate them and get them out.
 22 There are certain rules and protocols, and we
 23 have to handle them, have gloves on, all kinds of
 24 things, and then they'll take care of them.
 25 But I think the success rate is pretty good on

Page 33

1 not actually crushing any or doing anything to them.
 2 And that's part of our negotiation of what we do with
 3 the Fish and Wildlife Service. Since it is endangered
 4 and that's what they're in charge of, they say you can
 5 do your project, but you can only hurt one or two
 6 during the, your whole project. So there will be a
 7 whole group of folks out there making sure that we
 8 don't reach that threshold of hurting more than we're
 9 allowed to.
 10 RANDALL SIMMONS: Is that really feasible?
 11 What type of success rates do you have for opening it
 12 up after construction? Because they're put back in the
 13 same solar array field. What's -- I'm wondering what
 14 the success rate is, because it seems like you almost
 15 have to monitor every turtle on that site.
 16 CHIP LEWIS: Right.
 17 RANDALL SIMMONS: I'm wondering what type of
 18 science has been done in that regard?
 19 JASON MORETZ: Just real quick wanted to
 20 mention that once the plant is actually constructed, in
 21 operation, the activities that actually take place
 22 inside the fence line are very minimal. Very limited
 23 vehicle traffic. There's not tens of thousands of
 24 workers in there. I mean, it's a couple of people, and
 25 those people will be trained to look for and avoid

Page 34

1 Desert Tortoise when they're inside the plant and the
 2 project is operational.
 3 RANDALL SIMMONS: Well, I can see that. I
 4 mean, that's common sense, they'll try to avoid them,
 5 but those turtles you can't see out of your truck. I'm
 6 just wondering if it's feasible. It's cheaper, I know
 7 that, but I'm just trying to figure out if that's
 8 feasible for -- if there is actually evidence that
 9 that's --
 10 CHIP LEWIS: Well, it's pretty new, so we're
 11 kind of developing and going to -- I guess it's worked
 12 for some other animals, you were saying, Luke, in
 13 California? So there seems to be some success.
 14 LUKE SHILLINGTON: It's worked with kit foxes
 15 in California, and recently, I mean, this is something
 16 that wildlife agencies -- it's been new to us as well.
 17 It's something that they brought up recently because
 18 they've done some pilot programs and had good success
 19 with tortoises actually using the sites following
 20 construction. So, you know, again it's something that
 21 we're looking at as an alternative. It may be the best
 22 thing for the species to continue to use the site.
 23 The big other factor is that there's concerns
 24 about if you've got a perimeter fence around the whole
 25 project cutting off connectivity of, you know, genetic

Page 35

1 connectivity, it forces maybe more to the site, because
 2 of it. So allowing them to move through without a
 3 permanent physical barrier is what wildlife agencies
 4 are --
 5 PATRICK GOLDEN: And I'd like to just add too,
 6 that this idea, as everybody is saying, is relatively
 7 new. Nobody really knows, but it's almost certain that
 8 the agencies will require any tortoise that is removed
 9 from the construction footprint during construction to
 10 be fitted with a transmitter. I mean, we haven't had
 11 these negotiations yet, but it's likely. Usually in
 12 this part of the desert, when one is translocated, they
 13 are fixed with a transmitter and then they're tracked,
 14 you know, for years, not just during construction,
 15 so --
 16 RANDALL SIMMONS: There's construction, and
 17 after construction, how can we watch out for them?
 18 It's one thing to watch out from running them over.
 19 It's another thing to see that they thrive afterward.
 20 Because like you said, I mean, we don't want to mess up
 21 their mating rituals and habits, you know, whatever
 22 they do.
 23 PATRICK GOLDEN: Absolutely.
 24 TYLER SAMSON: Is it just because when you
 25 translocate them a distance, are you just trying to

Page 36

1 save money? I mean, I know, I understand when you're
 2 going to do the site, you're going to build the fence
 3 and do work in there. But there's going to be
 4 tortoises in there, and they're going to be in the
 5 ground. For those ones, you're going to have to tear
 6 down the burrow, right?
 7 PATRICK GOLDEN: Yes.
 8 TYLER SAMSON: Pull them out, do your
 9 husbandry, check the blood and tag them. But if you
 10 let them go, they're going to try to come back to that
 11 place.
 12 PATRICK GOLDEN: Yes. So I guess during
 13 translocation activities, as Chip was mentioning
 14 earlier, you find burrows, they don't dig up every
 15 single burrow. They use scopes to get in there,
 16 borescopes to see if there's an animal in there. If
 17 they can confirm that there's not, that burrow remains
 18 intact.
 19 You know, there would be some burrows
 20 destroyed, but there would also be others that would
 21 remain, and I think that's what Fish and Wildlife
 22 Services' idea is. If we can preserve some level of
 23 suitable habitat for these animals to have after
 24 construction, and there's a fence that's permeable, the
 25 hope is that they would come back in and reinhabit the

Page 37

1 area. They could still use it to move through instead
 2 of being blocked by an exclusion fence.
 3 TYLER SAMSON: I mean, I've worked on plenty
 4 of jobs where, even when we get escorted -- I had an
 5 escort in a buggy run over the tortoise, because it's
 6 not a kit fox. They're camouflaged, you can't see
 7 them. They're about that big. So, I mean, I can
 8 understand foxes, right? They're trying to get out of
 9 the way and they're quick, but a slow-moving tortoise,
 10 I'm just trying to get a better picture of how --
 11 because letting them go and come back, and if you're
 12 going to have tanks on the project --
 13 CHIP LEWIS: Well, one thing we know, I used
 14 to do a lot of research. I used to work for Arizona
 15 Game and Fish in their research and study all around
 16 with radio telemetry and recording their home range.
 17 When you move an animal out of its core area and then
 18 the bigger area is the home range and you put it
 19 somewhere else, it generally doesn't do as well as if
 20 it can be back within its home range.
 21 So it could be, and probably the premise is,
 22 even if there's still something that's going to happen
 23 down the road, it might be preferable to when you move
 24 it to a whole new area, that to make a new home range.
 25 So --

Page 38

1 TYLER SAMSON: We should have the analytics on
 2 that as far as the numbers, because we have a
 3 designated tortoise area. So I'd be interested to
 4 know, after the transportation, how many survived, and
 5 I guess maybe that would tell you a little bit about
 6 the home range, right?
 7 CHIP LEWIS: Yeah. That will be part of the
 8 discovery process. Everything we'll do in the analysis
 9 in this EIS document, that will help lead us to what is
 10 the best thing we can do.
 11 TAMARA DAWES: Chip, you might want to remind
 12 the Tribe that we do have, from the First Solar
 13 project, we do have that five-year plan in the summary
 14 that has occurred from the original translocation of
 15 those tortoises, so we can look to that and see what
 16 the return rates, if they actually returned to that
 17 particular area, because they did track those tortoises
 18 that were translocated.
 19 CHIP LEWIS: That was followed after that.
 20 PHIL SWAIN: Well, you know, I can see, what
 21 you're saying, but you're from the government. The
 22 people that are going to run this project are these two
 23 people here. Are they agreeing to everything what
 24 you're saying about you're going to watch this and
 25 you're going to watch that? Because I know like, I

Page 39

1 don't know who was saying, somebody used to be the
 2 turtle monitor, you know, making sure that when you
 3 went down that road, that you went down, I guess you
 4 were saying, like 5 miles an hour so you don't run over
 5 a turtle. And we're kind of like turtle experts
 6 ourselves, because they tell us not to pick them up and
 7 move them or do this or do that.
 8 So what you're saying is you discussed it with
 9 the new owners that have come in there and spent their
 10 money to make sure these things don't happen, because
 11 if you run over one too many turtles, then they're shut
 12 down. That's the way I understand it.
 13 CHIP LEWIS: Pretty close, yeah.
 14 PHIL SWAIN: That brings up the next question,
 15 is how many EIS projects has the Bureau done on the
 16 Reservation that could probably just talk to these
 17 people and tell them that, you know, this is what you
 18 need to look out for, or that this is my fifth project
 19 here on the Reservation. We're starting out with,
 20 what, First Solar, you know, that you have the EIS
 21 process, and this is what we're going to do and how
 22 we're going to do it.
 23 The proposal comes in and says this is what
 24 we're going to do, and I don't know what point we hear
 25 from the owners to say, "Yeah, we agree with everything

Page 40

1 the Bureau says." But I keep on thinking that now that
 2 First Solar's completely done, I don't know if we have
 3 any BIA police out there monitoring the travels of the
 4 tortoise, you know. And what we're saying is, to them,
 5 if you run over a turtle and he's still mature and
 6 still kicking and alive, bring it over to the Tribe,
 7 because the Tribe can throw it in the pot and have
 8 turtle soup.
 9 So those are the things they need to be told
 10 that this is what we need to do. You're talking up
 11 there like we've done this and you're not, you're not
 12 the biologist; right? Or are you the biologist?
 13 CHIP LEWIS: Not for this project, no.
 14 PHIL SWAIN: That's what I'm saying. That
 15 person would be on site while this project is being
 16 built. And I know that once the lease is signed, that
 17 becomes off limits to everybody, except those people
 18 working there. So myself as a Tribal member, I can't
 19 go onto that project just to observe or look around.
 20 So, you know, all the land that we lease, we
 21 lose control of. You know, we don't have no say any
 22 more once that comes into being. And I can understand
 23 why, but still, you know, that's what we end up losing.
 24 That's why I asked for a map of all the
 25 projects that were going on on the Reservation to make

Page 41

1 sure they weren't, you know, overlapping or -- because
 2 we've got one up here on the hill, you know, and I
 3 don't know where the hell that's at, but that's one of
 4 the projects, and then we've got another one over
 5 there, we got one over here, over there, and we got one
 6 in the far corner, so there's like five or six going on
 7 all at the same time, and if we had that many going on,
 8 we would have BIA here on a permanent basis, making
 9 sure everything was proper, and I don't see that. And
 10 you have those EIS reports for all those other
 11 projects.

12 CHIP LEWIS: Well, ultimately, to get kind of
 13 to the root of your question, we are working with
 14 8minute, and they'll be doing -- you know, we don't
 15 dictate and say, "You will do this," but in the end, in
 16 the lease package, the mitigation, the basic plans that
 17 we come up, as all the agencies together, including the
 18 Tribe, those will be appended to the lease agreement.
 19 And that -- so they become a term and condition, just
 20 like any other term and condition for like worker
 21 safety and everything else that goes on with a normal
 22 construction project.

23 So if there is something like, even after it's
 24 done, those couple or three workers are there, they can
 25 only go 10 miles an hour, that will be a part of the

Page 42

1 agreement we work out with those folks.

2 PHIL SWAIN: So how many projects has the
 3 Bureau been involved with here on the Reservation?
 4 CHIP LEWIS: We've been involved in three
 5 prior.

6 PHIL SWAIN: Which ones are they?
 7 CHIP LEWIS: The original K Road, the
 8 RES Americas, and the Aiya.

9 TAMARA DAWES: Of those three, there's only
 10 two executed leases.

11 PHIL SWAIN: That's the First Solar?
 12 TAMARA DAWES: First Solar and --
 13 VICKIE SIMMONS: Which EDF is the name now.
 14 TYLER SAMSON: Have there been any discussions
 15 about -- I know we talked about grubbing the site
 16 instead of, you know, for dust control. Instead of
 17 going with a blade and taking the topsoil off the whole
 18 area, I mean, it's just left bare, no vegetation,
 19 especially if you're planning on wanting the tortoises
 20 to run back in there, so maybe grubbing the site,
 21 taking all the topsoil off, because that's what keeps
 22 all the dust down is the topsoil, especially out there.

23 LUKE SHILLINGTON: Our construction guy
 24 unfortunately fell ill and wasn't able to be here
 25 tonight. The thing is that our construction -- we

Page 43

1 wanted him to be here today to talk about the
 2 construction issues. He is unable to make it. But he
 3 has been out to the site. Engineers are engaged in
 4 looking at it. The plan is to leave as much of that
 5 topsoil and vegetation intact as possible.

6 So there will be some places where minimal
 7 grading needs to take place, the associated foundation,
 8 the perimeter access road. For the arrays, they're
 9 looking at, you know, trimming some of the vegetation,
 10 you know, not mowing it down to the ground even, but
 11 leaving it as much intact as possible and just driving
 12 piles.

13 RANDALL SIMMONS: Could you comment on the
 14 culture site, planning to build on? Because there's
 15 been -- there's 2300 acres, but 5,000 are out there
 16 right now available. Are you going to build around
 17 those?

18 LUKE SHILLINGTON: Yes, so there -- I don't
 19 have the exact numbers of how many sites were
 20 identified, but there were a number identified.
 21 There's the large one we were at this morning. The big
 22 significant ones we are planning on completely
 23 avoiding. There are some other sites that are
 24 currently within, you know, the proposed footprint of
 25 the project so that's something we have to discuss.

Page 44

1 VICKIE SIMMONS: For the most part, would the
 2 Tribe receive reports on those, and they're
 3 confidential and they're not marked and they're only
 4 property of the Tribe and they stay in the Tribal
 5 Council chambers, so they are not something that we
 6 tell everybody about or share with everybody.

7 We do have that in record in the Tribal
 8 Council chambers for each project. I don't know if we
 9 have time to look at them. I looked for pictures, but
 10 some of the ones that I seen are so interesting, they
 11 go back on the whole history of the area. They have
 12 reports on who was living here, census markers and all
 13 types of stuff, especially for up here on the Aiya one.
 14 So they're very interesting, if some people would want
 15 to read those documents. But for the young people that
 16 are here, you know, someday that could be a goal of
 17 ours, you know, for other people to take a look at
 18 those books that we have with regard to cultural sites.

19 TYLER SAMSON: I like the yellow proposed
 20 transmission line.

21 LUKE SHILLINGTON: We do too.
 22 PHIL SWAIN: Does it go north? To where?
 23 RANDY SCHROEDER: To Reid-Gardner. That
 24 substation is still there and active. It was
 25 interconnected to that substation.

Page 45

1 LALOVI MILLER: (Inaudible)
 2 THE COURT REPORTER. I can't hear.
 3 LALOVI MILLER: (Inaudible)
 4 VERNON LEE: I was going to mention that I
 5 guess one -- he liked the one yellow marked line out
 6 there. My question is how many -- has anybody
 7 forecasted how many -- it's kind of a Tribal
 8 question -- how many potential solar sites that we
 9 might build, and how much room is in the corridor which
 10 you have to include FERC and anybody else -- I think
 11 the TransWest is going in there -- how many potential
 12 power lines can fit in the corridor, and can the
 13 corridor be expanded if it needs to be expanded? So
 14 it's kind of a forecast.
 15 You know, I can't see that, but I think
 16 there's four or five lines out there now, plus this
 17 one. Projecting forward, how many solar sites -- how
 18 many is going to go to Reid-Gardner, how many to
 19 Crystal? In other words, the layout of where are all
 20 these power lines going to go?
 21 We've got another potentially four or five
 22 solar sites, I think, that could be developed? Are
 23 they going to fit in?
 24 RANDALL SIMMONS: That's a Tribal question,
 25 and that was asked this afternoon. We didn't know,

Page 46

1 because right now we said, "Where is this one going to
 2 go? Where is TransWest going to go?" It's in the
 3 planning stages. It's not final yet. They have to do
 4 their reviews, and then we'll find out where TransWest
 5 goes and where this 8minutenergy goes.
 6 Also, that's a huge corridor. I thought it
 7 was near where all electrical are, and I thought they
 8 were going to deal with that inside that. No. I think
 9 it's almost -- almost a mile wide.
 10 So basically the existing corridor, it's
 11 almost, you almost got to lease that same size coming
 12 out of it, that they have built on.
 13 VERNON LEE: Right now there is plenty of
 14 room?
 15 RANDALL SIMMONS: Right now, yes.
 16 VERNON LEE: We're going to cross that bridge,
 17 presumably the Tribe and the BLM can come to terms
 18 about expanding it.
 19 RANDALL SIMMONS: And right now those two
 20 lines, TransWest and this one, are just coming.
 21 They're going to figure out based upon everything
 22 that's being put in right now where they're going to
 23 put those two lines. So we're studying those.
 24 As far as Tribal members that get employed,
 25 just a quick announcement for Tribal members. If you

Page 47

1 know somebody, they're going to be needing biologists,
 2 they're going to need, we're going to -- we don't have
 3 trained biologists, maybe, but we're going to need
 4 folks to be -- that might do additional cultural logs
 5 and additional turtle monitors, even biologists.
 6 So that's -- there might be needs out there
 7 and hopefully these, the companies that come in will
 8 work with us and employee these guys. We'll let Carol
 9 know so Carol can start planning for that so we can get
 10 employment for our people.
 11 VERNON LEE: I got another question. That is
 12 like in the future, you know, technology is going
 13 forward so fast, what happens if they come out with new
 14 solar, or PVs that are twice as efficient? And let's
 15 say, I mean, there's all kind of PV south of Vegas, and
 16 if they start upgrading theirs, at what point are we
 17 going to upgrade these so we can stay in the market, so
 18 we don't fall behind?
 19 JASON MORETZ: So we have a Purchase Power
 20 Agreement for 25 years with NV Energy. We are required
 21 to provide NV Energy with 300 megawatts of power every
 22 year for 25 years. So regardless what the new
 23 technology looks like, there will be no mandate for us
 24 to go and upgrade. Doesn't mean that there might not
 25 be an opportunity in the future, but in terms of our

Page 48

1 current Purchase Power Agreement, there's nothing in
 2 there that would either require us to or, you know,
 3 motivate us to change that technology.
 4 RANDALL SIMMONS: If that were the case,
 5 Vernon, I think that would be a First Solar problem.
 6 VERNON LEE: Yeah, we're locked in. As a
 7 tribe, we're locked in with what we agreed to.
 8 RANDALL SIMMONS: I just think if they get
 9 better technology, I think we might have a green world.
 10 VERNON LEE: Yeah, I know.
 11 TYLER SAMSON: Are all the panels going to be,
 12 are they going affixed, or are they going to be like
 13 those ones that move like that?
 14 LUKE SHILLINGTON: They'll be trackers.
 15 TYLER SAMSON: How come the one out there
 16 right now doesn't do that? The one that moves, is it
 17 better. Seems like those rams or something always keep
 18 going out.
 19 JASON MORETZ: So there's -- I can't remember
 20 exactly how old that project is, but essentially every
 21 project, you know, they do analyses to optimize the
 22 cost of the project, also production of the project,
 23 how much sun and where it is, and we run through all
 24 those. In the past five or six years, tracker systems
 25 have come down so much in price that they -- and they

Page 49

1 outperformed fixed, so that makes sense to install
 2 those. It's economics and production. They just
 3 produce more power because they track the sun optimal
 4 angles.
 5 TYLER SAMSON: Someone mentioned to me about
 6 the solar panels when the panels, like when they get
 7 old, they bleed out.
 8 LALONI MILLER: It was on TV a couple of years
 9 that the solar panels only last not very long. So what
 10 are these guys going to do after that? That was on TV
 11 two years ago.
 12 JASON MORETZ: So a couple of questions there.
 13 So the technology in solar panels has improved
 14 quite a bit, not only just in the last decade, but even
 15 within the last 4 years. And to her point, some of the
 16 older solar panels, there were concerns about whether
 17 materials were leaching from the panels. Today's
 18 panels, with the studies, that's one of the things that
 19 goes into the environmental document, environmental
 20 analyses. We have spec sheets that list out all the
 21 components in panels, what the panel is made of. And
 22 all our panels are guaranteed by the manufacturers.
 23 So, to your question of how long do they last?
 24 They do degrade over time in terms of how much energy
 25 they produce, but essentially what this project will do

Page 50

1 will be to install the panels, that we make sure we
 2 meet our Purchase Power Agreement for the next 25
 3 years.
 4 So in 25 years from now, you're not going to
 5 go out there and see panels falling apart.
 6 VERNON LEE: This may be a little too far out
 7 of the box, but is there -- what happens in the event
 8 that there's a gamma burst at the sun, eight minutes
 9 later it comes in and here it fries all the panels?
 10 You know, I mean -- that theoretically could happen.
 11 What would happen? I mean, do you still pay us, even
 12 though the panels are all fried?
 13 JASON MORETZ: We pay you, regardless of what
 14 happens. Our lease with you is a 25-year lease, with
 15 additional options that take us to 50 years. We pay
 16 you each and every year. If the solar plant, something
 17 happens, a big hailstorm comes and all the panels are
 18 damaged, the site's insured, and it will be insured to
 19 the point you keep receiving your revenue.
 20 CHIP LEWIS: Well, unless there's any other
 21 direct questions, I think this concludes our formal
 22 presentation and question and answer, but like I said,
 23 I think we're staying here until 7:30; right? So we'll
 24 be here until 7:30 and talk to us, answer questions, go
 25 look at the map or go through any of the materials we

Page 51

1 have, and we'll be glad to do whatever needs to be
 2 done.
 3 VICKIE SIMMONS: Is tomorrow night another
 4 scoping meeting in Las Vegas?
 5 CHIP LEWIS: Yes. It's at the same time, 5:30
 6 to 7:30.
 7 VICKIE SIMMONS: And that's probably when the
 8 BLM and the Fish and Wildlife will be over there?
 9 CHIP LEWIS: Right. They'll be there and
 10 they'll help answer questions or be involved.
 11 VICKIE SIMMONS: When are they having that
 12 interagency meeting?
 13 CHIP LEWIS: That is from 2:00 to 4:00.
 14 VICKIE SIMMONS: Can we go to that one, too?
 15 CHIP LEWIS: That's the interagency for all
 16 the agencies I had up earlier that are actually
 17 participating in the preparation. So --
 18 VICKIE SIMMONS: All right. Thank you.
 19 (Proceedings adjourned at 7:01 p.m.)
 20
 21
 22
 23
 24
 25

Page 52

CERTIFICATE OF REPORTER
 STATE OF NEVADA)
 COUNTY OF CLARK)
 I, Kevin Wm. Daniel, Certified Court Reporter,
 do hereby certify:
 That I reported in shorthand the proceedings had
 in the above-entitled matter at the place and date
 indicated.
 That I thereafter transcribed my said shorthand
 notes into typewriting, and that the typewritten
 transcript is a complete, true and accurate
 transcription of my said shorthand notes.
 I further certify that I am not a relative or
 independent contractor of counsel, of any of the
 parties; nor a relative, employee, or independent
 contractor of the parties involved in said action; nor
 do I have any other relationship with any of the
 parties or with counsel of any of the parties involved
 in the action that may reasonably cause my impartiality
 to be questioned.
 IN WITNESS WHEREOF, I have set my hand in my
 office in the County of Clark, State of Nevada this
 12th day of March, 2019.
 KEVIN WM. DANIEL, CCR #711

WORD INDEX

< 1 >

1 20:4, 12, 15
10 15:15 41:25
12th 52:23
1956 4:1

< 2 >

2 20:18
2,000 15:22
2:00 51:13
20 32:13
2019 1:8 52:23
2300 13:8, 13, 16,
 20 15:24 18:24
 19:2, 7 20:23
 21:1 43:15
2300-acre 13:23
230kV 23:11
25 47:20, 22 50:2,
 4
25-year 50:14
26 4:4

< 3 >

300 21:8 47:21

< 4 >

4 49:15
4:00 51:13

< 5 >

5 1:8 39:4
5,000 13:6, 12
 16:5, 9, 20 17:1, 1
 43:15
5,000-acre 13:20
5:30 1:9 51:5
50 50:15
500 17:2
50-year 7:23

< 7 >

7:01 51:19
7:30 50:23, 24
 51:6
711 1:25 52:25

< 8 >

8minute 6:7 7:16
 18:19 19:16
 26:22 41:14
8minutenergy 4:14,
 18, 19, 22, 23 20:6,
 12 46:5

< A >

able 28:10 42:24
above-entitled 52:7
Absolutely 35:23
AC 22:12, 19
Access 15:5, 6, 7, 9,
 10, 16 23:21 27:24
 43:8
accurate 52:11
acquisition 4:23
acreage 19:23
acres 13:3, 6, 8, 12,
 13, 16, 20 15:23, 24
 16:5, 9, 20 17:1, 2,
 2 18:24 19:2, 7
 20:3, 23 21:1
 43:15
Act 5:25 8:22
action 7:24 52:16,
 19
active 32:17, 18
 44:24
activities 33:21
 36:13
activity 29:12
actual 8:25 11:21
 26:23 27:15
 28:22 29:5
add 35:5
addition 13:24
 14:13 20:25
additional 15:22
 30:1 47:4, 5 50:15
address 10:19
 11:15 29:24 30:3,
 15 31:15, 16
addresses 28:21
adjacent 14:24
 24:3
adjourned 51:19
AFFAIRS 1:17
 2:16, 19 3:1
affect 9:18 25:8
affixed 48:12

afternoon 2:25
 27:6 45:25
afterward 35:19
agencies 3:14
 24:12 34:16 35:3,
 8 41:17 51:16
agency 3:11, 13
 5:12 6:14
aggregate 14:10
ago 14:1, 19 49:11
agree 39:25
agreed 48:7
agreeing 38:23
Agreement 15:23
 16:3, 11, 14 17:1
 19:8 20:10, 11
 41:18 42:1 47:20
 48:1 50:2
agreement, 16:14
ahead 7:19 8:16
 10:25
Air 6:25
Aiya 42:8 44:13
alive 40:6
allow 10:15 28:10
 32:4
allowed 19:6 33:9
allowing 35:2
alternative 23:24
 34:21
Americas 20:8, 8
 42:8
amount 8:20 20:3
amounts 7:21
amplify 27:2, 11
analyses 48:21
 49:20
analysis 24:11
 38:8
analytics 38:1
analyzes 6:2
angles 49:4
animal 36:16
 37:17
animals 9:16
 34:12 36:23
announcement
 46:25
annual 15:19
answer 50:22, 24
 51:10

anybody 9:4 45:6,
 10
apart 50:5
appended 41:18
apply 28:18
approached 6:5
 19:15
appropriate 10:15
approval 7:24
approve 10:25
approved 9:1
 16:2 17:23
approximately
 13:11 15:15
archeologist 3:2, 4
archeologists 26:22
area 12:7, 8 13:5,
 5, 11, 14, 20, 21, 22
 14:7, 9, 11, 14
 15:13, 14 16:4
 18:6 19:1, 5
 20:24 24:17
 27:18 28:8 29:4
 30:5 37:1, 17, 18,
 24 38:3, 17 42:18
 44:11
arises 5:24
Arizona 37:14
array 22:9, 9
 33:13
arrays 22:17 43:8
arrow 18:13
arroyos 25:7
ASHLEY 3:18, 18
asked 16:21 17:6
 18:20 24:4 31:23
 40:24 45:25
asking 9:20 18:9,
 11 29:23
assisting 2:16, 23
 3:4
associated 23:8
 43:7
assuming 18:12
attached 16:7
attendance 26:19
authority 7:11
available 10:12
 26:24 43:16
avian 24:20

<p>avoid 33:25 34:4 avoided 24:24 avoiding 43:23 always 18:3 axis 21:15</p> <p>< B ></p> <p>back 4:1, 25 17:18 18:3 21:19 28:25 31:18 32:3 33:12 36:10, 25 37:11, 20 42:20 44:11</p> <p>background 2:7 bad 9:18 20:1, 3 ballplayer 4:11 Band 6:14, 14 bare 42:18 BARGER 3:3, 3 barrier 29:1 35:3 based 46:21 basic 41:16 basically 5:25 11:1 12:21 13:13 14:18 22:14 24:2, 7 26:9 46:10 basis 41:8 beginning 9:23 12:13, 14 20:13 believe 2:9 bending 32:3 benefit 8:5, 9 25:12 benefits 8:20, 22 best 8:23 10:9 13:23 19:2, 5, 5 34:21 38:10 better 26:2 37:10 48:9, 17 BIA 2:23 3:8 4:16 6:6 7:15, 24 8:10, 12, 14 9:5 21:4 40:3 41:8 big 6:17 7:13 34:23 37:7 43:21 50:17 bigger 37:18 biggest 25:11 Biological 24:15 biologist 26:21 28:4 40:12, 12</p>	<p>biologists 27:16 32:19 47:1, 3, 5 birds 24:20 bit 11:13, 21 19:16 23:5 27:14 32:14 38:5 49:14 blade 42:17 blazing 30:9 bleed 49:7 BLM 6:16, 18, 19 7:10, 12 15:2 21:5 23:14, 17 29:25 30:3, 6, 9 46:17 51:8 BLM-maintained 29:17 blocked 37:2 blood 36:9 board 6:10 7:7 boards 26:4, 24 31:18 books 44:18 borescopes 36:16 Bose 17:14 bottom 32:3 Boulevard 15:9 box 9:23 10:4 50:7 Brandy 3:20, 20 Brett 3:15, 15 bridge 46:16 bring 40:6 brings 39:14 brought 34:17 buggy 37:5 build 6:7 8:19 36:2 43:14, 16 45:9 building 9:14 22:25 26:23 29:4 built 12:4 30:16 40:16 46:12 bullet 7:22 BUREAU 1:17 2:16, 19 3:1 14:21 39:15 40:1 42:3 burned 31:8 burrow 36:6, 15, 17 burrows 32:10, 12</p>	<p>36:14, 19 burst 50:8 business 4:25</p> <p>< C ></p> <p>cacti 24:17 caliche 20:1 California 34:13, 15 call 20:5, 17 30:23 31:5, 9 called 5:23 10:8 20:14 camouflaged 37:6 Canon 3:14 Canseco 4:11 CANTLEY 2:25, 25 3:4 25:22 card 31:12 care 29:19 32:24 Carol 47:8, 9 cars 30:8 case 6:5 48:4 catch 22:2 cause 52:19 CCR 1:25 52:25 cement 17:25 census 44:12 certain 8:19 32:22 35:7 certainly 30:12 CERTIFICATE 52:1 Certified 52:4 certify 52:5, 13 Chairman 2:8 17:6 chambers 44:5, 8 chance 5:14 change 48:3 charge 33:4 cheaper 34:6 check 28:4 36:9 checkerboard 15:20 Cheryl 4:25 5:2, 2 CHIP 1:15 2:18, 18 3:6 5:6, 19 7:21 11:24 12:3, 10, 13, 17 13:25 14:19 26:9, 17</p>	<p>27:12 28:20 29:9, 11, 22 30:11, 19, 24 31:3, 13, 16 32:5, 14 33:16 34:10 36:13 37:13 38:7, 11, 19 39:13 40:13 41:12 42:4, 7 50:20 51:5, 9, 13, 15 Chip's 25:19 CHRISTINA 3:10, 10 City 4:5 clarification 27:1 CLARK 52:3, 22 clearing 27:14 close 19:19 23:15 39:13 closer 19:16 26:1 close-ups 21:23 collected 22:21 collection 22:8, 20 collects 22:10 come 7:5 25:17 32:7 36:10, 25 37:11 39:9 41:17 46:17 47:7, 13 48:15, 25 comes 15:21 39:23 40:22 50:9, 17 coming 5:3 7:2 46:11, 20 comment 5:14, 16 9:20 10:10, 13 11:14, 16 26:6, 14, 15 43:13 comments 10:16, 19 11:6 25:20, 21 26:5, 18 commitment 6:23 common 34:4 communal 6:11 communications 24:12 community 9:17 companies 19:15 47:7 company 6:6 20:5, 16 complete 52:11</p>
---	---	--	---

<p>completely 40:2 43:22</p> <p>complies 8:12</p> <p>components 15:12 20:22 49:21</p> <p>concern 18:17</p> <p>concerns 9:4 34:23 49:16</p> <p>concludes 50:21</p> <p>concrete 28:24</p> <p>condition 41:19, 20</p> <p>conductive 28:9</p> <p>confidential 44:3</p> <p>confirm 36:17</p> <p>confused 11:25 12:16</p> <p>confusion 17:4, 16</p> <p>connectivity 34:25 35:1</p> <p>constructed 33:20</p> <p>construction 23:5, 18 27:13, 15, 15, 18, 24 28:21 29:2 30:2 31:24 32:1 33:12 34:20 35:9, 9, 14, 16, 17 36:24 41:22 42:23, 25 43:2</p> <p>consultants 4:16</p> <p>contact 25:19, 19</p> <p>continue 32:7, 8 34:22</p> <p>contract 23:19</p> <p>contractor 52:14, 16</p> <p>control 23:5 40:21 42:16</p> <p>converts 22:18</p> <p>cooling 4:3</p> <p>cooperator 6:13</p> <p>copy 17:7, 14</p> <p>core 37:17</p> <p>corner 12:23 17:19 41:6</p> <p>Correct 12:10 13:17</p> <p>corrections 10:20</p> <p>corridor 6:17 12:6 14:5, 19, 20 23:17 24:6, 7, 9 28:19, 22 29:7, 21</p>	<p>30:4, 9, 18 45:9, 12, 13 46:6, 10</p> <p>cost 48:22</p> <p>Council 2:5, 6, 9 44:5, 8</p> <p>Councilman 2:8</p> <p>counsel 52:14, 18</p> <p>country 10:3</p> <p>COUNTY 52:3, 22</p> <p>couple 33:24 41:24 49:8, 12</p> <p>course 8:4, 20 21:18 27:5 30:1</p> <p>court 11:3 25:17 45:2 52:4</p> <p>cover 13:13 28:10</p> <p>covered 18:6</p> <p>covering 19:19</p> <p>create 22:19</p> <p>cross 46:16</p> <p>crosses 21:6 23:13, 15</p> <p>CRR 1:25</p> <p>crushing 33:1</p> <p>Crystal 45:19</p> <p>cultural 19:3 24:21 44:18 47:4</p> <p>culture 43:14</p> <p>curious 29:6</p> <p>current 48:1</p> <p>currently 12:25 43:24</p> <p>cut 32:2</p> <p>cutting 34:25</p> <p>< D ></p> <p>damaged 50:18</p> <p>DANIEL 1:25 52:4, 25</p> <p>dark 12:2</p> <p>date 23:25 24:13 52:7</p> <p>DAWES 3:7, 8 38:11 42:9, 12</p> <p>day 19:6 21:18, 20 22:6 52:23</p> <p>DC 22:10, 18</p> <p>deal 46:8</p> <p>Debbie 3:17, 17</p> <p>decade 49:14</p>	<p>decision 6:2 8:24 10:25</p> <p>declaration 9:25</p> <p>declaring 10:23</p> <p>define 19:5 24:23</p> <p>degrade 49:24</p> <p>delay, 16:13</p> <p>DENNIS 4:21, 21</p> <p>Department 7:7</p> <p>Desert 24:16, 17 30:6 31:24 34:1 35:12</p> <p>design 28:6</p> <p>designated 23:16 24:5, 9 38:3</p> <p>destroy 32:12</p> <p>destroyed 36:20</p> <p>detail 7:20 11:21</p> <p>developed 4:4 26:11 45:22</p> <p>developing 24:10 34:11</p> <p>dictate 41:15</p> <p>different 20:17, 18 24:8 26:5</p> <p>dig 36:14</p> <p>dignitaries 2:11</p> <p>direct 50:21</p> <p>directly 26:9</p> <p>disclose 8:23</p> <p>discovery 8:18 38:8</p> <p>discuss 27:11 43:25</p> <p>discussed 20:22 39:8</p> <p>discussions 42:14</p> <p>distance 15:2 35:25</p> <p>District 3:16</p> <p>document 6:9, 11, 13, 16 8:1, 3, 11, 14, 25 10:1, 3, 9, 12, 17, 21, 24 11:12 38:9 49:19</p> <p>documents 26:12, 13 44:15</p> <p>doing 4:14 7:14 9:9, 19 19:3 27:14 30:4 31:21</p>	<p>33:1 41:14</p> <p>draft 10:8</p> <p>drilling 18:4</p> <p>driver 25:11</p> <p>driving 8:13 43:11</p> <p>dust 23:5 42:16, 22</p> <p>< E ></p> <p>EAGLE 1:1 16:7 20:4, 12, 14, 17</p> <p>earlier 23:21 36:14 51:16</p> <p>east 21:17, 19 22:5</p> <p>east-west 21:12</p> <p>easy 11:17</p> <p>eating 17:5</p> <p>economic 8:5, 9 25:11</p> <p>economics 49:2</p> <p>EDF 20:9, 9 42:13</p> <p>edge 24:6</p> <p>effectively 19:1</p> <p>efficient 47:14</p> <p>effort 6:13</p> <p>eight 50:8</p> <p>EIS 1:3 5:14 8:17, 21 9:2 10:8 16:23 18:12 24:14 25:13 26:11 38:9 39:15, 20 41:10</p> <p>either 27:19 48:2</p> <p>electric 4:4</p> <p>electrical 46:7</p> <p>electricity 23:3 26:23</p> <p>e-mail 11:14, 15 26:9 31:14, 16</p> <p>employed 46:24</p> <p>employee 47:8 52:15</p> <p>employment 47:10</p> <p>encompasses 12:7</p> <p>endangered 7:3 27:4, 8 33:3</p> <p>energy 4:2, 8 15:3 22:19 47:20, 21 49:24</p> <p>Energy's 21:6</p>
---	--	---	---

<p>engage 6:6 engaged 43:3 engineering 4:2 Engineers 43:3 entire 2:6 ENValue 2:23 ENVIRONMENTAL L 1:2, 16 2:17, 21, 23 5:23, 25 6:1, 22, 24 7:13 8:1, 2, 13, 15, 21 19:3 20:14 24:10 49:19, 19 EPA 6:21, 24 escort 27:23 37:5 escorted 28:2 37:4 escorting 29:14 especially 11:5 42:19, 22 44:13 essentially 48:20 49:25 estate 4:22 evaluated 13:22 24:4, 14, 18 25:13 evaluation 25:7 evening 2:2 3:7, 12 4:21 5:17 21:18 28:3 event 50:7 events 25:8 eventually 22:12 everybody 2:2, 13 4:24 5:5, 13 10:2 35:6 40:17 44:6, 6 evidence 34:8 exact 43:19 exactly 29:23 48:20 excavate 32:10, 21 excavating 32:13 exclusion 31:24 37:2 excuse 21:4 executed 42:10 exist 23:22 existing 12:3 14:1, 5, 16, 25 15:6, 8, 8, 15, 16 21:11 23:10, 21, 22 24:3 25:6 27:10 29:8 30:4, 17 46:10</p>	<p>exists 29:9 expanded 45:13, 13 expanding 46:18 experience 16:11 experts 39:5 explain 27:3 explore 8:22 30:12 31:23 exploring 28:7 extent 24:24 extreme 17:19 eyes 31:8</p> <p>< F > face 21:13 facilities 23:8 facing 21:17 fact 17:6, 13 25:5 factor 34:23 Fairly 25:4 fall 47:18 falling 50:5 familiar 14:11 FAPR 1:25 far 24:10 38:2 41:6 46:24 50:6 farm 22:16 fast 18:16 47:13 feasible 33:10 34:6, 8 features 26:3 28:6 Federal 5:22 6:3 8:12, 15 10:23, 23 fell 18:5 42:24 fence 23:1 31:20, 24 32:1, 6 33:22 34:24 36:2, 24 37:2 fenced 22:25 FERC 45:10 field 14:13 22:21 33:13 fifth 39:18 figure 34:7 46:21 figures 12:2 fill 11:14 final 10:19, 24 24:23 46:3 find 5:15 9:3 19:2 27:16 31:11</p>	<p>36:14 46:4 firm 16:15 firms 17:8 first 6:12, 12 9:23 14:1 17:8 19:13 20:7 27:12 38:12 39:20 40:2 42:11, 12 48:5 Fish 7:2 28:7 33:3 36:21 37:15 51:8 fit 45:12, 23 fitted 35:10 five 41:6 45:16, 21 48:24 five-year 38:13 fixed 35:13 49:1 fixed-tilt 21:11 flat 21:24, 25 flood 25:8 focus 24:13 folks 8:7 26:19 33:7 42:1 47:4 follow 14:24, 25 21:17 followed 4:3 38:19 following 34:19 follows 15:9 24:2 footprint 24:23 35:9 43:24 Force 6:25 forces 35:1 forecast 45:14 forecasted 45:7 foremost 6:12 forget 5:20 form 11:14 formal 50:21 formalities 9:24 forth 29:1 forward 8:24 20:20 45:17 47:13 found 18:4 foundation 43:7 four 45:16, 21 fox 37:6 foxes 34:14 37:8 fried 50:12 fries 50:9 frontage 15:9</p>	<p>full 7:24 functionally 11:1 funding 6:3, 3 further 19:22 27:3 52:13 future 47:12, 25</p> <p>< G > Gale 3:15, 15 Game 37:15 gamma 50:8 Gardner 14:17 15:3 GARY 2:25, 25 3:4 17:14 25:22, 23 gather 10:7 Gemini 8:6 general 12:21 13:1 generally 37:19 generate 6:8 23:3 generated 22:10 generation 24:2 genetic 34:25 gen-tie 24:1 gentleman 16:22 getting 9:10 given 10:15 15:19 25:5 gives 13:1 glad 51:1 gloves 32:23 go 6:19 7:19 8:16, 16 10:25 11:15, 21 18:11, 21 19:13, 22 20:19 21:15, 19 23:9 25:25 26:11, 24 27:16, 20 28:1, 11, 11, 23 32:6, 8, 10 36:10 37:11 40:19 41:25 44:11, 22 45:18, 20 46:2, 2 47:24 50:5, 24, 25 51:14 goal 44:16 goes 4:1 15:6, 9, 22 22:18 32:15 41:21 46:5, 5 49:19</p>
---	--	---	--

going 2:3 5:19
7:18 10:3 11:20
13:19 19:12, 17
21:9 25:5 26:19
27:13, 23 28:18
29:13, 18, 20 30:17
34:11 36:2, 2, 3, 4,
5, 10 37:12, 22
38:22, 24, 25 39:21,
22, 24 40:25 41:6,
7 42:17 43:16
45:4, 11, 18, 20, 23
46:1, 2, 8, 16, 21, 22
47:1, 2, 2, 3, 12, 17
48:11, 12, 12, 18
49:10 50:4
GOLDEN 2:22, 22
35:5, 23 36:7, 12
Good 2:2, 25 3:7,
12 4:21 9:18
10:21 19:24
29:22 32:25 34:18
Government 5:22
6:3, 14 9:25 38:21
grading 43:7
gravel 15:6
green 48:9
grid 22:12
ground 36:5 43:10
group 33:7
groups 22:17
26:21
grubbing 42:15, 20
guaranteed 49:22
guess 5:21 12:16
18:14 31:3 34:11
36:12 38:5 39:3
45:5
guy 42:23
guys 27:6 29:21
32:19 47:8 49:10
gypsum 18:4

< H >
habitat 19:19
27:10 36:23
habits 35:21
hailstorm 50:17
half 13:14, 21
15:14

HALL 1:11
hand 52:21
handle 4:22 32:23
happen 37:22
39:10 50:10, 11
happening 18:13
happens 47:13
50:7, 14, 17
hard 20:1
hardcore 32:19
harm's 27:19 28:5
31:25
HARPER 4:21, 22
head 31:8
hear 5:20 25:18
39:24 45:2
heard 27:9 31:2
heating 4:3
hell 41:3
he'll 12:14
help 6:15, 24 8:23,
23 25:17 38:9
51:10
helping 3:6
Hey 19:20
higher 19:14
highway 14:3
15:10
hill 41:2
history 44:11
hit 32:6, 8
hold 27:21
holding 9:5 16:15
holes 32:2
home 37:16, 18, 20,
24 38:6
homes 32:13
hope 36:25
hopefully 5:20
47:7
hour 39:4 41:25
huge 46:6
hugs 24:6
hurry 2:12
hurt 33:5
hurting 33:8
hurts 18:16
husbandry 36:9

< I >

I-15 14:3 15:17
23:22
idea 10:11 26:2
35:6 36:22
ideas 9:11
identified 23:25
24:13 25:3, 12
43:20, 20
ill 42:24
immediately 14:2
26:19
IMPACT 1:2
2:17, 21, 23 5:23
6:22 8:20 20:14,
23 24:11, 19 25:2
28:22 30:16, 17
impacts 6:2 8:22
24:19
impartiality 52:19
important 11:6
improved 49:13
inasmuch 28:20
inaudible 31:2, 7, 8
45:1, 3
include 25:7 45:10
included 16:6 17:1
including 41:17
inclusive 11:18
income 6:8
increase 20:2 30:2
increased 19:23
independent 52:14,
15
INDIAN 1:11, 17
2:16, 19 3:1
indicated 52:8
individually 26:25
information 9:8
10:7 25:19
input 9:10, 20
11:18
inside 33:22 34:1
46:8
install 49:1 50:1
installation 22:15
instant 32:20
insured 50:18, 18
intact 36:18 43:5,
11
intent 9:25
interaction 9:3

interagency 51:12,
15
interconnect 14:16
interconnected
44:25
interest 4:1
interested 4:6 38:3
interesting 44:10,
14
intervals 28:3 32:3
inverter 22:11
inverters 22:18
invocation 5:6
involve 10:11
involved 6:16, 21
7:1, 9 42:3, 4
51:10 52:16, 18
issue 9:12
issues 9:3 43:2
issuing 6:4, 20
its 8:8 22:12
24:8 37:17, 20

< J >
jacket 2:10
Jason 4:19, 19
31:22 33:19
47:19 48:19
49:12 50:13
JIM 3:12, 12 5:11,
11, 19
jobs 37:4
JONAS 4:17, 17
Jose 4:11 19:12

< K >
Kami 2:9
Kay 2:9
keep 7:18 31:7
40:1 48:17 50:19
keeps 42:21
Kelsey 4:17, 17
KEVIN 1:25 52:4,
25
key 25:3
kicking 10:5 40:6
kind 6:11 9:22, 24
11:8 12:23 13:1
18:1 21:21, 23
29:13 30:15

34:11 39:5 41:12
45:7, 14 47:15
kinds 32:23
kit 34:14 37:6
know 5:3 8:4, 18
9:10, 13, 15, 15, 16,
16 10:3 15:18
16:12, 16, 23 17:12
18:9, 15 19:9, 11
26:21, 22 27:6, 13
28:1 29:23 30:3,
11 32:6, 12, 14, 16,
19 34:6, 20, 25
35:14, 21 36:1, 19
37:13 38:4, 20, 25
39:1, 2, 17, 20, 24
40:2, 4, 16, 20, 21,
23 41:1, 2, 3, 14
42:15, 16 43:9, 10,
24 44:8, 16, 17
45:15, 25 47:1, 9,
12 48:2, 10, 21
50:10
knows 4:24 35:7

< L >
Lake 4:5
LALOVI 4:9, 9
45:1, 3 49:8
land 6:19 7:10, 12
13:10 14:21 15:2,
3 16:6 18:10, 11
19:25 21:6, 6
23:14, 14, 14, 16
40:20
lands 6:7
large 43:21
larger 19:1 20:24
Las 5:18 9:7
15:9 51:4
Laughter 3:21
4:12
Laurie 2:9
laws 8:2, 15
layout 45:19
leaching 49:17
lead 38:9
learn 5:15
lease 7:22, 23
8:25 10:25 13:5,
5, 11 14:7, 14 16:6,

15 18:24 20:24, 25
40:16, 20 41:16, 18
46:11 50:14, 14
leased 13:14
leases 16:2 42:10
leave 7:10 11:16
27:9 28:9 43:4
leaves 15:1
leaving 43:11
Lee 4:10, 10 45:4
46:13, 16 47:11
48:6, 10 50:6
left 42:18
leg 18:16
letting 37:11
level 36:22
LEWIS 1:15 2:18,
18 5:6, 19 7:21
11:24 12:3, 10, 13,
17 26:17 27:12
28:20 29:9, 11, 22
30:11, 19, 24 31:3,
13, 16 32:5, 14
33:16 34:10
37:13 38:7, 19
39:13 40:13
41:12 42:4, 7
50:20 51:5, 9, 13,
15
lifted 27:18
liked 45:5
limited 28:20
33:22
limits 40:17
LINCOLN 1:12
line 6:21 14:15,
18, 23 15:14, 21
21:2, 3 22:13, 23
23:9, 11 24:1, 1, 1,
8 33:22 44:20
45:5
lined 21:12
lines 6:17 12:6
14:6, 25 23:12
24:3 45:12, 16, 20
46:20, 23
list 49:20
literally 10:4
little 6:18 11:13,
21 13:14 15:20

19:16 23:5 27:14
32:5, 14 38:5 50:6
live 9:15
living 44:12
locate 13:23 19:18
located 7:4 13:12
14:2, 6, 7, 14, 20
23:20 26:2
location 12:21, 25
26:14
locations 14:10
25:3
locked 48:6, 7
logs 47:4
long 2:14 49:9, 23
long-term 30:16
look 26:1 33:25
38:15 39:18
40:19 44:9, 17
50:25
looked 17:13, 24
21:2 44:9
looking 12:1
15:18 16:19 17:5
19:1, 13 25:1
27:22 28:6 34:21
43:4, 9
looks 21:22 22:7,
14, 15 47:23
lose 40:21
losing 40:23
lot 19:15 20:1
21:25 37:14
lots 27:24
Luke 4:13, 13
7:18 34:12, 14
42:23 43:18
44:21 48:14
lunch 17:5

< M >
main 28:15
maintain 30:5
maintenance 22:24
23:6
making 8:12 29:3,
19 33:7 39:2 41:8
managed 6:17
14:21 23:17
management 5:1
14:22

Manager 2:20
4:20 8:10
managing 8:11
mandate 47:23
mandated 10:1
manufacturers
49:22
map 12:2, 14 17:6,
13, 14, 18, 25 18:21
40:24 50:25
maps 17:7 26:1,
13
MARCH 1:8
52:23
Marge 3:23, 23
marked 44:3 45:5
markers 44:12
market 47:17
Martha 3:22, 22
Mary 3:3, 3
materializes 16:14
materials 49:17
50:25
mating 35:21
matter 52:7
mature 40:5
MAYO 3:22, 22
McCabe 3:5, 5
mean 28:22 31:5
33:24 34:4, 15
35:10, 20 36:1
37:3, 7 42:18
47:15, 24 50:10, 11
means 21:10
measures 28:14
mechanical 4:2
meet 50:2
MEETING 1:6
5:13, 17 7:2
12:25 28:7 51:4,
12
meetings 9:6
10:14 12:1
megawatts 21:8
47:21
member 3:17, 19,
22 4:9, 10 40:18
members 8:8
15:20 46:24, 25
mention 33:20
45:4

<p>mentioned 13:25 14:19 23:9, 21 24:21 49:5</p> <p>mentioning 36:13</p> <p>Mesquite 3:24</p> <p>mess 35:20</p> <p>mic 2:13 5:20</p> <p>microphone 25:17</p> <p>mile 46:9</p> <p>miles 8:7 15:15 39:4 41:25</p> <p>Miller 2:9 4:9, 9 45:1, 3 49:8</p> <p>mind 2:12 9:17</p> <p>minimal 33:22 43:6</p> <p>minutes 50:8</p> <p>mitigating 28:13</p> <p>mitigation 27:3, 11 28:17 29:1, 8 41:16</p> <p>MOAPA 1:11, 13 6:14, 14 12:3, 5</p> <p>MODERATOR 1:15</p> <p>moment 5:7, 9 13:25 14:19</p> <p>money 36:1 39:10</p> <p>monitor 29:13 33:15 39:2</p> <p>monitoring 40:3</p> <p>monitors 27:22 47:5</p> <p>Moretz 4:19, 19 31:22 33:19 47:19 48:19 49:12 50:13</p> <p>morning 21:16 28:3 43:21</p> <p>motivate 48:3</p> <p>motor 22:5</p> <p>MOUNTAIN 1:1 18:1, 3 20:4, 12, 15, 18</p> <p>mounted 21:9, 15</p> <p>move 8:14 28:5, 11 35:2 37:1, 17, 23 39:7 48:13</p> <p>moves 48:16</p> <p>moving 8:24 31:25</p>	<p>mowing 43:10</p> <p>multi-agency 6:11</p> <p>< N ></p> <p>name 2:15, 18 20:5, 17, 18, 19 42:13</p> <p>nation 4:8</p> <p>National 5:24 8:21</p> <p>natural 27:10</p> <p>naturally 28:12</p> <p>near 15:3 46:7</p> <p>nearby 23:20</p> <p>need 10:20 15:22 16:12 39:18 40:9, 10 47:2, 3</p> <p>needed 16:10 18:5</p> <p>needing 20:19 47:1</p> <p>needs 43:7 45:13 47:6 51:1</p> <p>negotiated 17:7</p> <p>negotiation 33:2</p> <p>negotiations 35:11</p> <p>NEVADA 1:13 19:13, 17, 18 52:2, 22</p> <p>Nevada's 7:7</p> <p>never 16:14</p> <p>new 12:7, 9 34:10, 16 35:7 37:24, 24 39:9 47:13, 22</p> <p>newspaper 9:25</p> <p>night 21:19 22:1 51:3</p> <p>non-named 7:8</p> <p>normal 41:21</p> <p>north 15:1 18:6 21:15 44:22</p> <p>northwest 12:23</p> <p>note 25:22</p> <p>notes 52:10, 12</p> <p>notice 10:22</p> <p>number 43:20</p> <p>numbers 38:2 43:19</p> <p>nutshell 11:2</p> <p>NV 15:3 21:6 47:20, 21</p>	<p>< O ></p> <p>observe 40:19</p> <p>observed 5:9</p> <p>obvious 8:8</p> <p>obviously 23:2</p> <p>occasional 23:6</p> <p>occur 24:16</p> <p>occurred 38:14</p> <p>OFFICE 1:17 2:10 52:22</p> <p>OFFICER 1:16</p> <p>official 9:24 11:11</p> <p>Oh 16:12 19:12 25:23</p> <p>Okay 5:4 7:21 13:9 16:16 18:8, 23 20:21 25:14 29:22</p> <p>old 48:20 49:7</p> <p>older 49:16</p> <p>Once 5:11 10:16, 22 28:24 33:20 40:16, 22</p> <p>ones 28:15 32:9, 17 36:5 42:6 43:22 44:10 48:13</p> <p>online 26:7</p> <p>on-site 22:21, 22</p> <p>open 25:15</p> <p>opening 32:6, 7, 8 33:11</p> <p>operation 14:10 15:7 22:24 33:21</p> <p>operational 34:2</p> <p>operations 23:6</p> <p>opportunities 9:4</p> <p>opportunity 18:24 47:25</p> <p>opted 6:15</p> <p>optimal 49:3</p> <p>optimize 48:21</p> <p>options 50:15</p> <p>original 38:14 42:7</p> <p>ORION 3:25, 25</p> <p>Osborne 3:17, 17, 18, 18</p> <p>outperformed 49:1</p> <p>overall 14:14 22:7</p> <p>overlapping 17:10,</p>	<p>10 41:1</p> <p>Overton 3:15</p> <p>owned 15:3</p> <p>owners 39:9, 25</p> <p>< P ></p> <p>P.M 1:9 51:19</p> <p>package 41:16</p> <p>Paiute 3:11, 14</p> <p>panel 4:6 23:6 49:21</p> <p>panels 4:4, 5 21:9, 12, 14, 23 22:1, 4, 8, 10, 17, 19 23:2 48:11 49:6, 6, 9, 13, 16, 17, 18, 21, 22 50:1, 5, 9, 12, 17</p> <p>paper 5:14 10:23</p> <p>parallels 24:2</p> <p>part 7:17 11:12 23:19 28:21 29:24 33:2 35:12 38:7 41:25 44:1</p> <p>participate 11:3</p> <p>participating 5:5 51:17</p> <p>participation 6:23</p> <p>particular 16:4 38:17</p> <p>particularly 4:7 26:1</p> <p>parties 52:15, 16, 18, 18</p> <p>partner 6:12</p> <p>partners 6:10 7:12</p> <p>pass 2:13</p> <p>Pat 2:22</p> <p>PATRICIA 3:5, 5</p> <p>PATRICK 2:22 35:5, 23 36:7, 12</p> <p>Patterson 5:2, 2</p> <p>pay 50:11, 13, 15</p> <p>pedestal 28:24</p> <p>pedestals 28:24</p> <p>people 8:14 26:22 29:15 33:24, 25 38:22, 23 39:17 40:17 44:14, 15, 17 47:10</p> <p>performance 4:14</p>
--	---	--	---

perimeter 23:1
 32:1 34:24 43:8
permanent 35:3
 41:8
permeable 32:1
 36:24
permit 6:4
permitting 4:15
person 40:15
PHIL 4:11 11:23,
 25 12:9, 11, 16
 13:3, 7, 10, 16, 18
 15:18 17:12, 21, 24
 18:21 19:9, 11
 38:20 39:14
 40:14 42:2, 6, 11
 44:22
Phoenix 2:20 3:2,
 9
photographs 21:21
photovoltaic 21:8
 23:2
physical 35:3
pick 39:6
picture 37:10
pictures 44:9
piece 6:18 18:14
piles 43:12
pilot 34:18
place 5:6 13:23
 16:21 19:2 27:10
 33:21 36:11 43:7
 52:7
places 5:16 43:6
plan 27:9 28:16,
 18 38:13 43:4
planned 17:25
planning 31:6
 42:19 43:14, 22
 46:3 47:9
plans 27:4, 7 29:8
 41:16
plant 15:4 17:25
 18:7 20:5 31:6
 33:20 34:1 50:16
plants 9:16
please 5:8
plenty 5:16 37:3
 46:13
plus 45:16

point 9:8 14:8
 39:24 47:16
 49:15 50:19
pole 23:11
police 40:3
Policy 5:25 8:21
portfolio 19:14
portion 14:20
position 21:24
 24:8
possible 24:25
 43:5, 11
post 10:22
posters 25:22, 24,
 25
pot 40:7
potential 20:24
 24:18, 19 25:8
 27:3, 3 45:8, 11
potentially 45:21
Power 3:15 6:17
 12:6 15:3, 23
 16:10, 25 19:7, 17,
 17, 18 20:9, 11
 21:8 22:10, 12
 31:6 45:12, 20
 47:19, 21 48:1
 49:3 50:2
prefer 26:10
preferable 37:23
preference 11:9
premise 37:21
preparation 6:15
 7:13 8:3, 14 51:17
prepare 5:23 6:1,
 13 8:1 10:1, 3
preparing 6:9
 8:11 10:8
presentation 11:8
 25:15 26:18 50:22
preservation 28:17
preserve 29:19
 36:22
presumably 46:17
pretty 25:14
 32:16, 25 34:10
 39:13
previous 16:24
previously 17:23
price 48:25

primary 15:12
 20:22
prior 42:5
private 15:2 21:5
 23:14 26:10
privately 26:25
probably 32:11, 13
 37:21 39:16 51:7
problem 18:8, 9
 48:5
proceed 10:8, 18
Proceedings 51:19
 52:6
P-R-O-C-E-E-D-I-N
-G-S 2:1
process 8:3, 11, 16,
 17, 17, 18, 21 9:2
 11:1 16:22 18:12
 20:13 24:11 26:4
 28:14 29:24
 30:13 38:8 39:21
produce 21:7 49:3,
 25
produced 17:15
producer 4:8
production 48:22
 49:2
program 5:14
programs 34:18
PROJECT 1:1
 2:20 4:14, 20, 20
 6:4, 7, 18 7:9 8:6,
 18, 19 9:14, 17
 11:16, 22 12:1, 4, 5,
 9, 12, 20 13:7, 12,
 13, 22, 23, 24 14:2,
 4, 16, 23 15:5, 8, 13,
 13 16:7, 24 17:3,
 22 18:2, 23, 25
 19:5 20:20, 22, 23
 21:7, 11, 14 22:7,
 17, 20 23:1, 4
 24:23 25:9, 9, 11
 28:8 30:25 31:20
 33:5, 6 34:2, 25
 37:12 38:13, 22
 39:18 40:13, 15, 19
 41:22 43:25 44:8
 48:20, 21, 22, 22
 49:25
Projecting 45:17

projects 4:7, 15
 16:12 39:15
 40:25 41:4, 11
 42:2
project's 8:4
proper 41:9
property 44:4
proposal 7:15
 39:23
proposed 9:9 12:7
 14:15, 23 18:2
 24:1, 8 43:24
 44:19
protect 7:5
protecting 6:24
PROTECTION
 1:16
protocols 32:22
provide 7:19 8:5,
 9 25:5 47:21
provided 15:11, 16
 23:19
provides 15:7
providing 25:11
public 5:13 8:17
 9:3, 6 10:2, 5, 10,
 12 11:19
publication 10:19
publish 26:12
publishing 9:24
Pull 36:8
pulling 18:16
Purchase 15:23
 16:2, 10, 25 19:8
 20:10, 11 47:19
 48:1 50:2
purpose 8:8
purposes 7:22
put 10:9, 10 27:19
 33:12 37:18
 46:22, 23
putting 31:23
PV 21:9 22:15
 23:2 47:15
PVs 47:14

< Q >
quadrant 12:24
Question 11:23
 18:10 19:7 30:20,
 21, 22 39:14 41:13

45:6, 8, 24 47:11
49:23 50:22
questioned 52:20
questioning 16:9
questions 18:20
25:16, 18, 20 26:25
49:12 50:21, 24
51:10
quick 12:20 33:19
37:9 46:25
quite 49:14

< R >

racing 29:21
radio 37:16
rams 48:17
Randall 2:7, 7
26:6 27:2 28:16
29:6, 10, 15 30:1,
14, 20 31:14 33:10,
17 34:3 35:16
43:13 45:24
46:15, 19 48:4, 8
RANDY 2:15, 15
7:16, 19 11:20
12:19 13:4, 9, 17,
19 17:11, 17, 22
18:18, 23 20:21
25:23 26:8 31:17
44:23
range 37:16, 18, 20,
24 38:6
rate 32:25 33:14
rates 33:11 38:16
RDR 1:25
reach 33:8
read 44:15
ready 5:4
real 4:22 12:20
33:19
really 4:7 8:17
9:9, 19 20:1 23:4
33:10 35:7
realty 3:8, 11 7:25
reason 7:8 20:2
reasonably 52:19
reasons 18:5
receive 44:2
receiving 50:19
recognize 32:20

record 11:11 44:7
recorded 11:11
recording 11:4
37:16
red 2:10
reference 14:8
referred 22:9
regard 33:18
44:18
regardless 47:22
50:13
Region 2:19
REGIONAL 1:17
3:2, 8
Register 10:23
regulations 8:13
Reid 14:17 15:3
Reid-Gardner
15:16 23:10, 15
44:23 45:18
reinhabit 36:25
relates 30:24
relationship 52:17
relative 26:2
52:13, 15
relatively 35:6
remain 36:21
remains 36:17
remember 48:19
remind 38:11
removed 35:8
renewable 19:14
report 6:1 7:13
15:19 18:22
REPORTED 1:25
52:6
reporter 11:3
25:18 45:2 52:1, 4
reporting 11:5
reports 41:10
44:2, 12
representatives
30:7
require 35:8 48:2
required 5:22
47:20
requires 7:24 8:22
RES 20:8, 8 42:8
research 37:14, 15
RESERVATION
1:11 7:4, 10, 23

8:5, 7 9:6 12:22,
24 13:2, 10 14:21
15:1 17:20 28:16,
17 29:18 39:16, 19
40:25 42:3
resource 19:4
resources 24:15, 21
25:1, 4
retired 4:11
return 38:16
returned 38:16
revenue 50:19
review 6:15 10:13,
15
reviewing 6:23
reviews 46:4
right 2:3 10:17
12:17, 25 13:4
14:9, 10 18:1
19:24 26:15 29:4,
8, 16, 20 30:4
32:11, 15 33:16
36:6 37:8 38:6
40:12 43:16 46:1,
13, 15, 19, 22 48:16
50:23 51:9, 18
right-of-way 6:20
21:3, 5
rights-of-way 21:1
rituals 35:21
RIVER 1:11
Road 12:5 14:1
15:6, 8, 10 27:24
28:1, 5 29:17
37:23 39:3 42:7
43:8
roads 23:22
roam 28:25
rock 20:1
room 25:25 45:9
46:14
root 41:13
rotate 21:17 22:5
rotating 21:15
22:4
rotational 22:5
roughly 13:6 14:8
round 10:14
rows 21:12, 15
22:9
rules 32:22

run 12:19 19:17
27:13, 25 37:5
38:22 39:4, 11
40:5 42:20 48:23
running 35:18

< S >
safe 27:21
safety 41:21
Salt 4:5
Samson 2:8 31:19
32:9 35:24 36:8
37:3 38:1 42:14
44:19 48:11, 15
49:5
save 36:1
saying 6:6 16:12,
16, 19 17:12 18:7,
14 29:17 34:12
35:6 38:21, 24
39:1, 4, 8 40:4, 14
says 15:22 39:23
40:1
scenery 9:16
schedule 26:4
SCHROEDER
2:15, 15 7:19
12:19 13:4, 9, 17,
19 17:11, 17, 22
18:18, 23 20:21
25:23 26:8 31:17
44:23
science 33:18
scopes 36:15
SCOPING 1:6
5:13, 17 9:2 10:5
51:4
screen 12:15
25:21 31:17
second 7:22 10:4
section 15:24
see 2:13 7:16
12:17, 22 14:17
16:18 17:25
21:23 22:3 25:2
28:23 34:3, 5
35:19 36:16 37:6
38:15, 20 41:9
45:15 50:5
seen 17:16 30:5
44:10

semi-permeable 32:2	single-axis 21:10, 14, 24 22:15	Southwest 4:7 17:19	summary 12:20 38:13
send 26:9	sir 11:24 30:11	speak 15:25 18:19	sun 21:17, 20 48:23 49:3 50:8
sense 13:1 34:4 49:1	site 22:25 23:10, 23 24:16 28:11 32:4 33:15 34:22 35:1 36:2 40:15 42:15, 20 43:3, 14	SPEAKER 30:22 31:1, 5, 12	sunrise 21:20
series 9:6	sites 34:19 43:19, 23 44:18 45:8, 17, 22	spec 49:20	sunset 21:20
serve 6:8	site's 50:18	specialist 3:8, 11	Superintendent 3:13 5:12
Service 7:3 28:8 33:3	sits 13:2	species 7:3, 6, 8 19:4 24:20 27:4, 8 34:22	sure 8:12 11:18 18:18 27:5, 12 28:13 29:3, 19 31:13, 16 32:16 33:7 39:2, 10 41:1, 9 50:1
Services 31:23 36:22	sitting 11:9 17:5	speculation 19:10	survey 27:16
set 52:21	six 41:6 48:24	speed 30:5, 8	surveying 29:3
SHADOW 1:1 20:4, 12, 15, 18	six-month 16:13	spent 39:9	surveys 24:22
Shane 2:8	size 46:11	split 26:20	survived 38:4
share 9:8 44:6	sky 21:13	stages 46:3	SWAIN 4:11 11:23, 25 12:9, 11, 16 13:3, 7, 10, 16, 18 15:18 17:12, 21, 24 18:21 19:9 38:20 39:14 40:14 42:2, 6, 11 44:22
sheet 13:18	slide 9:21	stand 5:21 11:8	system 22:20
sheets 49:20	slides 25:24	start 8:3 19:24, 25 21:16 47:9, 16	systems 48:24
SHERWOOD 3:23, 23, 25, 25	slightly 7:10 24:8	started 2:3, 4 16:22	< T >
Shillington 4:13, 13 34:14 42:23 43:18 44:21 48:14	slow 30:8	starting 12:11 17:8 39:19	tag 36:9
short 15:2	slow-moving 37:9	starts 9:2	take 2:14 7:17 29:19 32:13, 24 33:21 43:7 44:17 50:15
shorthand 52:6, 9, 12	small 22:24	STATE 52:2, 22	taken 27:19
show 13:4	snowbird 3:24	STATEMENT 1:2 2:17, 21, 24 5:24 20:14	takes 23:3
showing 21:22	socio-economics 25:10	Statements 6:22	talk 7:17 11:10 23:18 26:3, 25 39:16 43:1 50:24
shows 12:21	SOLAR 1:1 4:1, 2, 4, 6 6:7, 7 8:19 9:14 12:4, 5, 9 13:24 14:1, 13, 16 15:8, 13 17:8 22:9, 16, 16, 17, 20, 20 23:9 30:25 31:8, 19 33:13 38:12 39:20 42:11, 12 45:8, 17, 22 47:14 48:5 49:6, 9, 13, 16 50:16	stay 11:9 44:4 47:17	talked 23:25 24:15 42:15
shut 31:6 39:11	Solar's 40:2	staying 50:23	talking 12:15 17:19 40:10
shy 11:13	somebody 16:16 39:1 47:1	stays 24:5	TAMARA 3:7, 7 38:11 42:9, 12
side 14:4 32:8	somebody's 18:15	steel 23:11	tanks 37:12
signal 18:6	someday 44:16	stowed 21:25, 25	team 4:18
signed 40:16	sorts 19:3	straightforward 25:4	tear 36:5
significant 43:22	soup 40:8	STREET 1:12	technology 21:8, 22 23:2 31:1
signs 30:6	south 15:9 19:22 21:13, 16 47:15	studies 19:3, 4, 4 49:18	
silence 5:7, 9	Southern 3:11, 14 12:24 21:13	study 37:15	
similar 23:11, 12 24:7		studying 46:23	
SIMMONS 2:2, 7 4:24 5:4 19:11 26:6 27:2 28:16 29:6, 10, 15 30:1, 14, 20 31:10, 14 33:10, 17 34:3 35:16 42:13 43:13 44:1 45:24 46:15, 19 48:4, 8 51:3, 7, 11, 14, 18		stuff 29:18 44:13	
single 23:11 36:15		substation 14:17 15:4, 16 22:21, 22 23:10 44:24, 25	
		success 32:25 33:11, 14 34:13, 18	
		successfully 24:24	
		suit 19:2	
		suitable 36:23	
		summarize 7:18	

47:12, 23 48:3, 9 49:13 telemetry 37:16 tell 9:21 32:17 38:5 39:6, 17 44:6 tens 33:23 term 41:19, 20 terms 46:17 47:25 49:24 terrain 20:3 terrorist 30:23 31:2, 7 testing 18:4 Thank 5:3, 4, 10, 18 30:19 51:18 Thanks 5:19 25:23 theirs 47:16 theoretically 50:10 thesis 4:2 thing 5:21 16:19 18:19 29:2 31:4 34:22 35:18, 19 37:13 38:10 42:25 things 31:22 32:24 39:10 40:9 49:18 think 4:24 7:1 9:5, 11, 13, 20 11:15 12:14 17:18 19:22 20:2 28:2 29:11, 12 32:14, 25 36:21 45:10, 15, 22 46:8 48:5, 8, 9 50:21, 23 thinking 31:21 40:1 this , 41:15 thought 46:6, 7 thousands 33:23 threat 30:23, 24 three 41:24 42:4, 9 threshold 33:8 thrive 35:19 throw 40:7 tie 24:2 tilted 21:16 22:2 time 5:15 10:15 19:15 29:12 41:7 44:9 49:24 51:5 times 21:25	tiny 6:18 today 17:6 43:1 Today's 49:17 told 40:9 Tom 2:8 3:20, 20 tomorrow 5:17 9:7 51:3 tomorrow's 7:2 tonight 2:6 9:7, 19 10:6 42:25 topics 24:13 topsoil 42:17, 21, 22 43:5 tortoise 7:9 19:21 24:16 28:18 29:20 30:6 31:24 32:17, 19 34:1 35:8 37:5, 9 38:3 40:4 tortoises 7:12 27:17 28:1, 9, 25 29:7 30:17 31:25 32:4 34:19 36:4 38:15, 17 42:19 total 21:7 tower 28:23 29:5 track 21:20 38:17 49:3 tracked 35:13 tracker 22:15 48:24 trackers 21:10, 24 48:14 tracking 21:14 22:3 traffic 30:2 33:23 trained 33:25 47:3 transcribed 52:9 transcript 52:11 transcription 52:12 transformed 22:11 transformer 22:11 translocate 35:25 translocated 35:12 38:18 translocation 36:13 38:14 transmission 14:5, 6, 15, 25 15:14 21:2, 3 22:13, 23 23:9 24:1 44:20	transmitted 22:13, 22 transmitter 35:10, 13 transportation 38:4 TransWest 45:11 46:2, 4, 20 travels 40:3 TRIBAL 1:11 3:18 4:9, 10 6:7 8:8 14:9 15:19 23:14, 16 40:18 44:4, 7 45:7, 24 46:24, 25 Tribe 6:5, 8 7:16 8:6, 9 16:1, 1 17:7 18:25 20:19 21:4 23:19 25:12 38:12 40:6, 7 41:18 44:2, 4 46:17 48:7 Tribe's 16:11 25:5 tried 9:13 triggering 7:25 trimming 43:9 triplex 4:5 truck 34:5 true 52:11 Truxton 3:14 try 32:16 34:4 36:10 trying 11:17 34:7 35:25 37:8, 10 turn 11:20 turned 20:8 turtle 19:19 31:20 33:15 39:2, 5, 5 40:5, 8 47:5 turtles 27:5 34:5 39:11 TV 49:8, 10 twice 47:14 two 9:21, 23 33:5 38:22 42:10 46:19, 23 49:11 Tyler 2:7 31:19 32:9 35:24 36:8 37:3 38:1 42:14 44:19 48:11, 15 49:5	type 27:7 30:5 33:11, 17 types 44:13 typewriting 52:10 typewritten 52:10 < U > U.S 28:7 31:22 ultimately 13:21 41:12 unable 43:2 unconfused 12:18 understand 16:8 17:17 36:1 37:8 39:12 40:22 understanding 15:25 16:1, 18 unfortunately 42:24 UNIDENTIFIED 30:22 31:1, 5, 12 units 22:3 upgrade 47:17, 24 upgrading 47:16 use 32:4 34:22 36:15 37:1 Usually 35:11 utility 14:18, 20 23:16 24:5, 9 utilization 4:3 utilize 19:7 < V > validity 19:10 Varela 3:10, 10 various 8:2 17:8 22:8 Vegas 5:18 9:7 15:9 47:15 51:4 vegetation 24:17 28:9 42:18 43:5, 9 vehicle 33:23 vehicles 27:23, 24 28:2 Vernon 4:10, 10 16:21 45:4 46:13, 16 47:11 48:5, 6, 10 50:6 versus 27:10 Vice 2:8 vicinity 19:21
--	---	---	---

VICKIE 2:2 4:24
5:4 19:11 31:10
42:13 44:1 51:3,
7, 11, 14, 18
video 2:4
visible 25:2
visitors 2:5
Visual 25:1
vote 19:12, 13

< **W** >

wait 13:7, 7, 7
want 5:16 7:17,
18 9:8, 10 11:10
12:19 16:6, 9, 20
20:10 22:1 25:19,
25 27:6, 20 28:11
35:20 38:11 44:14
wanted 6:25 17:1
19:16, 18 33:19
43:1
wanting 42:19
washes 25:7
washing 23:7
watch 35:17, 18
38:24, 25
water 17:2 23:3, 4,
18 25:4, 6
wave 5:21
way 15:1 17:9
22:1, 12 27:19, 20
28:5 31:25 37:9
39:12
ways 7:5 26:5
website 11:16
26:10, 14, 15
welcome 2:5, 11
5:11, 15
welcoming 5:13
well 4:18 5:18
12:17 14:9, 11
15:18 17:24 18:7,
14, 21 24:20 28:20
29:17 31:1 34:3,
10, 16 37:13, 19
38:20 41:12 50:20
wells 15:7 23:20
25:6
went 16:3, 4
17:18 18:2, 3
39:3, 3

We're 5:4 6:3, 8
8:2, 14 9:9, 19, 22
10:3, 4, 5, 24, 24
11:7, 7, 17 12:24
16:13, 15 20:13
26:17 27:14, 21, 22
28:6, 7, 13, 14
29:18, 23 33:8
34:10, 21 39:5, 19,
21, 22, 24 40:4
46:16, 23 47:2, 3
48:6, 7 50:23
west 14:2 22:6
WESTERN 1:16
2:19 24:6
We've 9:13 40:11
41:2, 4 42:4 45:21
whatnot 24:12
WHEREOF 52:21
wide 46:9
wife 3:20
Wildlife 7:3, 7
28:8 31:23 33:3
34:16 35:3 36:21
51:8
WILLIAMS 3:12,
13 5:11, 12
wind 22:2
WITNESS 52:21
WM 1:25 52:4, 25
wondering 17:9,
15 27:8 29:7
30:14, 15 33:13, 17
34:6
words 2:4 45:19
work 4:23 17:2
30:6 36:3 37:14
42:1 47:8
worked 34:11, 14
37:3
worker 41:20
workers 33:24
41:24
working 4:15, 18,
25 7:5 16:13
28:14 40:18 41:13
world 48:9
write 31:10

< **Y** >

Yeah 38:7 39:13,
25 48:6, 10
year 47:22 50:16
years 35:14 47:20,
22 48:24 49:8, 11,
15 50:3, 4, 15
yellow 14:18
23:25 44:19 45:5
young 44:15

< **Z** >

zipping 29:16

<u>WORD LIST</u>	AC (2)	animal (2)	based (1)
< 1 >	Access (9)	animals (3)	basic (1)
1 (3)	accurate (1)	announcement (1)	basically (10)
10 (2)	acquisition (1)	annual (1)	basis (1)
12th (1)	acreage (1)	answer (3)	beginning (4)
1956 (1)	acres (22)	anybody (3)	believe (1)
< 2 >	Act (2)	apart (1)	bending (1)
2 (1)	action (3)	appended (1)	benefit (3)
2,000 (1)	active (3)	apply (1)	benefits (2)
2:00 (1)	activities (2)	approached (2)	best (8)
20 (1)	activity (1)	appropriate (1)	better (4)
2019 (2)	actual (6)	approval (1)	BIA (13)
2300 (11)	add (1)	approve (1)	big (6)
2300-acre (1)	addition (3)	approved (3)	bigger (1)
230kV (1)	additional (5)	approximately (2)	biggest (1)
25 (4)	address (7)	archeologist (2)	Biological (1)
25-year (1)	addresses (1)	archeologists (1)	biologist (4)
26 (1)	adjacent (2)	area (33)	biologists (5)
< 3 >	adjourned (1)	arises (1)	birds (1)
300 (2)	AFFAIRS (4)	Arizona (1)	bit (8)
< 4 >	affect (2)	array (3)	blade (1)
4 (1)	affixed (1)	arrays (2)	blazing (1)
4:00 (1)	afternoon (3)	arrow (1)	bleed (1)
< 5 >	afterward (1)	arroyos (1)	BLM (15)
5 (2)	agencies (7)	ASHLEY (2)	BLM-maintained
5,000 (8)	agency (4)	asked (7)	(1)
5,000-acre (1)	aggregate (1)	asking (4)	blocked (1)
5:30 (2)	ago (3)	assisting (3)	blood (1)
50 (1)	agree (1)	associated (2)	board (2)
500 (1)	agreed (1)	assuming (1)	boards (3)
50-year (1)	agreeing (1)	attached (1)	books (1)
< 7 >	Agreement (13)	attendance (1)	borescopes (1)
7:01 (1)	agreement, (1)	authority (1)	Bose (1)
7:30 (3)	ahead (3)	available (3)	bottom (1)
711 (2)	Air (1)	avian (1)	Boulevard (1)
< 8 >	Aiya (2)	avoid (2)	box (3)
8minute (6)	alive (1)	avoided (1)	Brandy (2)
8minutenergy (8)	allow (3)	avoiding (1)	Brett (2)
< A >	allowed (2)	aways (1)	bridge (1)
able (2)	allowing (1)	axis (1)	bring (1)
above-entitled (1)	alternative (2)	< B >	brings (1)
Absolutely (1)	Americas (3)	back (15)	brought (1)
	amount (2)	background (1)	buggy (1)
	amounts (1)	bad (3)	build (6)
	amplify (2)	ballplayer (1)	building (4)
	analyses (2)	Band (2)	built (4)
	analysis (2)	bare (1)	bullet (1)
	analytics (1)	BARGER (2)	BUREAU (8)
	analyzes (1)	barrier (2)	burned (1)
	angles (1)		burrow (3)

burrows (4)
burst (1)
business (1)

< C >
cacti (1)
caliche (1)
California (2)
call (5)
called (3)
camouflaged (1)
Canon (1)
Canseco (1)
CANTLEY (4)
card (1)
care (2)
Carol (2)
cars (1)
case (2)
catch (1)
cause (1)
CCR (2)
cement (1)
census (1)
certain (3)
certainly (1)
CERTIFICATE
 (1)
Certified (1)
certify (2)
Chairman (2)
chambers (2)
chance (1)
change (1)
charge (1)
cheaper (1)
check (2)
checkerboard (1)
Cheryl (3)
CHIP (46)
Chip's (1)
CHRISTINA (2)
City (1)
clarification (1)
CLARK (2)
clearing (1)
close (3)
closer (2)
close-ups (1)
collected (1)

collection (2)
collects (1)
come (13)
comes (5)
coming (4)
comment (11)
comments (7)
commitment (1)
common (1)
communal (1)
communications
 (1)
community (1)
companies (2)
company (3)
complete (1)
completely (2)
complies (1)
components (3)
concern (1)
concerns (3)
concludes (1)
concrete (1)
condition (2)
conductive (1)
confidential (1)
confirm (1)
confused (2)
confusion (2)
connectivity (2)
constructed (1)
construction (24)
consultants (1)
contact (2)
continue (3)
contract (1)
contractor (2)
control (3)
converts (1)
cooling (1)
cooperator (1)
copy (2)
core (1)
corner (3)
Correct (2)
corrections (1)
corridor (21)
cost (1)
Council (5)
Councilman (1)

counsel (2)
country (1)
COUNTY (2)
couple (4)
course (5)
court (4)
cover (2)
covered (1)
covering (1)
create (1)
cross (1)
crosses (3)
CRR (1)
crushing (1)
Crystal (1)
cultural (4)
culture (1)
curious (1)
current (1)
currently (2)
cut (1)
cutting (1)

< D >
damaged (1)
DANIEL (3)
dark (1)
date (3)
DAWES (5)
day (5)
DC (2)
deal (1)
Debbie (2)
decade (1)
decision (3)
declaration (1)
declaring (1)
define (2)
degrade (1)
delay, (1)
DENNIS (2)
Department (1)
Desert (6)
design (1)
designated (4)
destroy (1)
destroyed (1)
detail (2)
developed (3)
developing (2)

dictate (1)
different (4)
dig (1)
dignitaries (1)
direct (1)
directly (1)
disclose (1)
discovery (2)
discuss (2)
discussed (2)
discussions (1)
distance (2)
District (1)
document (19)
documents (3)
doing (10)
draft (1)
drilling (1)
driver (1)
driving (2)
dust (3)

< E >
EAGLE (6)
earlier (3)
east (3)
east-west (1)
easy (1)
eating (1)
economic (3)
economics (1)
EDF (3)
edge (1)
effectively (1)
efficient (1)
effort (1)
eight (1)
EIS (15)
either (2)
electric (1)
electrical (1)
electricity (2)
e-mail (5)
employed (1)
employee (2)
employment (1)
encompasses (1)
endangered (4)
energy (7)
Energy's (1)

engage (1)
 engaged (1)
 engineering (1)
 Engineers (1)
 entire (1)
 ENValue (1)
ENVIRONMENTA
L (21)
 EPA (2)
 escort (2)
 escorted (2)
 escorting (1)
 especially (4)
 essentially (2)
 estate (1)
 evaluated (5)
 evaluation (1)
 evening (7)
 event (1)
 events (1)
 eventually (1)
 everybody (10)
 evidence (1)
 exact (1)
 exactly (2)
 excavate (2)
 excavating (1)
 exclusion (2)
 excuse (1)
 executed (1)
 exist (1)
 existing (21)
 exists (1)
 expanded (2)
 expanding (1)
 experience (1)
 experts (1)
 explain (1)
 explore (3)
 exploring (1)
 extent (1)
 extreme (1)
 eyes (1)

< F >
 face (1)
 facilities (1)
 facing (1)
 fact (3)
 factor (1)

Fairly (1)
 fall (1)
 falling (1)
 familiar (1)
 FAPR (1)
 far (5)
 farm (1)
 fast (2)
 feasible (3)
 features (2)
 Federal (6)
 fell (2)
 fence (10)
 fenced (1)
 FERC (1)
 field (3)
 fifth (1)
 figure (2)
 figures (1)
 fill (1)
 final (4)
 find (7)
 firm (1)
 firms (1)
 first (14)
 Fish (6)
 fit (2)
 fitted (1)
 five (4)
 five-year (1)
 fixed (2)
 fixed-tilt (1)
 flat (2)
 flood (1)
 focus (1)
 folks (5)
 follow (3)
 followed (2)
 following (1)
 follows (2)
 footprint (3)
 Force (1)
 forces (1)
 forecast (1)
 forecasted (1)
 foremost (1)
 forget (1)
 form (1)
 formal (1)
 formalities (1)

forth (1)
 forward (4)
 found (1)
 foundation (1)
 four (2)
 fox (1)
 foxes (2)
 fried (1)
 fries (1)
 frontage (1)
 full (1)
 functionally (1)
 funding (2)
 further (3)
 future (2)

< G >
 Gale (2)
 Game (1)
 gamma (1)
 Gardner (2)
 GARY (6)
 gather (1)
 Gemini (1)
 general (2)
 generally (1)
 generate (2)
 generated (1)
 generation (1)
 genetic (1)
 gen-tie (1)
 gentleman (1)
 getting (1)
 given (3)
 gives (1)
 glad (1)
 gloves (1)
 go (42)
 goal (1)
 goes (10)
 going (61)
 GOLDEN (6)
 Good (11)
 Government (5)
 grading (1)
 gravel (1)
 green (1)
 grid (1)
 ground (2)
 group (1)

groups (2)
 grubbing (2)
 guaranteed (1)
 guess (9)
 guy (1)
 guys (5)
 gypsum (1)

< H >
 habitat (3)
 habits (1)
 hailstorm (1)
 half (3)
 HALL (1)
 hand (1)
 handle (2)
 happen (4)
 happening (1)
 happens (4)
 hard (1)
 hardcore (1)
 harm's (3)
 HARPER (2)
 head (1)
 hear (4)
 heard (2)
 heating (1)
 hell (1)
 he'll (1)
 help (7)
 helping (1)
 Hey (1)
 higher (1)
 highway (2)
 hill (1)
 history (1)
 hit (2)
 hold (1)
 holding (2)
 holes (1)
 home (5)
 homes (1)
 hope (1)
 hopefully (2)
 hour (2)
 huge (1)
 hugs (1)
 hurry (1)
 hurt (1)
 hurting (1)

hurts (1)	issue (1)	left (1)	maps (3)
husbandry (1)	issues (2)	leg (1)	MARCH (2)
< I >	issuing (2)	letting (1)	Marge (2)
I-15 (3)	its (5)	level (1)	marked (2)
idea (4)	< J >	LEWIS (40)	markers (1)
ideas (1)	jacket (1)	lifted (1)	market (1)
identified (6)	Jason (8)	liked (1)	Martha (2)
ill (1)	JIM (5)	limited (2)	Mary (2)
immediately (2)	jobs (1)	limits (1)	materializes (1)
IMPACT (15)	JONAS (2)	LINCOLN (1)	materials (2)
impacts (3)	Jose (2)	line (19)	mating (1)
impartiality (1)	< K >	lined (1)	matter (1)
important (1)	Kami (1)	lines (11)	mature (1)
improved (1)	Kay (1)	list (1)	MAYO (2)
inasmuch (1)	keep (5)	literally (1)	McCabe (2)
inaudible (5)	keeps (1)	little (12)	mean (15)
include (2)	Kelsey (2)	live (1)	means (1)
included (2)	KEVIN (3)	living (1)	measures (1)
including (1)	key (1)	locate (2)	mechanical (1)
inclusive (1)	kicking (2)	located (9)	meet (1)
income (1)	kind (17)	location (3)	MEETING (8)
increase (2)	kinds (1)	locations (2)	meetings (3)
increased (1)	kit (2)	locked (2)	megawatts (2)
independent (2)	know (75)	logs (1)	member (6)
INDIAN (5)	knows (2)	long (3)	members (4)
indicated (1)	< L >	long-term (1)	mention (2)
individually (1)	Lake (1)	look (8)	mentioned (6)
information (3)	LALOVI (5)	looked (4)	mentioning (1)
input (3)	land (18)	looking (12)	Mesquite (1)
inside (3)	lands (1)	looks (5)	mess (1)
install (2)	large (1)	lose (1)	mic (2)
installation (1)	larger (2)	losing (1)	microphone (1)
instant (1)	Las (4)	lot (4)	mile (1)
insured (2)	Laughter (2)	lots (1)	miles (4)
intact (3)	Laurie (1)	Luke (9)	Miller (6)
intent (1)	laws (2)	lunch (1)	mind (2)
interaction (1)	layout (1)	< M >	minimal (2)
interagency (2)	leaching (1)	main (1)	minutes (1)
interconnect (1)	lead (1)	maintain (1)	mitigating (1)
interconnected (1)	learn (1)	maintenance (2)	mitigation (6)
interest (1)	lease (21)	making (6)	MOAPA (6)
interested (2)	leased (1)	managed (3)	MODERATOR (1)
interesting (2)	leases (2)	management (2)	moment (4)
intervals (2)	leave (5)	Manager (3)	money (2)
inverter (1)	leaves (1)	managing (1)	monitor (3)
inverters (1)	leaving (1)	mandate (1)	monitoring (1)
invocation (1)	Lee (9)	mandated (1)	monitors (2)
involve (1)		manufacturers (1)	Moretz (8)
involved (9)		map (10)	morning (3)
			motivate (1)

motor (1)	OFFICE (3)	Pat (1)	Power (24)
MOUNTAIN (7)	OFFICER (1)	PATRICIA (2)	prefer (1)
mounted (2)	official (2)	PATRICK (5)	preferable (1)
move (9)	Oh (3)	Patterson (2)	preference (1)
moves (1)	Okay (9)	pay (3)	premise (1)
moving (2)	old (2)	pedestal (1)	preparation (5)
mowing (1)	older (1)	pedestals (1)	prepare (6)
multi-agency (1)	Once (7)	people (13)	preparing (3)
< N >	ones (8)	performance (1)	presentation (4)
name (7)	online (1)	perimeter (4)	preservation (1)
nation (1)	on-site (2)	permanent (2)	preserve (2)
National (2)	open (1)	permeable (2)	presumably (1)
natural (1)	opening (4)	permit (1)	pretty (5)
naturally (1)	operation (4)	permitting (1)	previous (1)
near (2)	operational (1)	person (1)	previously (1)
nearby (1)	operations (1)	PHIL (25)	price (1)
need (8)	opportunities (1)	Phoenix (3)	primary (2)
needed (2)	opportunity (2)	photographs (1)	prior (1)
needing (2)	opted (1)	photovoltaic (2)	private (4)
needs (4)	optimal (1)	physical (1)	privately (1)
negotiated (1)	optimize (1)	pick (1)	probably (5)
negotiation (1)	options (1)	picture (1)	problem (3)
negotiations (1)	original (2)	pictures (1)	proceed (2)
NEVADA (6)	ORION (2)	piece (2)	Proceedings (2)
Nevada's (1)	Osborne (4)	piles (1)	P-R-O-C-E-E-D-I-N
never (1)	outperformed (1)	pilot (1)	-G-S (1)
new (10)	overall (2)	place (9)	process (19)
newspaper (1)	overlapping (3)	places (2)	produce (3)
night (3)	Overton (1)	plan (5)	produced (1)
non-named (1)	owned (1)	planned (1)	producer (1)
normal (1)	owners (2)	planning (6)	production (2)
north (4)	< P >	plans (4)	program (1)
northwest (1)	P.M (2)	plant (8)	programs (1)
note (1)	package (1)	plants (1)	PROJECT (81)
notes (2)	Paiute (2)	please (1)	Projecting (1)
notice (1)	panel (3)	plenty (3)	projects (8)
number (1)	panels (28)	plus (1)	project's (1)
numbers (2)	paper (2)	point (6)	proper (1)
nutshell (1)	parallels (1)	pole (1)	property (1)
NV (4)	part (10)	police (1)	proposal (2)
< O >	participate (1)	Policy (2)	proposed (9)
observe (1)	participating (2)	portfolio (1)	protect (1)
observed (1)	participation (1)	portion (1)	protecting (1)
obvious (1)	particular (2)	position (2)	PROTECTION (1)
obviously (1)	particularly (2)	possible (3)	protocols (1)
occasional (1)	parties (4)	post (1)	provide (5)
occur (1)	partner (1)	posters (3)	provided (3)
occurred (1)	partners (2)	pot (1)	provides (1)
	pass (1)	potential (8)	providing (1)
		potentially (1)	public (9)

publication (1)	regard (2)	room (3)	shows (1)
publish (1)	regardless (2)	root (1)	shut (2)
publishing (1)	Region (1)	rotate (2)	shy (1)
Pull (1)	REGIONAL (3)	rotating (2)	side (2)
pulling (1)	Register (1)	rotational (1)	signal (1)
Purchase (10)	regulations (1)	roughly (2)	signed (1)
purpose (1)	Reid (2)	round (1)	significant (1)
purposes (1)	Reid-Gardner (5)	rows (3)	signs (1)
put (7)	reinhabit (1)	rules (1)	silence (2)
putting (1)	relates (1)	run (11)	similar (3)
PV (4)	relationship (1)	running (1)	SIMMONS (33)
PVs (1)	relative (3)		single (2)
< Q >	relatively (1)	< S >	single-axis (4)
quadrant (1)	remain (1)	safe (1)	sir (2)
Question (14)	remains (1)	safety (1)	site (15)
questioned (1)	remember (1)	Salt (1)	sites (7)
questioning (1)	remind (1)	Samson (12)	site's (1)
questions (9)	removed (1)	save (1)	sits (1)
quick (4)	renewable (1)	saying (17)	sitting (2)
quite (1)	report (4)	says (3)	six (2)
	REPORTED (2)	scenery (1)	six-month (1)
< R >	reporter (5)	schedule (1)	size (1)
racing (1)	reporting (1)	SCHROEDER (18)	sky (1)
radio (1)	reports (3)	science (1)	slide (1)
rams (1)	representatives (1)	scopes (1)	slides (1)
Randall (22)	require (2)	SCOPING (6)	slightly (2)
RANDY (20)	required (2)	screen (3)	slow (1)
range (5)	requires (2)	second (2)	slow-moving (1)
rate (2)	RES (3)	section (1)	small (1)
rates (2)	research (2)	see (21)	snowbird (1)
RDR (1)	RESERVATION	seen (3)	socio-economics (1)
reach (1)	(21)	semi-permeable (1)	SOLAR (44)
read (1)	resource (1)	send (1)	Solar's (1)
ready (1)	resources (4)	sense (3)	somebody (3)
real (3)	retired (1)	series (1)	somebody's (1)
really (8)	return (1)	serve (1)	someday (1)
realty (3)	returned (1)	Service (3)	sorts (1)
reason (2)	revenue (1)	Services (2)	soup (1)
reasonably (1)	review (3)	set (1)	south (5)
reasons (1)	reviewing (1)	SHADOW (5)	Southern (4)
receive (1)	reviews (1)	Shane (1)	Southwest (2)
receiving (1)	right (32)	share (2)	speak (2)
recognize (1)	right-of-way (3)	sheet (1)	SPEAKER (4)
record (2)	rights-of-way (1)	sheets (1)	spec (1)
recorded (1)	rituals (1)	SHERWOOD (4)	specialist (2)
recording (2)	RIVER (1)	Shillington (7)	species (8)
red (1)	Road (13)	short (1)	speculation (1)
reference (1)	roads (1)	shorthand (3)	speed (2)
referred (1)	roam (1)	show (1)	spent (1)
	rock (1)	showing (1)	split (1)

stages (1)	team (1)	tracking (2)	UNIDENTIFIED
stand (2)	tear (1)	traffic (2)	(4)
start (6)	technology (9)	trained (2)	units (1)
started (3)	telemetry (1)	transcribed (1)	upgrade (2)
starting (3)	tell (6)	transcript (1)	upgrading (1)
starts (1)	tens (1)	transcription (1)	use (4)
STATE (2)	term (2)	transformed (1)	Usually (1)
STATEMENT (6)	terms (3)	transformer (1)	utility (5)
Statements (1)	terrain (1)	translocate (1)	utilization (1)
stay (3)	terrorist (3)	translocated (2)	utilize (1)
staying (1)	testing (1)	translocation (2)	
stays (1)	Thank (6)	transmission (12)	< V >
steel (1)	Thanks (2)	transmitted (2)	validity (1)
stowed (2)	theirs (1)	transmitter (2)	Varela (2)
straightforward (1)	theoretically (1)	transportation (1)	various (3)
STREET (1)	thesis (1)	TransWest (4)	Vegas (5)
studies (4)	thing (11)	travels (1)	vegetation (5)
study (1)	things (5)	TRIBAL (17)	vehicle (1)
studying (1)	think (26)	Tribe (21)	vehicles (3)
stuff (2)	thinking (2)	Tribe's (2)	Vernon (11)
substation (8)	this, (1)	tried (1)	versus (1)
success (5)	thought (2)	triggering (1)	Vice (1)
successfully (1)	thousands (1)	trimming (1)	vicinity (1)
suit (1)	threat (2)	triplex (1)	VICKIE (12)
suitable (1)	three (3)	truck (1)	video (1)
summarize (1)	threshold (1)	true (1)	visible (1)
summary (2)	thrive (1)	Truxton (1)	visitors (1)
sun (5)	throw (1)	try (3)	Visual (1)
sunrise (1)	tie (1)	trying (5)	vote (2)
sunset (1)	tilted (2)	turn (1)	
Superintendent (2)	time (8)	turned (1)	< W >
sure (17)	times (1)	turtle (9)	wait (3)
survey (1)	tiny (1)	turtles (3)	want (20)
surveying (1)	today (2)	TV (2)	wanted (6)
surveys (1)	Today's (1)	twice (1)	wanting (1)
survived (1)	told (1)	two (8)	washes (1)
SWAIN (24)	Tom (3)	Tyler (12)	washing (1)
system (1)	tomorrow (3)	type (4)	watch (4)
systems (1)	tomorrow's (1)	types (1)	water (6)
	tonight (5)	typewriting (1)	wave (1)
< T >	topics (1)	typewritten (1)	way (10)
tag (1)	topsoil (4)		ways (2)
take (9)	tortoise (15)	< U >	website (4)
taken (1)	tortoises (14)	U.S (2)	welcome (4)
takes (1)	total (1)	ultimately (2)	welcoming (1)
talk (8)	tower (2)	unable (1)	well (22)
talked (3)	track (3)	unconfused (1)	wells (3)
talking (3)	tracked (1)	understand (6)	went (7)
TAMARA (5)	tracker (2)	understanding (3)	We're (46)
tanks (1)	trackers (3)	unfortunately (1)	west (2)

WESTERN (3)
We've (6)
whatnot (1)
WHEREOF (1)
wide (1)
wife (1)
Wildlife (9)
WILLIAMS (4)
wind (1)
WITNESS (1)
WM (3)
wondering (9)
words (2)
work (7)
worked (3)
worker (1)
workers (2)
working (8)
world (1)
write (1)

< Y >

Yeah (5)
year (2)
years (10)
yellow (4)
young (1)

< Z >

zipping (1)

Environmental Impact Statement Scoping Meeting

Eagle Shadow Mountain Solar Project

03/06/2019



OASIS
REPORTING SERVICES

400 South Seventh Street • Suite 400, Box 7 • Las Vegas, NV 89101
702-476-4500 | www.oasisreporting.com | info@oasisreporting.com

COURT REPORTING | NATIONAL SCHEDULING | VIDEOCONFERENCING | VIDEOGRAPHY

Page 1

1 EAGLE SHADOW MOUNTAIN
 2 ENVIRONMENTAL IMPACT STATEMENT
 3 (EIS)
 4
 5 SCOPING MEETING
 6
 7 MARCH 6, 2019
 8 5:30 P.M.
 9
 10 PAINTED DESERT GOLF CLUB
 11 5555 PAINTED MIRAGE ROAD
 12 LAS VEGAS, NEVADA
 13
 14 MODERATOR: CHIP LEWIS
 15 ENVIRONMENTAL PROTECTION OFFICER FOR THE WESTERN
 16 REGIONAL OFFICE OF THE BUREAU OF INDIAN AFFAIRS
 17
 18
 19
 20
 21
 22
 23
 24 REPORTED BY: JENNIFER M. DALY, CRR, RPR, CCR, CSR
 25 LICENSE NO.: 766

Page 2

1 P-R-O-C-E-E-D-I-N-G-S
 2 MR. LEWIS: Good evening. Thank you for
 3 coming for our public scoping meeting for the Eagle
 4 Shadow Mountain Solar Project Environmental Impact
 5 Statement. We're here tonight to gather information
 6 from any interested or affected public and talk a
 7 little bit about the project so we know what's going
 8 on, and, more importantly, get feedback.
 9 So the project is on the Moapa River
 10 Indian Reservation in a partnership between
 11 8minutenergy --
 12 MR. SCHROEDER: Do you want to do
 13 introductions so we know who all is here?
 14 MR. LEWIS: However you want to handle
 15 it.
 16 So we have Bureau -- we need to do that
 17 to be formal.
 18 I'm Chip Lewis; I'm with BIA in Phoenix,
 19 western region office, and I'm the environmental
 20 specialist and the project manager for the
 21 Environmental Impact Statement.
 22 MS. McCABE: Patricia McCabe, assistant.
 23 I'm going to assist Chip in the AI process.
 24 MR. GOLDEN: I'm Patrick Golden with
 25 ENValue, the third-party contractor assisting BIA.

Page 3

1 MR. SHILLINGTON: Luke Shillington,
 2 8minutenergy Renewables on the land and title.
 3 MS. VARELA: Christina Varela, realty
 4 specialist at Southern Paiute Agency.
 5 MS. BARGER: Mary Barger, I'm an
 6 archeologist, and I'm assisting BIA.
 7 MS. DAWES: I'm Tamera Dawes. I'm the
 8 regional realty specialist, western region BIA.
 9 MR. KNOWLES: Glen Knowles. I'm with
 10 FWS Services.
 11 MR. SCHROEDER: I'm Randy Schroeder, I'm
 12 with ENValue, contractor assisting BIA.
 13 MR. CANTLEY: Garry Cantley, regional
 14 archeologist, BIA out of Phoenix.
 15 MR. LEWIS: Thank you. So as part of the
 16 preparation of the EIS, we want to present what the
 17 project is so we have a little bit of information,
 18 you know, know what's going on.
 19 It is on the reservation wholly, a
 20 proposed 2,300-acre project lead for the -- about
 21 300 megawatt project, and it includes about a
 22 10 mile pipeline in an established utility corridor
 23 on up to the Reid Gardner Substation, and the
 24 crossover line that goes from the towers over to the
 25 substation does, indeed, cross a little piece of BLM

Page 4

1 land, so BLM is also a partner involved in this
 2 process.
 3 The purpose of the project is to provide
 4 economic benefit to the tribe. Reservations are
 5 held in trust for their economic gain and use and
 6 benefit, and entering into lease agreements and
 7 getting lease revenue is a way for them to utilize
 8 their land for their purposes.
 9 The EIS process, Environmental Impact
 10 Statement, an environmental document required by the
 11 National Environmental Policy Act, requires us to
 12 take a look at the project since it has -- requires
 13 federal approval. BIA will be approving the lease
 14 agreement between 8minute and the tribe.
 15 BLM will be granting rights of ways,
 16 Fish & Wildlife Service is -- has their section,
 17 Endangered Species Act, permitting-type situation.
 18 So they have to have something to go by, and it's
 19 contained within the EIS.
 20 And let's see, who else has an action
 21 before us?
 22 So other folks that are on board, EPA,
 23 they are obligated to document, review, and be part
 24 of the process, the environmental review process.
 25 Nevada Department of Wildlife became a

Page 5

1 cooperators because of their interest in any wildlife
 2 that is a particularly endangered species and -- or
 3 more specific than that, the desert tortoise.
 4 The U.S. Air Force opted in to be a
 5 cooperators because of any impacts in their flight
 6 zone at all related to Nellis, that, perhaps, a
 7 solar project could have on their operations.
 8 Where we're at in the process is pretty
 9 much at the beginning. The public scoping process
 10 began on March 4th -- or February 4th, right, and it
 11 expires the -- today, actually. This is the last
 12 step of the scoping.
 13 So if you have comments, go ahead and get
 14 them in, then we'll move on to the other stages,
 15 which is preparing an official draft, or the whole
 16 document, environmental report, which is the Impact
 17 Statement.
 18 It will go out for public review. We'll
 19 have another round of public meetings, get input on
 20 that draft, then we'll be issuing the final
 21 documents and the decision that allows it to go
 22 forward.
 23 You can be brave and talk out loud in
 24 front of all these folks here.
 25 If you're shy, you can fill out the

Page 6

1 written form, or you can e-mail me or go to the
 2 website.
 3 I'll turn it over to Randy.
 4 MR. SCHROEDER: All right. This will
 5 just be a short summary of what the project is.
 6 Starting here with this location, it's
 7 about 40 miles north of Las Vegas up here on the
 8 Moapa Indian Reservation.
 9 It's very near an existing solar project,
 10 the KRoad, our first solar project, which you can
 11 see better on this map.
 12 So this project has a potential lease
 13 area that they've been evaluating, 8minute has been
 14 evaluating, of about 5,000 acres, as shown in this
 15 outline, and within that 5,000 acres, ultimately,
 16 2,300 acres would be developed for this 300 megawatt
 17 project.
 18 In addition, there is a, roughly, a
 19 10-mile long transmission line that's going to be
 20 built from the solar site up to the existing
 21 Reid Gardner Substation, and this line would
 22 parallel the multiple existing transmission lines
 23 that occur within this hatched area that's a
 24 designated utility corridor.
 25 Access to the site is on an existing road

Page 7

1 that, basically, follows. Also, this corridor down
 2 off of tribal land onto BLM land then becomes
 3 actually the Frontage Road along I-15 or
 4 North Las Vegas Boulevard.
 5 So, as we said, about 2,300 acres of land
 6 on the reservation that's totally for the solar
 7 project with rights of way off the reservation
 8 within that designated utility corridor on tribal
 9 lands, but managed by the Bureau of Land Management
 10 and also crossing a little bit of BLM land and a
 11 very small amount of private land right up by
 12 Reid Gardner that Nevada Energy owns.
 13 So it will be a PV project, single access
 14 tracking technology. These are just photos of what
 15 single access trackers look like.
 16 The solar farm, like I said, includes the
 17 panels and the single access trackers in groups
 18 called solar arrays.
 19 There's inverters that convert the
 20 DC power into AC, then it's collected through a
 21 collection system on site to the site substation
 22 from which the gen-tie line emanates to leave the
 23 site, and the project would be fenced.
 24 There's an O&M building that will likely
 25 be located on the site, and we make this point for

Page 8

1 members of the public just to emphasize that
 2 PV technology doesn't use any water to generate
 3 electricity.
 4 So the gen-tie line, like I said, is
 5 about 10 miles long, crossing tribal, BLM, and
 6 private lands owned by NV Energy. Almost all of the
 7 distance -- all of the distance on tribal land is
 8 within that designation utility corridor managed by
 9 the BLM, and the water for construction and the
 10 little bit required for O&M will come from the Moapa
 11 band; they will provide the water. And then the
 12 access, as we described earlier, is existing and in
 13 place and comes off of I-15.
 14 One alternative's been identified for the
 15 gen-tie line, basically, very similar to the
 16 proposed line, which is the yellow -- this green
 17 line. Instead of going into the corridor, where the
 18 other existing lines are currently located, would
 19 just hug the western edge of the corridor all the
 20 way up, and then across the small section of the BLM
 21 lands, and then on to NV Energy land up by
 22 Reid Gardner.
 23 These are the environmental resources
 24 that will be evaluated. Biology is a big topic.
 25 Desert tortoise is probably the most significant of

Page 9

1 the biological topics, as we were just discussing a
 2 little while ago.
 3 But we'll also look at all biological
 4 resources, cultural resources. There have been
 5 surveys done on the whole 5,000 acres to help define
 6 where the best 2,300 acres would be located, and
 7 then we'll also look at visual resources and water
 8 resources, potential impacts to them, and
 9 socioeconomics, as that being the focus of the
 10 project to provide economic benefit to the tribe.
 11 That's the end of our little
 12 presentation.
 13 MR. LEWIS: The principal component of
 14 airing the Environmental Impact Statement is to
 15 determine what issues may, you know, arise in this
 16 investigation part, scoping part of the project, and
 17 so all the agencies get together, and we come up
 18 with what we think the issues are, but this is a
 19 public process, so the point of this meeting is to
 20 reach out to the public and have you let us know if
 21 there are any issues, opportunities, concerns, that
 22 you may have that we may not have thought of.
 23 And so that's really the heart and soul
 24 of preparing -- coming up with those issues, and
 25 that's what gets analyzed in the document.

Page 10

1 So if there's anything that you have or
 2 wish to comment on or bring to our attention that we
 3 may not know about, that's why we're here.
 4 Feel free, you can speak up, speak on the
 5 record. You can go up and visit at the poster
 6 boards and talk privately to -- you know, we have a
 7 realty specialist, biologist, archaeologist, and the
 8 8minute folks are here.
 9 So however you choose to participate,
 10 you're welcome.
 11 MR. CONNORS: Thank you. I don't have
 12 any comments. I'm Bill Connors; I'm vice president
 13 with MDU Construction Services Group.
 14 One of our subsidiaries is Bombard
 15 Electric, and we did install on the Moapa Solar
 16 Project. We also installed -- we were talking
 17 earlier the Valley Electric Project, which is an
 18 active desert tortoise habitat, and we're here
 19 interested in all solar projects in Nevada and
 20 interested in any way we can help out to move the
 21 projects forward. Thank you.
 22 MR. SCHROEDER: Thanks.
 23 (Proceedings adjourned at 6:03 p.m.)
 24
 25

Page 11

1 REPORTER'S CERTIFICATE
 2 STATE OF NEVADA)
 3) SS:
 3 COUNTY OF CLARK)
 4 I, JENNIFER M. DALY, a duly commissioned
 5 and licensed Court Reporter, Clark County, State of
 6 Nevada, do hereby certify: That I reported the
 7 proceedings had in the above entitled matter,
 8 commencing on March 6, 2019, at the hour of
 9 5:30 p.m.
 10 That I thereafter transcribed my said
 11 shorthand notes into typewriting and that the
 12 typewritten transcript of said proceedings is a
 13 complete, true, and accurate transcription of my
 14 said shorthand notes.
 15 I further certify that I am not a
 16 relative or employee of an attorney or counsel of
 17 any of the parties, nor a relative or employee of an
 18 attorney or counsel involved in said action, nor a
 19 person financially interested in the action.
 20 IN WITNESS HEREOF, I have hereunto set my
 21 hand, in my office, in the County of Clark, State of
 22 Nevada, this 19th day of March, 2019.
 23
 24 JENNIFER M. DALY, CRR, RPR, CCR, CSR
 25 CSR No. 766

WORD INDEX

< 1 >

10 3:22 8:5
10-mile 6:19
19th 11:22

< 2 >

2,300 6:16 7:5
9:6
2,300-acre 3:20
2019 1:7 11:8, 22

< 3 >

300 3:21 6:16

< 4 >

40 6:7
4th 5:10, 10

< 5 >

5,000 6:14, 15 9:5
5:30 1:8 11:9
5555 1:11

< 6 >

6 1:7 11:8
6:03 10:23

< 7 >

766 1:25 11:24

< 8 >

8minute 4:14 6:13
10:8
8minutenergy 2:11
3:2

< A >

AC 7:20
Access 6:25 7:13,
15, 17 8:12
accurate 11:13
acres 6:14, 15, 16
7:5 9:5, 6
Act 4:11, 17
action 4:20 11:18,
19
active 10:18
addition 6:18

adjourned 10:23

AFFAIRS 1:16
agencies 9:17
Agency 3:4
ago 9:2
agreement 4:14
agreements 4:6
ahead 5:13
AI 2:23
Air 5:4
airing 9:14
allows 5:21
alternative's 8:14
amount 7:11
analyzed 9:25
approval 4:13
approving 4:13
archaeologist 10:7
archeologist 3:6, 14
area 6:13, 23
arrays 7:18
assist 2:23
assistant 2:22
assisting 2:25 3:6,
12
attention 10:2
attorney 11:16, 18

< B >

band 8:11
BARGER 3:5, 5
basically 7:1 8:15
began 5:10
beginning 5:9
benefit 4:4, 6 9:10
best 9:6
better 6:11
BIA 2:18, 25 3:6,
8, 12, 14 4:13
big 8:24
Bill 10:12
biological 9:1, 3
biologist 10:7
Biology 8:24
bit 2:7 3:17 7:10
8:10
BLM 3:25 4:1, 15
7:2, 10 8:5, 9, 20
board 4:22
boards 10:6

Bombard 10:14

Boulevard 7:4
brave 5:23
bring 10:2
building 7:24
built 6:20
BUREAU 1:16
2:16 7:9

< C >

called 7:18
Cantley 3:13, 13
CCR 1:24 11:24
CERTIFICATE
11:1
certify 11:6, 15
CHIP 1:14 2:18,
23
choose 10:9
Christina 3:3
CLARK 11:3, 5, 21
CLUB 1:10
collected 7:20
collection 7:21
come 8:10 9:17
comes 8:13
coming 2:3 9:24
commencing 11:8
comment 10:2
comments 5:13
10:12
commissioned 11:4
complete 11:13
component 9:13
concerns 9:21
CONNORS 10:11,
12
construction 8:9
10:13
contained 4:19
contractor 2:25
3:12
convert 7:19
cooperator 5:1, 5
corridor 3:22
6:24 7:1, 8 8:8,
17, 19
counsel 11:16, 18
COUNTY 11:3, 5,
21

Court 11:5

cross 3:25
crossing 7:10 8:5
crossover 3:24
CRR 1:24 11:24
CSR 1:24 11:24,
24
cultural 9:4
currently 8:18

< D >

DALY 1:24 11:4,
24
DAWES 3:7, 7
day 11:22
DC 7:20
decision 5:21
define 9:5
Department 4:25
described 8:12
DESERT 1:10 5:3
8:25 10:18
designated 6:24
7:8
designation 8:8
determine 9:15
developed 6:16
discussing 9:1
distance 8:7, 7
document 4:10, 23
5:16 9:25
documents 5:21
draft 5:15, 20
duly 11:4

< E >

EAGLE 1:1 2:3
earlier 8:12 10:17
economic 4:4, 5
9:10
edge 8:19
EIS 1:3 3:16 4:9,
19
Electric 10:15, 17
electricity 8:3
e-mail 6:1
emanates 7:22
emphasize 8:1
employee 11:16, 17
Endangered 4:17
5:2

<p>Energy 7:12 8:6, 21</p> <p>entering 4:6</p> <p>entitled 11:7</p> <p>ENValue 2:25 3:12</p> <p>ENVIRONMENTAL</p> <p>L 1:2, 15 2:4, 19, 21 4:9, 10, 11, 24 5:16 8:23 9:14</p> <p>EPA 4:22</p> <p>established 3:22</p> <p>evaluated 8:24</p> <p>evaluating 6:13, 14</p> <p>evening 2:2</p> <p>existing 6:9, 20, 22, 25 8:12, 18</p> <p>expires 5:11</p> <p>< F ></p> <p>farm 7:16</p> <p>February 5:10</p> <p>federal 4:13</p> <p>feedback 2:8</p> <p>Feel 10:4</p> <p>fenced 7:23</p> <p>fill 5:25</p> <p>final 5:20</p> <p>financially 11:19</p> <p>first 6:10</p> <p>Fish 4:16</p> <p>flight 5:5</p> <p>focus 9:9</p> <p>folks 4:22 5:24 10:8</p> <p>follows 7:1</p> <p>Force 5:4</p> <p>form 6:1</p> <p>formal 2:17</p> <p>forward 5:22 10:21</p> <p>free 10:4</p> <p>front 5:24</p> <p>Frontage 7:3</p> <p>further 11:15</p> <p>FWS 3:10</p> <p>< G ></p> <p>gain 4:5</p> <p>Gardner 3:23</p>	<p>6:21 7:12 8:22</p> <p>Garry 3:13</p> <p>gather 2:5</p> <p>generate 8:2</p> <p>gen-tie 7:22 8:4, 15</p> <p>getting 4:7</p> <p>Glen 3:9</p> <p>go 4:18 5:13, 18, 21 6:1 10:5</p> <p>goes 3:24</p> <p>going 2:7, 23 3:18 6:19 8:17</p> <p>GOLDEN 2:24, 24</p> <p>GOLF 1:10</p> <p>Good 2:2</p> <p>granting 4:15</p> <p>green 8:16</p> <p>Group 10:13</p> <p>groups 7:17</p> <p>< H ></p> <p>habitat 10:18</p> <p>hand 11:21</p> <p>handle 2:14</p> <p>hatched 6:23</p> <p>heart 9:23</p> <p>held 4:5</p> <p>help 9:5 10:20</p> <p>HEREOF 11:20</p> <p>hereunto 11:20</p> <p>hour 11:8</p> <p>hug 8:19</p> <p>< I ></p> <p>I-15 7:3 8:13</p> <p>identified 8:14</p> <p>IMPACT 1:2 2:4, 21 4:9 5:16 9:14</p> <p>impacts 5:5 9:8</p> <p>importantly 2:8</p> <p>includes 3:21 7:16</p> <p>INDIAN 1:16 2:10 6:8</p> <p>information 2:5 3:17</p> <p>input 5:19</p> <p>install 10:15</p> <p>installed 10:16</p> <p>interest 5:1</p>	<p>interested 2:6 10:19, 20 11:19</p> <p>introductions 2:13</p> <p>inverters 7:19</p> <p>investigation 9:16</p> <p>involved 4:1 11:18</p> <p>issues 9:15, 18, 21, 24</p> <p>issuing 5:20</p> <p>< J ></p> <p>JENNIFER 1:24 11:4, 24</p> <p>< K ></p> <p>know 2:7, 13 3:18, 18 9:15, 20 10:3, 6</p> <p>Knowles 3:9, 9</p> <p>KRoad 6:10</p> <p>< L ></p> <p>land 3:2 4:1, 8 7:2, 2, 5, 9, 10, 11 8:7, 21</p> <p>lands 7:9 8:6, 21</p> <p>LAS 1:12 6:7 7:4</p> <p>lead 3:20</p> <p>lease 4:6, 7, 13 6:12</p> <p>leave 7:22</p> <p>LEWIS 1:14 2:2, 14, 18 3:15 9:13</p> <p>LICENSE 1:25</p> <p>licensed 11:5</p> <p>line 3:24 6:19, 21 7:22 8:4, 15, 16, 17</p> <p>lines 6:22 8:18</p> <p>little 2:7 3:17, 25 7:10 8:10 9:2, 11</p> <p>located 7:25 8:18 9:6</p> <p>location 6:6</p> <p>long 6:19 8:5</p> <p>look 4:12 7:15 9:3, 7</p> <p>loud 5:23</p> <p>Luke 3:1</p> <p>< M ></p> <p>managed 7:9 8:8</p>	<p>Management 7:9</p> <p>manager 2:20</p> <p>map 6:11</p> <p>MARCH 1:7 5:10 11:8, 22</p> <p>Mary 3:5</p> <p>matter 11:7</p> <p>McCabe 2:22, 22</p> <p>MDU 10:13</p> <p>MEETING 1:5 2:3 9:19</p> <p>meetings 5:19</p> <p>megawatt 3:21 6:16</p> <p>members 8:1</p> <p>mile 3:22</p> <p>miles 6:7 8:5</p> <p>MIRAGE 1:11</p> <p>Moapa 2:9 6:8 8:10 10:15</p> <p>MODERATOR 1:14</p> <p>MOUNTAIN 1:1 2:4</p> <p>move 5:14 10:20</p> <p>multiple 6:22</p> <p>< N ></p> <p>National 4:11</p> <p>near 6:9</p> <p>need 2:16</p> <p>Nellis 5:6</p> <p>NEVADA 1:12 4:25 7:12 10:19 11:2, 6, 22</p> <p>north 6:7 7:4</p> <p>notes 11:11, 14</p> <p>NV 8:6, 21</p> <p>< O ></p> <p>obligated 4:23</p> <p>occur 6:23</p> <p>OFFICE 1:16 2:19 11:21</p> <p>OFFICER 1:15</p> <p>official 5:15</p> <p>operations 5:7</p> <p>opportunities 9:21</p> <p>opted 5:4</p> <p>outline 6:15</p>
--	---	--	--

<p>owned 8:6 owns 7:12</p> <p>< P > P.M 1:8 10:23 11:9 PAINTED 1:10, 11 Paiute 3:4 panels 7:17 parallel 6:22 part 3:15 4:23 9:16, 16 participate 10:9 particularly 5:2 parties 11:17 partner 4:1 partnership 2:10 Patricia 2:22 Patrick 2:24 permitting-type 4:17 person 11:19 Phoenix 2:18 3:14 photos 7:14 piece 3:25 pipeline 3:22 place 8:13 point 7:25 9:19 Policy 4:11 poster 10:5 potential 6:12 9:8 power 7:20 preparation 3:16 preparing 5:15 9:24 present 3:16 presentation 9:12 president 10:12 pretty 5:8 principal 9:13 private 7:11 8:6 privately 10:6 probably 8:25 Proceedings 10:23 11:7, 12 P-R-O-C-E-E-D-I-N -G-S 2:1 process 2:23 4:2, 9, 24, 24 5:8, 9 9:19</p>	<p>Project 2:4, 7, 9, 20 3:17, 20, 21 4:3, 12 5:7 6:5, 9, 10, 12, 17 7:7, 13, 23 9:10, 16 10:16, 17 projects 10:19, 21 proposed 3:20 8:16 PROTECTION 1:15 provide 4:3 8:11 9:10 public 2:3, 6 5:9, 18, 19 8:1 9:19, 20 purpose 4:3 purposes 4:8 PV 7:13 8:2</p> <p>< R > Randy 3:11 6:3 reach 9:20 really 9:23 realty 3:3, 8 10:7 record 10:5 region 2:19 3:8 REGIONAL 1:16 3:8, 13 Reid 3:23 6:21 7:12 8:22 related 5:6 relative 11:16, 17 Renewables 3:2 report 5:16 REPORTED 1:24 11:6 Reporter 11:5 REPORTER'S 11:1 required 4:10 8:10 requires 4:11, 12 Reservation 2:10 3:19 6:8 7:6, 7 Reservations 4:4 resources 8:23 9:4, 4, 7, 8 revenue 4:7 review 4:23, 24 5:18 right 5:10 6:4 7:11</p>	<p>rights 4:15 7:7 River 2:9 ROAD 1:11 6:25 7:3 roughly 6:18 round 5:19 RPR 1:24 11:24</p> <p>< S > SCHROEDER 2:12 3:11, 11 6:4 10:22 SCOPING 1:5 2:3 5:9, 12 9:16 section 4:16 8:20 see 4:20 6:11 Service 4:16 Services 3:10 10:13 set 11:20 SHADOW 1:1 2:4 SHILLINGTON 3:1, 1 short 6:5 shorthand 11:11, 14 shown 6:14 shy 5:25 significant 8:25 similar 8:15 single 7:13, 15, 17 site 6:20, 25 7:21, 21, 23, 25 situation 4:17 small 7:11 8:20 socioeconomics 9:9 Solar 2:4 5:7 6:9, 10, 20 7:6, 16, 18 10:15, 19 soul 9:23 Southern 3:4 speak 10:4, 4 specialist 2:20 3:4, 8 10:7 Species 4:17 5:2 specific 5:3 SS 11:2 stages 5:14 Starting 6:6 STATE 11:2, 5, 21</p>	<p>STATEMENT 1:2 2:5, 21 4:10 5:17 9:14 step 5:12 subsidiaries 10:14 Substation 3:23, 25 6:21 7:21 summary 6:5 surveys 9:5 system 7:21</p> <p>< T > take 4:12 talk 2:6 5:23 10:6 talking 10:16 Tamera 3:7 technology 7:14 8:2 Thank 2:2 3:15 10:11, 21 Thanks 10:22 think 9:18 third-party 2:25 thought 9:22 title 3:2 today 5:11 tonight 2:5 topic 8:24 topics 9:1 tortoise 5:3 8:25 10:18 totally 7:6 towers 3:24 trackers 7:15, 17 tracking 7:14 transcribed 11:10 transcript 11:12 transcription 11:13 transmission 6:19, 22 tribal 7:2, 8 8:5, 7 tribe 4:4, 14 9:10 true 11:13 trust 4:5 turn 6:3 typewriting 11:11 typewritten 11:12</p> <p>< U > U.S 5:4</p>
--	--	--	---

ultimately 6:15
use 4:5 8:2
utility 3:22 6:24
7:8 8:8
utilize 4:7

< V >

Valley 10:17
VARELA 3:3, 3
VEGAS 1:12 6:7
7:4
vice 10:12
visit 10:5
visual 9:7

< W >

want 2:12, 14 3:16
water 8:2, 9, 11
9:7
way 4:7 7:7 8:20
10:20
ways 4:15
website 6:2
welcome 10:10
We're 2:5 5:8
10:3, 18
WESTERN 1:15
2:19 3:8 8:19
wholly 3:19
Wildlife 4:16, 25
5:1
wish 10:2
WITNESS 11:20
written 6:1

< Y >

yellow 8:16

< Z >

zone 5:6

<u>WORD LIST</u>			
< 1 >	agreements (1)	Cantley (2)	designated (2)
10 (2)	ahead (1)	CCR (2)	designation (1)
10-mile (1)	AI (1)	CERTIFICATE	determine (1)
19th (1)	Air (1)	(1)	developed (1)
< 2 >	airing (1)	certify (2)	discussing (1)
2,300 (3)	allows (1)	CHIP (3)	distance (2)
2,300-acre (1)	alternative's (1)	choose (1)	document (4)
2019 (3)	amount (1)	Christina (1)	documents (1)
< 3 >	analyzed (1)	CLARK (3)	draft (2)
300 (2)	approval (1)	CLUB (1)	duly (1)
< 4 >	approving (1)	collected (1)	< E >
40 (1)	archaeologist (1)	collection (1)	EAGLE (2)
4th (2)	archeologist (2)	come (2)	earlier (2)
< 5 >	area (2)	comes (1)	economic (3)
5,000 (3)	arrays (1)	coming (2)	edge (1)
5:30 (2)	assist (1)	commencing (1)	EIS (4)
5555 (1)	assistant (1)	comment (1)	Electric (2)
< 6 >	assisting (3)	comments (2)	electricity (1)
6 (2)	attention (1)	commissioned (1)	e-mail (1)
6:03 (1)	attorney (2)	complete (1)	emanates (1)
< 7 >	< B >	component (1)	emphasize (1)
766 (2)	band (1)	concerns (1)	employee (2)
< 8 >	BARGER (2)	CONNORS (2)	Endangered (2)
8minute (3)	basically (2)	construction (2)	Energy (3)
8minutenergy (2)	began (1)	contained (1)	entering (1)
< A >	beginning (1)	contractor (2)	entitled (1)
AC (1)	benefit (3)	convert (1)	ENValue (2)
Access (5)	best (1)	cooperator (2)	ENVIRONMENTA
accurate (1)	better (1)	corridor (7)	L (12)
acres (6)	BIA (7)	counsel (2)	EPA (1)
Act (2)	big (1)	COUNTY (3)	established (1)
action (3)	Bill (1)	Court (1)	evaluated (1)
active (1)	biological (2)	cross (1)	evaluating (2)
addition (1)	biologist (1)	crossing (2)	evening (1)
adjourned (1)	Biology (1)	crossover (1)	existing (6)
AFFAIRS (1)	bit (4)	CRR (2)	expires (1)
agencies (1)	BLM (8)	CSR (3)	< F >
Agency (1)	board (1)	cultural (1)	farm (1)
ago (1)	board (1)	currently (1)	February (1)
agreement (1)	boards (1)	< D >	federal (1)
	Bombard (1)	DALY (3)	feedback (1)
	Boulevard (1)	DAWES (2)	Feel (1)
	brave (1)	day (1)	fenced (1)
	bring (1)	DC (1)	fill (1)
	building (1)	decision (1)	final (1)
	built (1)	define (1)	financially (1)
	BUREAU (3)	Department (1)	first (1)
	< C >	described (1)	Fish (1)
	called (1)	DESERT (4)	

flight (1)	IMPACT (6)	map (1)	particularly (1)
focus (1)	impacts (2)	MARCH (4)	parties (1)
folks (3)	importantly (1)	Mary (1)	partner (1)
follows (1)	includes (2)	matter (1)	partnership (1)
Force (1)	INDIAN (3)	McCabe (2)	Patricia (1)
form (1)	information (2)	MDU (1)	Patrick (1)
formal (1)	input (1)	MEETING (3)	permitting-type (1)
forward (2)	install (1)	meetings (1)	person (1)
free (1)	installed (1)	megawatt (2)	Phoenix (2)
front (1)	interest (1)	members (1)	photos (1)
Frontage (1)	interested (4)	mile (1)	piece (1)
further (1)	introductions (1)	miles (2)	pipeline (1)
FWS (1)	inverters (1)	MIRAGE (1)	place (1)
< G >	investigation (1)	Moapa (4)	point (2)
gain (1)	involved (2)	MODERATOR (1)	Policy (1)
Gardner (4)	issues (4)	MOUNTAIN (2)	poster (1)
Garry (1)	issuing (1)	move (2)	potential (2)
gather (1)	< J >	multiple (1)	power (1)
generate (1)	JENNIFER (3)	< N >	preparation (1)
gen-tie (3)	< K >	National (1)	preparing (2)
getting (1)	know (8)	near (1)	present (1)
Glen (1)	Knowles (2)	need (1)	presentation (1)
go (6)	KRoad (1)	Nellis (1)	president (1)
goes (1)	< L >	NEVADA (7)	pretty (1)
going (5)	land (11)	north (2)	principal (1)
GOLDEN (2)	lands (3)	notes (2)	private (2)
GOLF (1)	LAS (3)	NV (2)	privately (1)
Good (1)	lead (1)	< O >	probably (1)
granting (1)	lease (4)	obligated (1)	Proceedings (3)
green (1)	leave (1)	occur (1)	P-R-O-C-E-E-D-I-N
Group (1)	LEWIS (6)	OFFICE (3)	-G-S (1)
groups (1)	LICENSE (1)	OFFICER (1)	process (8)
< H >	licensed (1)	official (1)	Project (22)
habitat (1)	line (8)	operations (1)	projects (2)
hand (1)	lines (2)	opportunities (1)	proposed (2)
handle (1)	little (7)	opted (1)	PROTECTION (1)
hatched (1)	located (3)	outline (1)	provide (3)
heart (1)	location (1)	owned (1)	public (8)
held (1)	long (2)	owns (1)	purpose (1)
help (2)	look (4)	< P >	purposes (1)
HEREOF (1)	loud (1)	P.M (3)	PV (2)
hereunto (1)	Luke (1)	PAINTED (2)	< R >
hour (1)	< M >	Paiute (1)	Randy (2)
hug (1)	managed (2)	panels (1)	reach (1)
< I >	Management (1)	parallel (1)	really (1)
I-15 (2)	manager (1)	part (4)	realty (3)
identified (1)		participate (1)	record (1)
			region (2)
			REGIONAL (3)

Reid (4) related (1) relative (2) Renewables (1) report (1) REPORTED (2) Reporter (1) REPORTER'S (1) required (2) requires (2) Reservation (5) Reservations (1) resources (5) revenue (1) review (3) right (3) rights (2) River (1) ROAD (3) roughly (1) round (1) RPR (2) < S > SCHROEDER (5) SCOPING (5) section (2) see (2) Service (1) Services (2) set (1) SHADOW (2) SHILLINGTON (2) short (1) shorthand (2) shown (1) shy (1) significant (1) similar (1) single (3) site (6) situation (1) small (2) socioeconomics (1) Solar (10) soul (1) Southern (1) speak (2) specialist (4)	Species (2) specific (1) SS (1) stages (1) Starting (1) STATE (3) STATEMENT (6) step (1) subsidiaries (1) Substation (4) summary (1) surveys (1) system (1) < T > take (1) talk (3) talking (1) Tamera (1) technology (2) Thank (4) Thanks (1) think (1) third-party (1) thought (1) title (1) today (1) tonight (1) topic (1) topics (1) tortoise (3) totally (1) towers (1) trackers (2) tracking (1) transcribed (1) transcript (1) transcription (1) transmission (2) tribal (4) tribe (3) true (1) trust (1) turn (1) typewriting (1) typewritten (1) < U > U.S (1) ultimately (1)	use (2) utility (4) utilize (1) < V > Valley (1) VARELA (2) VEGAS (3) vice (1) visit (1) visual (1) < W > want (3) water (4) way (4) ways (1) website (1) welcome (1) We're (4) WESTERN (4) wholly (1) Wildlife (3) wish (1) WITNESS (1) written (1) < Y > yellow (1) < Z > zone (1)
---	--	---

Individual Comments



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

**75 Hawthorne Street
San Francisco, CA 94105-3901**

February 28, 2019

Mr. Chip Lewis
BIA Western Regional Office
2600 North Central Avenue
4th Floor Mailroom
Phoenix, Arizona 85004

Subject: Scoping comments for the proposed Eagle Shadow Mountain Solar Project on the Moapa River Indian Reservation, Clark County, Nevada

Dear Mr. Lewis:

The U.S. Environmental Protection Agency (EPA) has reviewed the Federal Register Notice published on February 4, 2019 requesting comments on the Bureau of Indian Affairs' (BIA) decision to prepare an Environmental Impact Statement (EIS) for the subject project. Our comments are provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) and our NEPA review authority under Section 309 of the Clean Air Act.

The proposed project would consist of a 300-megawatt (MW) solar photovoltaic (PV) electricity generation facility on up to 2,300 acres located on the Moapa River Indian Reservation. A proposed 10-mile long 230 kilovolt (kV) generation-tie transmission line would connect the solar project to NV Energy's Reid-Gardner 230kV Substation and would be located on Tribal lands, Federal lands administered and managed by BLM, and private lands. The Project is expected to be built in one phase of 300-MW to meet an existing Power Purchase Agreement.

EPA is a NEPA cooperating agency on the project. To assist in the scoping process, we have the following recommendations for your attention in the preparation of the EIS. These are based on our review of the NOI and the preliminary Table 3-1 provided to cooperating agencies which outlines all the resources/uses proposed for evaluation in this EIS and the rationale for eliminating some resources/uses for further analysis. Because the proposed Eagle Shadow Mountain Solar Project (ESMSP) would be the fourth utility-scale PV solar project on the Moapa River Indian Reservation evaluated in an EIS, BIA intends to "incorporate by reference" some analyses from the K-Road Moapa Solar EIS (2012), the Moapa Solar Energy Center EIS (2014), and the Aiya Solar Project EIS (2016). EPA supports this streamlining effort, intended to meet new Department of Interior NEPA streamlining guidelines including a one-year completion deadline, so long as the EIS in preparation effectively discloses what environmental impacts this particular project will have, and what measures will be taking to reduce those impacts.

While we support this strategy in general, we have the following recommendations for implementing it in the DEIS:

Incorporation by reference

- Ensure that any material incorporated by reference includes a citation and brief description, and ensure the referenced documents are readily available to the public (40 CFR 1502.21), such as including them on the project website with specific page numbers for each that will

assist the reader in retrieving the analyses. BIA should be prepared to furnish copies to central locations or send copies directly to commenters upon request.

- Ensure the analyses have been reviewed to determine they are still relevant and not dated. CEQ recommends that EISs that are more than 5 years old should be carefully reexamined to determine whether preparation of an EIS supplement is warranted (CEQ's 40 Most Asked Questions about the NEPA, No. 32), and, as such, suggests this time period as when analyses could begin to become dated. The K-Road EIS is more than 5 years old and the Moapa Solar Energy Center EIS is approaching 5 years old. Any analyses incorporated by reference from these documents should be reviewed for relevancy before incorporation.
- Ensure that any mitigation and monitoring plans are specific to the ESMSP site. We understand these plans will be appended to the DEIS, even if the resource area will not be evaluated further.

In addition, we have the following recommendations for your consideration in preparation of the EIS:

Alternatives analysis

In addition to the potential alternatives identified in the Notice of Intent (generation-tie routing options, modified footprint alternatives, alternate routing for other Project ROWs, and the No Action), EPA recommends that the BIA and the Tribe consider alternative mountings, alternative capacities, and alternative photovoltaic technologies. EPA strongly encourages siting renewable energy projects on disturbed, degraded, and contaminated sites before considering large tracts of undisturbed lands.

Impacts to floodplains/flood hazards

Table 3-1 indicates that floodplain impacts will not be further evaluated in the EIS and states that the project site is not located in a floodplain but the northern end of the gen-tie line would cross a 100-year floodplain near where it connects with the Reid-Gardner Substation. It states that the gen-tie line would span the drainage channels, but one or two transmission structures could be located within the floodplain; however, this would not result in any modification of a floodplain that would impede or redirect flood flows resulting in property damage on- or off-site. It states that the flood-carrying capacity of the floodplain, the pattern, or the magnitude of the flood flow would not be affected, and if any gen-tie structures would be located within the floodplain, foundations would be designed to withstand the low-velocity flooding in accordance with Clark County and associated floodplain requirements. Because the project is on Tribal land where County requirements do not apply, we recommend that the project description identify that the project will be designed and will voluntarily conform with local County floodplain requirements. See also our comment below regarding sizing stormwater infrastructure.

Water Resources

Table 3-1 indicates that impacts to surface and groundwater resources will be evaluated in the EIS.

Impacts to ephemeral drainages

The main project site contains numerous ephemeral drainages or desert washes. We recommend avoiding the larger drainages through careful micro-siting of project components to the maximum extent possible. Desert washes perform a diversity of hydrologic, biochemical, and geochemical functions that directly affect the integrity and functional condition of higher-order waters downstream. Healthy ephemeral waters with characteristic plant communities control rates of sediment deposition

and dissipate the energy associated with flood flows. These values are present regardless of whether the washes are deemed jurisdictional waters of the U.S. under Section 404 of the Clean Water Act.

We recommend: 1) avoiding placement of support structures in washes; 2) utilizing existing natural drainage channels on site, such as earthen berms or channels, rather than concrete-lined channels; 3) committing to the use of natural washes, in their present location and natural form, and including adequate natural buffers, to the maximum extent practicable, 4) minimizing the number of road crossings over washes and designing necessary crossings to provide adequate flow-through during storm events, and 5) avoiding complete clearing and grading of the site by evaluating the mounting of PV panels at sufficient height above ground to maintain natural vegetation and reduce impacts to drainages. Please identify in the DEIS the extent to which these elements have been incorporated into the project design.

In comparing alternatives, we recommend the discussion of impacts to ephemeral drainages include the acreages and channel lengths, habitat types, values, and functions of the waters that would be affected. Describe in the DEIS the extent to which desert washes are being cumulatively impacted by existing and planned large-scale solar projects (and other non-energy projects, if applicable) in region.

Water Quality

Erosion and sedimentation impacts

Table 3-1 indicates that implementation of required Best Management Practices (BMPs) would reduce erosion impacts to negligible levels. These would include physical soil stabilization and revegetation as outlined in plans included as design features for the ESMSP, such as the stormwater pollution prevention plan (SWPPP) and fugitive dust control plan. Because K-Road has already been constructed, there is the opportunity to observe the effects and adjust BMPs and design features in response. The K-Road EIS indicated that adaptive management would be utilized if erosion and sediment measures were found to be insufficient. We recommend a brief discussion of what adaptive management measures were necessary for the K-Road project. Please also see sizing stormwater infrastructure comment below.

We recommend larger drainages be given wide buffers so the channels may adjust to the new hydraulic conditions without the need for major human-made structures. In the DEIS, identify specific on-site drainages that will be targeted for avoidance. Consider establishing permanent sediment and channel elevation monitoring stations to assist in the adaptive management of erosion and sedimentation and commit to low-impact development techniques, such as bioretention, to ensure drainage patterns remain in the most natural state feasible.

Clean Water Act Section 303(d)

The drainages on the ESMSP site flow into the California Wash and then into the Muddy River. The Muddy River is considered an impaired waterway under the Clean Water Act, Section 303(d) and does not meet water quality standards¹. The Muddy River is impaired for Iron and Dissolved Oxygen from Glendale to Well Siding Diversion, and in addition to these, for *Escherichia coli* and fecal coliform from Well Siding Diversion to the mouth of Lake Mead. Disclose this in the DEIS and indicate whether any discharges from the site, during construction or operation, could contribute to these impairments, and how changes in hydrology and discharges at the project site could contribute to cumulative impacts to the Muddy River.

¹Water Quality Integrated Report available at: <https://ndep.nv.gov/water/rivers-streams-lakes/water-quality-standards/303d-305b-water-quality-integrated-report>

Sizing stormwater infrastructure

We recommend the BIA consider the impacts of changing precipitation patterns on the project, as part of its analysis of impacts to water resources. Identify design considerations needed to accommodate future anticipated effects such as increased intensity and severity of storms, such as upsizing the stormwater management system. As a reference, the large storm in 2014 disrupted the construction of the K-road solar project and lessons learned might be applicable for this project. We recommend including any monitoring data or observations from the completed K-Road Solar Project, including whether any wash-outs or flooding incidents during large storms since 2014 occurred, to inform the stormwater management system at the ESMSP site.

Water supply

Estimate the quantity of water the project will require during the construction phase and during operations (cleaning the PV panels during routine maintenance, administration and sanitation uses in offices, etc.). Describe the source of this water and potential effects on other water users. The NOI indicates that groundwater would be used. Identify the affected groundwater basin and impacts to groundwater recharge, springs or other surface water bodies, biologic resources, and the potential for subsidence. Identify available technologies to minimize or recycle water and utilize xeric native plants in any landscaping around buildings. Describe water reliability for the proposed project and clarify how existing and/or proposed sources may be affected by changing precipitation patterns.

Topography / Geology

Table 3-1 indicates that “Construction, operation/maintenance, or decommissioning of the proposed Project would not alter the soil stability of the solar site” and this resource topic has been eliminated from further analysis in this EIS. While Table 3-1 indicates grading will only occur where necessary, if large-scale grading will occur at the site, or if soils will be sterilized with pesticides to prevent weed growth under the panels, we recommend BIA fully analyze the impacts to soil stability in the DEIS. Grading or sterilizing soils prevents the natural revegetation of native plants that could minimize erosion. Additionally, in arid areas, disturbed vegetation is slow to recover.

Air quality

Table 3-1 indicates that the analysis of impacts to air quality will be incorporated by reference from the other solar project EISs. Table 3-1 identifies fugitive dust as an impact and that dust control BMPs would be utilized. We understand these practices and a Dust Control Plan will be incorporated in the EIS as appendices. BIA and the Tribe should consider requiring contractors to attend a Dust Control Class, held twice monthly, by the Clark County Department of Air Quality, and utilizing the resources in their Dust Control Handbook. See <http://www.clarkcountynv.gov/airquality/Pages/default.aspx>.

Table 3-1 indicates that a portion of the vegetation could be cleared on 2,300 acres of the Reservation. EPA recommends that BIA quantify the fugitive dust impact that would be generated from grading the soil. It is just as important to prevent unnecessary dust generation as it is to control it, and preserving desert vegetation under the arrays should be considered. We are aware that other solar projects are experimenting with leaving in vegetation, since desert vegetation is very slow to recover and disturbance encourages invasive species. It is now possible to mount PV panels at sufficient height above ground to maintain vegetation and minimize erosion. For example, Ivanpah Solar Electric Generating System mowed most of the site, instead of using bulldozers to scrape away all vegetation, which allowed vegetation to regrow beneath the panels. In addition, the NOI indicates the project construction will not be phased but will occur in one phase. If full grading will occur on site, despite our recommendations to the contrary, we recommend phasing construction to minimize fugitive dust.

Biological Resources

Vegetation Management

Table 3-1 indicates that impacts to vegetation will receive full analysis in the EIS. The DEIS should discuss general locations of rare plants and describe how potential impacts will be minimized. Consider impacts associated with an increase of shade on vegetation and species in the desert environment, and impacts associated with constructing fences around the project site. Indicate whether pesticides and herbicides would be used for vegetation treatment. We recommend maintaining the presence of native plants under PV panels, to the greatest extent possible.

Invasive Plants and Noxious Weeds

Table 3-1 indicates that impacts from noxious weeds will not be further evaluated in the EIS and the analysis of the projects potential impacts to spreading invasive and noxious weeds will be incorporated by reference from the other solar project EISs. Table 3-1 states that all applicable BMPs associated with weed management specified by BIA and BLM policies to reduce or prevent impacts from weed species would be implemented as design features for the ESMSP as outlined in a weed management plan developed to address construction, operation, and decommissioning of the Project. The presence of a completed solar project near the ESMSP site offers a unique opportunity to observe how the predictions regarding noxious weeds and mitigations to address them are working. We recommend conducting these observations at the completed K-Road solar site and integrating the results into the weed management plan for ESMSP.

Protected Species and Habitat

Table 3-1 indicates that impacts to threatened and endangered species, as well as BLM sensitive species, will be evaluated in the EIS. The DEIS should identify all petitioned and listed threatened and endangered species and critical habitat that might occur within the project area and identify and quantify which species or critical habitat might be directly or indirectly affected by each alternative. EPA recommends that BIA and the Tribe coordinate with the U.S. Fish and Wildlife Service to determine whether consultation under Section 7 of the Endangered Species Act is required. Disclose in the DEIS the status of such coordination efforts, as well as any potential impacts of construction and operations activities on habitat and species, and any mitigation measures that would be implemented to protect important wildlife habitat areas.

The project location contains habitat for the threatened Mojave Desert tortoise, a species that is experiencing negative impacts from multiple sources, including multiple renewable energy projects. The DEIS should fully present the direct and cumulative impacts that this project, along with other solar projects proposed in the Mojave Desert, is expected to have on this species. The potential long-term effects of utility-scale energy development in fragmenting or isolating desert tortoise conservation areas and restricting gene flow should be considered.

Analysis of impacts and mitigation for listed species should include: 1) baseline conditions of habitats and populations of the covered species; 2) a clear description of how avoidance, mitigation, and conservation measures will protect and encourage the recovery of the covered species and their habitats in the project area; and 3) monitoring, reporting and adaptive management efforts to ensure species and habitat conservation effectiveness.

Impacts to Birds

Table 3-1 indicates that impacts to migratory birds will be evaluated in the EIS. Describe in the DEIS whether there is increased fatality risk to birds, particularly water fowl, associated with solar PV

arrays. Birds may mistake the PV panels for water – the so-called lake effect – resulting in unexpected deaths of birds from collisions with the solar panels. Discuss the issue of avian mortality and describe measures to minimize potential impacts. We recommend that the Bird and Bat Conservation Strategies include avian mortality monitoring and adaptive management measures.

Include assurances that the design of the transmission line would comply with current standards and practices that reduce the potential for raptor fatalities and injuries. The commonly referenced source of such design practices is found within the Avian Power Line Interaction Committee documents: *Suggested Practices for Avian Protection on Power Lines: State of the Art in 2006* manual and *Reducing Avian Collisions with Power Lines: The State of the Art in 2012*.

Public Health and Safety - Valley fever

The project site is located in an area that the Centers for Disease Control has determined is suspected endemic for *Coccidioides immitis*, a fungus causing Valley Fever in humans². Ground disturbing activities associated with the proposed action may result in dispersal of *Coccidioides* spores. EPA recommends that BIA discuss this potential health and safety impact in the DEIS and identify measures to prevent or reduce the risk of exposure to workers and local residents.

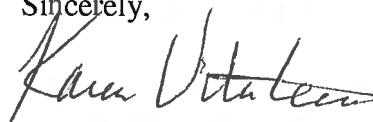
Cumulative impacts

Describe the methodology used to assess cumulative impacts. We recommend BIA consider the methodology developed jointly by EPA, the Federal Highway Administration, and the California Department of Transportation³. While this methodology was developed for transportation projects, the principles and steps in this guidance offer a systematic way to analyze cumulative impacts for any project.

There are currently many solar energy projects being proposed and constructed on public and private lands in the desert southwest. Consider impacts from these other projects, in addition to other developments in the area, on the resources that would be affected by the proposed project, as well as general resource trends. As mentioned, desert washes and ecosystems are experiencing cumulative effects from multiple large solar installations in the desert, as are the desert tortoise, and these are relevant to the cumulative impact assessment.

We appreciate the opportunity to provide comments on the preparation of the DEIS. We may have additional comments after attending the cooperating agency site visit, scheduled for March 5th. If you have any questions, please contact me at (415) 947-4178 or vitulano.karen@epa.gov.

Sincerely,



Karen Vitulano
Environmental Review Section

² See: <http://www.cdc.gov/fungal/diseases/coccidioidomycosis/causes.html>

³ Available at: http://www.dot.ca.gov/scr/cumulative_guidance/approach.htm.



NEVADA
**STATE HISTORIC
PRESERVATION OFFICE**

Department of Conservation and Natural Resources

Brian Sandoval, Governor
Bradley Crowell, Director
Rebecca L. Palmer, Administrator, SHPO

November 20, 2018

Bryan Bowker
Western Regional Office Director
Bureau of Indian Affairs
2600 North Central Avenue
Phoenix, AZ 85004-3008

Re: Lease and Rights-Of-Way for the Eagle Shadow Mountain Solar Project and Associated Infrastructure, Clark County, Nevada (Project No. 2018-126)
Environmental Quality Services MS620-EQS / SHPO Undertaking #2019-5682

Dear Mr. Bowker:

The Nevada State Historic Preservation Office (SHPO) has reviewed the subject documents received in hard copy on October 23, 2018 and via email on November 20, 2018 in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

Project Description

The SHPO understands this undertaking to be the Bureau of Indian Affairs' (BIA) approval of a lease and rights-of-way for the construction of a 300 megawatt solar photovoltaic electrical generation facility with associated infrastructure and access on the Moapa River Indian Reservation.

Area of Potential Effect (APE)

The BIA has determined that the direct effects as a result of this undertaking will be contained within a 2,500-acre area. Furthermore, the BIA has determined that indirect and cumulative effects as a result of this undertaking will be contained within a 5-mile radius of the solar field's direct APE or to the visual horizon, whichever is closer. The indirect APE is defined as a 1-mile radius from the centerline of the transmission line extending from the solar field. Since the BLM did a visual analysis of the Gemini solar field's visibility during their CRINA process, it may be helpful for the public if the BIA also does a viewshed analysis to further refine the indirect APE for this undertaking.

The SHPO **concurs** with the BIA's determination that this APE accounts for all potential direct, indirect, and cumulative effects that may result from this undertaking in keeping with 36 CFR §800.4(a)(1) and 36 CFR §800.16(d).

Identification Effort for Historic Properties

The SHPO notes that the proposed identification effort for archaeological properties within the direct APE is adequate for this undertaking. However, it is unclear what efforts the BIA is taking to identify other historic properties (e.g., architectural or traditional cultural properties) that could be within the indirect APE. If BIA is seeking SHPO review and comment on the proposed identification effort for the indirect APE, please submit additional information to our office.

901 S. Stewart Street, Suite 5004 ✦ Carson City, Nevada 89701 ✦ Phone: 775.684.3448 Fax: 775.684.3442

www.shpo.nv.gov

Native American Consultation

The SHPO notes that consultation with the affected Native American tribes has been identified per 36 CFR §800.2(c)(2)(i)(B). If this consultation results in the identification of properties of religious and/or cultural significance that could be affected by the undertaking, the SHPO looks forward to consulting with the BIA on the National Register eligibility and possible effects of the undertaking per 36 CFR §800.4(c) and 36 CFR §800.4(d). In order to maintain a complete and accurate record of consultation, please forward a brief narrative summary of the results of this consultation to our office so this may be added to the administrative record for this undertaking.

Consulting Parties and Public Consultation

The SHPO notes that consultation with the public and representatives of organizations that have a demonstrated interest in historic properties have been identified for consultation on this undertaking by the BIA in keeping with 36 CFR Part §800.2(c)(5). If this consultation results in the identification of historic properties that could be affected by the undertaking, the SHPO looks forward to consulting with the BIA concerning the National Register eligibility and possible effects of the undertaking. In order to maintain a complete and accurate record of consultation, please forward a brief narrative summary of the results of this consultation to our office so this may be added to the administrative record for this undertaking.

Should you have any questions concerning this correspondence, please contact Jessica Axsom at (775)684-3445 or by email at jaxsom@shpo.nv.gov or SHPO staff architectural historian Kristen Brown at (775) 684-3439 or by email at knbrown@shpo.nv.gov.

Sincerely,



Robin K. Reed
Deputy State Historic Preservation Officer

cc via email: Garry J. Cantley, BIA



Basin and Range Watch Western Watersheds Project

February 28th, 2019

To: Mr. Chip Lewis, BIA Western Regional Office, 2600 North Central Avenue, 4th Floor Mailroom, Phoenix, Arizona 85004; email: Chip.Lewis@bia.gov.

Re: Comments on the proposed Eagle Shadow Mountain Solar Project Agency/Docket Number: 190A2100DD/AAKC001030/A0A501010.999900253G

Basin and Range Watch is a 501(c)(3) non-profit working to conserve the deserts of Nevada and California and to educate the public about the diversity of life, culture, and history of the ecosystems and wild lands of the desert. Federal and many state agencies are seeking to open up millions of acres of unspoiled habitat and public land in our region to energy development. Our goal is to identify the problems of energy sprawl and find solutions that will preserve our natural ecosystems, open spaces, and quality of life for local communities. We support energy efficiency, better rooftop solar policy, and distributed generation/storage alternatives, as well as local, state and national planning for wise energy and land use following the principles of conservation biology.

Western Watersheds Project (WWP) works to protect and conserve the public lands, wilderness, wildlife, and natural resources of the American West through education, scientific study, public policy initiatives, and litigation. WWP has offices and staff in Nevada and other western states.

The Eagle Shadow Mountain Solar Project is a reservation project being reviewed by the Bureau of Indian Affairs. The decisions on the reservations should definitely be made by the people who are directly affected by the proposed action, but because this has made a full NEPA review in the Federal Register, we would like to offer the following ideas and ask you to consider the following impacts:

Purpose and Need: The Purpose and Need Statement should include a need to conserve resources. Those would be desert tortoise, all wildlife, rare plants, avian fauna, air quality and cultural sites.

Alternatives: While a No Action Alternative is required, other alternatives that would help the tribe economically without the environmental impacts of a big solar project could be considered.

Affected Environment/Environmental Consequences

Air Quality/Fugitive Dust:

If you build roads, transmission, large scale renewable projects and scrape up the Mojave Desert habitat, you will have fugitive dust. When deserts are scraped, a Pandora's Box of air quality issues is opened. Biological soil crust, desert pavement and old growth vegetation will all be lost. This is an Environmental Justice issue. The health impacts that will arise from airborne particulates from construction dust could have very negative on the local residents of the area. Dust control in hot, arid climates is very problematic. The removal of established vegetation, biological soil crusts and centuries old desert pavement creates opportunities for dust to be airborne every time the wind blows. Not only does fugitive dust create problems for visual and biological resources, it creates issues for public health as well. Coccidioidomycosis (Valley Fever) is a common issue in the desert regions when too much land is disturbed. There have been hundreds of cases of Valley Fever in Clark County and 33 cases reported in Clark County alone in 2016. ¹The rapid growth creates quote a bit of dust. The cumulative impact of scraping 10 square miles will only add a cumulative

The land rush of large solar projects all over the southwestern US has resulted in approval of many of these projects. In most of the cases, the developers have not adequately mitigated the fugitive dust that has resulted in the removal of large acreages of vegetated desert lands.

Visual Resources:

The project would dramatically change the view of the landscape and would impact adjacent public lands, wilderness areas and national park units. This impact is almost impossible to avoid.

Battery Storage:

How will the batteries on the site be cooled? In a building? Will this require power off the grid. Are remote solar sites the most efficient way to produce solar energy?

¹ <http://nvophie.weebly.com/home/valley-fever>

Biological Resources:

Terrestrial life forms such as the Desert Tortoise, Gila monster, American badger, Kangaroo rat, Desert iguana, Kit Fox, etc would all be impacted. The Lake Effect produced by solar power could also create a death trap for birds that mistake the panels for water and collide with them.

Desert Tortoise:

The 2017 and 2018 desert tortoise for the proposed nearby Gemini Solar Project surveys found 172 live tortoises, and based on density calculations, estimate that the project site contains 273 live tortoises. In addition to the live tortoises, biologists observed 2,774 desert tortoise burrows, 391 pellets, 323 carcasses, and 241 scats. Because of the high number of tortoises found here, we recommend that BLM and US Fish and Wildlife Service consider designating this area as new Critical Habitat and an Area of Critical Environmental Concern, since so many Critical Habitat Units are now no longer viable (see discussion below).

The project site is located between two recovery units and is considered an important connectivity corridor or least cost pathway due to suitable topography. The surrounding Areas of Critical Environmental Concern (ACEC's) that contain designated desert tortoise Critical Habitat include the Mormon Mesa, Gold Butte, and Coyote Springs Desert Wildlife Management Areas.

The Eagle Shadow Mountain site is closer to the Moapa Solar Project which was concluded to have an even higher population density than the Gemini site.

Recent modeling by Sanchez-Rameriz et al. (2018) using single nucleotide polymorphism markers and spatial data consistently associated genetic connectivity with least-cost distance, based on multiple landscape features associated with tortoise habitat, despite landscape distance. Spatial and landscape genetics identified cluster 5 as tortoise inhabiting northeastern Mojave Desert in California, through southern Nevada, to southwestern Utah. The Eagle Shadow Mountain Project could contribute to disconnecting this genetic population and fragment habitats, which have already undergone major development pressures. The cumulative impacts have stacked up in this region for the desert tortoise. The area has a major Interstate highway running through it and there are also several transmission utility corridors in the area. The Dry Lake South Solar Energy Zone (Designated Leasing Area) has filled up 3,000 acres and BLM wants to approve the Dry Lake East DLA which would be built on over 1,500 acres hugging a mountain range. The Moapa Solar Project was built on almost 2,000 acres very close by and there is a proposal to build 7,000 acre Gemini Solar Project on BLM lands as well. This project would be close to 10 square miles in size and 260 tortoises are estimated to be on the development site, the Red Flats Solar Project near Glendale would be 4,000 acres, the Ayia Solar Project on 900 acres of the Moapa Reservation and the Red Flats Solar Project on 2,000

acres near the Moapa Reservation. To the southwest is Las Vegas, Nevada which is experiencing a big economic urban growth boom now and thousands of acres of undeveloped public lands are being converted to housing subdivisions under the Clark County Multi Species Habitat Conservation Plan. Recently, the county passed a resolution which approved the transfer of over 40,000 acres of BLM lands to the county which would be used for housing subdivisions. If the Senate and Congress agree to this, that would add considerably to the cumulative loss of tortoise habitat in the region. To the north in the St. George, Utah area, the Northern Corridor highway project is proposed to slice directly through the Red Cliffs Tortoise Preserve, further leading to unmitigated mortality. At this rate of growth, there will not be much left for the tortoise if BLM approves the Gemini Solar Project.

At the most recent Desert Tortoise Management Oversight Group (MOG) meeting in Las Vegas, NV, Raul Morales, Deputy Director at Nevada of planning and resources for BLM said on February 27, 2019, that only one Recovery Unit is in an upward trend, and that the MOG needs to consider the future.

The Eagle Shadow Mountain Solar Project is proposed for the crucial linkage in the Northeastern Mojave Recovery Unit, in addition to a contiguous high-quality habitat block-- these blocks are becoming increasingly rare. Fragmentation is an increasing threat.

Cumulative development projects, solar proposals, urbanization, and a proposed airport is in the linkage near Jean threaten the functionality of this linkage corridor. The Clark County lands bill could further remove linkages. The connectivity between Recovery Units needs to be better protected.

The Management Oversight Group (MOG) is wrestling with solar energy development especially with rising renewable energy state RPS pushes.

Crucial connectivity corridors need to be better conserved, or if development occurs in them, better mitigation should be done.

The Desert Tortoise Council in recent letters to Congress opposing the Northern Corridor in Utah have stressed that these cumulative impacts, coupled with range-wide declines to the desert tortoise warrant uplisting to Endangered status under the federal Endangered Species Act.

US Fish and Wildlife Service in its latest status review (USFWS 2015), based on surveys and sampling from 2004 to 2014, found that 10 of 17 populations of the Mojave desert tortoise declined over that ten year period, and that 11 of 17 populations of the Mojave desert tortoise are no longer viable. These 11 populations represent 89.7 percent of the range-wide habitat in Critical Habitat Units/Tortoise Conservation Areas.

Avian Mortality/Lake Effect:

There are updated numbers that confirm there are significant numbers of bird mortalities found at solar projects. Photovoltaic project companies are turning in many of these numbers. Since the projects are very large, these numbers only likely represent a smaller percentage of what is actually taking place. Updated information about avian-solar interactions by US Fish and Wildlife Service shows this is a concern. Solar projects can have significant impacts to sensitive species, and those listed under the federal Endangered Species Act. Data reported and gathered from seven solar projects in the southern California desert and arid grassland habitats from 2012 through April 2016 show that 183 bird species have been killed at solar projects, a number that rises with new information. 3,545 individual birds were reported dead at solar projects, from a mix of incidental finds and systematic surveys (Dietsch 2016). This is likely an underestimate.

The Fish and Wildlife Service has identified several Birds of Conservation Concern that use the vicinity of the Eagle Shadow Mountain Solar Project. The 1988 amendment to the Fish and Wildlife Conservation Act mandates the U.S. Fish and Wildlife Service (USFWS) to “identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973.

Birds that are of concern have been found dead at solar projects, and may be impacted by the Eagle Shadow Mountain Solar Project, including these Birds of Conservation Concern:

- Federal Endangered/Threatened – Yuma Ridgeway’s (Clapper), Willow flycatcher, and Yellow-billed cuckoo.
- Birds of Conservation Concern – Eared grebe, American white pelican, Burrowing owl, Calliope hummingbird, Bald Eagle, Ferruginous Hawk, Golden Eagle, Peregrine Falcon, Snowy Plover, Long-billed Curlew, Black Swift, Calliope Hummingbird, Lewis's Woodpecker, Willow Flycatcher, Loggerhead Shrike, Virginia's Warbler, and Sage Sparrow.

Many of these Birds of Conservation Concern have been found in or in the vicinity of Lake Mead, the Muddy River and the Pahrangat National Wildlife Refuge as migrants or permanent residents (in the case of the burrowing owl). The arid regions between these water sources (Dry Lake Valley, Muddy Mountains, etc.) serve as flyways and a potential false lake could create issues. The Eagle Shadow Mountain Solar Project could potentially create this lake effect and polarized light may attract birds to photovoltaic solar projects as they mistake the panels for water. US Fish and Wildlife Service says many of these birds of conservation concern may be at risk.

Burrowing Owls/Kit Fox:

In a recent survey for the nearby proposed Gemini Solar Project on BLM lands, 99 kit fox burrows were found and 14 burrowing owl burrows were found. This could indicate a very large population on the site of the Eagle Shadow Mountain Solar Project. The burrowing owl is a sensitive species that is impacted by too much human activity.

Bighorn Sheep:

Is this site used by desert bighorn? Will this be surveys for?

Conclusion:

Large-scale solar projects do leave a major environmental impact that really can't be mitigated. Do you want all your open space converted to energy harvest areas? Should the landscape be converted to industrial energy or can there be economic alternatives that have fewer environmental impacts?

Thank you,

Kevin Emmerich
Co-Founder
Basin and Range Watch
P.O. Box 70
Beatty, Nevada 89003

Laura Cunningham
California Director
Western Watersheds Project
Cima CA 92323
Mailing: P.O. Box 70
Beatty NV 89003

References:

Dietsch, Thomas. May 2016. Update on Solar-Avian Interactions in Southern California. Migratory Bird Division US Fish and Wildlife Service. Presentation given at MultiAgency Avian-Solar Collaborative Working Group Public Meeting Sacramento, CA, May 10, 2016, http://blmsolar.anl.gov/program/aviansolar/docs/Avian-Solar_CWG_May_2016_Workshop_Slides.pdf.

Hagerty, B. E. and Tracy, C. R. 2010. Defining population structure for the Mojave Desert tortoise. *Conserv. Genet.* 11, 1795–1807.

Sanchez-Ramirez, S., Y. Rico, K. H. Berry, T. Edwards. A. E. Karl, B. T. Henen, and R. W. Murphy. 2018. Landscape limits gene flow and drives population structures in Agassiz's desert tortoise (*Gopherus agassizii*). *Nature Online Scientific Reports*.

February 26, 2019

Mr. Chip Lewis
BIA Western Regional Office
Southern Paiute Agency
2600 North Central Avenue
Phoenix, Arizona 85004

E-mail: Chip.Lewis@bia.gov

Re: Notice of intent to prepare an Environmental Impact Statement (EIS) that will evaluate a photovoltaic (PV) solar energy generation project on the Moapa River Indian Reservation and a 10-mile transmission line that would connect the solar project to Nevada Energy's Reid-Gardner substation.

Dear Mr. Lewis:

Thank you for providing the Notice of Intent concerning the preparation of an Environmental Impact Statement (EIS) for the proposed Eagle Shadow Mountain Solar Project. This project will be located on the Moapa River Indian Reservation and will include a transmission line approximately 10 miles long that would connect the solar project to Nevada Energy's Reid-Gardner substation. The project will be located on Tribal lands, Federal lands administered and managed by BLM and land owned by Nevada Power in Clark County Nevada. This letter provides Clark County Department of Air Quality's (DAQ) assessment of the project's conformity with Clark County Air Quality Regulations (AQRs).

As stated in your notice, the project will be constructed on up to 2,300 acres located within a 4,770 acre area lease area in Township 16 south, Range 64 east that includes all or part of Sections 9, 10, 11, 12, 14, 15, 16, 21 and 22 (Hydrographic Areas 216 and 218). Based upon the locations in your proposal, the project location is in attainment or is unclassified area for all criteria pollutants. (DAQ) does not have jurisdiction for enforcing air quality regulations within the Moapa River Indian Reservation or the other areas you specified.

In preparing an EIS for the proposed project, regulatory requirements may apply depending upon the type of activities that will take place at the construction site. Particulate Matter with an aerodynamic diameter of 10 microns or less (PM₁₀) is the pollutant primarily associated with construction activities and there are several provisions of the (AQRs) that regulate proposed construction within Clark County:

Section 94 of the AQRs requires that a dust control permit be obtained prior to: (i) soil disturbing or construction activities impacting 0.25 acres or more in overall area, (ii) mechanized trenching of 100 feet or more in length, or (iii) mechanical demolition of any structure 1,000 square feet or more in area. When construction activities exist, Best Available Control Measures (BACM) must be employed. More information about the dust control regulations and required forms can be found at the link below:

Construction activities include, but are not limited to, the following practices: (i) land clearing, (ii) soil and rock excavation or removal, (iii) soil or rock hauling, (iv) soil or rock crushing or screening, (v) initial landscaping, (vi) establishing and/or using staging areas, parking areas, material storage areas, or access routes to or from a construction site.

Section 94 of the AQRs requires that a construction project of ten (10) or more acres, trenching activities of one mile or greater, or structure demolition using implosive or explosive blasting techniques, include a detailed supplement to the Dust Mitigation Plan. The supplement must be in the form of a written report and must, at minimum, provide a project description, the area and schedule of the phases of land disturbance, and the control measures and the contingency measures to be used for all construction activities. The supplement will become part of the dust control permit as an enforceable permit condition.

Section 94 of the AQRs also requires that any construction project of fifty (50) or more actively disturbed acres have in place an individual designated as the Dust Control Monitor to ensure that dust control measures are implemented, pursuant to the provisions of Section 94.7.5. In addition, an application for a Dust Control Permit for 50 acres or more shall contain a soil analysis of the entire project.

The following provisions of AQRs (90, 91, 92) shall apply to areas located in a PM₁₀ non-attainment area, an area subject to a PM₁₀ maintenance plan as defined under U.S. Code 7595a, or in the Apex Valley (Hydrographic Areas 216 and 217), and areas which are not regulated by section 94.

- Section 90 limits the emission of particulate matter into the ambient air from open areas or parking lots.
- Section 91 of the AQRs restricts the emission of particulate matter into the ambient air from unpaved roads, unpaved alleys, unpaved road easements, and unpaved access roads for utilities and railroads.
- Section 92 limits fugitive dust from parking lots and storage areas.

Section 12 of the AQRs requires the issuance of a stationary source permit for any applicable source located in Clark County that has a potential to emit a regulated pollutant that is equal to or greater than the thresholds listed in that section.

Clark County's air quality regulatory program is not applicable Moapa tribal lands. However, DAQ notes that particulate emissions from construction of the Eagle Shadow Mountain Solar Project will most directly affect the Moapa tribal lands. The BIA may therefore want to consider incorporating BACM into the project EIS in order to mitigate these impacts. We also note that good soil stabilization or use of a paved surface on the facility site may reduce the cost of operations by minimizing frequency of cleaning/dust removal of the solar equipment.

For further assistance please contact me at (702) 455-1665, Russell Merle at (702) 455-1662 or the Small Business Assistance Program at (702) 455-1524.

Sincerely,

A handwritten signature in cursive script that reads "Brenda Whitfield". The signature is written in a dark ink and is positioned to the right of the word "Sincerely,".

Brenda Whitfield, Air Quality Specialist II
Clark County Department of Air Quality
Planning Division
4701 W. Russell Road
Las Vegas, NV 89118

From: [Lewis, Charles](#)
To: [Randy Schroeder](#); ESMSolar@logansimpson.com
Subject: Fwd: [EXTERNAL] RE: Eagle Shadow Mountain Solar Project
Date: Friday, March 08, 2019 12:55:42 PM

Chip Lewis
Regional Environmental Protection Officer
DOI-BIA/WRO/EQS
(602) 379-6750

----- Forwarded message -----

From: **Gonzalez, Brian** <Brian.Gonzalez@ladwp.com>
Date: Fri, Mar 8, 2019 at 11:37 AM
Subject: [EXTERNAL] RE: Eagle Shadow Mountain Solar Project
To: Lewis, Charles <chip.lewis@bia.gov>
Cc: Holloway, Chuck <Charles.Holloway@ladwp.com>, Parker, Nadia <Nadia.Parker@ladwp.com>

Thank you so much, Chip!

It was a pleasure speaking with you this morning. The files you sent will help the LADWP determine whether our agency has any utility interests that run through the Moapa Reservation.

As discussed, the LADWP is also kindly requesting that the following contact be added to future notification distribution lists related to this project:

Mr. Charles Holloway, Manager

Los Angeles Department of Water and Power

Environmental Planning and Assessment

111 N. Hope Street, Room 1044

Los Angeles, CA 90012

Thanks again for your help,

--Brian

BRIAN GONZALEZ

Environmental Planning and Assessment

Los Angeles Department of Water and Power

111 N. Hope Street, Room 1044

Los Angeles, CA 90012

213.367.2612

brian.gonzalez@ladwp.com

From: Lewis, Charles [mailto:chip.lewis@bia.gov]

Sent: Friday, March 8, 2019 9:58 AM

To: Gonzalez, Brian

Subject: Eagle Shadow Mountain Solar Project

Mr. Gonzalez,

Per our discussion, attached is a project fact sheet and two illustrations/maps that may help you with determining interest and involvement.

Chip Lewis

[Chip Lewis](#)

Regional Environmental Protection Officer

DOI-BIA/WRO/EQS

(602) 379-6750

-----Confidentiality Notice-----

This electronic message transmission contains information from the Los Angeles Department of Water and Power, which may be confidential. If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of the content of this information is prohibited. If you have received this communication in error, please notify us immediately by e-mail and delete the original message and any attachment without reading or saving in any manner.



CUSTOMERS FIRST

Eric Garcetti, Mayor
Board of Commissioners
Mel Levine, President
Cynthia McClain-Hill, Vice President
Jill Banks Barad
Christina E. Noonan
Aura Vasquez
Barbara E. Moschos, Secretary
David H. Wright, General Manager

May 14, 2019

Mr. Chip Lewis
BIA Western Regional Office
2600 North Central Avenue, 4th Floor Mailroom
Phoenix, Arizona 85004

Chip.Lewis@bia.gov

Dear Mr. Lewis:

Subject: Bureau of Indian Affairs Regarding Notice of Intent to Prepare Environmental Impact Statement for the Eagle Shadow Mountain Solar Project Intermountain – Adelanto Poles 1 and 2 Navajo-McCullough Line 1 LADWP File No. T-08509

This letter is written in response to a notice from the Bureau of Indian Affairs (BIA) dated February 12, 2019 regarding the Environmental Impact Statement (EIS) for the Eagle Shadow Mountain Solar Project. The project is within the Los Angeles Department of Water and Power (LADWP) and Intermountain Power Agency (IPA) Transmission Line Right of Way (TLRW). The property is located in Clark County, Nevada and generally described by the following Assessor Parcel Numbers (APNs):

067-00-001-009, 067-00-001-010, 067-00-001-011, 067-00-001-012, 067-00-001-016, 067-00-001-017, 067-00-001-018, 067-00-002-003, 067-00-002-004

On behalf of LADWP's Power System, the Right of Way Engineering (ROWE) Group reviewed the notice and has the following comments and conditions.

Comments

1. BIA referenced herein shall pertain to its employees, agents, consultants, contractors, or officers; agents, patrons, or invitees of BIA; or any other BIA affiliated entities.
2. The information provided to date is inadequate for properly reviewing the proposed project. LADWP therefore reserves the right to comment until more

detailed information is provided regarding the proposed solar project. The more detailed information shall include dimensioned plans of all existing and proposed improvements, clearances of all improvements from LADWP/IPA towers, grading and utility plans illustrating impacts to the LADWP/IPA TLRW, and property lines.

3. The Operating Agent for the Navajo-McCullough Line is the Nevada Power Company. Please forward this request to the addresses below:

Kiley Moore
NV Energy
6100 Neil Road M/S S3B40
Reno, NV 89511

William Muir
NV Energy
7155 S. Lindell Road M/S BS7SC
Las Vegas, NV 89118

Please note, Intermountain – Adelanto Poles 1 and 2 is operated and maintained by LADWP.

Conditions

1. BIA shall acknowledge that LADWP and IPA TLRW are an integral component of the transmission line system which provides electric power to the City of Los Angeles and other local communities. Their use is under the jurisdiction of the Federal North American Electric Reliability Corporation (NERC). Safety and protection of critical facilities are primary factors used to evaluate secondary land use proposals. The rights of way serve as platforms for access, construction, maintenance, facility expansion, and emergency operations. Therefore, the proposed use may from time to time be subject to temporary disruption caused by such operations.
2. No grading, improvements, or construction activities of any kind whatsoever will be allowed within the APNs stated above without written approval of LADWP.
3. No equipment shall be allowed to set up directly under LADWP and IPA transmission lines.
4. No equipment over 14 feet high shall be used near LADWP and IPA transmission lines without written permission of LADWP. Equipment higher than 14 feet will require submittal of a Conductor Survey to LADWP Overhead Transmission Engineering Group to ensure clearances meet the California Public Utilities Commission (CPUC), General Order No. 95 or the National Electrical Safety Code (NESC), whichever is more restrictive. Conductor Clearances will be subject to review and approval by LADWP Overhead Transmission Engineering Group. See the LADWP Conductor Survey Instructions attached.
5. Utilities agencies within the proposed excavation sites shall be notified of impending work. BIA shall be responsible for coordinating the relocation of

Mr. Chip Lewis
Page 3
May 14, 2019

utilities, if any, within the project boundaries. Before commencing any excavations, contact Underground Service Alert (a.k.a DigAlert).

6. All ground elevations are to remain unchanged from existing conditions after construction associated with the BIA proposed improvements is completed. Cut and fill slopes inside LADWP and IPA TLRW steeper than 2 horizontal to 1 vertical require retaining structures or geotechnical report approval.

Note: Grading activity resulting in a vertical clearance between the ground and the transmission line conductor elevation less than 35 feet or as noted in the CPUC General Order 95 or NESC, whichever is more restrictive, within the LADWP and IPA TLRW is unacceptable.

7. Ground cover for all below ground utilities shall not be less than four feet.
8. An area of at least 100 feet around the base of each transmission tower must remain open and unobstructed for necessary maintenance.
9. A permanent, unobstructed 20 foot wide roadway, accessible at all times by LADWP maintenance personnel, shall be provided and maintained. The roadway must remain open and unobstructed, excluded from any watering and kept as dry as possible at all times. See the Access Road Design Criteria attached.
10. Additional conditions may be required following review of final detailed site plans, grading/drainage plans, etc.
11. Standard Conditions for Construction shall apply. See attached.
12. This reply shall in no way be construed as an approval of any project.

Ms. Oriana Hone of the ROWE Group is assigned to handle this matter and is available at (213) 367-0062 should you require additional information.

Sincerely,



Gregory S. Huynh
Intermountain Power Project Operating Agent Manager
Los Angeles Department of Water and Power, Operating Agent

Mr. Chip Lewis
Page 4
May 14, 2019

GSH/OH:md

Enclosures: Conductor Survey Instructions
Access Road Design Criteria
Standard Conditions for Construction

c/enc: Ms. Oriana Hone
Mr. Thomas Honles
Mr. Nick Demos
Mr. David Nevarez
Mr. Edgar Perez
Mr. Tamer Ellyahky



PUBLIC COMMENT FORM
Bureau of Indian Affairs

EAGLE SHADOW MOUNTAIN SOLAR PROJECT
www.esmsolareis.com/
Scoping Comments

NAME: Sherryl Patterson

ADDRESS: PO Box 427

Moapa, Nu. 89025

- I have no comments, please keep me informed.
- Please remove me from your mailing list for this Project.
- I have the following comments about the Eagle Shadow Mountain Solar Project:

As a member of the Moapa Valley community
i am excited to know that the Moapa Band of
 Paiutes are using their land to not only benefit
their members, but to do their part in protecting
our environment with renewable energy.

Our community also benefits with much needed
jobs.

This is a win win for the area, and the world
we hope to see more projects coming our way.
As stewards of their land i am proud of the
Tribe for moving forward with solar projects.

Return to: Mr. Chip Lewis, Regional Environmental Protection Officer, BIA Western Regional Office, 2600 North Central Avenue, 4th Floor Mailroom, Phoenix, AZ 85004 Email: chip.lewis@bia.gov

(Or fold, seal, and add a stamp to the back of the sheet)

From: [Lewis, Charles](#)
To: [Randy Schroeder](#)
Subject: Fwd: [EXTERNAL] Eagle Shadow Mountain solar project shapefile?
Date: Wednesday, February 06, 2019 2:41:03 PM

Chip Lewis
Regional Environmental Protection Officer
DOI-BIA/WRO/EQS
(602) 379-6750

----- Forwarded message -----

From: **Pasha Feinberg** <PFeinberg@defenders.org>
Date: Wed, Feb 6, 2019 at 1:18 PM
Subject: [EXTERNAL] Eagle Shadow Mountain solar project shapefile?
To: Chip.Lewis@bia.gov <Chip.Lewis@bia.gov>

Good afternoon,

I am a renewable energy analyst for the non-profit Defenders of Wildlife. I am hoping for more information on the proposed Eagle Shadow Mountain solar project, specifically a shapefile of its proposed footprint or, if that's not available, a map of the proposed project. If you're not the appropriate person to ask, my apologies, although I'd be grateful if you could share the correct contact.

Many thanks,

- Pasha



Pasha Feinberg
Renewable Energy & Wildlife
Policy Analyst

Defenders of Wildlife
1130 17th Street N.W. Washington D.C. 20036
Tel: 202-772-3244 | **Fax:** 202-682-1331
pfeinberg@defenders.org | www.defenders.org

February 26, 2019

Mr. Chip Lewis
BIA Western Regional Office
Southern Paiute Agency
2600 North Central Avenue
Phoenix, Arizona 85004

E-mail: Chip.Lewis@bia.gov

Re: Notice of intent to prepare an Environmental Impact Statement (EIS) that will evaluate a photovoltaic (PV) solar energy generation project on the Moapa River Indian Reservation and a 10-mile transmission line that would connect the solar project to Nevada Energy's Reid-Gardner substation.

Dear Mr. Lewis:

Thank you for providing the Notice of Intent concerning the preparation of an Environmental Impact Statement (EIS) for the proposed Eagle Shadow Mountain Solar Project. This project will be located on the Moapa River Indian Reservation and will include a transmission line approximately 10 miles long that would connect the solar project to Nevada Energy's Reid-Gardner substation. The project will be located on Tribal lands, Federal lands administered and managed by BLM and land owned by Nevada Power in Clark County Nevada. This letter provides Clark County Department of Air Quality's (DAQ) assessment of the project's conformity with Clark County Air Quality Regulations (AQRs).

As stated in your notice, the project will be constructed on up to 2,300 acres located within a 4,770 acre area lease area in Township 16 south, Range 64 east that includes all or part of Sections 9, 10, 11, 12, 14, 15, 16, 21 and 22 (Hydrographic Areas 216 and 218). Based upon the locations in your proposal, the project location is in attainment or is unclassified area for all criteria pollutants. (DAQ) does not have jurisdiction for enforcing air quality regulations within the Moapa River Indian Reservation or the other areas you specified.

In preparing an EIS for the proposed project, regulatory requirements may apply depending upon the type of activities that will take place at the construction site. Particulate Matter with an aerodynamic diameter of 10 microns or less (PM₁₀) is the pollutant primarily associated with construction activities and there are several provisions of the (AQRs) that regulate proposed construction within Clark County:

Section 94 of the AQRs requires that a dust control permit be obtained prior to: (i) soil disturbing or construction activities impacting 0.25 acres or more in overall area, (ii) mechanized trenching of 100 feet or more in length, or (iii) mechanical demolition of any structure 1,000 square feet or more in area. When construction activities exist, Best Available Control Measures (BACM) must be employed. More information about the dust control regulations and required forms can be found at the link below:

Construction activities include, but are not limited to, the following practices: (i) land clearing, (ii) soil and rock excavation or removal, (iii) soil or rock hauling, (iv) soil or rock crushing or screening, (v) initial landscaping, (vi) establishing and/or using staging areas, parking areas, material storage areas, or access routes to or from a construction site.

Section 94 of the AQRs requires that a construction project of ten (10) or more acres, trenching activities of one mile or greater, or structure demolition using implosive or explosive blasting techniques, include a detailed supplement to the Dust Mitigation Plan. The supplement must be in the form of a written report and must, at minimum, provide a project description, the area and schedule of the phases of land disturbance, and the control measures and the contingency measures to be used for all construction activities. The supplement will become part of the dust control permit as an enforceable permit condition.

Section 94 of the AQRs also requires that any construction project of fifty (50) or more actively disturbed acres have in place an individual designated as the Dust Control Monitor to ensure that dust control measures are implemented, pursuant to the provisions of Section 94.7.5. In addition, an application for a Dust Control Permit for 50 acres or more shall contain a soil analysis of the entire project.

The following provisions of AQRs (90, 91, 92) shall apply to areas located in a PM₁₀ non-attainment area, an area subject to a PM₁₀ maintenance plan as defined under U.S. Code 7595a, or in the Apex Valley (Hydrographic Areas 216 and 217), and areas which are not regulated by section 94.

- Section 90 limits the emission of particulate matter into the ambient air from open areas or parking lots.
- Section 91 of the AQRs restricts the emission of particulate matter into the ambient air from unpaved roads, unpaved alleys, unpaved road easements, and unpaved access roads for utilities and railroads.
- Section 92 limits fugitive dust from parking lots and storage areas.

Section 12 of the AQRs requires the issuance of a stationary source permit for any applicable source located in Clark County that has a potential to emit a regulated pollutant that is equal to or greater than the thresholds listed in that section.

Clark County's air quality regulatory program is not applicable Moapa tribal lands. However, DAQ notes that particulate emissions from construction of the Eagle Shadow Mountain Solar Project will most directly affect the Moapa tribal lands. The BIA may therefore want to consider incorporating BACM into the project EIS in order to mitigate these impacts. We also note that good soil stabilization or use of a paved surface on the facility site may reduce the cost of operations by minimizing frequency of cleaning/dust removal of the solar equipment.

For further assistance please contact me at (702) 455-1665, Russell Merle at (702) 455-1662 or the Small Business Assistance Program at (702) 455-1524.

Sincerely,

A handwritten signature in cursive script that reads "Brenda Whitfield". The signature is written in a dark ink and is positioned to the right of the word "Sincerely,".

Brenda Whitfield, Air Quality Specialist II
Clark County Department of Air Quality
Planning Division
4701 W. Russell Road
Las Vegas, NV 89118

Appendix C

Project Design Features / BMPs and Agency-Required Mitigation

Appendix C

Project Design Features / BMPs and Agency-Required Mitigation

APPENDIX C
Applicant-Proposed Mitigation and Best Management Practices (BMPs)
EAGLE SHADOW MOUNTAIN SOLAR PROJECT

SOILS / EROSION

Grading on the solar site would be minimized to only those areas where necessary to meet the construction and operational requirements of the Project.

Construction and operational activities will be conducted in compliance with a stormwater pollution prevention plan (SWPPP) that would include BMPs and other erosion-control measures designed to minimize soil erosion and limit sheet flow and downstream sedimentation. The SWPPP would also incorporate adaptive management actions if erosion and sedimentation control measures are found to be insufficient to control surface water at the site.

To minimize wind erosion, all construction activities shall comply with the Fugitive Dust Control Plan that would be developed and implemented for the Proposed Project.

A Site Restoration Plan would be implemented as needed to limit impacts to temporary disturbance areas as much as practicable.

HYDROLOGY / WATER QUALITY

The drainage plan will be designed to maintain existing drainage patterns and control the rate and amount of surface water runoff.

Final grading and drainage plans will be completed and submitted for approval prior to construction and would demonstrate that downstream flows would not be adversely impacted as a result of proposed changes to natural washes from proposed grading, drainage management measures or the addition of retention ponds.

The paths for all stormwater flows would be identified and modeled as part of the final grading and drainage plan.

The number of drainage crossings would be minimized to the extent possible and each would be designed to accommodate adequate flow.

Post-storm monitoring of erosion and sedimentation would be conducted during construction. If localized gullies were to develop or result in increased rates of erosion and sedimentation, repairs would be made and erosion and sedimentation control measures would be updated.

All large ancillary facilities (e.g., project substation) will be located outside of drainages. Some PV supports could be placed within ungraded drainages where technically feasible.

A Spill Prevention, Control, and Countermeasure (SPCC) plan would be developed and implemented during construction and the operations phase of the Proposed Project. Adequately-sized secondary spill containment would be incorporated around the transformers at the on-site substation to ensure proper capture and control measures for potential spills. The Plan would also provide for hazardous material spill prevention and clean-up measures, were a spill to occur.

AIR QUALITY

The Project would obtain a dust control permit from Clark County for construction activities outside tribal land including any required supplements.

The area of grading and vegetation removal would be limited to only that area required for Project construction and operation.

Ground disturbing activities would be undertaken on both tribal and non-tribal lands in accordance with the applicable dust control plan(s) to minimize fugitive dust emissions.

Vehicular speeds on non-paved roads would be limited 25 miles per hour.

Grading operations would be phased where appropriate to limit the amount of disturbance at any one time, and water would be used for stabilization of disturbed surfaces under windy conditions.

Water would be applied to disturbed areas to control dust and facilitate soil compaction, where necessary. Water will be applied using water trucks and application rates would be monitored to prevent runoff and ponding. Approved palliatives would be used to control dust as required.

Exposed stockpiled material areas would be covered and excavation and grading would be suspended during windy conditions (forecast or actual wind conditions of approximately 25 miles per hour or greater).

APPENDIX C

Applicant-Proposed Mitigation and Best Management Practices (BMPs) EAGLE SHADOW MOUNTAIN SOLAR PROJECT

Open storage piles and disturbed areas would be stabilized by covering and/or applying water to stockpile to form a crust or organic dust palliative where appropriate at the completion of activity.

All trucks hauling soil and other loose material would be covered or at least 2 feet of freeboard would be maintained.

All paved roads would be kept clean of objectionable amounts of mud, dirt, or debris, as necessary. Gravel or other similar material would be used where non-paved access roads intersect paved roadways to prevent mud and dirt track-out.

A traffic and parking management plan would be finalized to minimize traffic interference and maintain traffic flow.

Unnecessary idling of equipment would be limited.

BIOLOGICAL RESOURCES

Prior to construction, a Weed Management Plan will be developed that includes measures designed to reduce the propagation and spread of designated noxious weeds, undesirable plants, and invasive plant species, or as determined by the agencies (BIA, BLM, etc.) in coordination with the Band.

The Applicant will implement controls at entry locations to facilitate weed management and invasive species control in order to minimize infestation to the project site from an outside source. Trucks and other large equipment will be checked before entering the site for any invasive species debris or seed.

To minimize activities that attract prey and predators during construction and operations, garbage will be placed in approved containers with lids and removed promptly when full to avoid creating attractive nuisances for wildlife. Open containers that may collect rainwater will also be removed or stored in a secure or covered location to not attract birds.

All work area boundaries will be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers, equipment, vehicles, and construction materials shall remain within the ROW, existing roads, and designated areas. Staging areas will be located in previously disturbed areas whenever possible.

All transmission towers and poles will be designed to be avian-safe in accordance with the *Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006* (Avian Power Line Interaction Committee [APLIC] 2006) and the Avian Power Line Interaction Committee (APLIC 2006) and *Reducing Avian Collisions with Power Lines* by the U.S. Fish and Wildlife Service and the APLIC (APLIC 2012).

If construction activities are scheduled to commence during the breeding season for western burrowing owls (February 1 through August 31), a qualified biologist will conduct pre-construction surveys within 30 days prior to construction for Western Burrowing Owls within suitable habitat. All areas within 250 feet of ground disturbing activities will be surveyed, per USFWS 2007 Burrowing Owl guidance.

Lighting would be designed to provide the minimum illumination needed to achieve O&M objectives and not emit excessive light to the night sky by installing light absorbing shields on top of all light fixtures and focusing desired light in a downward direction.

A Facility Decommissioning Plan would be finalized and provided to the Band, BIA, and BLM addressing the Project facilities under their respective management. This plan would be submitted for approval at least six months prior to commencement of site closure activities.

Potential closure activities could include re-grading and restoration of original site contours and re-vegetation of areas disturbed by closure activities in accordance with the Site Reclamation Plan. Revegetation seed mixes will be composed of native plant species.

Worker environmental awareness training will be required for all maintenance and operation staff for the duration of the project. In addition to an overview of minimization measures for all biological resources, the training will include specific best management practices designed to reduce effects to the desert tortoise.

Prior to construction, temporary tortoise-proof fencing will be installed around the boundary of the solar facility. Biological monitors or biologists approved to handle and relocate tortoises will be present during fence installation to relocate all tortoises in harm's way to outside the permitted ROW.

APPENDIX C

Applicant-Proposed Mitigation and Best Management Practices (BMPs) EAGLE SHADOW MOUNTAIN SOLAR PROJECT

Fence specifications will be agreed to in consultation with USFWS. Tortoise guards will be placed at all road access points where desert tortoise-proof fencing is interrupted to exclude desert tortoises from the project footprint. Gates or tortoise exclusion guards will be installed with minimal ground clearance and shall deter ingress by desert tortoises. Monitoring and maintenance will include regular removal of trash and sediment accumulation and restoration of minimal ground clearance between the ground and the bottom of the fence, including re-covering the subsurface portion of the fence if exposed.

The temporary desert tortoise fencing will be inspected monthly during periods of high tortoise activity (April 1 – May 31 and September 1 – October 31).

The Applicant will implement the Raven Management Plan (BLM 2014) to be provided by the BLM for portions of the Proposed Project on BLM-administered lands. The Applicant will inspect transmission structures annually for nesting ravens and other predatory birds and report observations of nests to the Service, BLM, and BIA.

No overnight hazards to desert tortoises (e.g., auger holes, trenches, pits, or other steep-sided depressions) will be left unfenced or uncovered; such hazards will be eliminated each day prior to the work crew and monitoring biologists leaving the site. All excavations will be inspected for trapped desert tortoises at the beginning, middle, and end of the workday, at a minimum, but will also be continuously monitored by a biological monitor or authorized biologist.

CULTURAL RESOURCES

A Memorandum of Agreement (MOA) between the Band, BIA, BLM, and SHPO will be required to define the steps that shall be taken to lessen, resolve, and/or mitigate the effects to cultural resources that may be adversely affected by the project.

Archaeological and Tribal monitors will be employed during construction in the vicinity of cultural resource sites to ensure that cultural resources are not directly affected by the project.

Fencing or other protective barriers will be placed to protect historic properties during construction as needed.

Should any unrecorded and unanticipated cultural resources be discovered during construction, all activities within the immediate area of discovery shall cease. Any unanticipated discoveries of cultural resources or changes to the Project APE would be managed in accordance with an *Unanticipated Discoveries Plan* that would be developed in consultation with the Tribe, BIA, BLM, and SHPO.

Should any unrecorded cultural resources be discovered during construction, all activities within the immediate area of discovery would cease. The Chairman of the Moapa Tribal Council, or his or her designated representative, and the BIA Regional Archeologist shall be notified immediately and, consulting with BLM and SHPO as appropriate, would make arrangements to assess the nature of discovered cultural resources and, if feasible, avoid the resources to the fullest extent practicable. If avoidance is not possible, the Applicant would minimize and mitigate any damages to any unanticipated discoveries before construction would be allowed resume in the immediate vicinity of the find/discovery.

TRANSPORTATION

A Traffic Management Plan would be finalized and approved by the Tribe and BIA that identifies BMPs to minimize construction-related traffic impacts.

Deliveries of materials would be scheduled for off-peak hours, when practical, to reduce effects during periods of peak traffic.

Truck traffic would be phased throughout construction, as much as practical.

Carpooling or mass transportation options for construction workers would be encouraged.

Before construction, the Applicant and agency representatives will document the pre-construction condition of the access route, noting any existing damage. After construction, any damage to public roads will be repaired to the road's pre-construction condition, as determined by the agency representatives.

PUBLIC HEALTH AND SAFETY

The Project would be designed in accordance with all applicable federal and industrial standards including the American Society of Mechanical Engineers (ASME), National Electrical Safety Code (NESC), International Energy

APPENDIX C

Applicant-Proposed Mitigation and Best Management Practices (BMPs) EAGLE SHADOW MOUNTAIN SOLAR PROJECT

Conservation Code (IECC), International Building Code (IBC), Uniform Plumbing Code (UPC), Uniform Mechanical Code (UMC), the National Fire Protection Association (NFPA) standards, and OSHA regulations.

All employees and contractors would be required to adhere to appropriate health and safety plans and emergency response plans. All contractors would be required to maintain and carry health and safety materials including the MSDS of hazardous materials used on site.

An Emergency Response Plan would be developed and implemented based on the results of a comprehensive facility hazard analysis.

A Hazardous Waste Storage Plan would describe the storage, transportation, and handling of wastes and emphasize the recycling of construction wastes where possible.

The Project would coordinate with the holders of all existing ROWs that would be crossed or paralleled by the Project ROWs (transmission lines and access roads) to minimize encroachment conflicts and possible effects to existing transmission lines and pipelines.

APPENDIX C-1
Additional Agency-Required Mitigation
EAGLE SHADOW MOUNTAIN SOLAR PROJECT

BIOLOGICAL RESOURCES

The measures below to reduce effects on the desert tortoise during construction, operation, and maintenance have been included in the Biological Opinion (BO) for ESMSP and would be required to be implemented:

1. **Construction area flagging.** Work areas will be flagged prior to beginning construction activities, and disturbance will be confined to the work areas. A biological monitor will escort all survey crews onsite prior to construction. All survey crew vehicles will remain on existing roads and stay within the flagged areas to the maximum extent practicable. In cases where construction vehicles are required to go off existing roads, a biological monitor (on foot) will precede the vehicles.
2. **Desert tortoise fencing.** Temporary tortoise-proof fencing will be installed around the boundary of the solar facility. Biological monitors under supervision of an authorized biologist (approved by the Service) will be present during fence installation to relocate all tortoises in harm's way to outside the work area. Additional clearance surveys and activities will be conducted after completion of the tortoise fence to ensure that no tortoises remain inside the fenced construction boundaries.

Fence specifications will be consistent with those approved by the Service (Service 2009b). Tortoise guards will be placed at all road access points where tortoise-proof fencing is interrupted to exclude desert tortoises from the Project footprint. Gates or tortoise exclusion guards will be installed with minimal ground clearance and shall deter ingress by desert tortoises. The temporary tortoise-proof fencing will be removed once the Project is commissioned, allowing tortoises to re-occupy the site during operations.

During the tortoise active seasons, all new fences will be checked twice a day for the first two weeks after construction or the first two weeks after tortoises become active if fence construction occurs in the winter, including once each day immediately before temperatures reach lethal thresholds. After the first two weeks, all tortoise exclusion fencing will be inspected monthly during construction, quarterly for the life of the Project, and immediately following all major rainfall events. Any damage to the fence will be repaired within two days of observing the damage.

3. **Field Contact Representative.** The BIA and Applicant will designate a Field Contact Representative (FCR) who will be responsible for overseeing compliance of the minimization measures of the biological opinion. The FCR will be onsite during all active construction activities that could result in "take" of a desert tortoise. The FCR will have the authority to halt activities that are in violation of the desert tortoise protective measures until the situation is remedied.
4. **Authorized desert tortoise biologist.** All authorized desert tortoise biologists (and monitors) are agents of BIA and the Service and will report directly to BIA, the Service, BLM, and the Applicant concurrently regarding all compliance issues and take of desert tortoises; this includes all draft and final reports of non-compliance or take. Authorized desert tortoise biologists, monitors, and the FCR will be responsible for ensuring compliance with all conservation measures for the Project as described in the biological opinion. Prior to starting construction, authorized biologist(s) will submit documentation of authorization from the Service and approval from NDOW. Potential authorized desert tortoise biologists will submit their statement of qualifications to Service.

An authorized desert tortoise biologist will record each observation of a desert tortoise handled in the tortoise monitoring reports. This information will be provided directly to BIA, the Service, and BLM.

APPENDIX C-1
Additional Agency-Required Mitigation
EAGLE SHADOW MOUNTAIN SOLAR PROJECT

Potential authorized desert tortoise biologists must submit their statement of qualifications to the Service's Southern Nevada Fish and Wildlife Office in Las Vegas for approval, allowing a minimum of 30 days for Service response. The statement form is available in Chapter 3 of the Desert Tortoise Field Manual on the internet at: https://www.fws.gov/nevada/desert_tortoise/dt/dt_manuals_forms.html

Authorized desert tortoise biologist requests in southern Nevada should be e-mailed to:
ADTB_request@fws.gov

5. **Biological monitoring.** Under supervision of an authorized biologist, biological monitors will be present at all active construction locations (not including inside the solar field after it has been fenced with desert tortoise fencing and clearance surveys have been completed). Desert tortoise monitors will provide oversight to ensure proper implementation of protective measures, record and report desert tortoises and tortoise sign observations in accordance with approved protocol, and report incidents of noncompliance in accordance with the biological opinion and other relevant permits. The biological monitor(s) will survey the construction area to ensure that no tortoises are in harm's way. If a tortoise is observed entering the construction zone, work in the immediate vicinity will cease until the tortoise moves out of the area. Tortoises found aboveground during construction activities will be moved offsite by an authorized biologist following the protocols described in the Desert Tortoise Translocation Plan.
6. **Desert tortoise clearance surveys and translocation.** After installation of tortoise fencing around the perimeter of the solar facility and prior to surface-disturbing activities, biological monitors and the authorized desert tortoise biologists who supervise them will conduct a clearance survey to locate and remove all desert tortoises from harm's way including those areas to be disturbed, using techniques that provide full coverage of construction zones (Service 2009b).

No surface-disturbing activities shall begin until two consecutive surveys find no live tortoises. In sectors or zones where a live tortoise is found, surveys will be repeated until the two-pass standard is met.

An authorized biologist will excavate burrows potentially containing desert tortoises located in the area to be disturbed with the goal of locating and removing all desert tortoises and desert tortoise eggs. Typical tortoise burrows have a characteristic shape with a flat bottom and arched top similar to a capital letter 'D' with the flat side down. Clearance will include evaluation of caliche caves and dens, as tortoises are known to shelter there. Caliche is a naturally occurring hardened cemented soil composed of calcium carbonate, gravel, sand, and silt. The practice of excavating every obvious tortoise burrow will not be done as it has shown to be ineffective and inefficient in locating tortoises; instead, all obvious tortoise burrows will be scoped for presence and possible extraction. During clearance surveys, all handling of desert tortoises and their eggs and excavation of burrows shall be conducted solely by an authorized desert tortoise biologist in accordance with the most current Service-approved guidance (Service 2009b). If any active tortoise nests are encountered, the Service must be contacted immediately prior to removal of any tortoises or eggs from those burrows to determine the most appropriate course of action. Unoccupied burrows will remain in place to allow for tortoise use during operations. Outside construction work areas, all potential desert tortoise burrows and pallets within 50 feet of the edge of the construction work area will be flagged. If a desert tortoise occupies a burrow during the less-active season, the tortoise may be temporarily penned or will be translocated following Service approval, contingent upon weather conditions and health assessment results. No stakes or flagging will be placed on the berm or in the opening of a desert tortoise burrow. Desert tortoise burrows will not be marked in a manner that facilitates poaching. Avoidance flagging will be designed to be easily distinguished from access route or other flagging and will be designed in consultation

APPENDIX C-1
Additional Agency-Required Mitigation
EAGLE SHADOW MOUNTAIN SOLAR PROJECT

with experienced construction personnel and authorized biologists. This flagging will be removed following construction completion.

An authorized desert tortoise biologist or biological monitor will inspect areas to be backfilled immediately prior to backfilling. Burrows with the potential to be occupied by tortoises within the construction area will be searched for presence. In some cases, a fiber optic scope will be used to determine presence or absence within a deep burrow.

A translocation plan following the 2018 guidance will be approved by the Service prior to the start of construction (Service 2018b). The plan identifies potentially suitable recipient locations, control site options, post-translocation densities, procedures for pre-disturbance clearance surveys and tortoise handling, as well as disease testing and post-translocation monitoring and reporting requirements. Tortoises found within 500 meters of the project boundary (fenceline) will be relocated outside of the nearest fence to a location that contains suitable habitat; tortoises found within the interior of the project site (>500 meters from a boundary fence) will be translocated to somewhere within the 4,070-acre lease area that contains suitable habitat.

BIA and the Applicant will have an authorized biologist relocate tortoises following the Service- approved protocol (Service 2009b) and according to the approved translocation plan. If the Service releases a revised protocol for handling desert tortoises before initiation of Project activities, the revised protocol will be implemented.

Tortoises found within the project area will be relocated outside of the ROW to an area of suitable habitat as directed by the Service. Translocation will follow installation of exclusionary tortoise fence, as determined in coordination with the agencies. Translocation events will occur to specific locations outlined in the approved project-specific translocation review package (TRP) and disposition plan, based on construction and translocation timing considerations for each tortoise. The project will employ two strategies for translocating tortoises, depending on the initial capture location of each animal:

- a. **Short-distance Translocations:** Tortoises found within 500 meters of the solar site fenceline or within the gen-tie construction area will be relocated to areas immediately outside of the project's temporary exclusion fencing or outside of harm's way in the vicinity of the gen-tie ROW. All short-distance translocation tortoises will have health assessments, have blood samples drawn, and be marked. Following the completion of construction, the exclusion fencing will be removed, the permanent site fencing will be permeable to desert tortoises, and the existing vegetation on the project site is expected to be left relatively intact during construction and operation of the project. Therefore, the short-distance translocation strategy is designed to allow tortoises to freely re-occupy the site following construction.
- b. **Long-distance Translocation:** Tortoises found in the interior of the solar site fenceline (>500 meters from the exclusion fence) will be translocated to recipient sites identified within the 1,870-acre area identified for the project but not proposed for project development. The following actions will occur:
 - An authorized biologist will perform health assessments and draw blood samples for each tortoise relocated. Blood testing will determine whether any desert tortoise suffers from upper respiratory tract disease (URTD).

APPENDIX C-1

Additional Agency-Required Mitigation EAGLE SHADOW MOUNTAIN SOLAR PROJECT

- Tortoises will be temporarily tagged with combination global positioning system (GPS)/radio-transmitter tags, so if the results of blood work indicate that a tortoise is infected with URTD, the tortoise can be retrieved and handled as directed by the Service.
 - When determining a release location for an individual tortoise, release site preference will be to find a like-for-like shelter resource. Every attempt will be made to find similar cover sites and habitat to that at the location of each individual found on the Project site, otherwise all translocatees shall be released at the most appropriate and available unoccupied shelter sites (e.g., soil burrows, caliche caves, rock caves, etc.) or under the shade of a shrub. Because of the impermanent nature of soil burrows and cave availability, prior to submitting the final Disposition Plan and determining exact areas of release, potential release sites will be re-investigated for existing burrows and caliche or rock caves that can be used for shelter sites. Known active and inactive tortoise burrows discovered during the surveys will be re-investigated for this purpose. If insufficient shelter sites exist in an area to be used for translocation, the Applicant shall coordinate with the agencies to determine the most appropriate course of action, such as reviewing an alternate release site, modifying/improving existing burrows and partial burrows, or artificially creating burrows per Service protocols prior to translocation. The number of artificial burrows per translocated tortoise will be included in the TRP/Disposition Plan, as feasible, and may include more than one burrow per tortoise to increase translocation success (i.e. tortoises remaining within their release locations). The disposition of relocated tortoises will be evaluated and reported on following the reporting requirements of the biological opinion.
 - If a tortoise voids its bladder while being handled, it will be given the opportunity to rehydrate before release. Tortoises will be offered fluids by soaking in a shallow bath or an authorized desert tortoise biologist will administer nasal-oral fluid or injectable epicoelomic fluids. Any tortoise hydration support beyond offering water or shallow soaking will only be provided by an authorized biologist who has received advanced training in health assessments and been specifically approved by the Service for these procedures.
7. **Integrated Weed Management Plan.** Prior to construction, an Integrated Weed Management Plan will be developed that includes measures designed to reduce the propagation and spread of designated noxious weeds, undesirable plants, and invasive plant species, or as determined by the cooperating or reviewing agencies (BIA, BLM, NDOW, etc.). Measures in the plan will include but are not limited to the following:
- Areas with current weeds will be mapped. Topsoil with the presence of weeds will not be salvaged and reused elsewhere in the Project. The topsoil from such areas will be disposed of properly.
 - Inspect heavy equipment for weed seeds before they enter the Project area. Require that such equipment be cleaned first to remove weed seeds before being allowed entry. Clean equipment that has been used in weed infested areas before moving it to another area.
 - Any straw or hay wattles are used for erosion control must be certified weed free.
8. **WEAP.** A WEAP will be presented to all personnel onsite during construction. This program will contain information concerning the biology and distribution of the desert tortoise, desert tortoise activity patterns, and its legal status and occurrence in the proposed Project area. The program will also discuss the definition of "take" and its associated penalties, measures designed to minimize the effects of construction activities, the means by which employees limit impacts, and reporting requirements to be implemented when tortoises are encountered. Personnel will be instructed to check under vehicles before moving them as tortoises often seek shelter under parked vehicles. Personnel will also be instructed on the required

APPENDIX C-1
Additional Agency-Required Mitigation
EAGLE SHADOW MOUNTAIN SOLAR PROJECT

procedures if a desert tortoise is encountered within the proposed Project area. WEAP training will be mandatory, as such, workers will be required to sign in and wear a sticker on their hardhat to signify that they have received the training and agree to comply.

9. **Access roads.** Construction access will be limited to the Project area and established access roads.
10. **Speed limits and signage.** Until the desert tortoise fence has been constructed, a speed limit of 15 miles per hour will be maintained during the periods of highest tortoise activity (March 1 through November 1) and a limit of 25 mph during periods of lower tortoise activity. This will reduce dust and allow for observation of tortoises in the road. Speed limit and caution signs will be installed along access roads and service roads. After the tortoise-proof fence is installed and the tortoise clearance surveys are complete, speed limits within the fenced and cleared areas will be established by the construction contractor based on surface conditions and safety considerations and remain with limits established by the Service in the biological opinion.
11. **Trash and litter control.** Trash and food items will be disposed properly in predator proof containers with resealing lids. Trash will be emptied and removed from the Project site on a periodic basis as they become full. Trash removal reduces the attractiveness of the area to opportunistic predators such as ravens, coyotes, and foxes.
12. **Raptor control.** The applicant will inspect structures annually for nesting ravens and other predatory birds and report observations of nests to the Service and BIA as stated in the Raven Management Plan. Transmission line support structures and other facility structures will be designed to discourage their use by raptors for perching or nesting (e.g., by use of anti-perching devices) in accordance with the most current APLIC guidelines. In addition to increasing desert tortoise protection, following these guidelines during transmission line construction will reduce the possibility of avian electrocution and other hazards.
13. **Overnight hazards.** No overnight hazards to desert tortoises (e.g., auger holes, trenches, pits, or other steep-sided depressions) will be left unfenced or uncovered; such hazards will be eliminated each day prior to the work crew and monitoring biologists leaving the site. All excavations will be inspected for trapped desert tortoises at the beginning, middle, and end of the workday, at a minimum, but will also be continuously monitored by a biological monitor or authorized biologist. Should a tortoise become entrapped, the authorized biologist will remove it immediately.

When outside of the fenced areas of the Project site, Project personnel will not move construction pipes greater than 3 inches in diameter if they are stored less than 8 inches above the ground until they have inspected the pipes to determine the presence or absence of desert tortoises. As an alternative, the Applicant may cap all such structures before storing them outside of the fenced area.

14. **Blasting.** If blasting is required in desert tortoise habitat, detonation will only occur after the area has been surveyed and cleared by an authorized desert tortoise biologist no more than 24 hours prior. A minimum 200-foot buffered area around the blasting site will be surveyed. A larger area will be surveyed depending on the anticipated size of the explosion as determined by the authorized desert tortoise biologist. All desert tortoises above ground within the surveyed area will be moved 500 feet from the blasting site to a shaded location or placed in an unoccupied burrow. Desert tortoises that are moved will be monitored or penned to prevent returning to the buffered survey area. Tortoises located outside of the immediate blast zone and that are within burrows will be left in their burrows. All potential desert tortoise burrows, regardless of

APPENDIX C-1
Additional Agency-Required Mitigation
EAGLE SHADOW MOUNTAIN SOLAR PROJECT

occupied status, will be stuffed with newspapers, flagged, and location recorded using a global positioning system (GPS) unit. Immediately after blasting, newspaper and flagging will be removed. If a burrow or cover site has collapsed that could be occupied, it will be excavated to ensure that no tortoises have been buried and are in danger of suffocation. Tortoises removed from the blast zone will be returned to their burrow if it is intact or placed in a similar unoccupied or constructed burrow.

15. **Penning.** Tortoises may be held *in-* or *ex-situ* (e.g., if temperatures do not allow for translocation or if tortoises do not pass the health assessment) for a maximum of 12 months. Previously constructed and approved enclosure pens are present adjacent to the Project site and will be used if any quarantine is necessary. Quarantine is not the preferred option for tortoises to be translocated and will only be used as necessary in coordination with the Service. This penning is not the same as the temporary penning described in the blasting measure.
16. **Stormwater Pollution Prevention Plan.** The applicant will oversee the establishment and functionality of sediment control devices as outlined in the stormwater pollution prevention plan.
17. **Tortoise Encounters During Construction.** If a tortoise is injured as a direct or indirect result of Project construction activities, it shall be immediately transported to a veterinarian or wildlife rehabilitation facility and reported within 24 hours or the next workday to the Service. Any Project construction-related activity that may endanger a desert tortoise shall cease in the immediate vicinity of a desert tortoise if encountered on the Project site. Project construction activities may resume after an Authorized Biologist removes the desert tortoise from danger or after the desert tortoise has moved to a safe area.

Operations and Maintenance Minimization Measures

The following minimization measures will be implemented during O&M of the Proposed Action to reduce effects on the desert tortoise and other species:

18. **WEAP Training.** WEAP training will be required for all O&M staff for the duration of the Project. In addition to an overview of minimization measures, the training will include specific BMPs designed to reduce effects to the desert tortoise. All Project personnel will check under vehicles or equipment before moving them. If Project personnel encounter a desert tortoise, they will avoid the tortoise. The desert tortoise will be allowed to move a safe distance away prior to moving the vehicle.
19. **Biological Monitoring.** A biological monitor(s) will be present during ground-disturbing and/or off-road O&M activities outside of the fenced solar facility to ensure that no tortoises are in harm's way. Tortoises found aboveground during O&M activities will be avoided or moved by an authorized biologist if necessary. Pre-maintenance clearance surveys followed by temporary exclusionary fencing also will be required if the maintenance action requires ground or vegetation disturbance. A biological monitor will flag the boundaries of areas where activities will need to be restricted to protect tortoises and their habitat. Restricted areas will be monitored to ensure their protection during construction.
20. **Speed Limits.** Speed limits within the project area, along transmission line routes, and access roads will be restricted to less than 25 mph during O&M. Speed limits in the solar facility will be restricted to 15 mph during O&M.

APPENDIX C-1

Additional Agency-Required Mitigation EAGLE SHADOW MOUNTAIN SOLAR PROJECT

21. Trash and Litter Control and other Predator Deterrents. Trash and food items will be disposed properly in predator proof containers with resealing lids. Trash will be emptied and removed from the Project site on a periodic basis as they become full. Trash removal reduces the attractiveness of the area to opportunistic predators such as ravens, coyotes, and foxes. To reduce attractants for birds, open containers that may collect rainwater will be removed or stored in a secure or covered location.

Decommissioning Minimization Measures

The same minimization measures used for construction will be used for decommissioning.

Compensatory Mitigation

The applicant will pay the following required compensatory mitigation:

22. Habitat Compensation. Prior to surface disturbance activities within desert tortoise habitat, the Project proponent will pay a one-time remuneration fee (per acre of proposed disturbance). The compensation for habitat loss under Section 7 of the Endangered Species Act (ESA) is an annually adjusted rate, currently \$902/acre (subject to change annually on March 1). Fees are based on the current \$902/acre fee for all permanently disturbed acres. For all project acres that will be temporarily disturbed and leave vegetation in place, fees will be assessed at 50% of the current rate. All assessed fees will be applied toward a habitat use study and tortoise monitoring for the Project.

23. Habitat Use Study. The Project proponent will work with the University of Nevada, Las Vegas (UNLV), U.S. Geological Survey (USGS), or other agency to design and implement a 2-3-year study to compare onsite and off-site desert vegetation and climate (e.g., annual and perennial plant growth and cover, ambient temperature) to address metrics of habitat change, including how desert tortoises use the vegetation onsite for forage and cover. Results from tortoise monitoring as approved in the Project's Desert Tortoise Translocation Plan will also inform the tortoise use portion of this study.

PUBLIC HEALTH AND SAFETY

The Project needs to incorporate the following measures to reduce potential worker exposure to the *Coccidioides immitis* fungus that can cause Valley Fever:

- Include training for workers and supervisors on the potential presence of Valley Fever spores, methods to minimize exposure, and how to recognize symptoms
- Limit workers' exposure to outdoor dust in disease-endemic areas by (1) providing air-conditioned cabs for vehicles that generate dust and making sure workers keep windows and vents closed, (2) suspending work during heavy winds, and (3) directing them to remove dusty clothing after fieldwork and store in closed plastic bags until washed.
- When exposure to dust is unavoidable, provide approved respiratory protection to filter particles.

Appendix D

Bird and Bat Conservation Strategy

Appendix D

Bird and Bat Conservation Strategy

Eagle Shadow Mountain Solar Project

Bird and Bat Conservation Strategy

October 2019

Table of Contents

1	Introduction.....	1
1.1	Purpose.....	1
1.2	Goals.....	1
2	Laws, Regulations, and Cultural Traditions.....	2
2.1	Migratory Bird Treaty Act.....	2
2.2	Endangered Species Act.....	2
2.3	Bald and Golden Eagle Protection Act.....	2
3	Proposed Project.....	4
3.1	Project Area and Description.....	4
3.2	Project Components.....	7
3.2.1	Substation, Transmission Line and Interconnections.....	7
3.2.2	Solar Field.....	9
3.2.3	Artificial Lighting.....	9
3.2.4	Access Road.....	9
4	Species of Concern.....	10
4.1	Bat Species.....	10
4.2	Federally Protected Avian Species Likely to Occur in the Project Area.....	11
4.2.1	Golden Eagles.....	11
4.3	Special Status Avian Species.....	12
5	Areas of Risk.....	14
5.1	Collision Risk.....	14
5.2	Electrocution.....	14
5.3	Territory Abandonment and Nest Disturbance.....	15
5.4	Habitat Loss and Fragmentation.....	15
5.5	Artificial Lighting.....	16
5.6	Ongoing Human Disturbance.....	16
6	Mitigation Measures.....	18
6.1	Electrocution.....	18
6.2	Anti-Perching and Nesting.....	18
6.3	Habitat Loss and Fragmentation.....	19
6.4	Lighting.....	19
6.5	Nest Disturbance and Territory Abandonment.....	19
6.6	Litter Disposal and Removal.....	20
7	Monitoring.....	21
7.1	Pre-construction Avian Monitoring.....	21
7.2	Post-construction Mortality Monitoring.....	21
7.3	Permit Compliance.....	21
7.4	Training.....	21
8	Adaptive Management.....	22
8.1	Agency Collaboration.....	22
9	References.....	23

Appendices

- A Mortality Reporting Form**
- B Nest Reporting Form**

1 Introduction

This Bird and Bat Conservation Strategy (BBCS) is a voluntary, project-specific document that outlines a plan to reduce the risks that result from bird and bat interactions with components of the Proposed Project. The goal of this, and any, BBCS is to reduce bird and bat mortality (USFWS 2012). The statutory authority for addressing effects to birds stems primarily from the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act (BGEPA), as well as the Endangered Species Act (ESA); for bats, the United States Fish and Wildlife Service's (USFWS) statutory authority arises primarily from the ESA (USFWS 2010a).

1.1 Purpose

This BBCS has been prepared in compliance with state and federal regulations to outline project-specific practices and measures for reducing avian and bat impacts potentially resulting from operation of the Eagle Shadow Mountain Solar Project (ESMSP or the "Proposed Project"). Two of the greatest concerns with respect to the Project is the potential for avian and, to a lesser degree, bat collision with power lines, as well as the permanent loss of golden eagle (*Aquila chrysaetos*) foraging habitat.

1.2 Goals

Implementation of this BBCS would fulfill multiple goals in an effort to reduce avian and bat mortality throughout construction of this Project. The goals specific to this BBCS are to:

1. Identify and isolate where avian and bat mortality has the potential to occur and reduce the potential for avian and bat mortality by implementing specific mortality reduction actions;
2. Design Project electric lines to be raptor safe in accordance with Avian Power Line Interaction Committee (APLIC) design standards (APLIC 2006, 2012), including ensuring that electrified systems do not present an electrocution risk and minimizing the risk of collisions with transmission lines and associated infrastructure;
3. Conduct preconstruction surveys to avoid impacts to nesting birds;
4. Establish an avian and bat reporting system to document incidents of electrocution and collision mortality during construction;

2 Laws, Regulations, and Cultural Traditions

Native birds and bats in Nevada are protected primarily under three pieces of legislation: the ESA, MBTA, and BGEPA. The Moapa Band of Paiutes (Tribe) does not have tribal guidance or regulations concerning birds and bats within the Moapa River Indian Reservation (Reservation).

2.1 Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (16 US Code [USC] 703-712) is administered by the U.S. Fish and Wildlife Service (USFWS 1998) and is the cornerstone of migratory bird conservation and protection in the U.S. The Act authorizes the Secretary of the Interior to regulate the taking of migratory birds; and provides that it shall be unlawful, except as permitted by regulations, “to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird” (16 USC 703). The list of species protected by the Act was revised in 2013, and includes almost all bird species that are native to the US. The updated memorandum to the MBTA, M-37050 and guidance memorandum (issued January 10, 2017), conclude that “the take of birds resulting from an activity is not prohibited by the MBTA when the underlying purpose of that activity is not to take birds.” Therefore, incidental take (takings and/or killings that directly and foreseeably result from, but are not the purpose of, an activity) of migratory bird species is not strictly prohibited by the MBTA. The ESA and Bald and Golden Eagle Protection Act are not changed by M-37050.

2.2 Endangered Species Act

Section 9 of the ESA prohibits everyone, private person and federal agency alike, from "taking" endangered and threatened wildlife. "Take" is defined to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. "Harm" is further defined by USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. "Harass" is defined by USFWS as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering (USFWS 1998). Any activity that may result in the “incidental take” of threatened or endangered species requires permission from the USFWS under ESA Sections 7 or 10.

2.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940 (as amended 1959, 1962, 1972, and 1978) prohibits the take, disturbance or possession of bald and golden eagles with limited exceptions. Take, in the Act, is defined as “to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.” Disturb is defined in the Act as, “to agitate or bother a bald or golden eagle to a degree that causes or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding,

feeding or sheltering behavior.” Important eagle-use areas include eagle nests, foraging areas, or roost sites that eagles rely on for breeding, sheltering, or feeding, and the landscape features surrounding such nests, foraging areas, or roost sites that are essential for the continued viability of the site for breeding, feeding, or sheltering eagles.

3 Proposed Project

3.1 Project Area and Description

The Project would be located approximately 30 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1-1**), west of I-15 and east of U.S. Highway 93. The Proposed Project site is accessible from Exit 64 on I-15. Traffic would exit I-15 and travel less than one mile and exit to the north on North Las Vegas Boulevard until reaching the solar site. These existing roads on the Reservation include the road built to provide access to the nearby existing K Road Solar Facility and the road providing access to the existing tribal aggregate operation and water wells that would be adjacent to the ESMSP. There is currently little traffic on any of the roads in the immediate vicinity of the project. No upgrades to these existing roads are anticipated to be necessary to provide the access needed for this Project, other than maintenance during construction and operations, as required. The Reservation in Clark County, Nevada, consists of 71,954 acres of land located approximately 25 miles northeast of Las Vegas. Clark County extends over 8,091 square miles.

325MK 8me LLC (Applicant), a subsidiary of 8minutenergy, has entered into an agreement with the Moapa Band of Paiute Indians (Tribe) to lease land, up to 50 years, on the Moapa River Indian Reservation (Reservation) for the purposes of constructing, operating, and maintaining the Eagle Shadow Mountain Solar Project (ESMSP), a 300-megawatt (MW) AC solar generating facility using photovoltaic (PV) technology and associated infrastructure (the Proposed Project or Project).

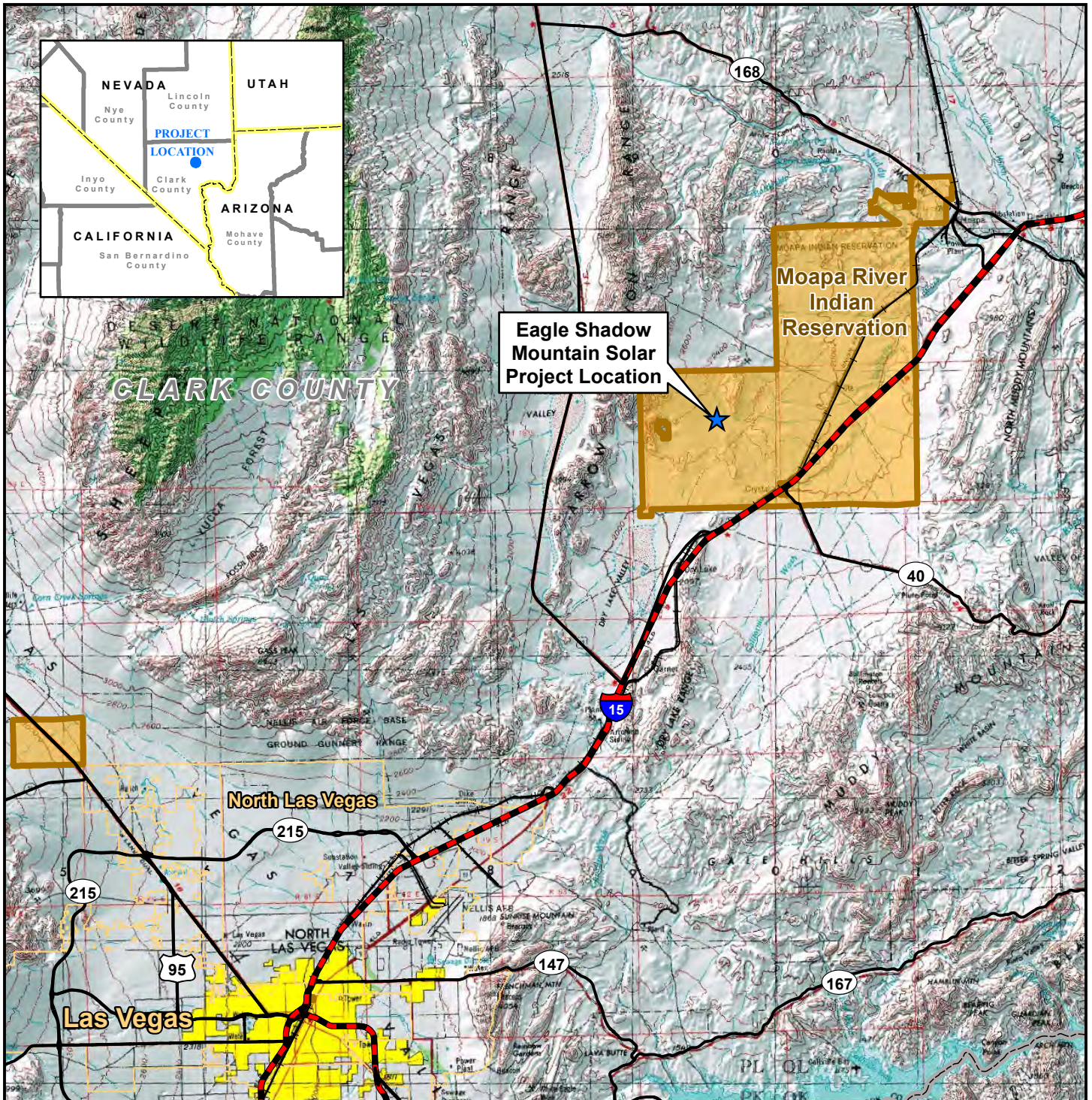
The proposed solar generating facility would be constructed on up to 2,200 acres within a study area of approximately 4,770 acres of tribal trust land within the Reservation. The Project infrastructure would include a 230 kilovolt (kV) electric transmission generation interconnection (gen-tie) line. Main access to the ESMSP site for construction and through operations and decommissioning would be provided via existing roads. Access to this portion of the Reservation 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 include the road built to provide access to the nearby existing K Road Solar Facility and the road providing access to the existing tribal aggregate operation and water wells that would be adjacent to the ESMSP.

The Project is located in the Basin and Range physiographic province in the north central portion of the Mojave Desert. Basin and Range structure in the Mojave Desert is characterized by abrupt mountain ranges, generally of moderate height. The Project site is situated in the north end of the Dry Lake Valley. The site consists primarily of low-profile bajada slopes and ephemeral washes, which drain to Dry Lake, a closed basin playa, and California Wash.






The general ecological setting of the Project is consistent with Mojave Desert scrub. The area is dominated by open stands of creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia*

dumosa). Desert saltbush (*Atriplex* spp) scrub habitat and cactus-yucca scrub are also present and concentrated within ephemeral washes. A more detailed description of the project area can be found in the Draft Environmental Impact Statement for the Project.


The Project facilities are anticipated to temporarily disturb about 2,164.8 acres and permanently disturb about 120 acres. Temporarily disturbed areas may be mowed to a height no less than 18 inches and drive and crush construction techniques would be implemented in order to retain native vegetation during operations. Almost all disturbance would occur on the Reservation except for 1.5 miles of genetic line on BLM and private land. The 230kV transmission line corridor would have a length of approximately 16 miles. The Project location allows efficient connection of the energy from solar resources to existing transmission infrastructure. The selected site is adjacent to an existing transmission corridor that has a direct path to the existing Reid Gardner Substation.

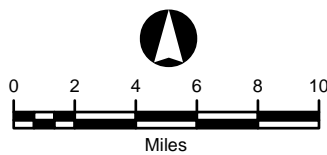


Legend

-  Solar Project Location
-  Interstate
-  US/ State Highway
-  Railroad
-  Municipal Boundary

Jurisdictional Land Ownership

-  Indian Reservation



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

Eagle Shadow Mountain Solar Project

**FIGURE 1-1
 PROJECT LOCATION**

Map Extent: Clark County, Nevada

Date: 11-06-18	Author: rnc
----------------	-------------

G:\Eagle Shadow Mountain Solar Project\MXD's\Project Location 8.5x11 110618.mxd

3.2 Project Components

The Project would include the following main elements:

- Solar Field with Single-axis Tracking Systems
- On-site Electrical Collection System and Substation
- Site Security and Fencing
- Communication Systems Infrastructure
- Operations and Maintenance Area
- Internal Project Roads
- An approximately 12.4-mile interconnection to the Reid Gardner substation via a 230kV transmission line and associated access roads
- Modifications to the Reid Gardner substation
- Energy Storage System
- Lighting
- Water Supply
- Wastewater Treatment
- Waste and Hazardous Materials Management
- Fire Protection

3.2.1 Substation, Transmission Line and Interconnections

The Project includes the construction of an on-site substation (within the up to 2,200--acre solar facility) with medium voltage (12.5-kV,34.5-kV, or 66-kV) to high voltage (230-kV) step-up transformer(s) with mineral oil, breakers, buswork, protective relaying, supervisory control and data acquisition (SCADA), and associated substation equipment.

3.2.1.1 230-kV Gen-Tie Transmission Line

The 230 kV-line to Reid Gardner would head northeast from the ESM site for approximately 12.4 miles to the Reid Gardner Substation (**Figure 1-1**).

3.2.1.2 Transmission Line Poles

The Project is considering steel monopole transmission structures for the 230-kV line to Reid Gardner Substation (**Figure 1-2**). The structures for the 230-kV line would range in height from 90 feet to 150 feet.

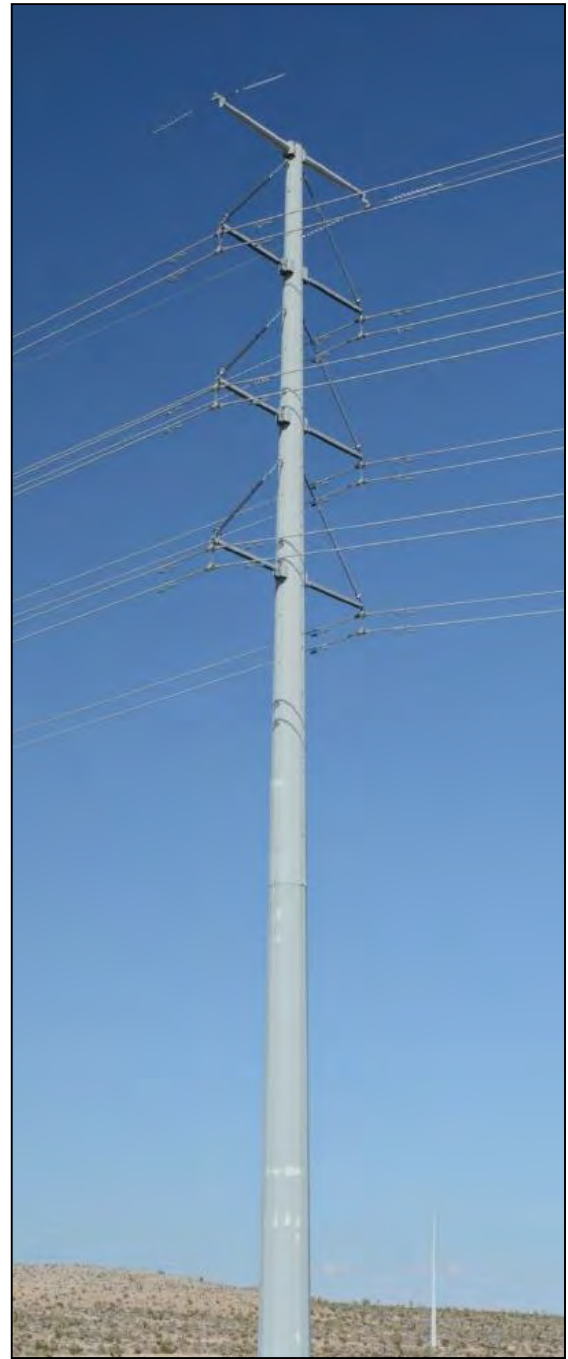
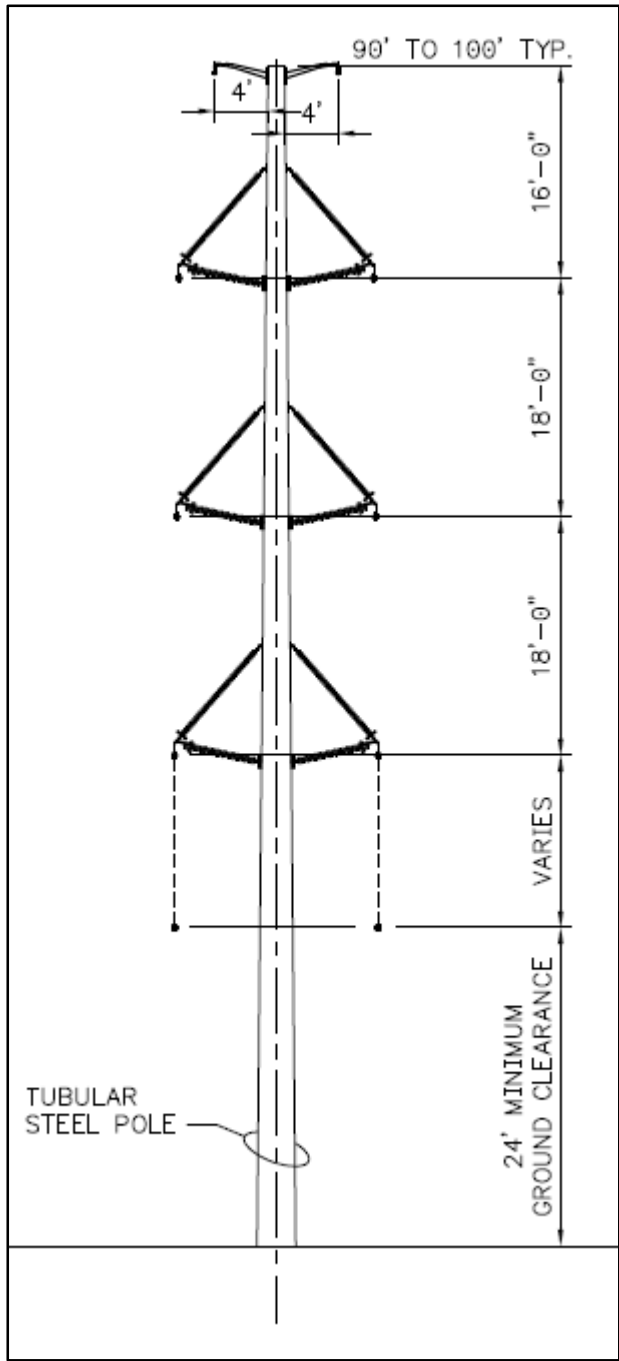


Figure 1-2
 Typical Gen-Tie Transmission Structure

3.2.2 Solar Field

The solar field would utilize PV technology and would cover approximately up to 2,220 acres on the Reservation. The PV modules, inverters, and transformers would be grouped into approximately 1 to 3 megawatts of alternating current (MWac) blocks.

3.2.3 Artificial Lighting

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

3.2.4 Access Road

The Project would require vehicular access for construction, operation, and maintenance. An existing approximately 5-mile gravel access road connecting the ESM to North Las Vegas Boulevard would be used to provide access to the solar facility. Existing and new access roads would be used or constructed to facilitate construction, operations, and maintenance of the gen-tie within the BLM Moapa Utility Corridor, on BLM administered lands, and private lands owned by NV Energy (**Figure 2**).

4 Species of Concern

The Proposed Project site supports suitable nesting and/or foraging habitat for several avian species and potentially suitable foraging habitat for several species of bat. The following section describes the known and predicted occurrences of avian and bat resources in and around the Proposed Project site.

4.1 Bat Species

No bats are currently listed by the USFWS or the Nevada Natural Heritage Program as threatened or endangered in Clark County, Nevada (USFWS 2013; Nevada Natural Heritage 2010). Twelve species of bat could occur within the Proposed Project site, and the BLM has designated all twelve as sensitive species. If present at all, these species are only expected to be present within the Proposed Project site during nocturnal foraging events and are addressed in **Table 1**. Based on surveys of the site and surrounding areas, there are no known or expected roosting locations or hibernacula within or in the immediate vicinity of the Proposed Project site.

TABLE 1 – BAT SPECIES WITH THE POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name	Scientific Name	Status	Habitat	Potential to Occur
California leaf-nosed bat	<i>Macrotus californicus</i>	N, NP	Inhabits low deserts, caves, mines, buildings.	Low potential to occur. Occurs at lower elevations.
California myotis	<i>Myotis californicus</i>	N	Semiarid deserts and grasslands, forests, coastal forests and montane forests.	Moderate potential to occur. Common. May forage within Project Area.
Townsend’s big-eared bat	<i>Corynorhinus townsendii</i>	N, NP	Salt desert scrub, sagebrush and pinyon-juniper mahogany. Will not live in extreme desert environments	Low potential to occur. Mine and cave obligates. Foraging habitat not present within the project area.
Western red bat	<i>Lasiurus blossevillii</i>	N, NP	Woodland habitats, Muddy River area.	Low potential to occur. No suitable habitat.
Big free-tailed bat	<i>Nyctinomops macrotis</i>	N	Inhabits rocky terrain, roosts in rocky cliffs, weather rock fissures including desert shrubs.	Low potential to occur. Rare.

Fringed myotis	<i>Myotis thysanodes</i>	N, NP	Low desert scrub to high elevation coniferous forests.	Low potential to occur. Reliance on cave roosts.
Cave myotis	<i>Myotis velifer</i>	N,	Cave dwelling; will roost in rock or wall crevices, old buildings and under bridges.	Low potential to occur. Rare.
Pallid bat	<i>Antrozous pallidus</i>	N, NP	Arid deserts and grasslands. Shallow caves and crevices, rock outcrops buildings, and tree cavities.	Low potential to occur. Reliance on tree roosts.
Spotted bat	<i>Euderma maculatum</i>	N, NP	Desert scrub to forest habitats. Roosts in caves and crevices.	Low potential to occur, prefer riparian areas for foraging.
Allen's lappet-eared bat	<i>Idionycteris phyllotis</i>	N, NP	Uses a variety of habitats including Mojave desert scrub, coniferous forests, and riparian woodlands.	Low potential to occur. Prefers high coniferous forest.
Western pipistrelle	<i>Pipistrellus hesperus</i>	N	Desert habitats of blackbrush, creosote bush, salt desert shrub and sagebrush	Moderate potential to occur. Common.
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>	N, NP	Roosts in caves, man-made structures. Found from low desert to high mountains.	Moderate potential to occur. Abundant species in southern Nevada.

Altenbach et al 2002, NNHP 2010

N BLM Nevada Special Status Species - designated Sensitive by State Office

NP Nevada State Protected Species protected under NRS 501.

4.2 Federally Protected Avian Species Likely to Occur in the Project Area

4.2.1 Golden Eagles

The golden eagle is protected under the BGEPA, which includes the September 11, 2009 Eagle Rule (Rule) 50 CFR parts 13 and 22, as well as the MBTA. Periodic helicopter surveys by NDOW indicate that suitable nesting and remnant nests occur in the approximately 2.5 to 4.5 miles north and west of the Proposed Project.

The entire Proposed Project site is considered suitable foraging habitat for golden eagles and the

species is likely to occasionally forage within the Proposed Project site. No suitable nesting habitat is present in the Proposed Project site and no known active nests occur closer than 2.5 miles from the project area. The construction and O&M of the Project is not expected to result in take. However, the potential for collision would be increased by the construction of this project if proper precautions are not taken.

4.3 Special Status Avian Species

In addition to the BGEPA and MBTA, the BLM and the State of Nevada have additional protection for endemic avian species. **Table 2** addresses these special status species that could be found in the Proposed Project site, the protection afforded these species, the associated habitat and the likelihood of occurrence.

TABLE 2 – SPECIAL STATUS AVIAN SPECIES WITH THE POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name	Scientific Name	Status	Habitat	Potential to Occur
Golden eagle	<i>Aquila chrysaetos</i>	NP, N, BGEPA	Mountainous and open terrain. Generally nests in rocky outcrops	Moderate likelihood to occur. See in depth discussion below.
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	LT, NP	Open woodland, parks, deciduous riparian woodland; nests in tall cottonwood and willow riparian woodland.	Low likelihood to occur. No suitable habitat.
Western burrowing owl	<i>Athene cunicularia hypugaea</i>	NP, N	Open grasslands, desert scrub, agricultural lands and open stages of pinyon-juniper habitat. Utilizes abandoned burrows.	Moderate likelihood to occur. May forage or nest in the Project Area. None detected during biological surveys.
Ferruginous hawk	<i>Buteo regalis</i>	N, NP	Open grasslands, sagebrush flats, low foothills and fingers of pinyon-juniper habitat	Low likelihood to occur. Little suitable habitat present.
Swainson's hawk	<i>Buteo swainsoni</i>	N, NP	Agricultural valleys with cotton, elm or other suitable nest trees.	Low likelihood to occur. No suitable habitat present.
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	N, NP	Beaches, dry mud or salt flats, sandy shores of rivers, lakes, and ponds.	Low likelihood to occur. No suitable habitat present.
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	LE, S, NP	Thickets, scrubby and brushy areas, open second growth, swamps, and open woodland.	Low likelihood to occur. No suitable habitat present.
Peregrine falcon	<i>Falco peregrinus</i>	N, NP	Mountains, open forested regions, and human population centers	Low likelihood to occur. Little suitable foraging habitat present; no suitable nesting habitat.

Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	N, NP	Pinyon-juniper woodland, less frequently pine, also occurs in scrub oak and sagebrush	Low likelihood to occur. No suitable habitat present.
Loggerhead shrike	<i>Lanius ludovicianus</i>	N, NP	Open country with scattered trees and shrubs, savanna, desert scrub.	Moderate likelihood to occur. May forage within the Project Area.
Lewis' woodpecker	<i>Melanerpes lewis</i>	N, NP	Open forest and woodland, often logged or burned, including oak, coniferous forest.	Low likelihood to occur. No suitable habitat present.
Yuma clapper rail	<i>Rallus obsoletus yumanensis</i>	LE, S, NP	Freshwater marshes containing dense stands of cattails and bulrushes.	Low likelihood to occur. No suitable habitat present.
LeConte's thrasher	<i>Toxostoma lecontei</i>	N, NP	Habitat consists of sparsely vegetated desert flats, dunes, alluvial fans, or gently rolling hills.	Moderate likelihood to occur. Suitable habitat present.
Brewer's sparrow	<i>Spizella breweri</i>	NP	Strongly associated with sagebrush in areas with scattered shrubs and short grass.	Low likelihood to occur. Little suitable habitat present.
Bald eagle	<i>Haliaeetus leucocephalus</i>	S, BGEPA	Large bodies of water for feeding. Mature trees for roosting.	Low likelihood to occur. No suitable habitat present.
Bendire's thrasher	<i>Toxostoma bendirei</i>	NP	Variety of desert habitats with fairly large shrubs or cacti and open ground, or open woodland with scattered shrubs and trees	Low likelihood to occur. Rare.

NatureServe 2013, NNHP 2010

S BLM Nevada Special Status Species - USFWS listed, proposed or candidate

N BLM Nevada Special Status Species - designated Sensitive by State Office

NP Nevada State Protected Species protected under NRS 501.

LE USFWS Listed Endangered

LT USFWS Listed Threatened

C USFWS Candidate

BGEPA Bald and Golden Eagle Protection Act

5 Areas of Risk

This section outlines potential risks to bird and bats resulting from the Proposed Project. **Section 6** provides methods to avoid or minimize these risks through Project design, construction, and operation measures, **Section 7** addresses how the Applicant will monitor and prevent avian and bat species mortality and **Section 8** outlines Adaptive Management.

Based on the results of the wildlife surveys completed for the Project, potential Project related risks associated with the construction and operation would include collision with overhead electric lines, solar panels and other features, electrocution, loss of foraging habitat and habitat fragmentation, nest and roost site disturbance, and disturbance due to ongoing human presence at the facility.

5.1 Collision Risk

Vulnerability to collision depends on many factors including bird behavior and maneuverability, topography, weather, and power line design and placement. Bird collision with power lines has been documented for decades, and risk of collision is considered highest in areas where birds congregate, such as power lines that bisect daily flight paths to meadows, wetlands and river valleys (APLIC 2006).

Birds may have significant “blind spots,” increasing risk of collision even during daylight hours. Scanning below for prey or roost sites can render them blind to objects in the direction of travel (Martin and Shaw 2010). Transmission lines are the Project components that present the greatest risk of avian collision. Given that the utility corridor is currently populated with seven electric transmission lines ranging in size from 230-kV to 500-kV it is assumed that the addition of one additional line on the west side of the existing utility corridor would not have a cumulative effect on in-air collisions. The existing lines have been in place for many years and foraging flight patterns have most likely adapted to the vast size of the utility infrastructure.

5.2 Electrocution

Power lines are present in many wildlife habitats and may result in the electrocution of raptors and other bird species (APLIC 2006; Lehman et al., 2010; and references therein). The potential for electrocutions depends on the arrangement and spacing of energized and grounded components of poles and towers that are sometimes used for perching, nesting and other activities (APLIC 2006, 2012). However, nearly all electrocutions occur on smaller, more tightly spaced residential and commercial electrical distribution lines that are less than 69-kV (APLIC 2006, 2012).

To protect avian species from electrocution, APLIC has established guidelines for electric line design. Incorporating appropriate design standards into the Gen-Tie Line and collector lines on the SPGF will minimize electrocution risk. The Gen-Tie Line and overhead collector lines will have clearances between electrical components as recommended by APLIC (2006, 2012), e.g.,

at least 60 inches of horizontal separation and a vertical separation of 40 inches between phase conductors, which is greater than the physical dimensions of all large birds, including eagles, that could potentially use the structures for perching. In situations where particular hardware would present an electrocution risk (e.g., jumpers, cutouts, arrestors, transformers, etc.), perch guards and/or insulators will be installed, per APLIC guidelines, to minimize electrocution risk. Therefore, electrocution of all birds including raptors would be highly unlikely.

5.3 Territory Abandonment and Nest Disturbance

The Tribe, Bureau of Indian Affairs (BIA) or the BLM do not have regulations quantitatively limiting noise generation or effects from the Project during the temporary construction phases or operational phase. The EPA has developed and published a criterion to be used as an acceptable guideline when no other local, tribal, county, or state standard has been established. The Project would affect ambient noise and vibration levels if it would result in the generation of noise levels or exposure of sensitive species to noise levels or ground-borne vibration in excess of standards established in applicable federal, state, and local general plans or noise ordinances.

There is the potential for golden eagles, as well as other bird species, to use the Project area for foraging and other birds for nesting. Birds would be susceptible to noise disturbance as described above, potentially resulting in alteration of foraging and/or nesting behaviors. There is potential for nest disturbance of migratory birds including burrowing owl burrows during the construction phase of the project due to noise, removal of vegetation, and leveling the ground. Known golden eagle nesting areas are located 2.5 to 4.5 miles from the Project. It is not expected that noise and other construction activity would affect nesting behavior of these known nests at this distance.

Short term impacts could result to birds; however, the area within the fenced solar facility would be void of sensitive or listed species. Impacts to vegetation and presence of humans and machinery would deter most birds from within the solar facility and therefore noise impacts to wildlife would be focused upon species immediately adjacent to the facility. Given the location of the facility, it is assumed that only short-term impacts would occur from noise and vibration during the construction phase. Most non-listed bird species would return to the area after construction if significant habitat and foraging opportunity exists.

5.4 Habitat Loss and Fragmentation

An estimated 120 acres is considered suitable foraging habitat for Golden Eagles and other avian/bat species discussed in this BBCS would be permanently affected by the Project, with additional temporary losses of an estimated 2,164.8 acres foraging habitat during construction activities. Loss of foraging habitat could impact foraging behaviors of these avian and bat species. The Proposed Project permanent impact of 120 acres of this habitat is very small (<0.01% assuming 10-mile foraging area) in comparison to available habitat within the area.

The Project Area currently supports suitable nesting and foraging habitat for some avian species,

and foraging habitat for some bats. These species could potentially be adversely affected during construction and operation activities. Bird nesting could also occur in the limited vegetation in the Project Area and in ground burrows in or near the Project Area. In the vicinity of the Project, the avian nesting season for most bird species is from late February to early July. The human activity at the ESM site or along the Gen-Tie Line could attract undesired species, such as ravens, that could affect the ability of other species to nest in the area. Workers will be trained to avoid activities that attract ravens and other scavengers/predators such as coyotes (*Canis latrans*) to the Project Area, per the Project's Raven Control Plan.

Bat roosts or nursery colonies can occur in a variety of natural substrates or manmade structures that provide specific thermal properties and protection from predators. Typically these are large, stable structures, uninhabited or with minimal use by humans, such as buildings, barns, bridges, or caves, mines, and trees. Likewise, aquatic features that produce insects can be an important resource for foraging bats. No bat roosting habitat currently exists for sensitive bat species within or near the Proposed Project site but the site potentially provides bat foraging habitat. Because bats do not forage during daylight hours the potential for Project-related construction or operations impacts on bats is limited but some nighttime construction could occur.

Direct habitat loss will occur from the Project, and habitat fragmentation may reduce the functionality of this area for birds and bats; however, because an abundance of similar lands are available in the vicinity to provide habitat for any avian individuals displaced from the Project site, and since this Project site is not located in a sensitive, unique, or significant area of ecological importance to bird or bat species, the impacts are likely to be small and have no significant population level effects on any bird or bat species in the area.

5.5 Artificial Lighting

Additional light sources during the operation of the ESMSP could result in concentrated foraging locations of avian and bat species that feed on insects nocturnally since the artificial lighting could attract insects. Artificial lighting also has the potential to negatively affect migration patterns of migratory birds and bats that move through the area. Lighting impacts would be reduced by focusing light sources downward. If lighting at individual solar panels or other equipment is needed for night maintenance, portable lighting will be used.

5.6 Ongoing Human Disturbance

Maintenance would consist of dust control and grounds upkeep, cleaning and repair of modules, repair and upkeep of all transformers, inverters and wiring collection systems, control systems upkeep, building maintenance and water treatment, and permanent storm water controls and maintenance.

Routine Preventative Maintenance (PM) activities would be scheduled in accordance with the frequencies outlined in the Original Equipment Manufacturer (OEM) specifications. O&M would

require the use of vehicles and equipment including but not limited to welding, re-fueling, lubricating, panel washing equipment, forklifts, manlifts, and chemical sprayers for weed abatement. Flatbed trucks and pick-up trucks as well as utility vehicles would be used on a daily basis during construction at the facility and on-site.

Major equipment maintenance and overhauls would be completed at intervals of approximately 5-10 years. Replacement of non-functioning equipment may require the use of heavy haul transport equipment and large overhead cranes. Noise and activity disturbance would occur as a result of the O&M activities, but the impacts would be minor and intermittent in nature and are expected to have little or no added impacts to birds or bats in the area.

6 Mitigation Measures

As discussed in **Section 4**, the Proposed Project Area supports suitable habitat avian species, thereby creating a potential for impacts on these species from construction and O&M activities. The potential for impacts to bats is low because they are not known to breed in the Proposed Project Area.

The following construction and operation measures will be implemented to minimize potential impacts on avian and bat species.

6.1 Electrocutation

All transmission towers and poles would be designed to be avian-safe in accordance with the *Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006* (APLIC 2006) and *Reducing Avian Collisions with Power Lines* by the U.S. Fish and Wildlife Service and the APLIC (APLIC, 2012). All aspects of the substations, switching stations, transformers and power lines (steel monopole structures) would be constructed utilizing avian-safe practices as suggested by APLIC using industry standards (APLIC 2006). Any potential electrocution caused mortality to avian or bat species would be captured under the reporting system (**Appendix A**).

6.2 Anti-Perching and Nesting

To reduce perching along segments of the transmission line, perch deterrents would be installed during construction. Anti-perching and nesting devices are important tools for reducing the risk of avian electrocution, protecting desert tortoise from increased predation, and keeping the entire electrical system running smoothly. Because conductor spacing on the 230-kV transmission line would be so great as to preclude avian electrocution, perch deterrents are expected to be used primarily to eliminate the use of transmission lines and transmission line towers as hunting perches for raptor species. Deterring this kind of perching would limit the predation of other avian species or animals which use surrounding vegetation for foraging and nesting.

Inspections of lines and other areas where raptor or corvids (crows and ravens) might nest along the transmission lines would be conducted monthly during the breeding season (February 15 to August 31st) for the first 3 years of operation. Inactive nests are not protected by MBTA and removal would be conducted prior to the next breeding season. Should nesting activity become a long-term issue, alternate measures to discourage nesting activities should be implemented. Prior to removing or relocating any nests, facility personnel would consult with USFWS and when necessary, proper USFWS permits would be obtained. Reporting of nests and nest relocation would be completed using forms found in **Appendix B**. Removal of inactive nests discovered by O&M staff would occur for the life of the project.

Any hollow mine claim markers discovered on site would also be removed to prevent birds from becoming entrapped.

6.3 Habitat Loss and Fragmentation

Construction of the electric transmission line would have a temporary effect on vegetation, but the areas would be allowed to re-vegetate, and wildlife species would be able to utilize them for habitat and foraging. Use of the existing utility corridor for access and transmission largely restricts the impact to a previously impacted area, and aids in reduction of impacts to historically undisturbed areas within the Reservation and on BLM-managed lands.

An Integrated Weed Management Plan (IWMP) has been prepared and was submitted to the BIA, BLM and the Tribe for review and approval before construction begins. Methods of noxious weed and invasive species identification, prevention and treatment for the Project are outlined in the WMP. The WMP recognizes the Project's impact on vegetation and defines the expected treatments and activities necessary to both maintain the determined desired conditions for the vegetation community within the Reservation, and control the weeds that may arise within the up to 2,200-acre ESM footprint.

6.4 Lighting

Lighting would be designed to provide minimum illumination needed to achieve O&M objectives and not emit excessive light to the night sky by installing light absorbing shields on top of all light fixtures, and focusing desired light in a downward direction (Reed et al. 1985). This would reduce the visibility of the lights to migratory birds traveling through the area. Downward facing lights would also reduce the number of insects attracted to lights resulting in a decrease of potential concentrated feeding areas for bats. Any additional lighting needed to perform activities such as repairs would be kept to a minimum and only used when these actions are in progress.

6.5 Nest Disturbance and Territory Abandonment

Vegetation clearing and ground disturbing activities would be conducted outside the migratory bird nesting season when practical. If ground-disturbing activities cannot be avoided during this time period, pre-construction nest surveys shall be conducted by a qualified biological monitor within 3 days prior to the initiation of ground disturbing activities. For all non-raptor bird species, surveys would cover all potential nesting habitat in and within 300 feet of the area to be disturbed. Any disturbance or harm to active nests would be reported within 24 hours to the USFWS and the BLM, if on BLM lands. The biological monitor would halt work if it is determined that active nests are being disturbed by construction activities and the appropriate agencies would be consulted.

If vegetation clearing is proposed to begin during the breeding season, a qualified biologist would conduct pre-construction nest surveys within 3 days prior to any vegetation clearing activities to identify all active nests within the construction area, and the vegetation and habitat type in which each nest is found will be recorded. Nest locations would be marked using handheld GPS (but not marked in the field in order to avoid attracting potential nest predators); an avoidance area would be clearly marked on the ground in order to prevent equipment from impacting the nest. Environmental

monitors would be in place during initial ground-disturbing activities during the construction period to minimize impacts to natural resources. During clearing activities associated with construction, qualified biologists would destroy bird nests only after young have fledged and perform any mitigation measures necessary to reduce or eliminate negative effects on avian species inhabiting the construction area. Activities associated with the removal of nests or relocation of Burrowing Owls are regulated by the USFWS under the MBTA.

If construction is scheduled to commence during the breeding season, a qualified biologist would conduct pre-construction surveys within 30 days prior to construction for western burrowing owl within suitable habitat prior to breeding season. All areas within 250 feet of the Project would be surveyed, per USFWS 2007 Burrowing Owl guidance. If an active nest is identified, there would be no construction activities within 250 feet of the nest location to prevent disturbance until the chicks have fledged or the nest has been abandoned, as determined by a qualified biologist. The occurrence and location of any Western Burrowing Owl would be documented by biological monitors in daily reports and submitted to the authorized biologist on a daily basis. The authorized biologist would report all incidents of disturbance or harm to Western Burrowing Owls within 24 hours to the USFWS and report any incidence of mortality on the proper form (**Appendix A**).

When removal of occupied burrows is unavoidable, the following mitigation measures shall be implemented outside of the breeding season:

- Passive relocation methods are to be used by the biological monitors to move the owls out of the impact zone. This includes covering or excavating all unoccupied burrows and installing one-way doors into occupied burrows. This will allow any animals inside to leave the burrow, but will exclude any animals from re-entering the burrow. A period of at least 48 hours is required after the relocation effort to allow the birds to leave the impacted area before excavation of the burrow can begin. The burrows should then be excavated and filled in to prevent their reuse.

6.6 Litter Disposal and Removal

To minimize activities that attract prey and predators during construction and operations, garbage will be placed in approved containers with lids and removed promptly when full to avoid creating attractive nuisances for birds and bats. Open containers that may collect rainwater will also be removed or stored in a secure or covered location to not attract birds.

7 Monitoring

Bird mortalities observed during construction of the Project would be documented and reported to the USFWS within 48 hours.

7.1 Pre-construction Avian Monitoring

Biological monitors would be assigned to the Project in areas of sensitive biological resources. The monitors would be responsible for ensuring that impacts to special status species, native vegetation, wildlife habitat, or unique resources would be avoided to the fullest extent possible. Where appropriate, monitors would flag the boundaries of areas where activities would need to be restricted to protect the species of concern discussed in this BBCS as well as other plant and animal species not listed. Those restricted areas would be monitored to ensure their protection during construction.

7.2 Post-construction Mortality Monitoring

Post-construction monitoring is not proposed for this Project. The Moapa Solar Project (formerly the K-Road Solar Project) is located on the reservation very close to and within the same habitat types as the ESM Solar Project (1.35 miles to the east). Moapa Solar has been conducting avian mortality surveys since January 2017. Surveys from January 2017 – July 2019 (29 months) have found only 9 total avian mortalities at the solar site, four of which were determined to be caused by collision and all are common species. No post-construction mortality monitoring would be necessary at the ESM Project because this current data from the nearby existing project shows there are no issues related to avian mortalities at this location and within these habitat types. Following construction, O&M staff would be required to take the WEAP training described below which would include a reporting protocol if avian mortalities are incidentally found during regular O&M activities.

7.3 Permit Compliance

The Proponents may find it necessary in some situations to obtain federal and state permits regarding avian and bat species, including nest removal or relocation permits (depredation permit). In such situations, the Proponent may seek to obtain them by working with the federal and state resource agencies to determine which permits are necessary. Under no circumstances would the Proponent perform any activity requiring a permit without first obtaining the proper permit or authorization to do so.

7.4 Training

A Worker Environmental Awareness Program (WEAP) would be prepared and implemented. All construction crews and contractors would be required to participate in WEAP training prior to starting work on the Project. The WEAP training would include a review of the special status species and other sensitive resources that could exist in the Project area, the locations of sensitive biological resources and their legal status and protections, and measures to be implemented for avoidance of these sensitive resources. A record of all trained personnel would be maintained.

8 Adaptive Management

8.1 Agency Collaboration

This BBCS is a “living” document. Adaptive management will ensure an ongoing open communication between the Proponent and the agencies. The parties will cooperatively evaluate issues if they arise. The Applicant will work collaboratively with the BIA, BLM and USFWS to comply with legal requirements as well as the requirements contained within this BBCS.

9 References

- Altenbach, J. S., W. Amy, P. V. Bradley, P. E. Brown, K. Dewberry, D. B. Hall, J. Jeffers, B. Lund, J.E. Newmark, M. J. O'Farrell, M. Rahn, R. E. Sherwin, C. R. Tomlinson, J. A. Williams. 2002. Nevada Bat Conservation Plan. Nevada Bat Working Group. Austin, Nevada. 188 pp.
- APLIC (Avian Power Line Interaction Committee). 2006. Suggested practices for avian protection on power lines: The state of the art in 2006. Washington, D.C. and Sacramento, CA: Edison Electric Institute, Avian Power Line Interaction Committee, and California Energy Commission.
- APLIC. 2012. Reducing Avian Collisions with Power Lines. The State of the Art in 2012. Washington, D.C. and Sacramento, CA: Edison Electric Institute and Avian Power Line Interaction Committee
- Lehman, R. N., J. A. Savidge, P. L. Kennedy, and R. E. Harness. 2010. "Raptor Electrocutation Rates for a Utility in the Intermountain Western United States." *Journal of Wildlife Management*. 74 (3): 459-470.
- Martin, G.R. and J.M. Shaw. 2010. Bird collisions with power lines: Failing to see the way ahead? *Biological Conservation* 143 (2010) 2695–2702. August 2010.
- Natureserve. 2013. NatureServe Web Service. Arlington, VA. U.S.A. Available <http://services.natureserve.org>. (Accessed: 26 March 2013)
- Nevada Natural Heritage Program. 2010. Department of Conservation and Natural Resources. <http://heritage.nv.gov/index.htm>. Accessed March 30, 2013.
- Reed, J.R., Sincock J.L., Hailman J.P. 1985. Light attraction in endangered procellariiform birds: reduction by shielding upward radiation, *The Auk*, 102, 377-383.
- U.S. Fish and Wildlife Service (USFWS). 1998. The Migratory Bird Treaty Act (16 United States Code §§ 703-712). Available at: <http://www.fws.gov/laws/lawsdigest/migtrea.html>
- USFWS. 1998. Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act. http://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf.
- USFWS Utah Field Office. 1999. USFWS Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances. http://www.fws.gov/wyominges/Pages/Species/Species_SpeciesConcern/Raptors.html.
- USFWS. 2007. Protecting Burrowing Owls at Construction Sites in Nevada's Mojave Desert Region. June. Nevada Fish and Wildlife Office. Las Vegas, Nevada.
- USFWS. 2011. Monitoring Migratory Bird Take at Solar Power Facilities: An Experimental Approach. May 2, 2011. 6pp.
- USFWS. 2012. Region 8 Interim Guidelines for the Development of a Project-Specific Bird and Bat Conservation Strategy for Solar Energy Projects and Related Transmission Lines. U.S. Fish and Wildlife Service – Pacific Southwest Region. Updated December 2012.
- USFWS. 2013. Species by County Report. http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=32003 Accessed 30 March 2013.
- Warren-Hicks, W.R. Wolpert, and J. Newman. 2012. Webinar on Improving Methods for Estimating Fatality of Birds and Bats at Wind Energy Facilities. California Wind Energy Association, September 26, 2012. Accessed at: <http://calwea.org/webinar.html>.

Appendix A – Mortality Reporting Data Form

EAGLE SHADOW MOUNTAIN SOLAR PROJECT

MORTALITY REPORTING FORM

DATE: _____ TIME: _____ OBSERVER: _____

PROXIMAL TO PROJECT COMPONENT: _____

CARCASS POSITION

GPS COORDINATES East: _____ North: _____

BEARING (degrees) to PROJECT COMPONENT: _____

DISTANCE (meters) to PROJECT COMPONENT: _____

CARCASS DESCRIPTION

SPECIES: _____

SEX (*circle*): M F U AGE (*circle*): A J U Tag/Band Number: _____

CONDITION (*circle*): intact scavenged dismembered feather spot injured

ESTIMATED TIME SINCE DEATH/INJURY (no. of days): <1 1 2 3 4 5 6 7 7+

CAUSE OF DEATH: _____

OBSERVABLE INJURIES: _____

SUBSTRATE/GROUND COVER (*at carcass location*): _____

DISPOSITION OF CARCASS¹ (*circle*): left in place removed collected for trials collected for other:

SHIPPED TO:

[name of institution] _____

[physical address] _____

[phone/email] _____

WEATHER CONDITIONS

AIR TEMPERATURE (degrees Fahrenheit): _____

PRECIPITATON (last 24 hours, *circle*): none light rain rain heavy rain hail snow

CLOUD COVER (*circle*): clear mostly clear partly cloudy mostly cloudy cloudy

WIND DIRECTION: _____ SPEED (mph, *circle*): 0-10 10-20 20-30 30+ gusty

NOTES (describe noteworthy weather conditions since last search, including high wind, fog, precipitation, and storm events):

PHOTOGRAPHS²:

Close Up: Photo 1 _____

Photo 2 _____

Landscape: Photo 3 _____

Photo 4 _____

PHOTO NOTES: _____

NOTIFICATION³:

DATE: _____

TIME: _____

NAME: _____

AGENCY/ASSOCIATION: _____

NOTES:

¹ Permit required to handle bird carcasses.

² At least four photographs should be taken. Two should be close-in shots of the carcass and should be taken from at least two different angles. Two should be shots taken farther away showing the landscape (project components, surrounding habitat, etc.) and should be taken from at least two different angles).

³ Indicate who was notified of the event, date, time, etc.

Appendix B – Nest Reporting Data Form

EAGLE SHADOW MOUNTAIN SOLAR PROJECT

NEST REPORTING FORM

DATE: _____ TIME: _____ OBSERVER: _____

PROXIMAL TO PROJECT COMPONENT: _____

NEST POSITION

GPS COORDINATES East: _____ North: _____

BEARING (degrees) to PROJECT COMPONENT: _____

DISTANCE (meters) to PROJECT COMPONENT: _____

NEST DESCRIPTION

SPECIES: _____

SEX OF INDIVIDUALS AT NEST (*circle all that apply*): M F U

AGE (*circle all that apply*): A J U

ESTIMATED NUMBER OF EGGS/CHICKS (IF APPLICABLE) _____

GENERAL DESCRIPTION OF NEST SITE

Substrate (e.g., cliff or outcrop [rock type], tree/shrub [species, live/dead], ground, artificial structure [type]):

Estimated height of substrate: _____(m) Estimated height of nest above ground: _____(m)

Nest type and location on substrate (e.g., stick nest in upper/lower canopy stick nest on/in ledge, pothole, or crevice; scrape on/in ledge, pothole, or crevice; stick nest on artificial platform mounted in tree; tree cavity; burrow; etc.):

Protection from weather (YES/NO; describe nature of protection, e.g., tree canopy, cliff backdrop, pothole/crevice, burrow, etc.):

Approximate compass direction of exposure to elements (wind, sun, etc.): _____

Nest size—indicate whether estimated or measured: _____

Height (top to bottom)_____ Width (left to right)_____ Depth (back to front)_____ (meters)

Known or probable alternative nests within territory and associated nest #'s:

PHOTOGRAPHS¹:

Close Up: Photo 1 _____

Photo 2 _____

Landscape: Photo 3 _____

Photo 4 _____

PHOTO NOTES: _____

NOTIFICATION²:

DATE: _____

TIME: _____

NAME: _____

AGENCY/ASSOCIATION: _____

NOTES:

¹ At least four photographs should be taken. Two should be close-in shots of the nest and should be taken from at least two different angles. Two should be shots taken farther away showing the landscape (project components, surrounding habitat, etc.) and should be taken from at least two different angles).

² Indicate who was notified of the event, date, time, etc.

Appendix E

Gen-Tie Plan of Development (POD)

Eagle Shadow Mountain Gen-Tie Project

Plan of Development

Submitted to:

Bureau of Land Management
Las Vegas Field Office
4701 North Torrey Pines Drive
Las Vegas, NV 89130

Submitted by:

Eagle Shadow Mountain Solar Project
325MK 8me LLC
250 Sutter Street, Suite 600
San Francisco, CA 94108

May 2019

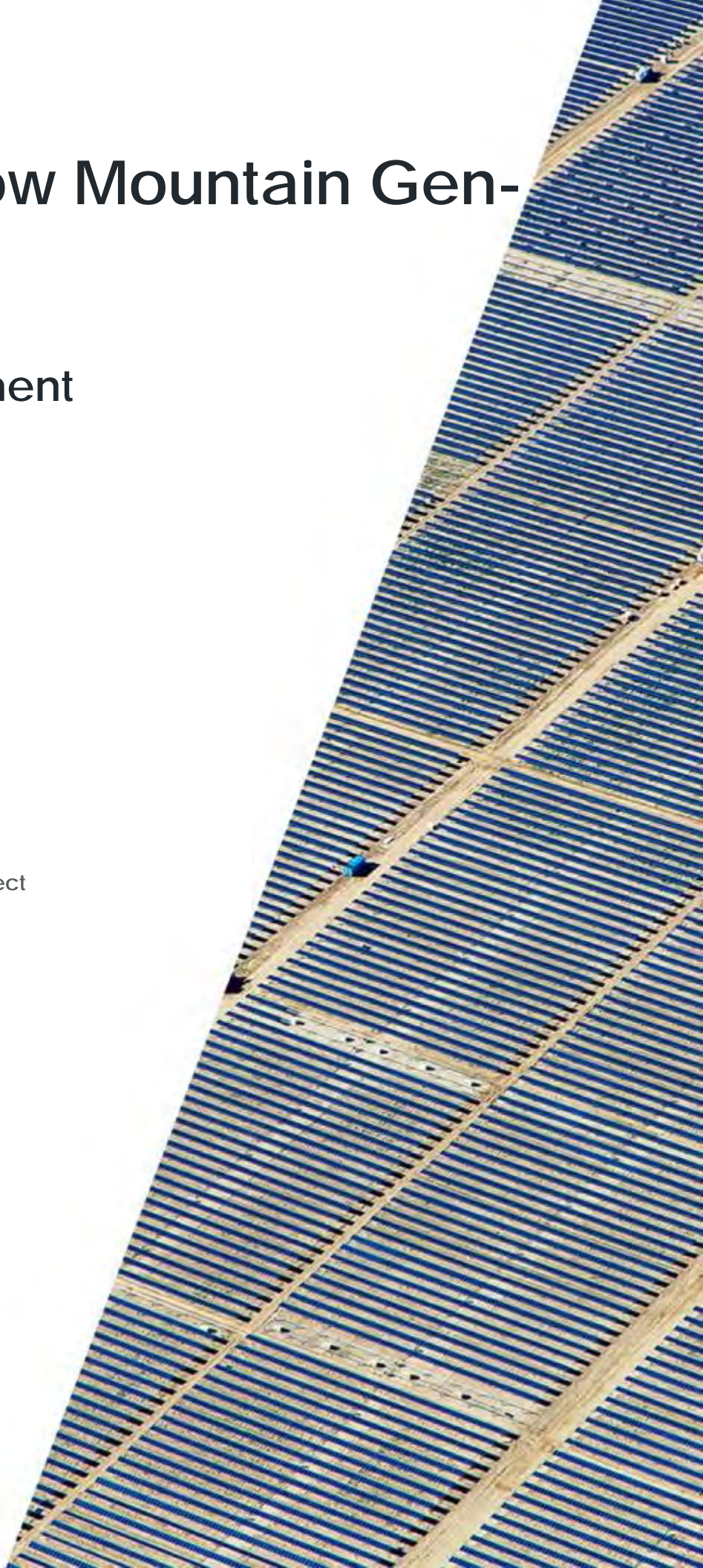


TABLE OF CONTENTS

- OVERVIEW 4**
 - Applicant’s Purpose and Need 5
 - Project Location 5
 - Origin and Destination Routing 5
 - Major Users Along the Route..... 12
- PROJECT DESCRIPTION 12**
- ELEMENTS COMMON TO BOTH ACTION ALTERNATIVES 12**
 - Solar Facility Access Road 12
 - Transmission Support Structures 13
 - Gen-Tie Service Road..... 13
 - Point of Change of Ownership Structure..... 13
 - NV Energy Transmission Provider’s Interconnection Facilities..... 13
 - Telecommunications and Metering at the Eagle Shadow Mountain Solar Project Substation..... 14
 - NV Energy Network Upgrades 14
- PROJECT FEATURE SPECIFICATIONS AND DISTURBANCE AREAS..... 14**
- GOVERNMENT AGENCIES INVOLVED..... 16**
 - Federal..... 16
 - Tribal..... 16
 - State 16
 - Local..... 16
- CONSTRUCTION OF THE FACILITIES..... 16**
 - Site Engineering Surveys..... 16
 - Timing of Activities..... 17
 - Access Roads 17
 - Transmission Structure Erection Sites 17
 - Conductor Pulling and Tension Sites 17
 - Water Use 18
 - Industrial Wastes and Toxic Substances..... 18
 - Personnel and Vehicles 18
- STABILIZATION AND REHABILITATION 19**
 - Soil Replacement and Stabilization..... 19
 - Disposal of Vegetation 19
 - Seeding Specifications 19

Construction Roads 19

OPERATIONS AND MAINTENANCE 20

Gen-Tie Operation..... 20

Safety..... 20

DECOMMISSIONING..... 20

OVERVIEW

325MK 8me LLC (the Applicant) proposes to construct and operate an electrical generator intertie (gen-tie) transmission line (Proposed Project) that would be partially located on lands administered by the Bureau of Land Management (BLM). The gen-tie would cross BLM-owned land, lands held in trust by the Bureau of Indian Affairs (BIA) for the Moapa Band of Paiutes (MBOP) and administered by the BLM, and private lands located in Clark County, NV. The Proposed Project would interconnect an up to 300 megawatt alternating current (MWac) solar photovoltaic (PV) electric generation facility (Eagle Shadow Mountain Solar Project or solar facility), located on the Moapa River Indian Reservation, to the regional electrical grid at the NV Energy Reid Gardner Substation. The Proposed Project would be designed to accommodate transmission of energy generated by the Eagle Shadow Mountain Solar Project and potential future solar energy generation and storage projects, with a combined total capacity of up to 800 MWac.

The Proposed Project would involve construction, operation, and eventual decommissioning of a 230 kilovolt (kV) single- or dual-circuit gen-tie line that would run northeastward from the Eagle Shadow Mountain Solar Project substation for up to 12.4 miles to the Reid Gardner Substation, which is located on private land in unincorporated Clark County. The Applicant is evaluating two alternative routes concurrently, both of which would require a right-of-way (ROW) across lands managed by the BLM. This Plan of Development (POD) was prepared as part of the SF-299 application process for a ROW Grant from the BLM for the portions of the two gen-tie alternatives that would cross BLM-administered lands.

Components of the Proposed Project on BLM-administered lands would be limited to transmission line structures, electrical conductors and communication lines strung between structures, and roads to access transmission structures. Both gen-tie alternatives would require a BLM ROW up to about 11.1 miles in length. The proposed ROW for the gen-tie would be 125 to 200 feet wide. The entire approximately 11.11-mile proposed BLM ROW for the gen-tie is within a designated utility corridor (Moapa Corridor, P.L. 96-491), which currently includes at least 11 BLM-authorized linear ROWs (Table 1). All portions of the gen-tie that would be on lands administered by BLM would be constructed above ground.

Table 1– Authorized Rights-of-Way within BLM Moapa Utility Corridor

Serial No.	Proponent/Holder	Project	ROW Width
NVN 082385	Holly Energy Partners	UNEV Pipeline	50'
NVN 042581	Kern River Gas Transmission Co	Natural Gas Pipeline	75'
NVN 089176	K-Road Moapa Solar LLC	500 kV Transmission Line	Varies – 100' – 200'
NVN 091072	K-Road Moapa Solar LLC	Road and Drainage	27'
NVN 010683	Los Angeles Department of Water and Power	500 kV Transmission Line	Varies – 200' – 400'

Table 1– Authorized Rights-of-Way within BLM Moapa Utility Corridor

Serial No.	Proponent/Holder	Project	ROW Width
NVN 004790	LADWP / BOR / Nevada Energy	Navajo - McCullough 550 kV	200'
NVN 039815	NV Energy	Pecos - Harrisburg 345 kV Transmission Line	Varies – 150' – 330'
NVN 0061985	NV Energy	230 kV Transmission Line	Varies – 100' – 230'
NVN 0067348	NV Energy	230 kV Transmission Line	100'
NVN 091614	Overton Power District	Arrow Canyon Powerline	50'
NVN 086732	TransWest Express LLC	600 / 500 kV Transmission Line	Varies – 200' – 300'

Applicant’s Purpose and Need

The purpose of the Proposed Project is to facilitate transmission of the energy produced at the Eagle Shadow Mountain Solar Project and potential future solar energy generation and storage projects to the regional electrical grid. The need for the Proposed Project is to:

1. Provide a means of conveying up to 800 MWac of renewable energy to the electric grid to meet increasing demand for in-state generation;
2. To complement the Applicant’s dedication to environmental stewardship through environmentally sensitive project siting;
3. To assist the Moapa Band of Paiutes by promoting economic development and bring living-wage jobs to the region throughout the life of the Proposed Project.

Project Location

The Eagle Shadow Mountain Solar Project’s energy generation facilities would be located entirely on Moapa River Indian Reservation lands in Clark County, west of Interstate-15, approximately 4 miles northwest of the intersection of I-15 and the Valley of Fire Highway, and approximately 1.5 miles west of the Moapa Southern Paiute solar facility. The Proposed Project (i.e., gen-tie line) would be located on a combination of private lands, MBOP lands held in trust by the BIA, and on lands administered by the BLM (Figure 1).

Origin and Destination Routing

The Proposed Project would originate at the Eagle Shadow Mountain Solar Project substation on lands held in trust by the BIA for the MBOP located adjacent to the BLM-administered Moapa Utility Corridor. The two gen-tie ROW alternatives would proceed eastward from the Eagle Shadow Mountain Solar Project substation and enter BLM-administered land in the Lot 11, Section 14, Township 16S, Range 64E, Mount Diablo Base Meridian. From there the route would proceed northeast on BLM administered-land for approximately 11.1 miles, eventually exiting BLM-administered land in Lot 2, Section 7, Township 15S, Range 66E, Mount Diablo Base Meridian, and terminate at the Reid Gardner substation on private

land in NW¼SW¼ Section 5, Township 15S, Range 66E, Mount Diablo Base Meridian. The following alternatives will be carried forward for detailed analysis under the National Environmental Policy Act (NEPA):

Alternative 1 (No Action Alternative): Under NEPA, the BLM must consider the effects that would occur if the ROW application is denied. Under this alternative, a combination of lands held in trust by the BIA for the MBOP and private land would be used for construction, operation, and decommissioning of the gen-tie line. The environmental effects of the No Action Alternative would likely be similar to those associated with the BLM alternatives, albeit greater due to the longer lengths associated with avoiding BLM-administered lands.

Alternative 2 (Proposed Action): The Proposed Action would cross up to 11.1 miles of BLM-administered land primarily within a designated utility corridor (Attachment 1). Of the 11.1 miles of the Proposed Action that would cross BLM-administered land, about 0.34 miles would be located on BLM land outside of the utility corridor in the Lot 2, Section 7, Township 15S, Range 66E, Mount Diablo Base Meridian. The gen-tie ROW on BLM-administered lands would be up to 125 to 200 feet wide, totaling up to 267.2 acres. This route would be centrally located within the utility corridor, staying as close as possible to the westernmost existing or authorized (approved but not yet constructed) linear ROW within the corridor.

In addition to the proposed gen-tie ROW, the Proposed Action would require ROWs for use of existing access roads. One ROW would be for use of an existing access road that would be used as the primary access road for the solar facility, and the other ROW would be for use of new and existing access roads, outside of the proposed gen-tie ROW, to facilitate construction and operation of the gen-tie.

Alternative 2, Proposed Action, Legal Description for Gen-Tie Right-of-Way

T. 16 S., R. 64 E.,

sec. 12, Lots 1, 8, 9, and 14, SE¼SW¼, NW¼SE¼, SE¼NE¼

sec. 13, NW¼NW¼

sec. 14, Lots 1, 8, 9, and 11, SE¼NE¼, and NW¼SE¼

Acres: 56.6

T. 16 S., R. 65 E.,

sec. 5, Lot 7

sec. 6, Lot 8

sec. 7, Lot 7

Acres: 40.2

T. 15 S., R. 65 E.,

sec. 12, Lots 6, 7, and 14, SW¼SE¼, SE¼SE¼, NE¼SE¼

sec. 13, Lot 1, SW¼NW¼, SE¼NW¼, NE¼NW¼, NW¼NE¼

sec. 14, Lots 6, 7, and 14, SW¼SE¼, NE¼SE¼

sec. 22, Lots 7, 8, 9, 16, and 17

sec. 23, Lots 4, 5, and 7

sec. 27, Lots 4, 5, and 7
sec. 28, Lots 12, 13, 14, 21, and 22
sec. 32, Lots 1, 11, 12, 17, and 18, SW $\frac{1}{4}$ SE $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$
sec. 33, Lots 4, 5, and 6
Acres: 162.4

T. 15 S., Range 66E
sec. 7, Lot 2
Acres: 7.9

Total Alternative 2 Gen-Tie ROW Acreage: 267.2 acres

Legal Description for Primary Solar Facility Access Road

T. 16 S., R. 64 E.,
sec. 1, Lot 7, NE $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$
sec. 14, Lots 9, 11, and 12, SE $\frac{1}{4}$ SW $\frac{1}{4}$
sec. 22, SW $\frac{1}{4}$ SE $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$
sec. 23, SW $\frac{1}{4}$ NW $\frac{1}{4}$, NW $\frac{1}{4}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ NW $\frac{1}{4}$
sec. 27, NE $\frac{1}{4}$ NW $\frac{1}{4}$, NW $\frac{1}{4}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$ NW $\frac{1}{4}$
sec. 28, SE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$
sec. 33, SW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$
Acres: 17.9

Total Primary Solar Facility Access Road ROW Acreage: 17.9 acres

Alternative 2, Proposed Action, Legal Description for Gen-Tie Access Roads (outside of Gen-Tie ROW)

T. 16 S., R. 64 E.,
sec. 12, Lots 1, 8, 9, and 14, SE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$
sec. 13, NW $\frac{1}{4}$ NW $\frac{1}{4}$
sec. 14, Lots 1, 8, 9, and 11, SE $\frac{1}{4}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$
Acres: 5.1

T. 16 S., R. 65 E.,
sec. 5, Lot 7
sec. 6, Lot 8
sec. 7, Lot 7
Acres: 5.3

T. 15 S., R. 65 E.,
sec. 12, Lots 6, SW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$
sec. 13, SW $\frac{1}{4}$ NW $\frac{1}{4}$, NW $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ NW $\frac{1}{4}$, NW $\frac{1}{4}$ NE $\frac{1}{4}$
sec. 14, SW $\frac{1}{4}$ SE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$
sec. 22, Lots 7, 8, 9, 16, and 17
sec. 23, Lots 3, 4, 5, and 7

sec. 27, Lots 4, 5, and 7
sec. 28, Lots 12, 13, 14, 21, and 22
sec. 32, SW¼SE¼, NW¼SE¼, NE¼SE¼, SE¼NE¼
sec. 33, Lots 4, 5, and 6
Acres: 11.7

T. 15 S., Range 66E
sec. 7, Lots 1, 2, NE¼NW¼
Acres: 1.0

Total Alternative 2 Gen-Tie Access Roads ROW Acreage: 23.0 acres

Alternative 3 (Alternative BLM Alignment): The Alternative BLM Alignment would roughly follow the same alignment as Alternative 2, but rather than being centrally-located within the corridor, it would stay as close as possible to the northern edge of the utility corridor (Attachment 2). Alternative 3 would cross up to 11.0 miles of BLM-administered land, primarily within a designated utility corridor (with the exception of about 0.34 miles located on BLM land outside of the utility corridor in the Lot 2, Section 7, Township 15S, Range 66E, Mount Diablo Base Meridian). The Alternative 3 gen-tie ROW would also be up to 125 to 200 feet wide, totaling up to 266.5 acres.

Similar to the Proposed Action, Alternative 3 would also require ROWs for use of existing access roads. One ROW would be for use of an existing access road that would be used as the primary access road for the solar facility, and the other ROW would be for use of new and existing access roads, outside of the proposed gen-tie ROW, to facilitate construction and operation of the gen-tie.

Alternative 3, Alternative BLM Alignment, Legal Description for Gen-Tie Right-of-Way

T. 15 S., R. 65 E.,
sec. 12, Lots 6, 7, 9, 12, and 14, NE¼SE¼
sec. 13 Lot 1
sec. 14, Lots 1, 4, 6, 7, 9, 12, 14
sec. 22, Lots 1, 5, 7, 9, 11, 14, and 16
sec. 23, Lot 5
sec. 27, Lot 5
sec. 28, Lots 1, 8, 10, 12, 15, 17, and 20
sec. 29, Lot 10
sec. 31, Lot 10
sec. 32, Lots 1, 3, 9, 11, 12, 14, and 17
Acres: 171.0

T. 15 S., R. 66 E.,
sec. 7, Lot 2
Acres: 6.8

T. 16 S., R. 64 E.,
sec. 10, Lot 6

sec. 11, Lot 4
sec. 12 Lot 1, 3, 6, 8, 9, 11, and 14
sec. 14, Lots 1, 3, 6, 8, 9, 10, 11, and 12
Acres: 3.5

T. 16 S., R. 65 E.,
sec. 6, Lot 8
Acres: 28.7

Total Alternative 3 Gen-Tie ROW Acreage: 266.5 acres

Legal Description for Primary Solar Facility Access Road

T. 16 S., R. 64 E.,
sec. 1, Lot 7, NE $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$
sec. 14, Lots 9, 11, and 12, SE $\frac{1}{4}$ SW $\frac{1}{4}$
sec. 22, SW $\frac{1}{4}$ SE $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$
sec. 23, SW $\frac{1}{4}$ NW $\frac{1}{4}$, NW $\frac{1}{4}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ NW $\frac{1}{4}$
sec. 27, NE $\frac{1}{4}$ NW $\frac{1}{4}$, NW $\frac{1}{4}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$ NW $\frac{1}{4}$
sec. 28, SE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$
sec. 33, SW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$
Acres: 17.9

Total Primary Solar Facility Access Road ROW Acreage: 17.9 acres

Alternative 3, Alternative BLM Alignment, Legal Description for Gen-Tie Access Roads (outside of Gen-Tie ROW)

T. 15 S., R. 65 E.,
sec. 12, Lots 4, 6, 7, 9, 12, and 14, SW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$
sec. 13 Lot 1, SW $\frac{1}{4}$ NW $\frac{1}{4}$, NW $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, NW $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ NW $\frac{1}{4}$
sec. 14, Lots 1, 4, 6, 7, 9, and 14, SW $\frac{1}{4}$ SE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$
sec. 22, Lots 1, 7, 8, 9, 16, and 17
sec. 23, Lots 3, 4, 5, and 7
sec. 27, Lots 4, 5, and 7
sec. 28, Lots 12, 13, 14, 19, 20, 21, and 22
sec. 29, Lots 9 and 10
sec. 31, Lot 10
sec. 32, Lots 1, 2, 11, 12, 17, and 18, NE $\frac{1}{4}$ SE $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$
sec. 33, Lots 4, 5, and 6
Acres: 16.9 acres

T. 15 S., R. 66 E.,
sec. 7, Lots 1 and 2, NE $\frac{1}{4}$ NW $\frac{1}{4}$
Acres: 1.2

T. 16 S., R. 64 E.,

sec. 11, Lot 4

sec. 12, Lot 1, 3, 8, and 14, NW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$

sec. 13, NW $\frac{1}{4}$ NW $\frac{1}{4}$

sec. 14, Lots 1, 3, 6, 8, 9, 10, 11, and 12

Acres: 3.5

T. 16 S., R. 65 E.,

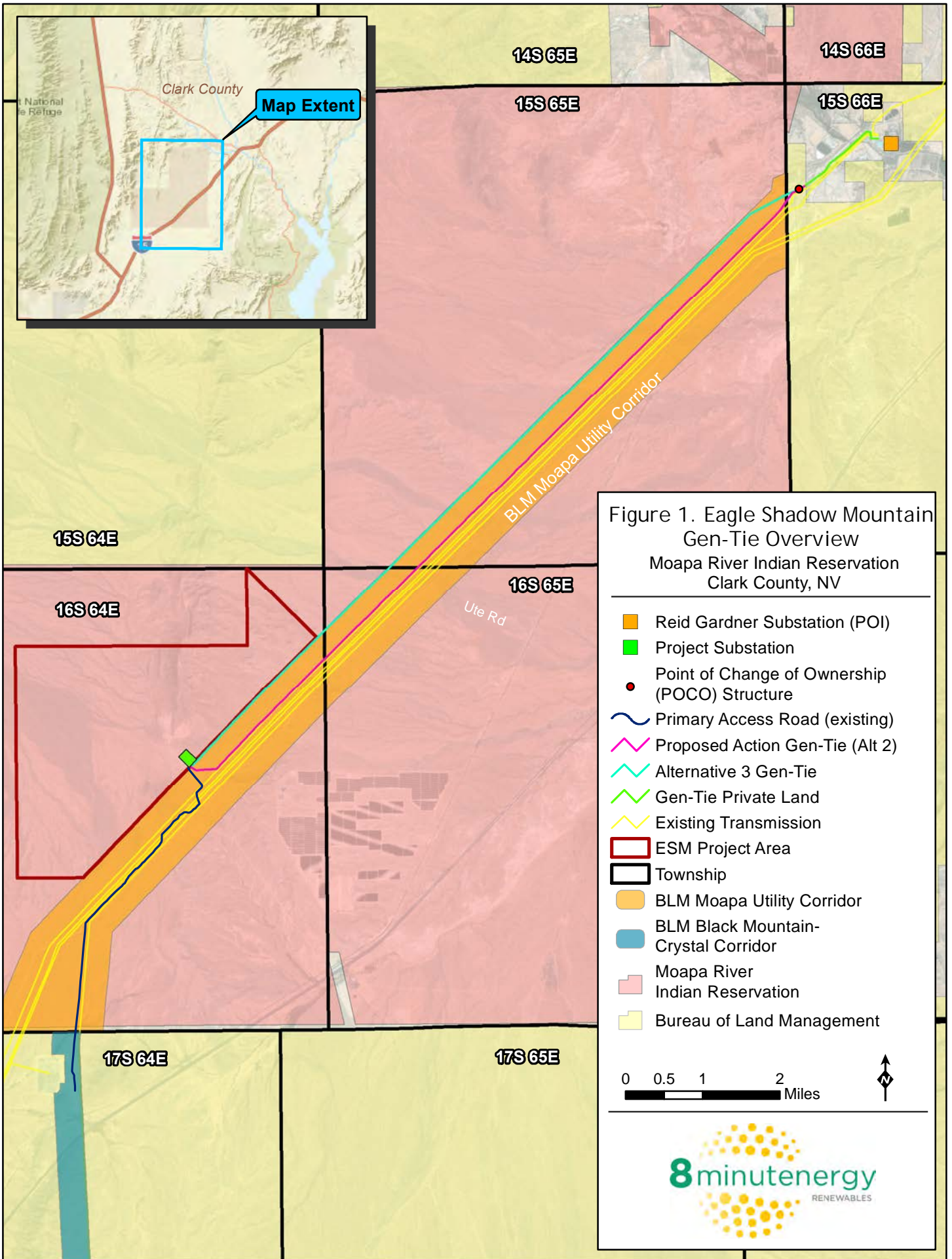
sec. 5, Lot 7

sec. 6, Lot 8

sec. 7, Lot 7

Acres: 6.2 acres

Total Alternative 3 Gen-Tie Access Road Acreage : 30.3 acres



Major Users Along the Route

Existing electric transmission lines, a high-pressure natural gas pipeline, and associated access roads parallel the proposed gen-tie routes on BLM-administered lands. Both alternatives would cross a gravel road used to access several telecommunications facilities. All other lands along the proposed gen-tie route are vacant. Other than an aggregate mine, located approximately 0.5 miles northwest of the project substation site, there appears to be no active grazing, mining, industrial, or agricultural uses near the proposed route.

PROJECT DESCRIPTION

The Proposed Project involves construction, operation, and decommissioning of an up to 230 kilovolt (kV) single- or dual-circuit gen-tie line from the Proposed Eagle Shadow Mountain Solar Project, located on land held in trust by the BIA for the MBOP, to the existing Reid Gardner Substation, located on private land owned by NV Energy. Assuming one of the Action Alternatives (e.g., Alternative 2 or 3) is selected, the portion of the gen-tie on BLM-administered lands would be up to 11.5 miles long within a 125 to 200-foot wide ROW corridor, resulting in a gen-tie ROW of up to 267.2 acres. Except for an about 0.34-mile segment in the Lot2, Section 7, Township 15S, Range 66E, Mount Diablo Base Meridian, the entire BLM ROW is within a designated utility corridor.

Because the proposed Eagle Shadow Mountain Solar Project would be located entirely on land held in trust by the BIA for the MBOP, it is not subject to BLM discretionary approval. The Eagle Shadow Mountain Solar Project may include the following components: solar arrays comprised of PV panels and inverters, on-site substation(s), electrical collection lines connecting the inverters to the on-site substation(s), an operations and maintenance building, energy storage systems, and other related infrastructure such as access roads, fences, and telecommunication systems.

ELEMENTS COMMON TO BOTH ACTION ALTERNATIVES

The energy generated by the solar facility would be sold to NV Energy under a long-term power purchase agreement. The Proposed Project would provide a direct connection between the solar facility substation and the existing NV Energy Reid Gardner Substation.

Solar Facility Access Road

Main access to the solar facility site and gen-tie ROW would be provided via existing roads. The existing roads include the road built to provide access to the nearby existing Moapa Southern Paiute Solar Project and the road providing access to the existing tribal aggregate operation and wells that would be adjacent to the solar facility (Figure 1). No upgrades to these existing roads are anticipated to be necessary to provide the access needed for this project, other than maintenance during construction and operations, as required.

Transmission Support Structures

Assuming the Proposed Project is approved for construction, transmission support structures (towers and poles) would be erected within the ROW and would typically be spaced 700 feet to 900 feet apart (center to center), depending on the topographic, hydrologic, and geologic conditions of the underlying lands. Either of the Action Alternatives may utilize three different types of transmission structures: single- or dual-circuit steel mono-pole tangent structures, single- or dual-circuit steel mono-pole vertical dead-end structures, and single- or dual-circuit steel 3-pole dead-end crossing structures. Transmission structure heights will generally range from about 90 feet high to about 150 feet high. The minimum ground clearance of the conductor cable will be 25 feet. Communications cable or fiber cable will also be installed on the transmission structures.

Gen-Tie Service Road

The Action Alternatives were designed with an emphasis on providing the smallest ground disturbance footprint on BLM lands and are sited to follow existing roads. Where feasible, spur roads would be constructed from existing roads and/or existing transmission structure footprints to access work areas for new gen-tie transmission structures. The permanent disturbance estimates for each of the Action Alternatives (Tables 1 and 2) conservatively assume new transmission structure access roads would be 14 ft-wide. New and existing gen-tie access roads outside of the proposed up to 200 ft-wide gen-tie ROW would require a separate ROW grant. Access to the Point of Change of Ownership (POCO) structure (see below) would be via a permanent ROW constructed from an existing access road on NV Energy-owned land across BLM land in Lot 2, Section 7, Township 15S, Range 66E.

Point of Change of Ownership Structure

The Applicant would be responsible for constructing either of the Action Alternatives from the Eagle Shadow Mountain Project Substation to the POCO dead-end structure and 230-kV switch, located in Lot 2, Section 7, Township 15S, Range 66E, Mount Diablo Base Meridian (NAD83, UTM Zone 11N, 709709 m E, 4058311 m N). From the POCO structure, the remaining transmission structures would be constructed by NV Energy on NV Energy-owned lands and continue to the point of interconnection terminal within the existing 230-kV Reid Gardner Substation. The BLM ROW required from the POCO structure to the next structure on NV Energy land would be up to 0.10 miles long.

NV Energy Transmission Provider's Interconnection Facilities

From the POCO structure, 230-kV single- or dual-circuit transmission structures would be installed on NV Energy-owned land to facilitate installation of approximately 1.37 miles of overhead 2-954 aluminum conductor steel-reinforced cable bundled conductor per phase, including optical fiber composite overhead ground wire or equivalent, between the POCO structure and the Reid Gardner Substation. Dedicated relays, and supervisory control and data acquisition required for protection equipment and connection to dual fiber feeds, would be installed at the Reid Gardner 230-kV Switching Station for the gen-tie.

Telecommunications and Metering at the Eagle Shadow Mountain Solar Project Substation

Telecommunications would be installed at the Eagle Shadow Mountain Solar Project Substation consisting of a remote terminal unit (RTU) and necessary communications equipment for the Generating Facility (i.e., the Eagle Shadow Mountain Solar Project) including a multiplexer on the communications line (i.e., T-1 line) and miscellaneous communication cables and link equipment, as required. Support equipment (i.e., metering class current transformers and potential transformers) would be installed inside the Eagle Shadow Mountain Solar Project Substation to facilitate metering of all applicable energy outputs.

NV Energy Network Upgrades

The 230-kV terminal addition would be located on private property at the Reid Gardner Substation. The network upgrades include: reuse of two existing 230-kV breakers and associated switches, replacing existing control cables associated with the 230-kV breakers, a new relay and control enclosure, three 230-KV coupling capacitor voltage transformers for internal metering and operation of protective relays, a new line, breaker, RTU, and bus differential relay panels, and improvements to substation grounding and conduit/cable trench systems in the area surrounding the new relay and control enclosure.

PROJECT FEATURE SPECIFICATIONS AND DISTURBANCE AREAS

Permanent disturbance areas will be those areas where the surface of the ground is not restored to its existing condition after construction, such as those relating to foundations or new access roads. Temporary disturbance areas include those where construction activity will take place but where restoration of the surface will be possible, such as those relating to temporary work areas, pull sites, and lay-down areas. In some places, areas of temporary disturbance will overlap with areas previously disturbed by prior transmission line installations. A temporary construction ROW may include an area beyond the permanent ROW for the gen-tie route and access roads. These areas may be necessary to facilitate the safe operation of equipment.

Table 2 – Proposed Action (Alternative 2) Specifications

Electrical Specifications for 230-kV Line	
Nominal Voltage	230 kV ac
Circuit Configuration	Vertical
Ground Clearance of Conductor	25 ft. minimum per RUS at Designed Thermal Limit for Emergency Line Loading Conditions (212 deg F)
Type of Pole	Single- or dual-circuit steel mono-pole tangent structures, single- or dual-circuit steel mono-pole vertical dead-end structures, and single- or dual- circuit steel 3-Pole dead-end Xing structures
Pole Height	Ranges from 90 ft. to 150 ft.
Assumed Pole diameter at Base	8 ft.
Right of Way Width	125 – 200 ft
Span Length	Typically 700 ft. to 900 ft.

Project Feature	Description	BLM-Administered Property
Length of Lines	Total length of line on BLM-administered lands.	11.1 miles
Number of Poles	Total number of dead-end, angle, or tangent poles on BLM-administered Property	73
Structure Erection Sites	Typically 125 ft. x 50 ft. at each structure location	73
Wire Pulling and Tensioning Sites	100 ft. wide by 400 ft. long, generally extends past each dead-end or angle structure. Necessary for conductor stringing equipment and placement of wire reels.	7
New Construction/ Maintenance Access Road	Typically bladed 14 ft. wide only where necessary and not maintained after construction is complete. Disturbance is assumed permanent to account for future access requirements.	2.7 miles

Table 3 – Proposed Action (Alternative 2) Disturbance Acreages

Project Feature	Temporary Disturbance	Permanent Disturbance
New Gen-Tie Access Road	2.0 acres	4.5 acres
Gen-Tie Structure Work Area	9.2 acres	0.8 acres
Wire Pulling and Tensioning Sites	5.7 acres	0 acres
<i>Total</i>	<i>16.9 acres</i>	<i>5.3 acres</i>

Table 4– Alternative BLM Alignment (Alternative 3) Specifications

Electrical Specifications for 230-kV Line		
Nominal Voltage	230 kV ac	
Circuit Configuration	Vertical	
Ground Clearance of Conductor	25 ft. minimum at Designed Thermal Limit for Emergency Line Loading Conditions (212 deg F)	
Type of Pole	Single- or dual-circuit steel mono-pole tangent structures, single- or dual-circuit steel mono-pole vertical dead-end structures, and single- or dual- circuit steel 3-Pole dead-end Xing structures	
Pole Height	Ranges from 90 ft. to 150 ft.	
Assumed Pole diameter at Base	8 ft.	
Right of Way Width	125 – 200 ft	
Span Length	Typically 700 ft. to 900 ft.	
Project Feature	Description	BLM PROPERTY
Length of Lines	Total length of line on BLM-administered lands.	11.0 miles
Number of Poles	Total number of dead-end, angle, or tangent poles excluding structures within interconnecting substations and structures on BLM-administered property	73
Structure Erection Sites	Typically 125 ft.x50 ft. at each structure locations	73
Wire Pulling and Tensioning Sites	100 ft. wide by 400 ft. long, generally extends past each dead-end or angle structure. Necessary for	6

	conductor stringing equipment and placement of wire reels.	
New Construction/ Maintenance Access Road	Typically bladed 12 ft. wide only where necessary and not maintained after construction is complete. Disturbance is assumed permanent to account for future access requirements.	11.0 miles

Table 5 – Alternative BLM Alignment (Alternative 3) Disturbance Acreages

Project Feature	Temporary Disturbance	Permanent Disturbance
New Gen-Tie Access Road	6.4 acres	15.3 acres
Gen-Tie Structure Work Area	7.3 acres	0.8 acres
Wire Pulling and Tensioning Sites	4.6 acres	0 acres
<i>Total</i>	<i>18.3 acres</i>	<i>16.1 acres</i>

GOVERNMENT AGENCIES INVOLVED

Federal

- Bureau of Land Management
- United States Fish and Wildlife Service
- Bureau of Indian Affairs
- United States Army Corps of Engineers
- Environmental Protection Agency

Tribal

- Moapa Band of Paiutes

State

- Public Utilities Commission of Nevada
- State Historic Preservation Office
- Nevada Department of Wildlife

Local

- Clark County

CONSTRUCTION OF THE FACILITIES

Site Engineering Surveys

After a preferred gen-tie route alternative is selected through the National Environmental Policy Act (NEPA) process, on-ground investigations will be completed to accurately locate the centerline of the ROW within the selected alternative. The exact centerline will be chosen to best implement design criteria and to satisfy any NEPA mitigation measures. Required permits to survey on federal lands will be obtained prior to the surveying effort. Survey work will consist of centerline location and ROW

boundaries, where necessary. Support structure locations, access roads, and the gen-tie route centerline will be flagged and staked, where necessary.

Timing of Activities

Heavy construction is expected to occur between 6:00 am and 5:00 pm, Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Some activities may require construction activities 24 hours per day, seven days per week. Low level noise activities may potentially occur between the hours of 10:00 pm and 7:00 am. Nighttime activities could potentially include, but are not limited to, refueling equipment, staging material for the following day's construction activities, quality assurance/control, and commissioning.

Access Roads

Where possible the two Alternative routes are sited to follow existing roads to minimize the ground disturbance footprint on BLM-administered lands. Where feasible, existing roads will provide access for project construction, operation, and maintenance. Construction of the gen-tie would begin with construction of access roads and spur roads. New access roads and spur roads would typically be 14 feet wide and bladed. If necessary, new roads would be compacted to ensure stability. Access roads parallel to the gen-tie alignment and spur roads would not be maintained following construction. Access to the POCO structure would be via a permanent ROW constructed from an existing access road on NV Energy-owned land across BLM land in Lot 2, Section 7, Township 15S, Range 66E.

Transmission Structure Erection Sites

Temporary transmission structure erection sites, typically 125 feet long x 50 feet wide would be established at each transmission structure location. These areas would be cleared of vegetation. Each transmission structure would be set within an augured hole (tangent structures) or concrete pier foundation (dead-end structures). The primary equipment used in setting foundations will be concrete trucks, auger rigs, pickup trucks, crane and front-end loaders. Holes would be excavated using a truck-mounted drill rig or a standalone auger rig if required. Poles would be delivered on a flat-bed trailer and hoisted into place by a crane. The annular space between the poles and holes would be backfilled with concrete or soil. Excavated spoil material would be spread around the temporary work areas.

Conductor Pulling and Tension Sites

Multiple pulling and tensions sites would be required for installing the conductors on the transmission structures. Pulling and tension sites would be approximately 100 feet wide x 400 feet long and would be located within and adjacent to the gen-tie service road. Conductors would be strung between transmission structures with heavy duty trucks and a telescoping boom lift. If necessary, to avoid seasonal washes some sections of conductors may be strung by either using a helicopter or by first 'walking' a light pulling rope between structures that is then used to pull in the heavier conductor. Cables will be pulled through one segment of the transmission line at a time. To pull cables, truck-mounted cable-pulling equipment is placed alongside the first and last towers or poles in a segment. Power pulling equipment is used at the front end of the segment, while power braking or tensioning

equipment is used at the back end. The conductors are then pulled through the segment and attached to the insulators. Equipment is then moved to the next segment; the front end pull site previously used becomes the back end pull site for the next segment. After conductors have been pulled into place in a section, the conductor tension is increased to achieve a ground clearance of at least 25 feet prior to moving to the next section. The northernmost tension and pulling site on BLM land would be located just northeast of the POCO structure in Lot 2, Section 7, Township 15S, Range 66E.

Water Use

Water would be used for dust suppression and soil compaction during construction. Water would be obtained from two existing wells owned by the MBOP on the solar facility site.

Industrial Wastes and Toxic Substances

The transmission line will have minimal levels of materials that have been defined as hazardous under 40CFR, Part 261. Hazardous materials spill kits would be carried in vehicles for any small spills that could occur. Hazardous materials would not be disposed of on-site, released onto the ground, underlying groundwater, or any surface water. Fully enclosed containment would be provided for all refuse. All construction waste, including trash, solid waste, petroleum products, and other hazardous materials, would be disposed of at a properly licensed waste disposal facility.

Personnel and Vehicles

The workers and vehicles expected to be required to construct the proposed transmission line are estimated below (per structure):

Table 6 – Gen-Tie Line Construction Equipment and Construction Workforce

Equipment Type	Quantity	PERSONNEL
Survey Gen-Tie Route		
Off-highway trucks	2	2: Driver
Clear and Grade Tower Structures and Roads		
Crawler Tractor	1	2: Driver + Spotter
Grader	1	2: Driver + Spotter
Drum Roller Compactor	1	2: Driver + Spotter
Off-highway trucks	3	3: Driver
Foundation Installation		
Drilling Rig	1	3: Driver + Operator + Support
Crane	2	6: 2 Drivers + 2 Operators + 2 Spotters
Boom Truck	1	1: Operator
Flat Bed Truck	1	1: Operator
Crew Truck(s)	6	6: Crew
Concrete Truck	1	1: Driver/Operator
Pole Erection		
Bucket Lift Truck	1	2: Driver + Operator
Boom Truck(s)	1	3: Driver + Operator + Support
Crew Truck(s)	6	6: Linemen/Groundmen
Cable Pulling		
Heavy-duty Truck (Puller)	1	2: Driver + Operator

Heavy-duty Truck (Tensioner)	1	2: Driver + Operator
Crew Truck(s)	6	6: Linemen/Groundmen
Crew Truck(s)	6	3: Spotters
Helicopter	1	2: Pilot + Spotter

In addition, the project will require the following:

- Engineering Surveys – Truck(s) and 3 crew
- Cleanup and Restoration – Truck(s) and 4 crew

Final design characteristics – and thus, final equipment and personnel requirements – will be determined in the detailed design phase of the project.

STABILIZATION AND REHABILITATION

Soil Replacement and Stabilization

Construction areas and access roads will be kept in an orderly condition throughout the construction period. Refuse and trash, including stakes and flags, will be removed from the sites and properly disposed of. Construction equipment will be oiled and fueled in designated areas with appropriate protections to prevent and/or contain accidental spills. No construction equipment oil or fuel will be drained on the ground. Oils or chemicals will be hauled to an approved site for disposal.

Construction will be completed by restoring temporary disturbance areas to the original contour of the land surface to the extent determined by the BLM. Dirt excavated for the foundations will be spread on the ground, on access roads, or taken off site for disposal in a permitted disposal site. Compaction may take place for the access roads that will remain during transmission line operation.

Disposal of Vegetation

Vegetation will be left in place wherever possible to avoid excessive root damage and allow for re-sprouting. Any vegetation that is removed will be transported to a suitable regional landfill, in covered trucks, to prevent any fugitive emissions of plant materials en-route to the disposal facility.

Seeding Specifications

Salvaged native plants will be used for revegetation, if appropriate, along with seeding using BLM-recommended seed mixes. Re-seeding or revegetating with native plants will occur in suitable areas, as necessary. Re-seeding will take place during appropriate months following transmission line construction. Seed will be planted using drilling, straw mulching, or hydromulching, as directed by the BLM.

Construction Roads

Roads that are built for the construction of the transmission line may be reclaimed upon construction completion or may be actively maintained for use during the operational life of the transmission line.

Individual portions of construction roads to be reclaimed will be determined at the end of construction, to be dictated by operational needs and considerations.

OPERATIONS AND MAINTENANCE

Gen-Tie Operation

The Proposed Project would operate continuously throughout the life of the Eagle Shadow Mountain Solar Project. Following construction, activities associated with the gen-tie would be restricted to 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. Shared service roads would be maintained pursuant to a road maintenance agreement entered into among the parties that share the service road. Gen-tie access roads would not be regularly maintained, but as-needed grading may be conducted to provide access to transmission structures for maintenance activities.

Additional operations and maintenance activities may include insulator washing, periodic air inspections, repair or replacement of lines), replacement of insulators, painting tower or pole identification markings or corroded areas, response to emergency situations (e.g., outages) to restore power (infrequent/as needed).

With the exception of emergency situations and outages, most maintenance work would take place between 7 am and 6 pm, Monday through Friday, but may also take place 24 hours a day, 7 days a week. Transmission line conductors may occasionally need to be upgraded or replaced over the life of the line. Old cables will be taken down and new cables will be strung on the insulators.

Safety

Safety precautions and emergency systems will be implemented as part of the design and construction of the transmission line to ensure safe and reliable operation. Administrative controls may include classroom and hands-on training in operating and maintenance procedures, general safety items, and a maintenance program plan. These controls will compliment transmission line design and monitoring features to enhance safety and reliability.

DECOMMISSIONING

Following the useful life of the Proposed Project, project components would be decommissioned and removed from the ROW. 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. Work to decommission the transmission line is anticipated to be conducted within the boundaries of existing easements and rights of way.

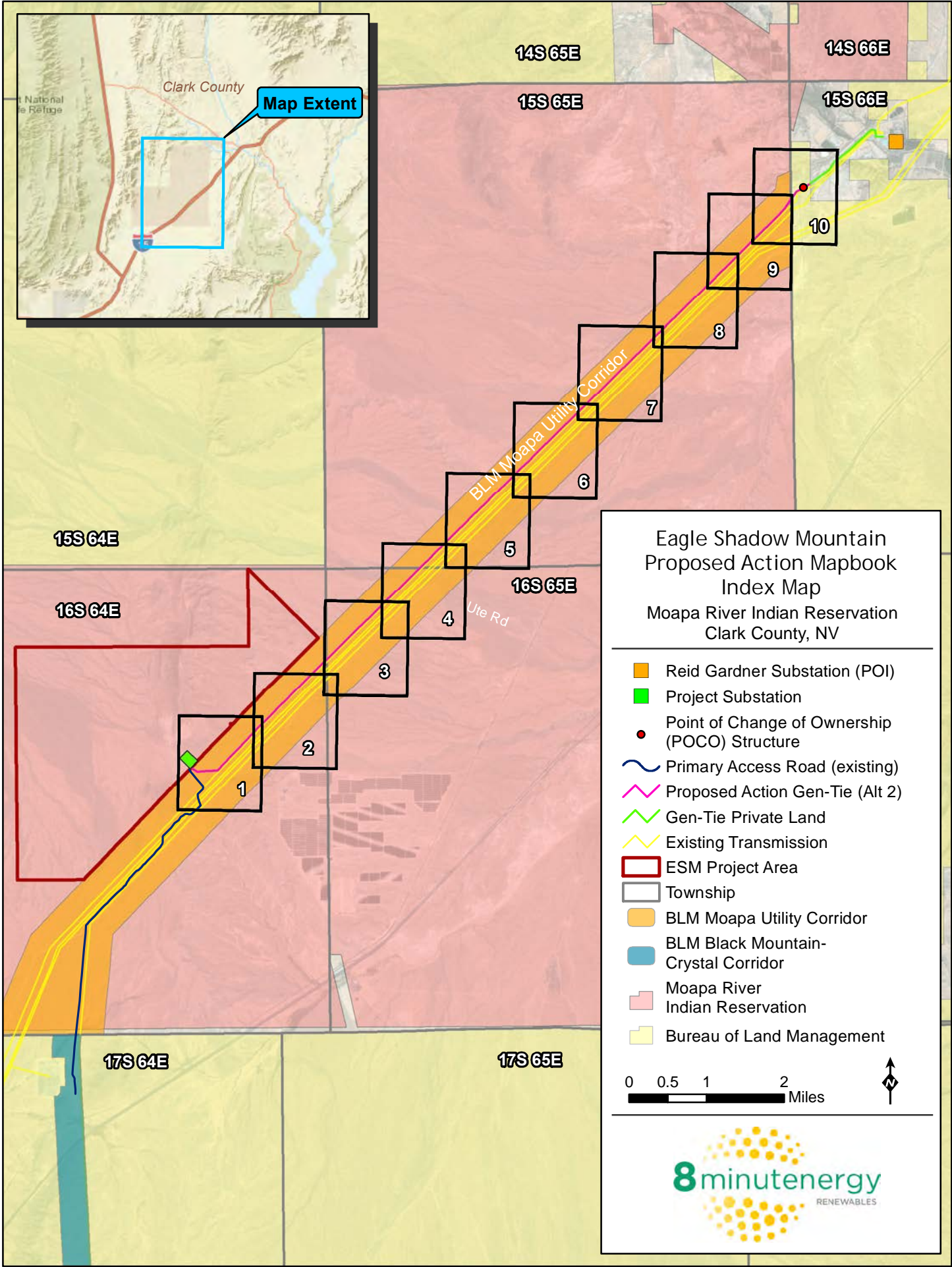
All decommissioning of transmission structures, electrical devices, equipment, and wiring/cabling will be in accordance with local, state and federal laws. Any electrical decommissioning will include obtaining

required permits, and following applicable safety procedures before de-energizing, isolating, and disconnecting electrical devices, equipment and cabling.

Restoration will be completed by restoring disturbed access road surfaces to the original contour and character of the land. Any compacted ground will be roughened, mixed with suitable subgrade materials and levelled, including the spreading of topsoil as necessary to ensure suitable conditions for vegetation regrowth.

Following decommissioning of the transmission line components, the site will be stabilized. Native plants will be used for revegetation, if appropriate, along with seeding using BLM-recommended seed mixes. Re-seeding will take place during appropriate months. Seed will be planted using drilling, straw mulching, or hydromulching, as appropriate.

Attachment 1 - Proposed Action Mapbook



Eagle Shadow Mountain
Proposed Action Mapbook
Index Map
Moapa River Indian Reservation
Clark County, NV

- Reid Gardner Substation (POI)
- Project Substation
- Point of Change of Ownership (POCO) Structure
- ~ Primary Access Road (existing)
- ~ Proposed Action Gen-Tie (Alt 2)
- ~ Gen-Tie Private Land
- ~ Existing Transmission
- ▭ ESM Project Area
- ▭ Township
- ▭ BLM Moapa Utility Corridor
- ▭ BLM Black Mountain-Crystal Corridor
- ▭ Moapa River Indian Reservation
- ▭ Bureau of Land Management

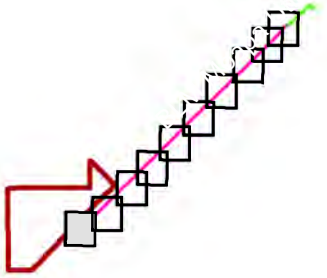
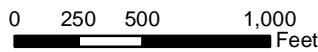
0 0.5 1 2 Miles





Proposed Action Mapbook 1 of 10

- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- ESM Substation
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- ESM Project Area Boundary
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

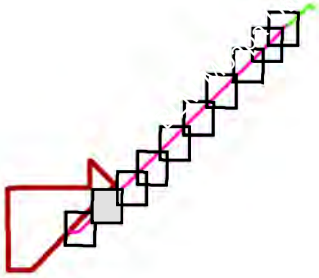




Proposed Action Mapbook 2 of 10

- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

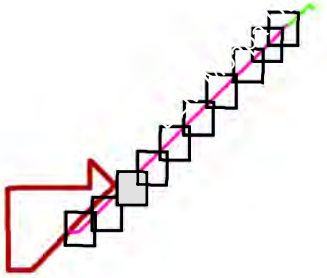
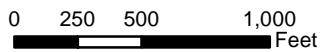
0 250 500 1,000
 Feet

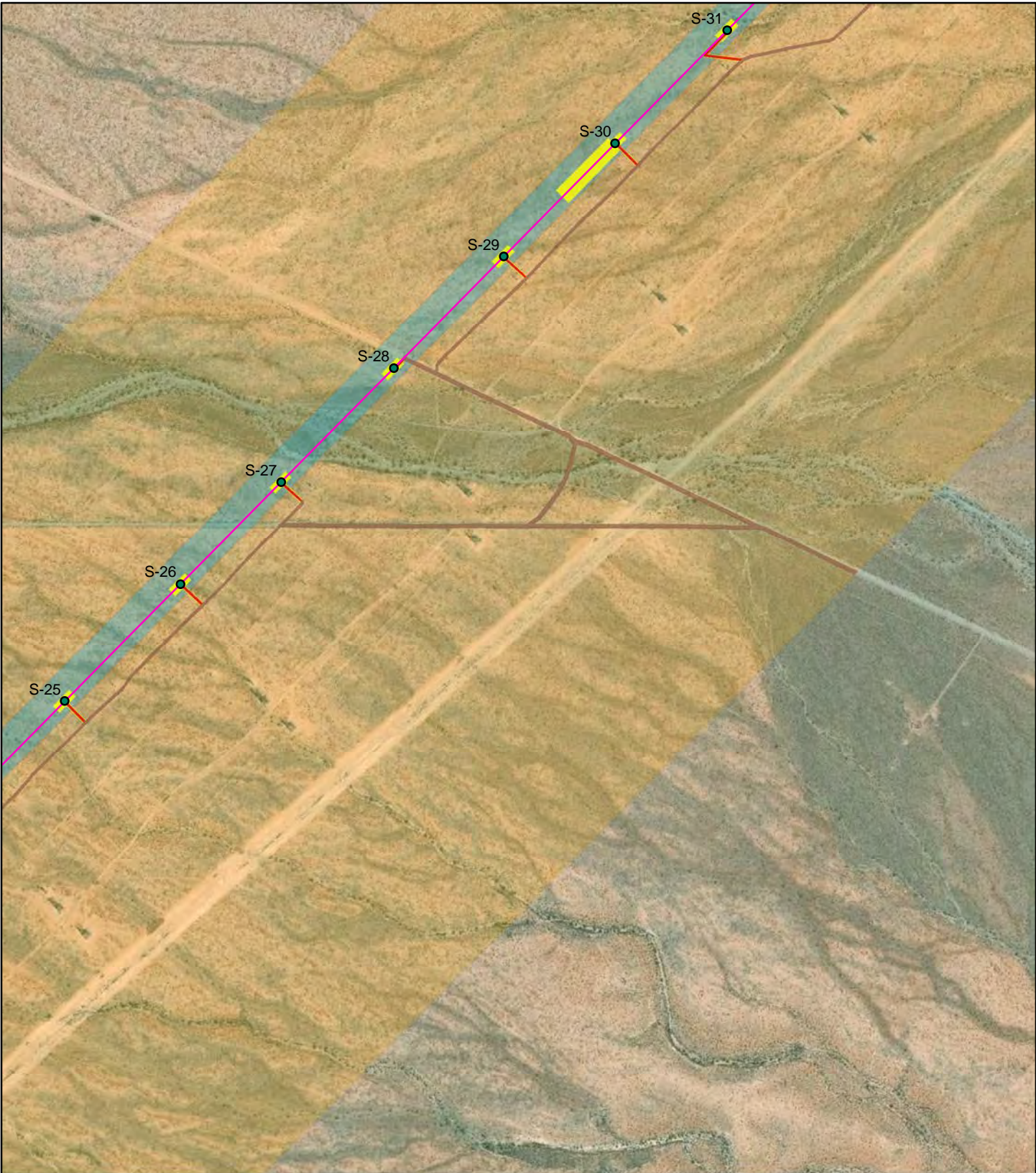




Proposed Action Mapbook 3 of 10

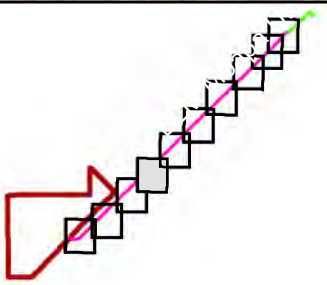
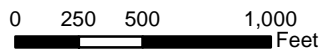
- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

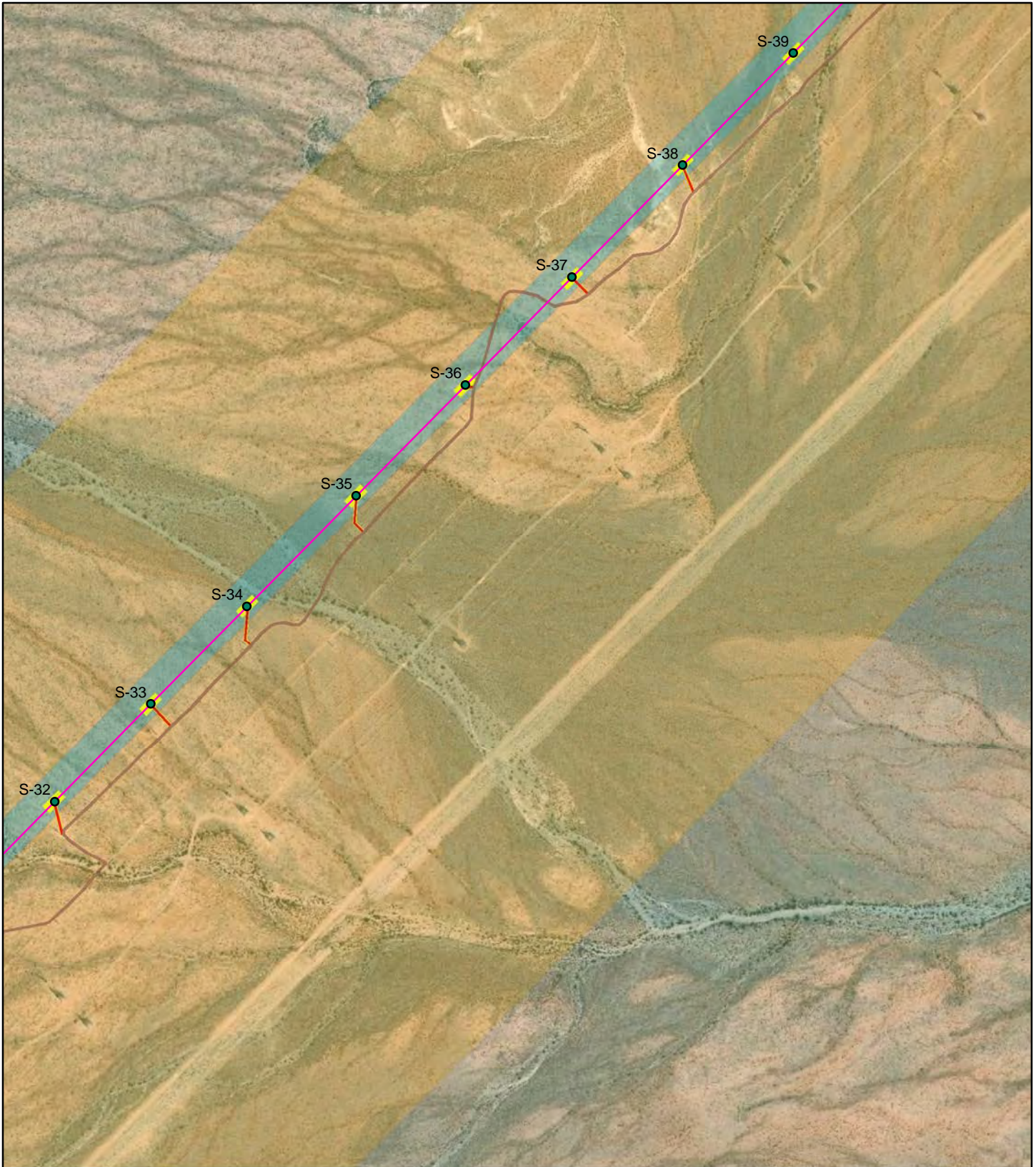




Proposed Action Mapbook 4 of 10

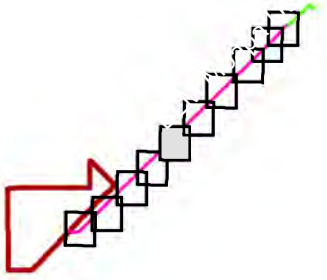
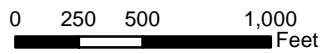
- Gen-Tie Structure
- ~ Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

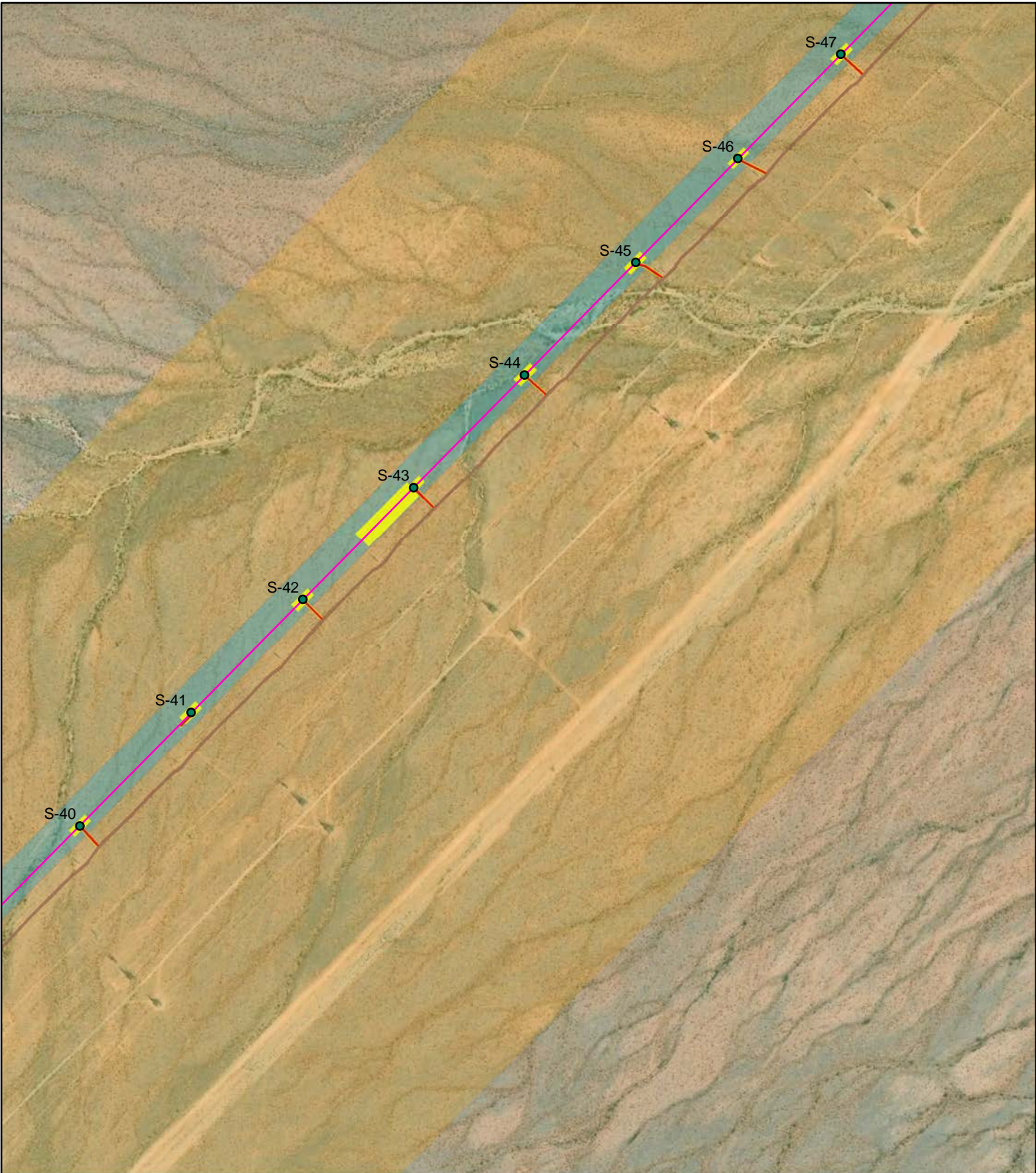




Proposed Action Mapbook 5 of 10

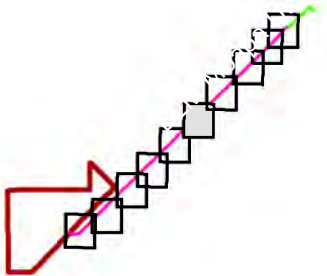
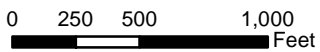
- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

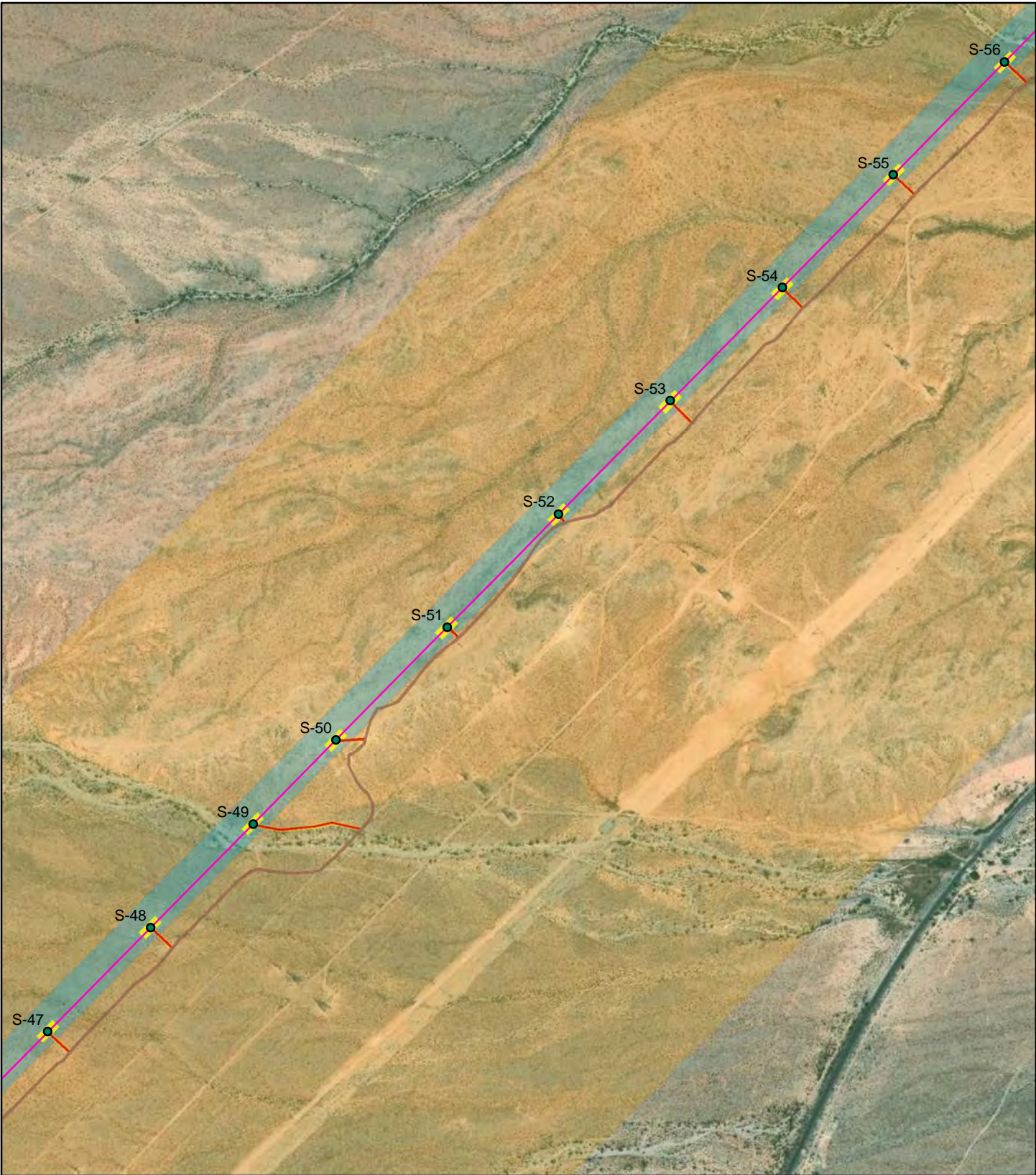




Proposed Action Mapbook 6 of 10

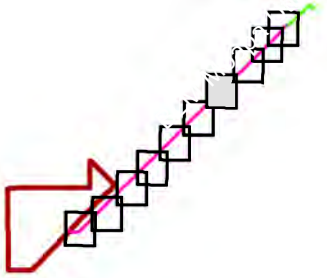
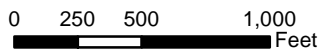
- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

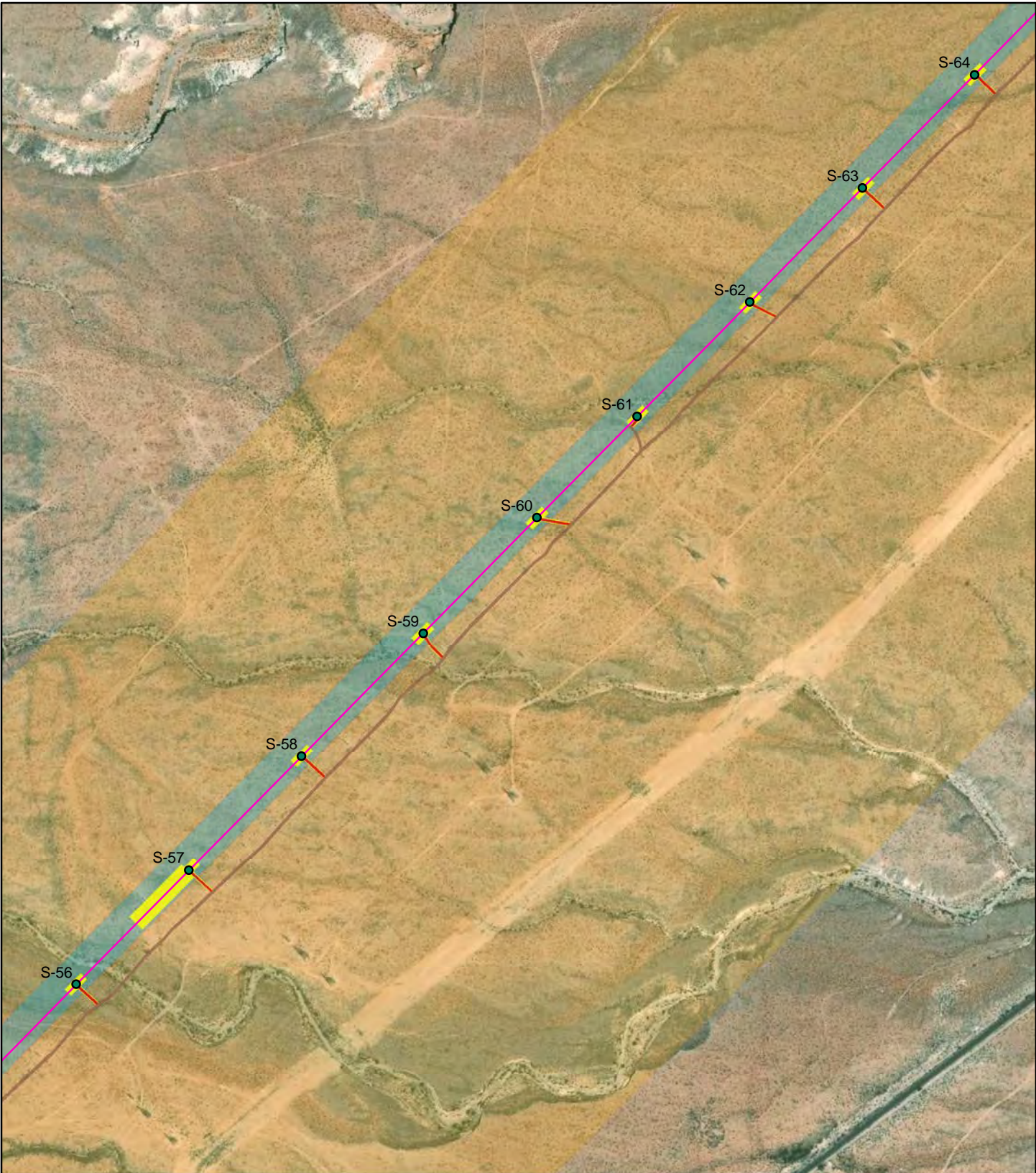




Proposed Action Mapbook 7 of 10

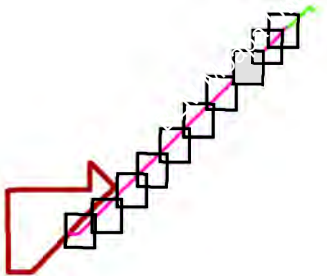
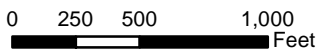
- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

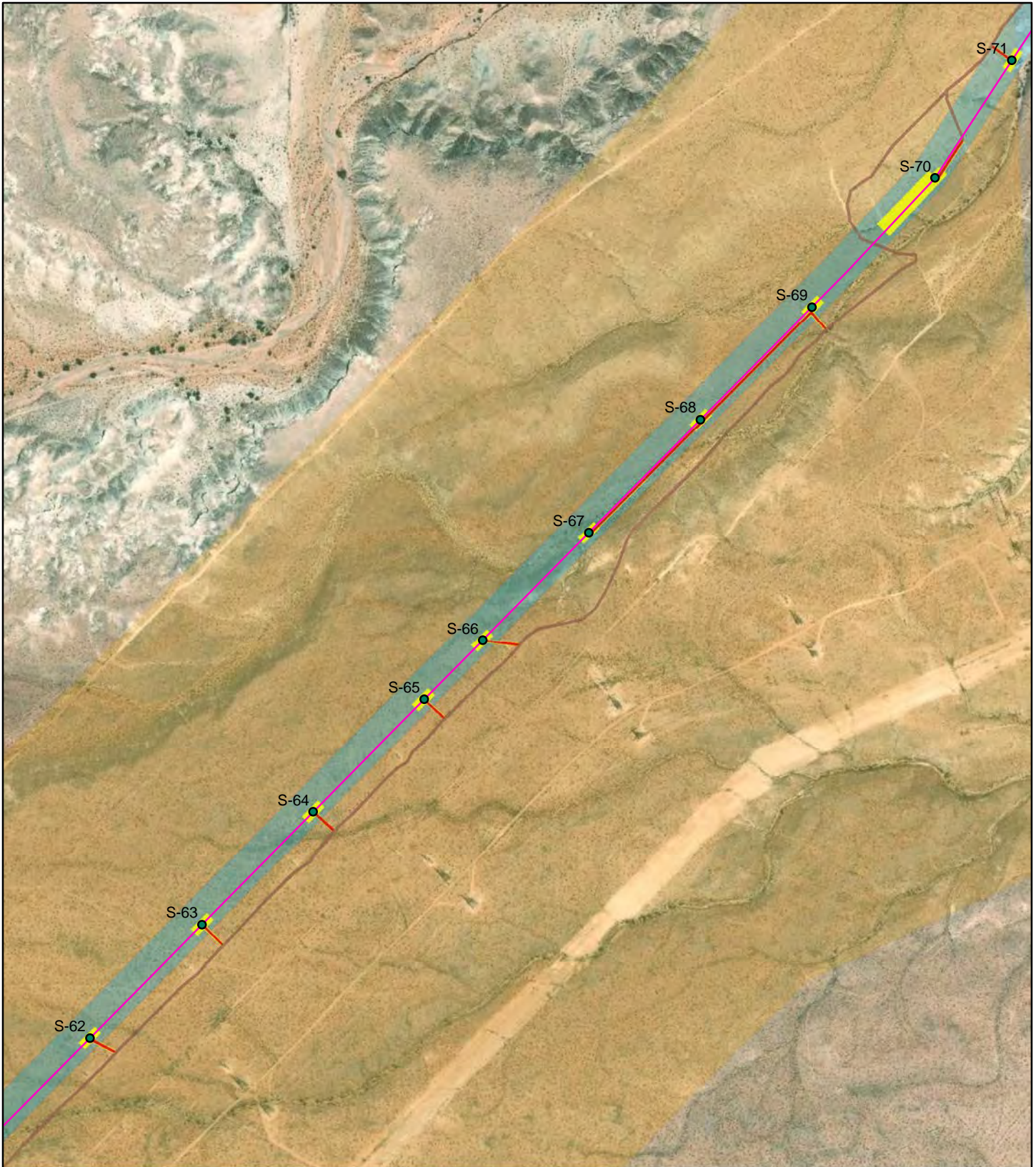




Proposed Action Mapbook 8 of 10

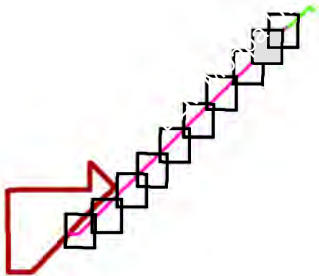
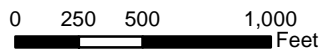
- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

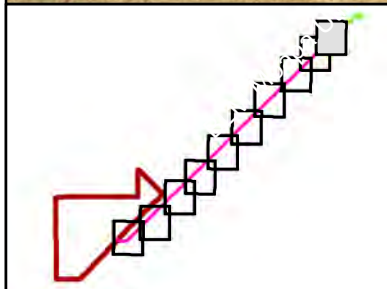
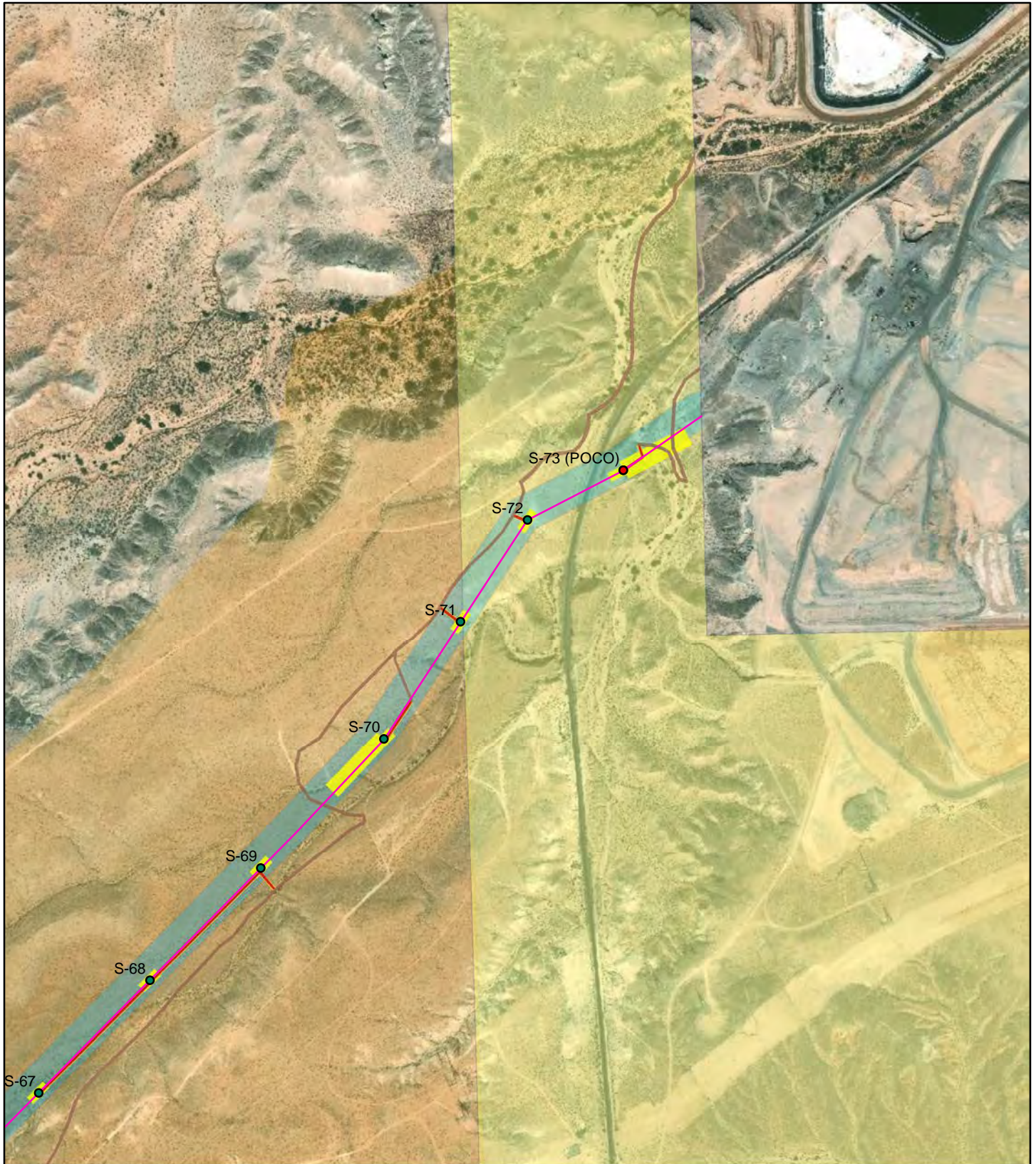




Proposed Action Mapbook 9 of 10

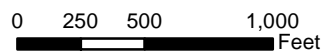
- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor



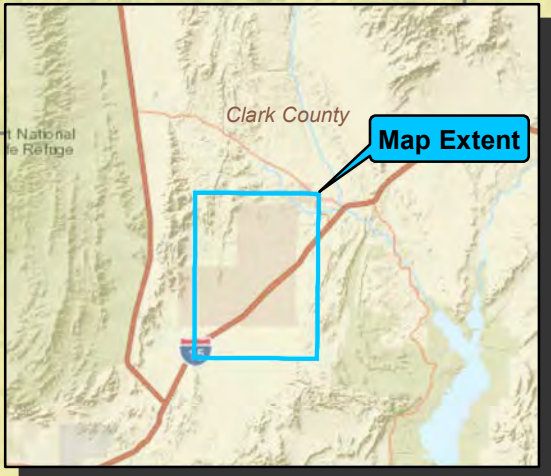
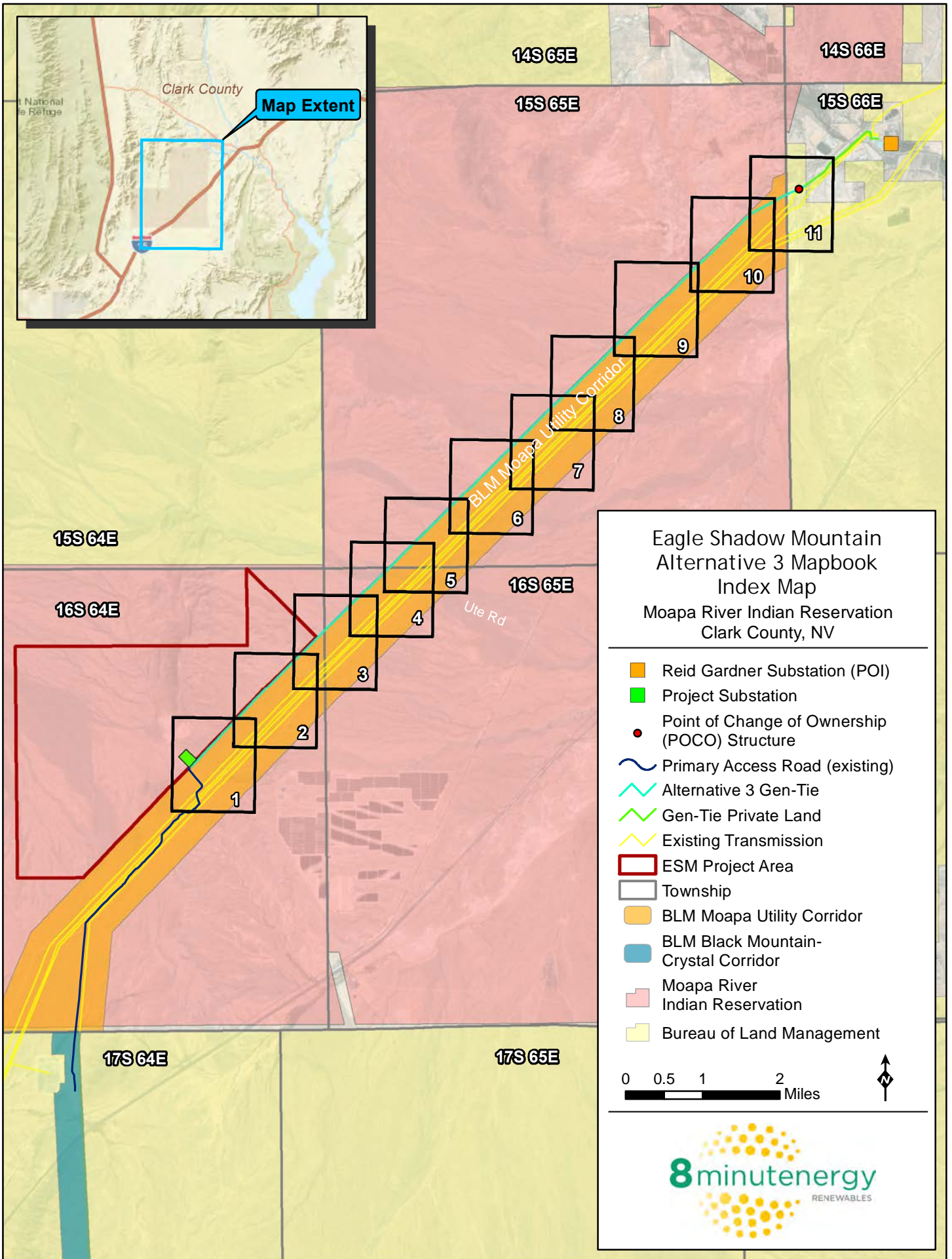


Proposed Action Mapbook 10 of 10

- POCO Structure
- Gen-Tie Structure
- ~ Primary Access Road
- ~ Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor
- BLM Land



Attachment 2 - Alternative 3 Mapbook



14S 65E

14S 66E

15S 65E

15S 66E

15S 64E

16S 64E

16S 65E

17S 64E

17S 65E

BLM Moapa Utility Corridor

Ute Rd

Map Extent

1

2

3

4

5

6

7

8

9

10

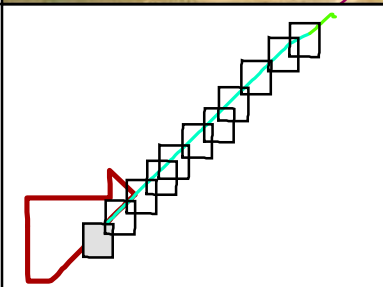
11

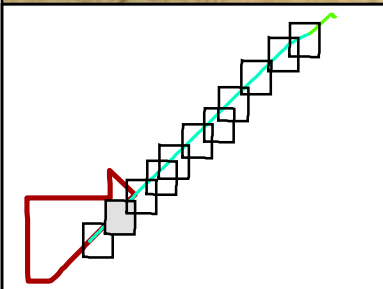


Alternative 3 Mapbook 1 of 11

- Gen-Tie Structure
- Permanent Disturbance
- Primary Access Road
- Gen-Tie Centerline
- Temporary Disturbance
- ESM Substation
- ESM Project Area Boundary
- Gen-Tie Access Road (existing)
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

0 250 500 1,000
Feet





Alternative 3 Mapbook 2 of 11

- Gen-Tie Structure
- ~ Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor
- ESM Project Area Boundary

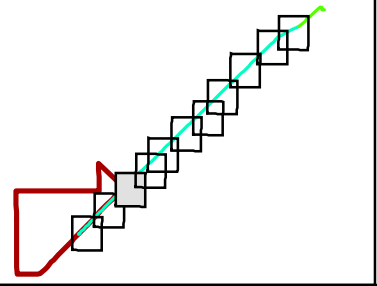
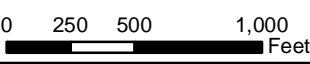
0 250 500 1,000
 Feet





Alternative 3 Mapbook 3 of 11

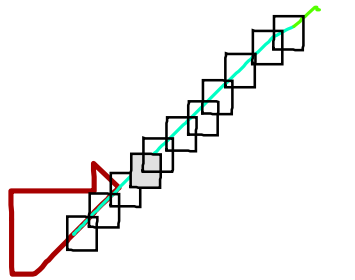
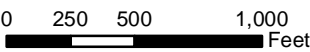
- Gen-Tie Structure
- ~ Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor
- ESM Project Area Boundary





Alternative 3 Mapbook 4 of 11

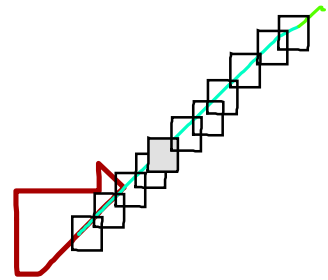
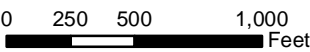
- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

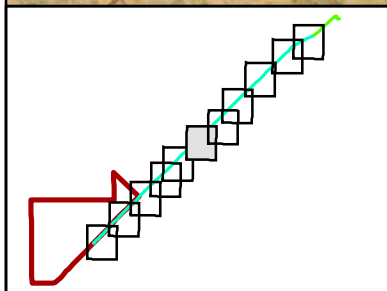
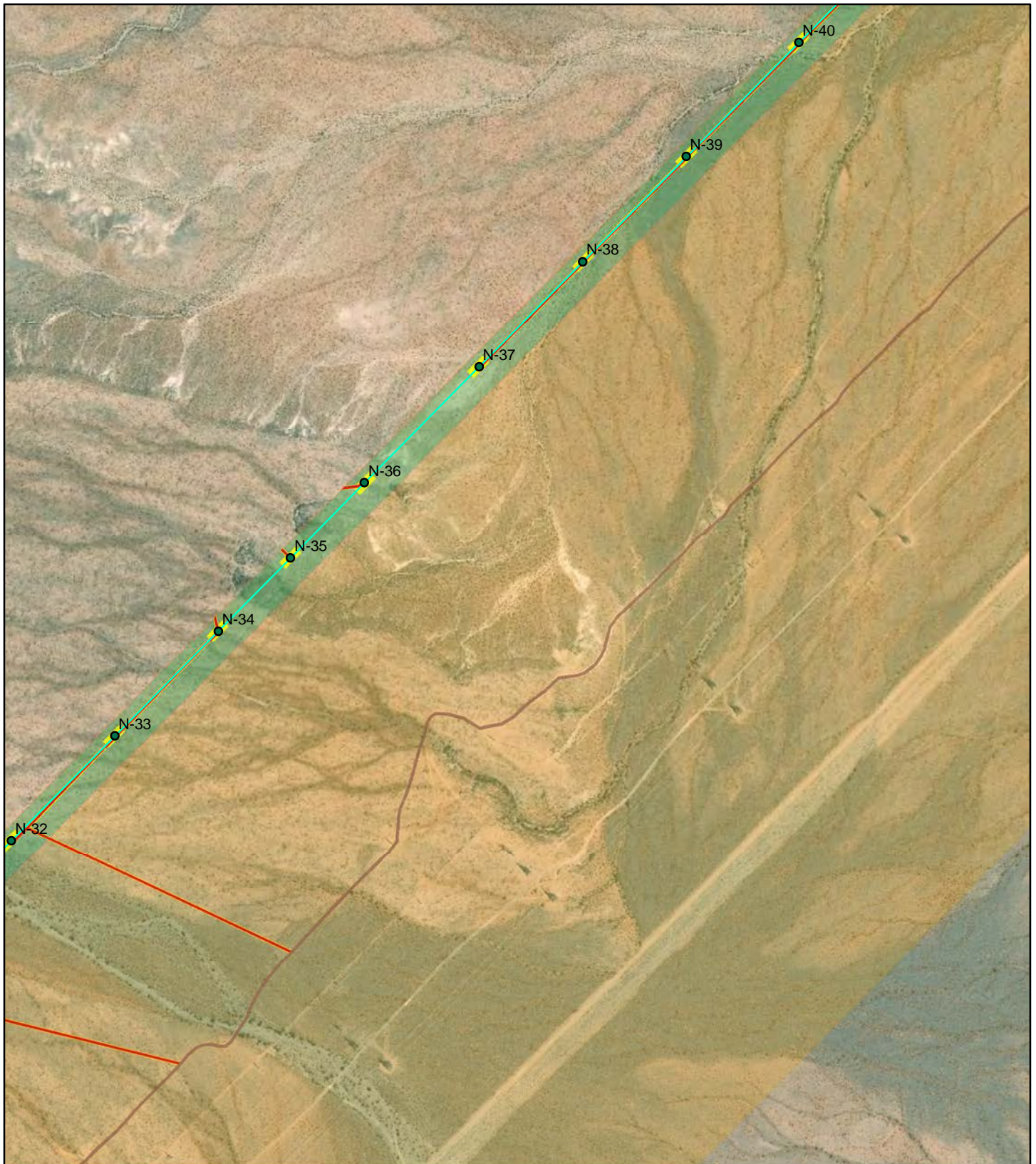




Alternative 3 Mapbook 5 of 11

- Gen-Tie Structure
- Permanent Disturbance
- Primary Access Road
- Temporary Disturbance
- Gen-Tie Centerline
- 200-ft Gen-Tie ROW
- Gen-Tie Access Road (existing)
- BLM Moapa Utility Corridor





Alternative 3 Mapbook 6 of 11

- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

0 250 500 1,000
Feet

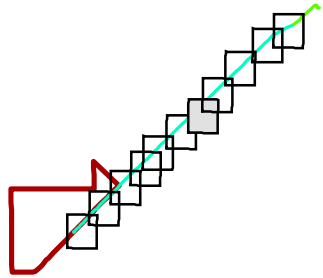


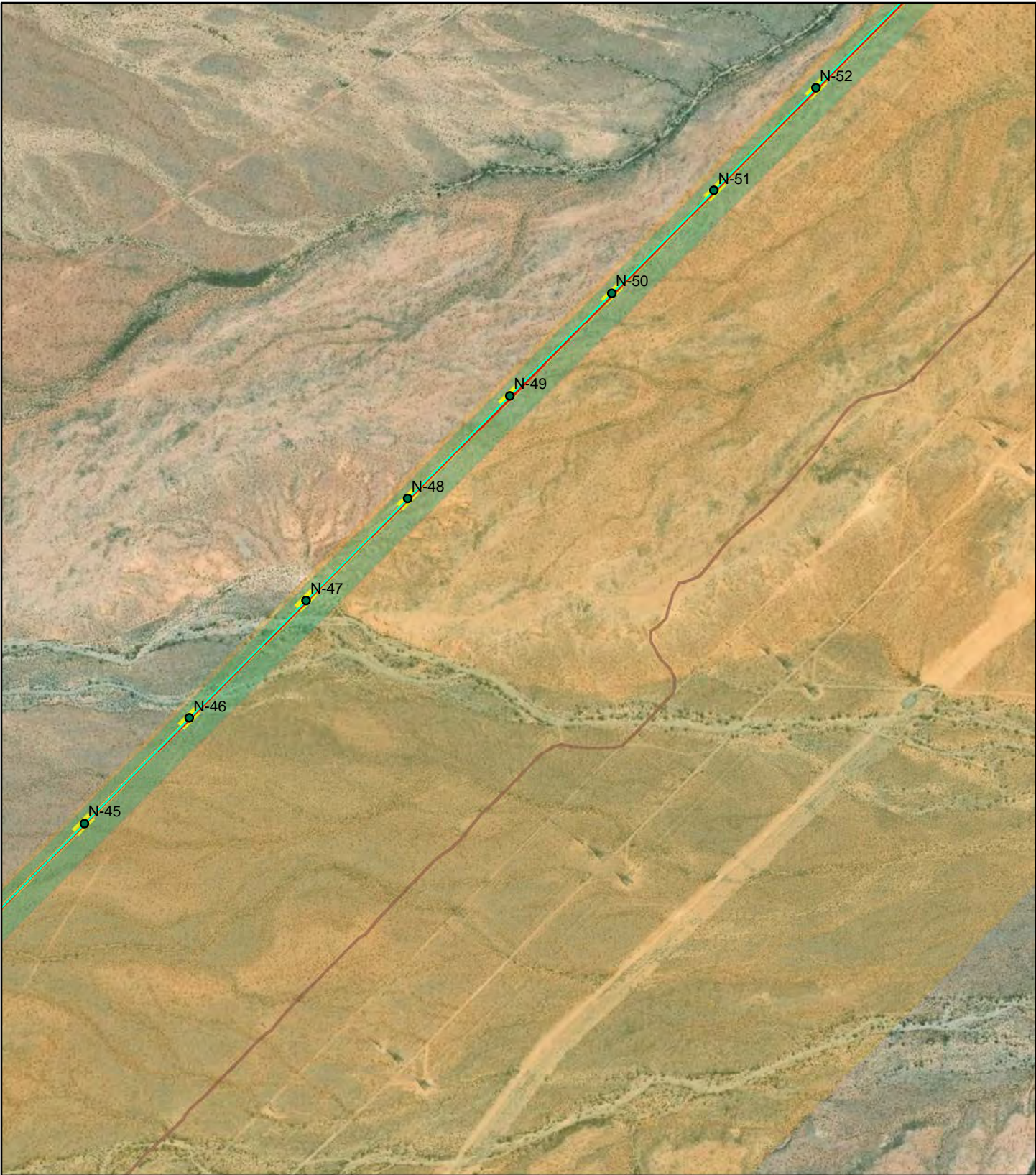


Alternative 3 Mapbook 7 of 11

- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

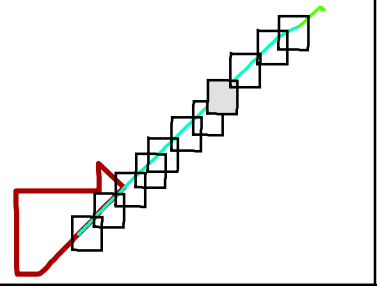
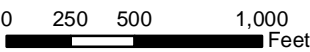
0 250 500 1,000
 Feet





Alternative 3 Mapbook 8 of 11

- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

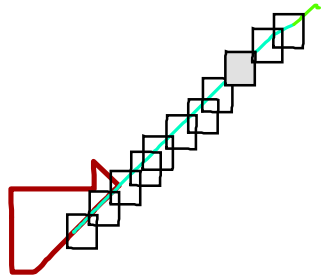




Alternative 3 Mapbook 9 of 11

- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

0 250 500 1,000
Feet

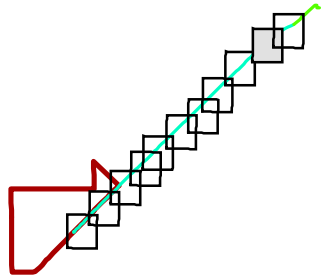


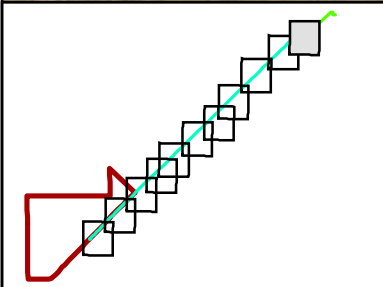


Alternative 3 Mapbook 10 of 11

- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor

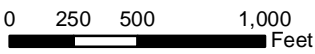
0 250 500 1,000
 Feet





Alternative 3 Mapbook 11 of 11

- POCO Structure
- Gen-Tie Structure
- Primary Access Road
- Gen-Tie Centerline
- Gen-Tie Access Road (existing)
- Permanent Disturbance
- Temporary Disturbance
- 200-ft Gen-Tie ROW
- BLM Moapa Utility Corridor
- BLM Land



Appendix F

Traffic Plan

Eagle Shadow Mountain Solar Project

TRAFFIC PLAN

1.0 PROJECT INFORMATION

1.1. Background

325MK 8me LLC (Applicant), a subsidiary of 8minutenergy , has entered into an agreement with the Moapa Band of Paiute Indians (Tribe) to lease land, up to 40 years, on the Moapa River Indian Reservation (Reservation) for the purposes of constructing, operating, maintaining, and eventual decommissioning of the Eagle Shadow Mountain Solar Project (ESMSP), a 300 megawatt (MW) AC solar generating facility using photovoltaic (PV) technology and associated infrastructure (Proposed Project or Project).

The proposed solar generating facility would be constructed on up to 2,200 acres within a study area of approximately 4,770 acres of tribal trust land within the Reservation. The Project infrastructure would include a 230 kilovolt (kV) electric transmission generation interconnection (gen-tie) line. Main access to the ESMSP site for construction and through operations and decommissioning would be provided via existing roads. Access to this portion of the Reservation would be via Interstate 15 (I-15), US Highway 93 (US 93), and North Las Vegas Boulevard to existing improved roads on the Reservation. These existing roads on the Reservation include the road built to provide access to the nearby existing K Road Solar Facility and the road providing access to the existing tribal aggregate operation and water wells that would be adjacent to the ESMSP.

This traffic plan outlines the framework for a detailed traffic management plan that the construction contractor will be required to develop in consultation with the Nevada Department of Transportation (NDOT) prior to the start of construction.

1.2. Location

The Project would be located approximately 30 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1**), west of I-15 and north and east of US 93. The primary access to the Proposed Project site will be from Exit 64 on I-15. This interchange is in the final stages of recent improvements. Traffic to the ESMSP site would exit I-15 and travel less than one mile to North Las Vegas Boulevard turning north toward the solar site. At the northern end of Las Vegas Boulevard, Project traffic would utilize an existing improved road to cross BLM lands and cross the Reservation to the solar site. This existing road on BLM and the Reservation is the road built to provide access to the nearby existing K Road Solar Facility and also provides access to the existing tribal aggregate operation and water wells that would be adjacent to the ESMSP. **Figure 2** shows the location of the ESMSP project components.

Nearly all construction traffic associated with both the solar site and gen-tie would use the roads and route described above. It is possible that some construction traffic associated with the northernmost part of the gen-tie (near Reid-Gardner Substation) could use either the I-15 exits at Hidden Valley Road or State Route 168 to access the gen-tie ROW in these areas.

Except for I-15 and US 93, there is currently little traffic on any of the roads that will provide primary access to the Project in the immediate vicinity. No upgrades to these existing roads are anticipated to be necessary to provide the access needed for this Project. However, it is possible that maintenance during construction and operations could be needed, as required.

Within the site, new access ways would be located around and within the solar field area around specific blocks of equipment to allow access by maintenance and security personnel. These access ways would be built to provide vehicle and equipment access to the solar panels and related equipment.

1.3. Scope of Work and Schedule

The proposed ESMSP is anticipated to begin construction in Fall of 2020. Construction is expected to take approximately 18 months and would include mobilization, grading and site preparation, installation of drainage and erosion controls, PV panel/tracker assembly, solar field and gen-tie component construction.

1.4. Purpose of the Traffic Management Plan

This Traffic Management Plan (TMP) outlines steps to minimize the impacts and delays to traffic associated with the Proposed Project. The TMP describes the measures that may be used to address any traffic and parking impacts identified.

1.5. Existing Transportation Facilities

I-15 provides access to the Proposed Project area from the urban area of Las Vegas to the south and Mesquite, Nevada and Salt Lake City, Utah to the north. North Las Vegas Boulevard provides access north of US 93. In addition to the roads in the area, the Union Pacific Railroad runs north-south within approximately 3.0 miles from the proposed solar site.

Table 1-1 provides a summary of the primary roads and transportation corridors in the Project area. **Table 1-2** provides more detailed information on the transportation routes and annual average daily traffic volumes (AADT) for the primary access roads in the vicinity of the Proposed Project. **Figure 3** shows the roads along with the locations where the road counts were taken

**TABLE 1-1
PUBLIC ROUTES PROVIDING DIRECT OR INDIRECT ACCESS TO THE PROPOSED
PROJECT**

Route	Direction	Type	Lanes	Description
I-15	north-south	Paved Interstate Freeway	2 (each direction)	Provides a connection between Las Vegas, NV and Salt Lake City, UT. Provides direct access to Proposed Project via SH 168
US-93	east-west	Paved Principal Arterial	1 (each direction)	US 93 is a major highway traversing the eastern edge of the state.
North Las Vegas Boulevard	north-south	Rural Minor Collector	1 (each direction)	North Las Vegas Boulevard provides access between US 93 and the K Road Solar access road. It is a two-lane undivided road.
Union Pacific Railroad	north-south	Railroad	1 track	Provides connection between Salt Lake City and Los Angeles

**TABLE 1-2
AADT SUMMARY FOR ROADS NEAR THE
PROPOSED PROJECT
2018**

Location	AADT
I-15, Southbound On Ramp at US 93 Interchange (Exit 64)	3,300
I-15, Northbound Off Ramp at US 93 Interchange (Exit 64)	3,600
I-15, Northbound On Ramp at US 93 Interchange (Exit 64)	1,300
I-15 Southbound Off Ramp at US 93 Interchange (Exit 64)	1,200
I-15, Segment Between Exit 64 and Exit 58 (Apex)	30,500
I-15, Segment Between Exit 64 and Exit 75 (Valley of Fire)	26,400
US 93	3,750
N. Las Vegas Blvd. (north of US 93)	No data
Hidden Valley Road	150
SR 168	2,000

Source: NDOT Traffic Records Information Access data, 2018.

2.0 TRAFFIC IMPACTS

2.1. Major Transportation Routes

2.1.1. Construction Phase

The roadways listed in **Table 1-1** are anticipated to be impacted by the Proposed Project. The impacts to these roadways could include increased wear on the road from the construction loads, increased traffic volumes during construction, and potential delays during the construction peak periods.

Increased traffic volumes for the construction personnel and the material deliveries will impact traffic flows throughout the duration of the 18-month project construction period. The on-site construction workforce would consist laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel. The construction workforce is anticipated to be an average of 300 construction workers with a peak not expected to exceed 750 workers at any given time, generating about 1,500 daily round trips. To account for the variability during peak periods, a conservative estimate assuming no carpooling was used. Deliveries of equipment and supplies to the site would also vary over the construction period but are expected to average about 25 daily round trips, with a maximum of about 100 daily round trips. Construction equipment would typically include augers, bulldozers, various trucks, trailers, tractors, and cranes. All project related parking will be onsite during construction.

Construction will generally occur between 5:00 a.m. and 5:00 p.m. and could occur up to seven days a week. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. For instance, during hot weather, it may be necessary to start work earlier (e.g., at 3:00 am) to avoid work during high ambient temperatures. Further, construction requirements would require some night-time activity for installation, service or electrical connection, inspection and testing activities. Nighttime activities would be performed with temporary lighting.

It is expected that most project-related construction traffic (equipment, materials, and workers) would originate from the south in Las Vegas with some construction workers coming from the north. The Proposed Project will increase traffic on I-15 and by a maximum of 1,600 vehicle trips daily. The intersection of US 93 and North Las Vegas Boulevard would also experience increased traffic from the Proposed Project.

2.1.2. Operations and Maintenance Phase

When the site becomes operational, it is anticipated that the Project operational staff of 5 personnel would generate up to an additional 10 trips per day (5 entering in the morning and 5 departing in the evening) with very few heavy vehicles. The site is anticipated to be operational for 40 or more years.

The roadways and intersections are projected to be unaffected during the operations phase.

3.0 MITIGATION OF TRAFFIC IMPACTS

The traffic impacts identified in the previous sections could cause minor (5-minute) delays to travelers in the Proposed Project vicinity, specifically the I-15 / US 93 / North Las Vegas Boulevard interchange. This section describes potential measures which could be used to reduce potential traffic impacts resulting from construction of the Proposed Project.

3.1 Coordination with NDOT / Final Traffic Plan

Prior to the start of construction, the construction contractor responsible for building the ESMSP would be required to develop a detailed traffic management plan in consultation with NDOT.

3.2 Motorist Information and Construction Area Signs

Informing the road users is one way to help reduce the impacts from construction. If required, drivers could be informed about the construction and any major delays allowing them to modify their travel planning (timing). Both static and variable message signs (VMS) may be used to inform users coming from each direction that there could be delays due to construction traffic. If needed, this signage would be placed on I-15 on both sides of the US 93 intersection.

3.3 Construction Staging

To mitigate any traffic impacts attributable to the construction workforce during the project, construction start times could be staggered during peak construction periods such that the entire workforce required for each day could arrive/leave at different times. This could be done by staggering workers by construction areas or by construction task.

3.4 Carpooling

While not expected, if needed, carpooling could be used during peak construction periods to reduce the total number of trips entering/leaving the site, and in turn, reduce traffic congestion. The construction manager may coordinate with the workforce to determine the best location and time to coordinate carpooling, if needed. Another possible option would be to organize a shuttle that could take the workers from a centralized point such as the Moapa Travel Plaza to the site.

3.5 Public Information and the Media

Stakeholders such as NDOT, Clark County, and the Moapa Community would be informed with outreach letters prior to construction. The letter will provide a description of the project and the time frame as well as outline any short-term restrictions that may impact stakeholders. The letters would also provide contact information for any stakeholders who may have questions.

If needed, updates to the local communities through radio, the internet, or local newspaper could provide information to the current local users of US 93 who may be impacted by construction of the Proposed Project.

3.6 Off-Peak Hour Activities

To minimize adding trips during the daily workforce commute, deliveries would be scheduled during the off-peak hours, to the greatest extent practicable.

4.0 POTENTIAL EFFECTS TO THE PUBLIC

4.1 Bicycles and Pedestrians

Bicycles and pedestrians are rare in the vicinity of the Proposed Project but could occasionally be present. The existing routes would accommodate bicycles or pedestrians during construction similarly as the current condition.

4.2 Delivery and Service Vehicles

I-15 serves commercial trucking and delivery and service vehicles traveling between Las Vegas and Salt Lake City. The Proposed Project may cause increased traffic volumes on I-15 (and at exit 64) and on US 93, but delays are not expected. If delays were to occur, they would be expected to less than five minutes and have a minor effect on delivery and service vehicles.

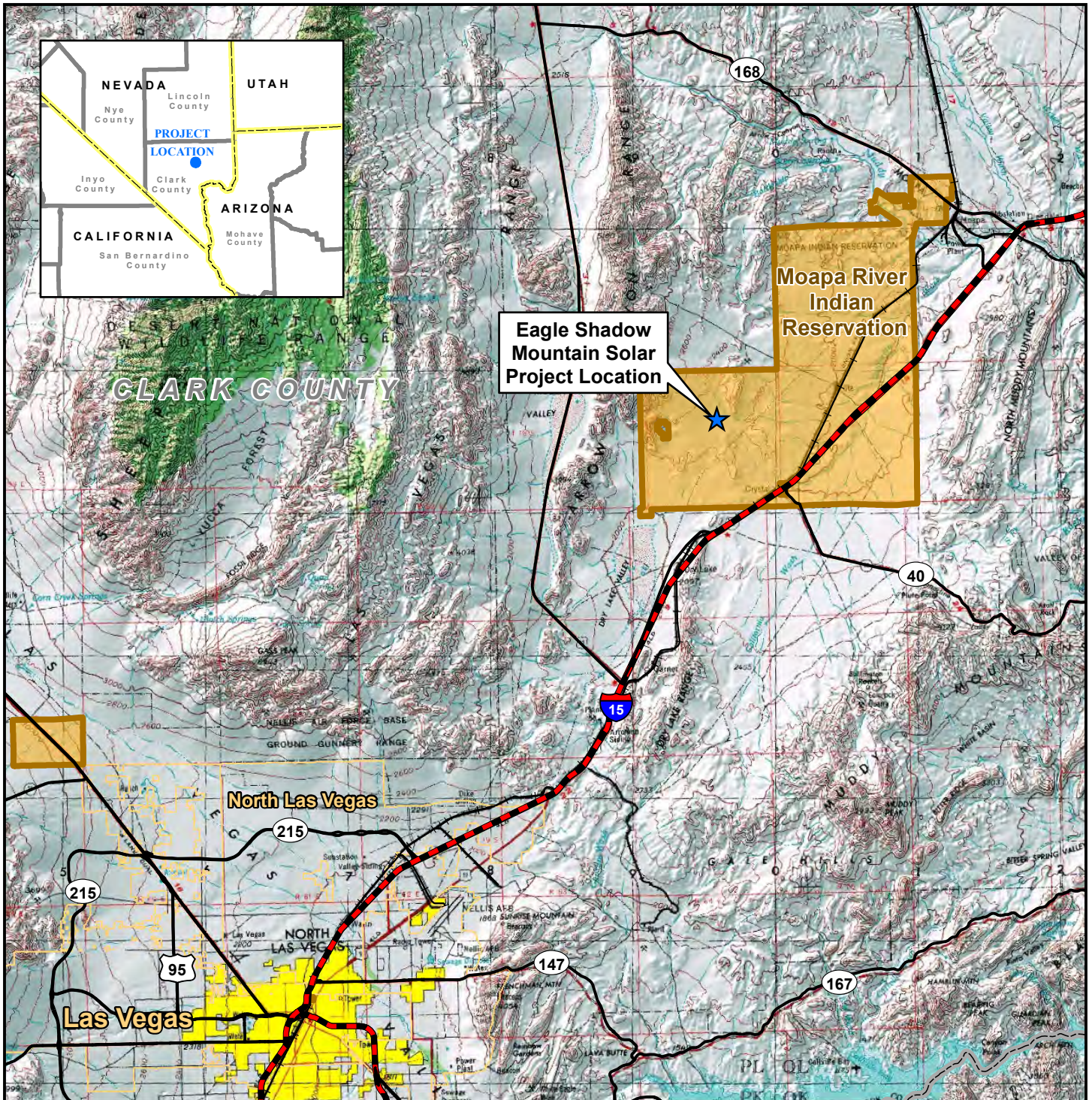
4.3 Emergency Services

Emergency vehicles dispatched through 911 services for ambulance, sheriff, State Highway Patrol, and the local Fire Departments use the routes within the Project vicinity. Clark County Fire Department has an agreement with the Tribe to provide fire protection and emergency medical services to the Reservation. Emergency services will not be interrupted by the Proposed Project. The Clark County Fire Department will be notified prior to the start of construction and kept informed of the progress of construction at the site.

5. CONCLUSION

The construction of the Proposed Project may have impacts on the existing transportation networks by increasing the volumes during the 18-month construction period. Increased traffic during operations would be minimal.

The traffic volumes during construction will increase along I-15, the ramps at Exit 64, US 93, and along North Las Vegas Boulevard and the existing access road. Potential measures that could be included in the final traffic management plan have been described in Section 3.

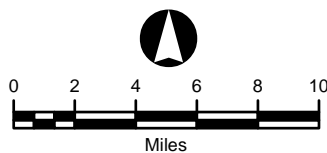


Legend

- Solar Project Location
- Interstate
- US/ State Highway
- Railroad
- Municipal Boundary

Jurisdictional Land Ownership

- Indian Reservation



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

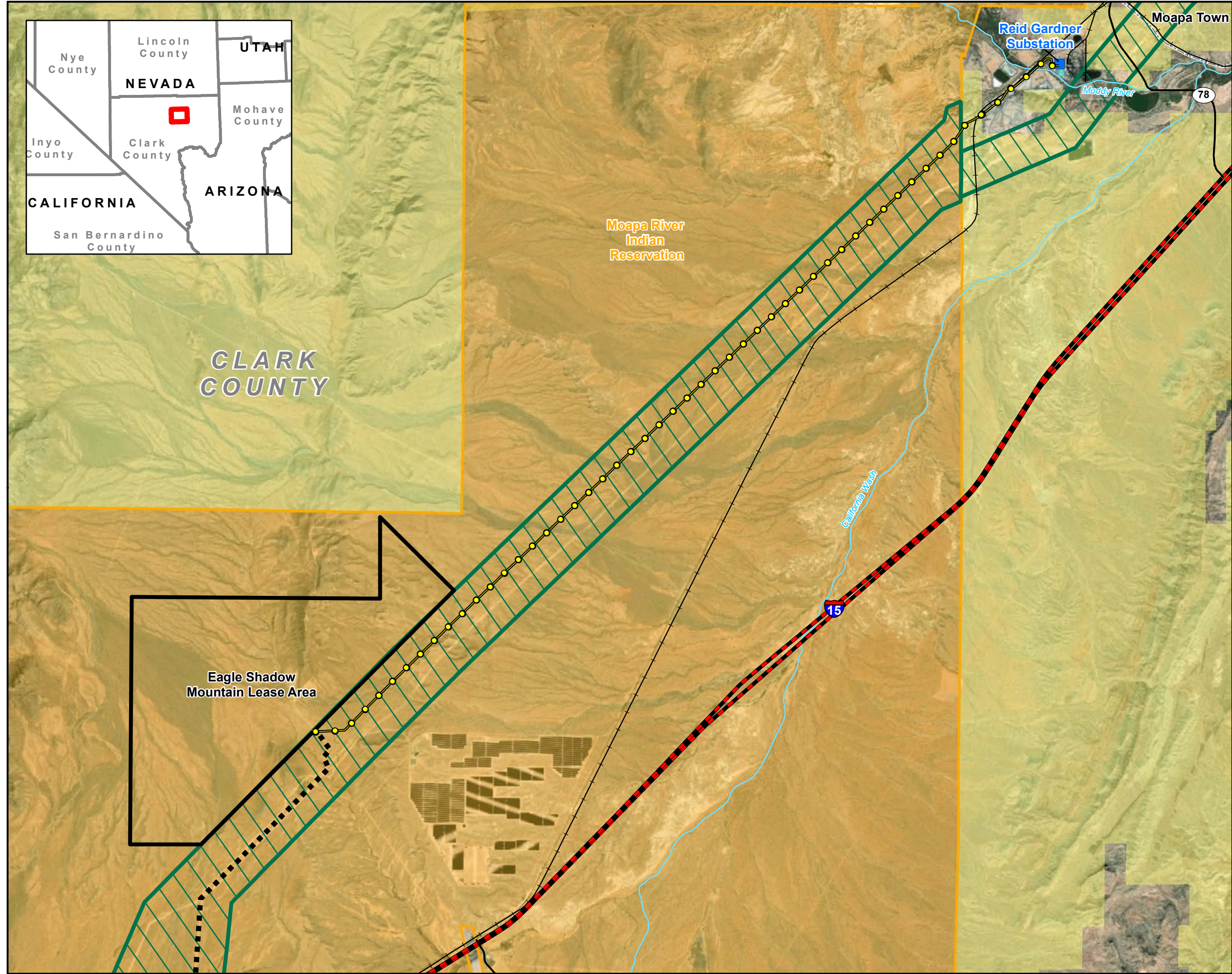
Eagle Shadow Mountain Solar Project

**FIGURE 1
 PROJECT LOCATION**

Map Extent: Clark County, Nevada

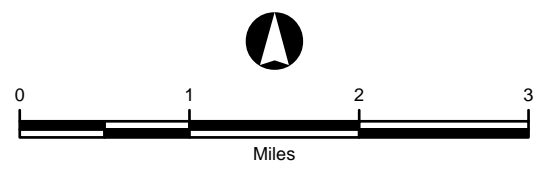
Date: 11-06-18	Author: rnc
----------------	-------------

G:\Eagle Shadow Mountain Solar Project\MXD's\Project Location 8.5x11 110618.mxd



Legend

- Project Components**
 - ESM Gen-Tie - Alternative
 - Eagle Shadow Mountain Solar Project Area
- 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
 - Existing Access Road



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

Eagle Shadow Mountain Solar Project

Figure 2
ESM Solar Project Components

Map Extent: Clark County, Nevada

Date: 03-20-19	Author: mc
G:\ESM\MXD's\Project Location_032019.mxd	

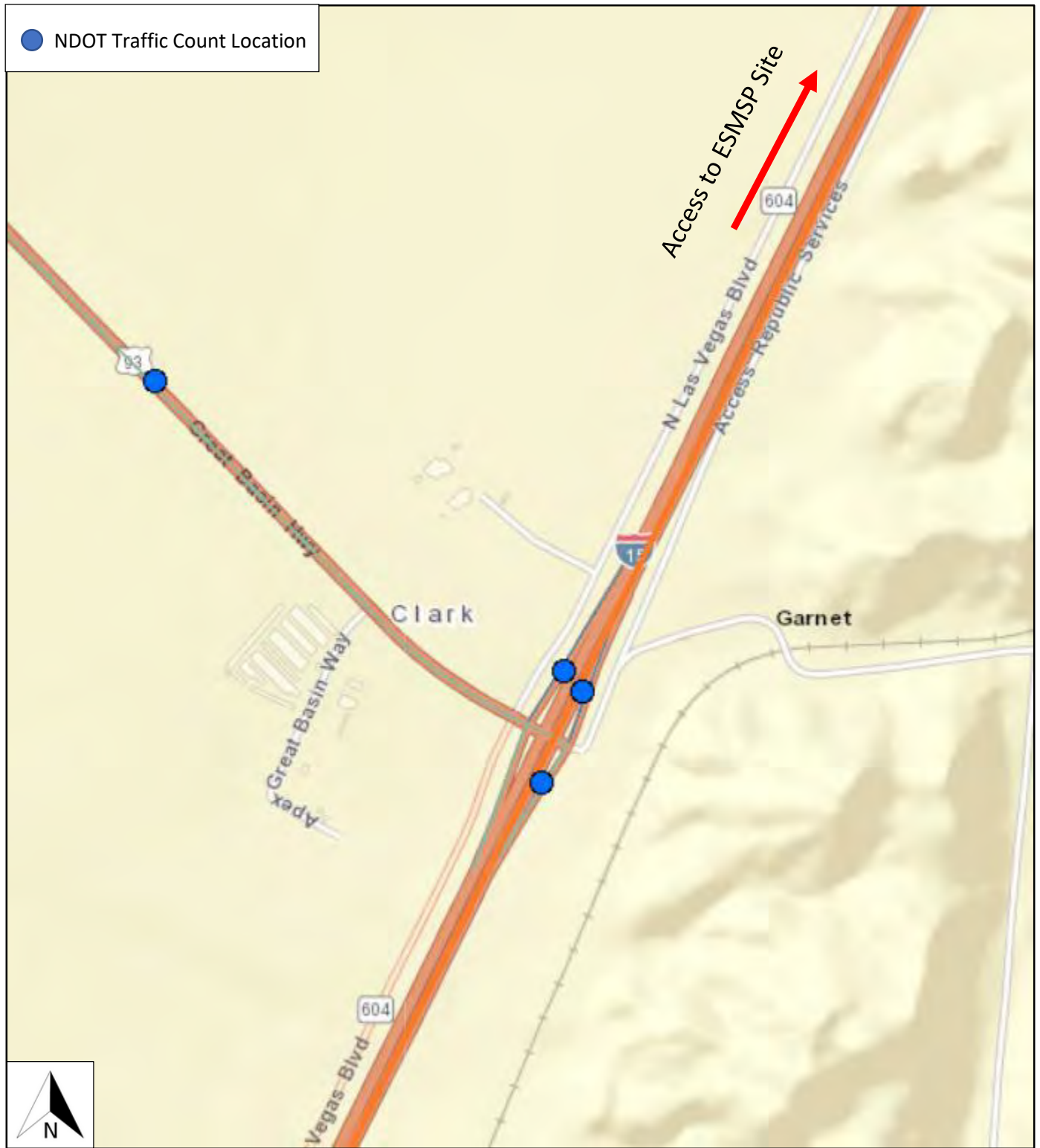


Figure 3
Primary Access to ESMSP

Appendix G

Integrated Weed Management Plan

Integrated Weed Management Plan

EAGLE SHADOW MOUNTAIN SOLAR PROJECT

CLARK COUNTY, NEVADA

June 2019

Table of Contents

1	Introduction	1
1.1	Purpose of the Plan.....	1
2	Roles and Responsibilities.....	2
2.1	General Roles and Responsibilities	2
2.2	Permit Compliance Procedures and Tasks	2
3	Project Summary.....	3
3.1	Project Location	3
3.2	Project Description	3
4	Weed Surveys	5
5	Weed Management	7
5.1	Preventative Measures	7
5.2	Treatment Methods	7
5.3	Agency Specific Requirements.....	8
6	Weed Monitoring.....	11
6.1	Ongoing Monitoring.....	11
6.2	Post Construction.....	11
6.3	Monitoring of Known Infestation Areas	11
7	Herbicide Application, Handling, Spills and Cleanup	12
7.1	Herbicide Application.....	12
7.2	Herbicide Spills and Cleanup.....	13
7.3	Worker Safety and Spill Reporting	13
8	References	14

FIGURES

Figure 1 - Project Location.....	15
Figure 2 - Project Area.....	16

TABLES

Table 2-1 – Procedures and Task Matrix.....	2
Table A-1 – Designated Noxious and Invasive Weed Species of the State of Nevada.....	17

APPENDICES

Appendix A	Nevada Designated Noxious Weed Species
Appendix B	Adjuvant and Herbicide Formulas Approved by the BLM
Appendix C	Example of BLM Pesticide Use Proposal Submittal Form
Appendix D	Example of a BLM Pesticide Application Record Form
Appendix E	Weed Stipulations for Construction Projects on BLM Land

Acronyms and Abbreviations

BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
EPA	U.S. Environmental Protection Agency
GIS	geographic information system
GPS	global positioning system
IWMP	Integrated Weed Management Plan
LVFO	Las Vegas Field Office
MM	Mitigation Measure
mph	miles per hour
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NRS	Nevada Revised Statute
O&M	Operations and Maintenance
PAR	Pesticide Application Records
PPE	Personal Protective Equipment
Project	Eagle Shadow Mountain Solar Project
PV	Photovoltaic
PPA	Power Purchase Agreement
PUP	Pesticide Use Proposal
Reservation	Moapa River Indian Reservation
ROW	right-of-way
SDS	Safety Data Sheets
WEAP	Worker Environmental Awareness Procedure

1 Introduction

1.1 Purpose of the Plan

The purpose of this Integrated Weed Management Plan (IWMP) is to describe methods to prevent, mitigate, and control the spread and establishment of weeds during the implementation of the Eagle Shadow Mountain Solar Project (Project). The Project proponent and its approved contractors would be responsible for implementation of this plan. The objective is to understand the type and distribution of weeds in the Project area, and to implement effective control and monitoring efforts toward reducing the spread and establishment of weeds in the Project area. This IWMP is applicable to the construction, operation, and decommissioning of the proposed Project.

The Environmental Impact Statement, Appendix C Applicant-Proposed Mitigation and Best Management Practices (BMPs) – Biological Resources states the following:

- *Prior to construction, an Integrated Weed Management Plan will be developed that includes measures designed to reduce the propagation and spread of designated noxious weeds, undesirable plants, and invasive plant species, or as determined by the agencies (BIA, BLM, etc.) in coordination with the Band.*
- *The Applicant will implement controls at entry locations to facilitate weed management and invasive species control in order to minimize infestation to the project site from an outside source. Trucks and other large equipment will be checked before entering the site for any invasive species debris or seed.*

2 Roles and Responsibilities

2.1 General Roles and Responsibilities

All site Project proponent construction and operations employees, contractors, and sub-contractors will be familiar with the IWMP, and will be responsible for implementing aspects of this IWMP.

All Workers, Contractors, and Contractor Staff shall:

- Complete all required Worker Environmental Awareness Procedure (WEAP) training before starting work. WEAP training will include a section on weed spread and colonization.
- Ensure vehicles and equipment to be used on site will be inspected for excess soil or signs of noxious weeds prior to gaining entry to the site. If inspections indicated that a vehicle requires washing, this activity will occur off-site at existing car washes with appropriate containment facilities.
- Any straw or hay wattles used for erosion control must be certified weed free.
- Limit disturbance areas to the smallest area needed for construction.

2.2 Permit Compliance Procedures and Tasks

The following procedure and task matrix outlines the specific Mitigation Measures (MMs) and Best Management Practices (BMPs) that will be implemented, as needed, to minimize the potential for weed spread and establishment.

BMP#	Site Procedure(s)	Task Assignment and Schedule
1	Prior to construction, a Integrated Weed Management Plan will be developed that includes measures designed to reduce the propagation and spread of designated noxious weeds, undesirable plants, and invasive plant species, or as determined by the cooperating or reviewing agencies (BIA, BLM, NDOW, etc.).	This IWMP has been prepared and submitted to referenced agencies for approval.
2	Areas with current weeds will be mapped.	Appropriately qualified staff will perform weed surveys.
4	Equipment that has been used in weed-infested areas on the Project will be cleaned before moving it to another area.	Equipment operators will be required to knock off built up dirt and debris from vehicles prior to moving to a new area if they are working in an area that is weed-infested
5	Any straw or hay wattles are used for erosion control must be certified weed free.	Procurement will ensure that materials ordered are certified weed-free prior to purchase.

3 Project Summary

3.1 Project Location

The Proposed Project would be located approximately 30 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1**). The solar project would be located on up to 2,200 acres of tribal trust land, west of I-15 and east of U.S. Highway 93, in Sections 1, 9, 10, 11, 14, 15, 16, 21 and 22 of Township 16 South, Range 64 East. These lands are currently vacant except for roads, pipelines, a tribal aggregate operation, and wells on lands adjacent to the solar field.

The portion of the proposed 12.5-mile gen-tie line located on Tribal lands within the designated utility corridor managed by the BLM occur within Sections 12, 13, and 14 in Township 16 South, Range 64 East; Sections 5, 6, and 7 in Township 16 South, Range 65 East; and Sections 12, 13, 14, 22, 23, 27, 28, 32, and 33 in Township 15 South, Range 65 East. The short segment on Federal lands managed by the BLM would be within Section 7 in Township 16 South, Range 66 East and the portion on private lands owned by NVE adjacent to the Reid-Gardner Substation would be within Sections 5 and 6 in Township 16 South, Range 66 East. All of these lands are adjacent to multiple existing linear electric transmission and pipeline utilities and private lands (owned by NV Energy) adjacent to the Reid-Gardner Substation.

Figure 2 shows the location of the components of the Proposed Project and associated facilities.

3.2 Project Description

The following describes the major features of the proposed Project. For a comprehensive description of the proposed Project, refer to the associated Draft Environmental Impact Statement for the Eagle Shadow Mountain Solar Project for the Project design details (subject to minor design changes).

The Project will consist of an up to 300 megawatt alternating current (MWac) solar energy generating facility using photovoltaic (PV) technology and associated infrastructure. Project components include on-site facilities, off-site facilities, and temporary facilities needed to construct the Project. The solar site would be located entirely on Tribal lands. Major on-site facilities include the solar field comprised of multiple blocks of PV solar panels mounted on single-axis tracking systems, associated inverter and transformer equipment, an energy storage system (ESS), a project substation, and operation and maintenance (O&M) facilities.

The offsite facilities would include an approximately 12.5-mile dual-circuit 230kV gen-tie line located on Tribal lands, BLM-administered lands, and private lands owned by NV Energy. Most of the gen-tie would be within a Federally-designated utility corridor on Tribal lands. This line would require a right-of-way (ROW) width of 125 to 200 feet. The Applicant would construct the gen-tie from the Project

substation to a structure located on BLM-administered land in the SW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 7 referred to as the Point of Change of Ownership (POCO). From the POCO structure, the remaining portion of the gen-tie would be constructed by NVE to the Reid Gardner Substation. Additional offsite facilities include an existing road that would provide access to the Project and electric distribution and communication lines. Temporary facilities that would be removed at the end of construction include laydown and construction areas and water storage tanks also located on Tribal lands.

Power produced by the Project would be conveyed to the regional transmission system via the gen-tie interconnection to NVE's existing 230kV Reid-Gardner Substation.

4 Weed Surveys

A weed survey of the proposed gen-tie ROW has been completed and results are presented in the Noxious Weed Survey Report (Heritage 2019) which is attached. The only species of noxious weed on the Nevada state list that was observed in the gen-tie ROWs was Sahara mustard (*Brassica tournefortii*). It was not abundant and occurred in both disturbed and undisturbed habitats. There were 16 occurrences totaling 26 acres within both corridors. African mustard (*Strigosella africana*) was the most abundant non-native plant species and is considered an invasive species. Other non-native species (also considered invasive) that were commonly observed include Mediterranean grass (*Schismus* sp.), red brome (*Bromus rubens*), Cheatgrass (*Bromus tectorum*), and Redstem filaree (*Erodium cicutarium*).

Updated weed surveys within the Project site, including the proposed routes for new gen-tie access roads, will be conducted prior to conducting surface disturbing activities. These surveys will be focused on identifying and mapping occurrences of weed species described in the Nevada Revised Statutes 555.010, included as **Appendix A** to this IWMP.

The Nevada Department of Agriculture Plant Industry Division maintains a list of noxious weeds for the State of Nevada. Noxious weeds on this list are assigned to one of three categories, including:

- **Category A Weeds:** Weeds that are generally not found or that are limited in distribution throughout the State. Category A weeds are subject to active exclusion from the State and active eradication where found, including the premises of a dealer of nursery stock.
- **Category B Weeds:** Weeds that are generally established in scattered populations in some counties of the State. Such weeds are subject to active exclusion, where possible; and active eradication from the premises of a dealer of nursery stock.
- **Category C Weeds:** Weeds that are generally established and generally widespread in many counties of the State. Such weeds are subject to active eradication from premises of a dealer of nursery stock.

In addition to the listed weeds, occurrences of identified above will also be identified and described, although they are not listed as noxious weeds. The State of Nevada has not categorized or designated these species as noxious weeds because their distribution and occurrence are far too widespread for management efforts to successfully eradicate these species. The management efforts, described in this plan, will rely on the results of this initial weed survey.

The results of the weed survey will contribute to the identification of problem areas

within the proposed Project site. The weed survey will include botanists walking parallel transects, searching for weeds on both sides of each transect. Identified weed occurrences will be described to species, assigned a ground cover rating, and individuals will be counted or estimated, as appropriate. The location of identified weed occurrences will be recorded using a hand-held global positioning system (GPS) unit and all recorded occurrences will be mapped using geographic information system (GIS) software. All identified weed occurrences will be marked in the field, either by flagging, pin flags or other means so as to indicate to construction personnel that such areas are to be avoided until appropriately treated.

5 Weed Management

Weed management at the proposed ESMSP will include identification of problem areas, implementation of measures intended to prevent the spread and establishment of new weed occurrences, and application of appropriate measures to treat known occurrences of weeds. These steps toward effective weed management are described in the following sections.

5.1 Preventative Measures

The prevention of weed establishment is the most effective weed management practice. Preventing or reducing the potential for weed establishment reduces additional efforts, costs, and time invested in subsequent weed control or eradication measures. Several measures have proven to be effective toward preventing the spread and establishment of weeds on projects where surface disturbing activities are proposed. The following preventative measures will be implemented:

- Vehicles will be inspected upon entry to the site to ensure cleanliness.
- Disturbance areas will be limited to the smallest area needed for construction.
- The WEAP training will include a section on weed spread and colonization.
- Additionally, on BLM lands, all weed stipulations for construction projects developed by BLM will be implemented.

This plan is a living document. It may be revised to modify or exclude measures listed or include additional measures as appropriate over the life of the project if unforeseen circumstances are identified.

5.2 Treatment Methods

Treatment methods are necessary to control and eradicate known invasive and noxious weed occurrences. Treatment methods include a variety of approaches such as mechanical, chemical, and biological controls using Early Detection and Rapid Response (EDRR)(NISC 2003). The most appropriate and effective weed treatment measures will be determined following the assessment of existing weed populations on the Project site. .

Mechanical treatments include the use of physical means to remove plants, reproductive parts, or propagules. Mechanical treatments include manual methods (pulling plants from the soil), use of hand tools and hand-held power tools, mowing, and more aggressive efforts that involve removing above and below ground plant structures. The designation of the appropriate mechanical treatment will depend on variables including season, plant life stage, weed species, size and population of each occurrence, and more. The weed management contractor will coordinate with the appropriate agencies before implementing any weed treatment methods.

Chemical treatments involve the use and application of herbicides. Treatment methods on BIA lands will utilize the BLM's *Chemical Pest Control Manual* as a

guideline for weed control (see Section 5.3.1 below). The use of herbicides is highly regulated and involves a variety of specific protocols, safety measures, and precautions for eliminating, reducing, and mitigating for uncontrolled releases. The Project site is located within suitable and occupied desert tortoise habitats. As such, the application of herbicides may be permitted, though a Pesticide Use Proposal (PUP) would need to be submitted to the BLM prior to herbicide use on BLM lands.

Herbicide use would follow those approved in BLM's Programmatic EIS (PEIS) for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Managed Lands in 17 Western States (BLM 2016). The applicant would implement a Site Restoration Plan and an Integrated Weed Management Plan that specifies procedures for managing vegetation and minimizing the spread of non-native and noxious weeds, including integrated pest management and use of herbicides. Standard Operating Procedures (SOPs) would be incorporated into this plan and implemented. The herbicides that may be used in mowed areas, based on those allowed on BLM lands, include aminopyralid, clopyralid, imazapyr, imazapic, glyphosate, metasulfuron methyl, and rimsulfuron. Herbicides that are believed to have deleterious effects on reptiles, such as 2,4-D, would not be allowed. Any herbicide use would be used during the less active tortoise season. The possible use of herbicides as a treatment method is described in additional detail in Section 7 of this report.

Biological treatments include the use of plants and animals (particularly insects) that parasitize, ingest, or out-compete weed species. Based on the weed species expected to occur in the Project area, biological controls are not expected to be a viable or appropriate alternative for treating weed occurrences at the proposed site.

5.3 Agency Specific Requirements

5.3.1 Bureau of Land Management Lands

The BLM regulates the use and type of herbicides on all of its administered lands. Included in its *Final Programmatic Environmental Impact Statement Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM 2007) is a list of the 14 active herbicidal ingredients approved for use on BLM lands. **Appendix B** includes the 2019 list of adjuvants, chemical additives intended to improve the efficacy of herbicides, approved for use on lands administered by the BLM. Guidelines for the use of chemical means to control vegetation on lands administered by the BLM are presented in the BLM's *Chemical Pest Control Manual* (BLM Manual 9011). These guidelines require submittal of a PUP and pesticide application records (PAR) for use of herbicides on lands administered by the BLM. **Appendix C** includes a BLM PUP submittal form, and **Appendix D** includes an example of a BLM PAR form.

PUPs are to be submitted to BLM several weeks before herbicide application on lands administered by the BLM. The appropriate weed control procedures, including target species, timing of control, and method of control, will be determined through consultation with the Las Vegas Field Office (LVFO) weed specialist. All personnel

associated with application of weed control measures will be appropriately trained and hold all the required certifications. PARs are to be submitted no more than 24 hours after application of the herbicide.

The BLM ROW grant for the gen-tie line, as well the ROW for use of the existing site access road will include stipulations, best management practices, and requirements to prevent and control the proliferation of weeds including both invasive and noxious species in accordance with Nevada State and federal laws, BLM direction, policy, and the Las Vegas Field Office Resource Management Plan. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA, 7 U.S.C. §136 et seq. [1996]) also regulates herbicide use and would be adhered to.

5.3.2 BLM Las Vegas Field Office Noxious Weed Management Plan

The LVFO of the BLM prepared this document as guidance for weed management programs. The methods included in the BLM Noxious Weed Management Plan (BLM 2006) originated from a cooperative effort between BLM and other federal agencies that produced the document, Partners Against Weeds.

These regulations and guidelines will be generally followed and implemented on all areas of proposed disturbance on BLM land and generally utilized as a guideline throughout the project site.

5.3.3 Nevada Revised Statute (NRS): The Nevada Control of Insects, Pests, and Noxious Weeds Act

The following section applies to BLM and private lands; the BIA has the discretion to utilize existing State regulatory guidelines as appropriate.

NRS 555.150

NRS 555.150 (Eradication of Noxious Weeds by Owner or Occupant of Land) of the Nevada Revised Statute reads:

“Every railroad, canal, ditch, or water company, and every person owning, controlling, or occupying lands in this State, and every county, incorporate city or district having the supervision and control over streets, alleys, lanes, rights-of-way, or other lands shall cut, destroy, or eradicate all weeds declared and designated as noxious in NRS 555.130, before such weeds propagate and spread, and whenever required by the State Quarantine Officer.”

NRS 555.210

NRS 555.210 (Performance of Necessary Work by Weed Control Officer on Failure by Landowner Charges as Lien) of the Nevada Revised Statute reads:

“If any landowner fails to carry out a plan of weed control for his or her land in compliance with the regulations of the district, the weed control officer may enter upon the land affected, perform any work necessary to carry out the plan, and charge such work against the landowner. Any such charge, until

paid, is a lien against the land affected coequal with a lien for unpaid general taxes and may be enforced in the same manner.”

5.3.4 Bureau of Indian Affairs: Western Region Integrated Noxious Weed Management Plan and Programmatic Environmental Assessment for Weed Control Projects on Indian Lands

The BIA Western Region prepared this document to outline noxious weed control techniques and describes control strategies for specific noxious weed species and management zones (BIA 2014). These guidelines will be generally followed and implemented on all areas of proposed disturbance on Tribal land and generally utilized as a guideline throughout the project site.

6 Weed Monitoring

All Project areas that are proposed for surface disturbance will be monitored for weeds by qualified botanists and/or appropriately trained personnel. Monitoring will occur throughout the appropriate growing season when species are easily identified. Upon identification of infestation, appropriately trained staff will determine what action is necessary, and treatment measures will be implemented accordingly.

6.1 Ongoing Monitoring

During construction, weed monitoring will occur on an ongoing basis. Appropriately trained personnel will use the results of the initial weed inventory to monitor known weed occurrences and will observe activity areas for opportunistic weed occurrences.

6.2 Post Construction

Weed monitoring will begin immediately following construction. Weed monitoring will occur at all disturbed sites at least twice a year (March and September) for an estimated five years or until restoration efforts are deemed complete by the Tribe, BIA, and BLM. For BLM-managed public lands, monitoring will be conducted in accordance with the ROW stipulations - typically annual monitoring or as needed for the life of the ROW.

The goal of weed monitoring is to ensure no net increase in weed species or overall weed cover to the baseline conditions. Identified weed occurrences will be noted and recorded in the same manner as was described for the weed inventory effort. A monitoring report will be made available to applicable agencies. The report will help determine whether success criteria (e.g., no net increase in weeds) are being met. Adaptive management strategies would be implemented if necessary.

6.3 Monitoring of Known Infestation Areas

Known occurrences of weed infestations will be evaluated as part of the initial mapping effort. Post-construction monitoring will determine if noteworthy changes have occurred at known infestation sites, particularly if the number of individuals or area covered by an infestation has changed dramatically. A brief summary will be prepared annually to document the areas treated the effectiveness of the weed management program, including weed infestation identification, and weed control.

7 Herbicide Application, Handling, Spills and Cleanup

7.1 Herbicide Application

If herbicides are deemed necessary for weed control, personnel responsible for applying herbicides will obtain all of the required Federal, State, or local agency permits and will hold all necessary certifications and have received all relevant training. Permits may include terms and conditions that are not included in this Integrated Weed Management Plan. A licensed contractor will apply herbicides in accordance with all applicable laws, regulations, and permit stipulation, including U.S. Environmental Protection Agency (EPA) label instructions. A PUP must be obtained from BLM prior to herbicide application on BLM land. If faced with any of the following scenarios, herbicide application shall be suspended until such conditions no longer exist:

- Wind velocities in excess of 10 miles per hour (mph) during application of liquid herbicides and 15 mph during application of dry herbicides;
- Snow or ice present on weed foliage; or
- Precipitation is occurring or imminent.
- Only apply in desert tortoise habitat during the less -active desert tortoise seasons.

For weed infestations readily accessible and passable by vehicle, vehicle-mounted applicators will be used. Manual application methods will be used in weed occurrences that are relatively small, inaccessible by established road or ROW, or in rough, varied terrain. All herbicide applicators, spreaders and sprayers, will be calibrated before each use to ensure all applications rates and procedures are appropriately implemented.

Herbicide transport and handling will follow these methods:

- Only the quantity of herbicide expected for each day's use will be transported.
- Herbicide concentrate will be transported in approved containers in a controlled manner so as to prevent spills. Concentrate will be positioned in delivery or work vehicles so as to be secured and separated from the driving compartment, food, clothing, and safety equipment.
- The mixing of herbicide materials will be within designated areas. All mixing will take place over a drip/spill containment device and at a distance more than 200 feet from open or flowing water, wetlands, or other sensitive resources.
- Herbicides will not be applied to areas of open or flowing water, wetlands, or other sensitive resources unless authorized by the appropriate regulatory agency.
- All equipment and containers used for herbicide storage, application, and transport will subject to inspection for leaks or damage.

- Emptied herbicide containers will be disposed in accordance with instructions provided on the label.

7.2 Herbicide Spills and Cleanup

All spills and inadvertent releases of herbicides will be addressed immediately upon detection. Spill response kits will be readily available in herbicide contractor vehicles and in daily on-site herbicide storage areas.

Spill response will vary depending on a variety of conditions, including location, amount of spill, area impacted by spill, type of herbicide spilled, and more. For each spill the following procedures should be implemented:

- Disseminate the appropriate on-site and agency notifications of a spill.
- Secure the affected area barring pedestrian and vehicle traffic.
- All spill response personnel shall put on the appropriate Personal Protective Equipment (PPE) prior to entering the spill containment area.
- Personnel, while wearing the appropriate PPE and equipped with the necessary tools and equipment, shall stop the herbicide leak or release.
- All materials associated with spill response, including the released herbicide, affected soils and plants, absorptive material, clothing, and PPE shall be removed and containerized according to appropriate regulations and procedures.

All generated spill response containers shall be transported, following appropriate regulations, and disposed legally at an approved disposal facility.

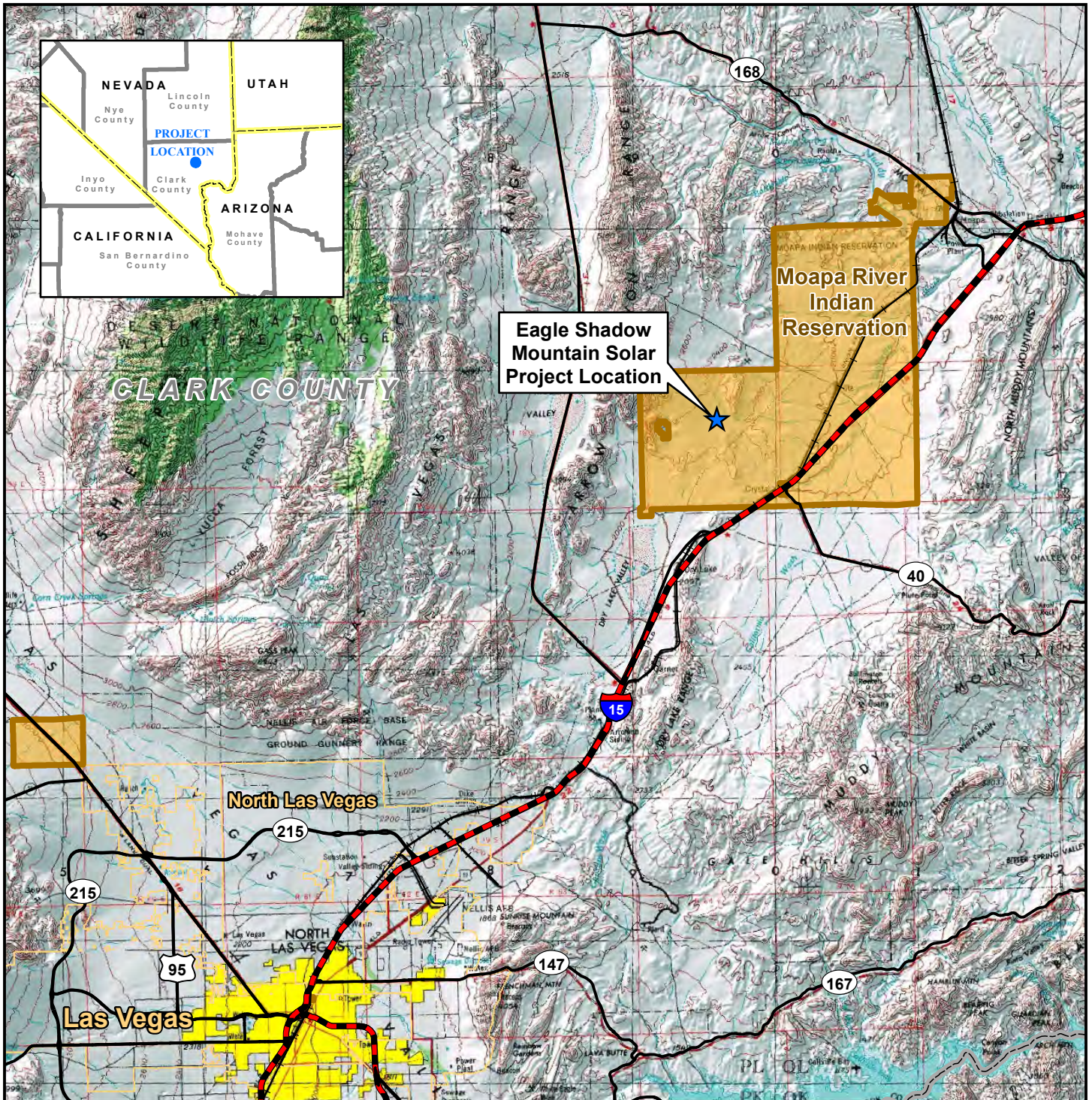
7.3 Worker Safety and Spill Reporting

All contractors responsible for herbicide use, transport, application, and control at the site will hold the appropriate certifications. Such certifications shall be made available. Contractors transporting herbicides to the site shall also have legible Safety Data Sheets (SDS) and labels on-site. All herbicide spills and inadvertent releases shall be reported in accordance with all applicable laws and regulations.

8 References

- Bureau of Indian Affairs (BIA). 2014. Western Region. Integrated Noxious Weed Management Plan and Programmatic Environmental Assessment for Weed Control Projects on Indian Lands. August 2014. 364 pp.
- Bureau of Land Management (BLM). 2006. Noxious Weed Plan, Las Vegas Field Office, Bureau of Land Management: A Plan for Integrated Weed Management. 47pp.
- BLM. 2007. Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement. Available on the internet at:
<https://eplanning.blm.gov/eplfrontoffice/eplanning/planandProjectSite.do?methodName=dispatchToPatternPage¤tPageId=103592>. Accessed on June 13, 2019
- BLM. 2016. Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States.
- National Invasive Species Council (NAIC). 2003. General Guidelines for the Establishment and Evaluation of Invasive Species Early Detection and Rapid Response Systems. Version 1. 16 pp.

Figures

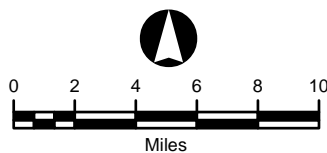


Legend

- Solar Project Location
- Interstate
- US/ State Highway
- Railroad
- Municipal Boundary

Jurisdictional Land Ownership

- Indian Reservation



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

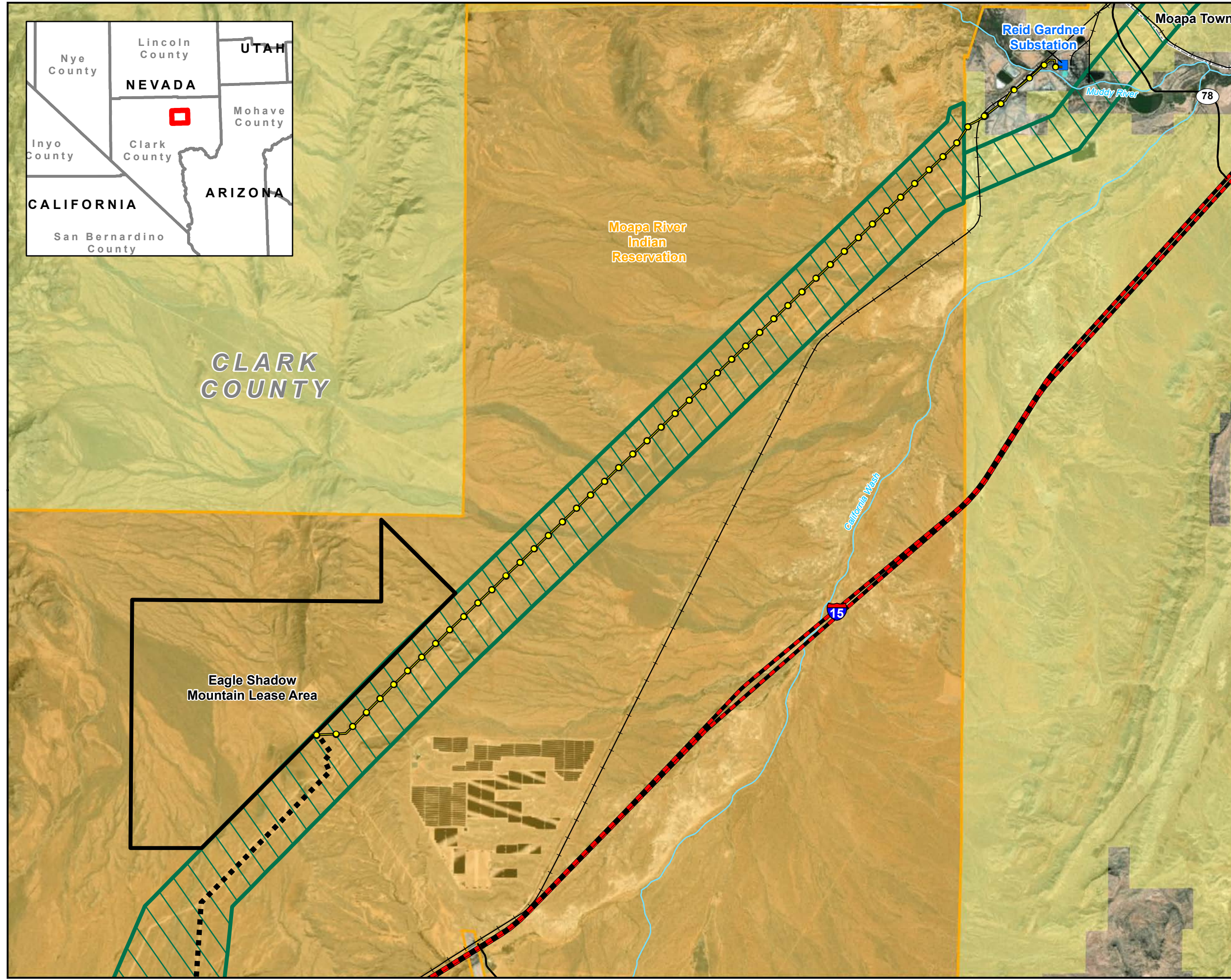
Eagle Shadow Mountain Solar Project

**FIGURE 1
 PROJECT LOCATION**

Map Extent: Clark County, Nevada

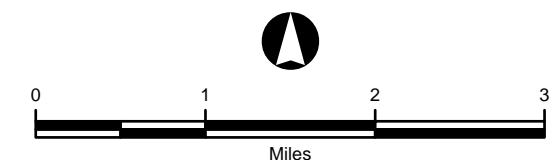
Date: 11-06-18	Author: rnc
----------------	-------------

G:\Eagle Shadow Mountain Solar Project\MXD's\Project Location 8.5x11 110618.mxd



Legend

- Project Components**
- ESM Gen-Tie - Alternative
- Eagle Shadow Mountain Solar Project Area
- 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
- Existing Access Road



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

Eagle Shadow Mountain Solar Project

Figure 2
ESM Solar Project Components

Map Extent: Clark County, Nevada

Date: 03-20-19	Author: mc
G:\ESM\MXD's\Project Location_032019.mxd	

APPENDIX A
NEVADA DESIGNATED NOXIOUS WEED SPECIES

TABLE A-1		
DESIGNATED NOXIOUS AND INVASIVE WEED SPECIES OF THE STATE OF NEVADA		
Common Name	Scientific Name	Category¹
African rue	<i>Peganum harmala</i>	A
Austrian fieldcress	<i>Rorippa austriaca</i>	A
Swainsonpea	<i>Sphaerophysa salsula</i>	A
Black henbane	<i>Hyoscyamus niger</i>	A
Camelthorn	<i>Alhagi maurorum</i>	A
Common crupina	<i>Crupina vulgaris</i>	A
Dalmatian toadflax	<i>Linaria dalmatica</i>	A
Dyer's woad	<i>Isatis tinctoria</i>	A
Eurasian water-milfoil	<i>Myriophyllum spicatum</i>	A
Giant reed	<i>Arundo donax</i>	A
Giant salvinia	<i>Salvinia molesta</i>	A
Goatsrue	<i>Galega officinalis</i>	A
Crimson fountain grass	<i>Pennisetum setaceum</i>	A
Houndstongue	<i>Cynoglossum officinale</i>	A
Hydrilla	<i>Hydrilla verticillata</i>	A
Iberian starthistle	<i>Centaurea iberica</i>	A
Common St. Johnswort	<i>Hypericum perforatum</i>	A
Malta starthistle	<i>Centaurea melitensis</i>	A
Mayweed chamomile	<i>Anthemis cotula</i>	A
Mediterranean sage	<i>Salvia aethiopsis</i>	A
Purple loosestrife	<i>Lythrum salicaria, L. virgatum & cultivars</i>	A
Purple starthistle	<i>Centaurea calcitrapa</i>	A
Rush skeletonweed	<i>Chondrilla juncea</i>	A
Sow thistle	<i>Sonchus arvensis</i>	A
Spotted knapweed	<i>Centaurea maculosa</i>	A
Squarrose knapweed	<i>Centaurea virgata</i>	A
Sulfur cinquefoil	<i>Potentilla recta</i>	A
Syrian bean caper	<i>Zygophyllum fabago</i>	A
Yellow starthistle	<i>Centaurea solstitialis</i>	A
Yellow toadflax	<i>Linaria vulgaris</i>	A
Horsenettle	<i>Solanum carolinense</i>	B
Diffuse knapweed	<i>Centaurea diffusa</i>	B
Leafy spurge	<i>Euphorbia esula</i>	B

TABLE A-1 DESIGNATED NOXIOUS AND INVASIVE WEED SPECIES OF THE STATE OF NEVADA		
Common Name	Scientific Name	Category ¹
Medusahead	<i>Taeniatherum caput-medusae</i>	B
Musk thistle	<i>Carduus nutans</i>	B
Russian knapweed	<i>Acroptilon repens</i>	B
African mustard	<i>Brassica tournefortii</i>	B
Scotch thistle	<i>Onopordum acanthium</i>	B
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>	B
Canada thistle	<i>Cirsium arvense</i>	C
Hoary cress	<i>Cardaria draba</i>	C
Johnsongrass	<i>Sorghum halepense</i>	C
Perennial pepperweed	<i>Lepidium latifolium</i>	C
Poison-hemlock	<i>Conium maculatum</i>	C
Puncture vine	<i>Tribulus terrestris</i>	C
Salt cedar (tamarisk)	<i>Tamarix</i> spp.	C
Spotted water hemlock	<i>Cicuta maculata</i>	C

¹ A: Weeds not found or limited in distribution throughout the state; actively excluded from the state and actively eradicated where found; control required by the state in all infestations.

B: Weeds established in scattered populations in some counties of the state; actively excluded where possible; control required by the state in areas where populations are not well established or previously unknown to occur.

C: Weeds currently established and generally widespread in many counties of the state; abatement at the discretion of the State Quarantine Officer.

APPENDIX B
ADJUVANT AND HERBICIDE FORMULAS APPROVED BY THE BLM

Adjuvants Approved for Use on BLM Administered Lands

Update: April 4, 2019

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Surfactant				
	Non-ionic Surfactant			
	90-10 Surfactant		Brewer International	
	A-90		Alligare, LLC	
	Alligare 90		Alligare, LLC	
	Activate Plus		WinField United (Winfield Solutions, LLC)	CA Reg. No. 9779-50004-AA WA Reg. No. 1381-09001
	Activator 90		Loveland Products, Inc.	CA Reg. No. 34704-50034-AA
	Ad Spray 90		Helena Agri-Enterprises, LLC (Helena Chemical Company)	WA Reg. No. 5905-70020
	Alligare Surface		Alligare, LLC	
	Alligare Surface West		Alligare, LLC	CA Reg. No. 81927-50007-AA WA Reg. No. 81927-15004
	Alligare Trace		Alligare, LLC	
	Aquifact		Aqumix, Inc.	
	Audible 80		Exacto, Inc.	
	Audible 90		Exacto, Inc.	
	Brewer 90-10		Brewer International	
	Chempro S-820		Chemorse Ltd.	WA Reg. No. 46059-15001
	Chempro S-910		Chemorse Ltd.	WA Reg. No. 46059-14001
	Chemsurf 80		Chemorse Ltd.	CA Reg. No. 1050984-50004-AA WA Reg. No. 46059-10002
	Chemsurf 90		Chemorse Ltd.	CA Reg. No. 1050984-50005-AA WA Reg. No. 46059-10003
	Combelt Premier 90		Van Diest Supply Co.	
	Combelt Trophy Gold		Van Diest Supply Co.	
	Denali-EA		Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50204-AA WA Reg. No. 2935-15006
	Elite Platinum		Red River Specialties, Inc.	
	Elite Premium		Red River Specialties, Inc.	
	EP-90		Eco-Pak, LLC	
	Haf-Pynt		Drexel Chemical Company	CA Reg. No. 19713-50007-AA WA Reg. No. 19713-14001
	Hum-AC 820		Drexel Chemical Company	WA Reg. No. 19713-09001
	Induce		Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50091-AA
	Induce pH		Helena Agri-Enterprises, LLC (Helena Chemical Company)	
	Inlet		Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50099-AA
	LI-700		Loveland Products, Inc.	CA Reg. No. 34704-50035
	Magnify		Monterey AgResources	CA Reg. No. 17545-50018
	NIS 90:10		Precision Laboratories, LLC	CA Reg. No. 9349-50002-AA WA Reg. No. 9349-13001
	NIS-EA		Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
	No Foam A		Creative Marketing & Research, Inc.	CA Reg. No. 1050775-50015
	Optima		Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50075-AA
	PAS-800		Drexel Chemical Company	
	Preference		WinField United (Winfield Solutions, LLC)	WA Reg. No. 1381-50011
	R-900		Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
	Rainer-EA		Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Surfactant	Non-ionic Surfactant - cont.			
		Range Master	ORO Agri Inc.	WA Reg. No. 72662-19001
		Red River 90	Red River Specialties, Inc.	
		Red River NIS	Red River Specialties, Inc.	
		Scanner	Loveland Products, Inc.	CA Reg. No. 34704-50064
				WA Reg. No. 34704-09003
		Spec 90/10	Helena Agri-Enterprises, LLC (Helena Chemical Company)	
		Spray Activator 85	Van Diest Supply Co.	
		Spreader 90	Loveland Products, Inc.	WA Reg. No. 34704-05002-AA
		Spret	Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50098-AA
		Super Spread 90	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	WA Reg. No. AW-2935-70016
		Super Spread 7000	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50170
				WA Reg. No. AW-2935-0002
		Surf-Ac 820	Drexel Chemical Company	WA Reg. No. 19713-70002
		Surf-Ac 910	Drexel Chemical Company	WA Reg. No. 19713-70003
		UAP Surfactant 80/20	Loveland Products, Inc.	
		Wetcit	ORO Agri Inc.	CA Reg. No. 72662-50001-AA
				WA Reg. No. 72662-05001
		X-77	Loveland Products, Inc.	CA Reg. No. 34704-50044
	Spreader/Sticker			
		Agri-Trend Spreader	Agri-Trend	
		Antero-EA	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50206
				WA Reg. No. 2935-18001
		Aqua-King Plus	WinField United (Winfield Solutions, LLC)	
		Attach	Loveland Products, Inc.	CA Reg. No. 34704-50026
		Bond	Loveland Products, Inc.	CA Reg. No. 36208-50005
		Bond Max	Loveland Products, Inc.	CA Reg. No. 34704-50060
				WA Reg. No. 34704-08003
		Chempro S-196	Chemorse Ltd.	CA Reg. No. 1050984-50006-AA
				WA Reg. No. 46059-11001
		Cohere	Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50083-A
		CWC 90	CWC Chemical, Inc.	
		Gulfstream	WinField United (Winfield Solutions, LLC)	
		Insist 90	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Insist 90 Plus	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	WA Reg. No. 2935-17001
		Lastick	Helena Agri-Enterprises, LLC (Helena Chemical Company)	
		Nu Film 17	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50021-AA
		Nu-Film-IR	Miller Chem. & Fert. Corp.	
		Nu Film P	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50022-AA
		Onside Kick	Exacto, Inc.	
		Pinene II	Drexel Chemical Company	CA Reg. No. 19713-50003-AA
				WA Reg. No. 19713-00001
		Protyx	Precision Laboratories, LLC	WA Reg. No. 9349-13002
		R-56	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50144
		Rocket DL	Monterey AgResources	CA Reg. No. 17545-50019
		Tactic	Loveland Products, Inc.	CA Reg. No. 34704-50041-AA
		TopFilm	Biosorb, Inc.	
		Widespread Max	Loveland Products, Inc.	CA Reg. No. 34704-50061
				WA Reg. No. 34704-09001

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
	Silicone-based			
		Aero Dyne-Amic	Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50080-AA
		Aircover	WinField United (Winfield Solutions, LLC)	
		Alligare OSS/NIS	Alligare, LLC	
		Chempro S-172	Chemorse Ltd.	CA Reg. No. 1050984-50008-AA
				WA Reg. No. 46059-15002
		Dyne-Amic	Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5095-50071-AA
		Elite Marvel	Red River Specialties, Inc.	
		Freeway	Loveland Products, Inc.	CA Reg. No. 34704-50031
				WA Reg. No. 34704-04005
		Kinetic	Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50087-AA
		Phase	Loveland Products, Inc.	CA Reg. No. 34704-50037-AA
		Phase II	Loveland Products, Inc.	
		Scrimmage	Exacto, Inc.	
		SilEnergy	Brewer International	
		Sil-Fact	Drexel Chemical Company	CA Reg. No. 19713-50004-AA
		Sil-MES 100	Drexel Chemical Company	
		Silnet 200	Brewer International	
		Silwet L-77	Loveland Products, Inc.	CA Reg. No. 34704-50043
		Speed	Precision Laboratories, LLC	
		Sun Spreader	Red River Specialties, Inc.	
		Syl-coat	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50189
				WA Reg. No. 2935-12002
		Sylgard 309	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50161
		Syl-Tac	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50167
		Syl-Tac-EA	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50203
				WA Reg. No. 2935-15004
		Thoroughbred	WinField United (Winfield Solutions, LLC)	
Oil-based				
	Crop Oil Concentrate			
		60/40 Crop Oil Concentrate	Chemorse Ltd.	WA Reg. No. 46059-15004
		Agri-Dex	Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50094-AA
		Alligare Forestry Oil	Alligare, LLC	
		Brewer 83-17	Brewer International	
		Combelt Crop Oil Concentrate	Van Diest Supply Co.	
		Combelt Premium Crop Oil Concentrate	Van Diest Supply Co.	
		Crop Oil Concentrate	Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50085-AA
		Crop Oil Concentrate	Loveland Products, Inc.	
		CWR Herbicide Activator	Creative Marketing & Research, Inc.	CA Reg. No. 1050775-50020-AA
		Exchange	Precision Laboratories, LLC	WA Reg. No. 9349-13008
		Herbimax	Loveland Products, Inc.	CA Reg. No. 34704-50032-AA
				WA Reg. No. 34704-04006
		Maximizer Crop Oil Conc.	Loveland Products, Inc.	CA Reg. No. 34704-50059
				WA Reg. No. 34704-08002
		Monterey Crop Oil	Monterey AgResources	CA Reg. No. 17545-50031
		Mor-Act	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50098
		Peptoil	Drexel Chemical Company	WA Reg. No. 19713-70001
		Power-Line Crop Oil	Land View Inc.	
		Primary	Drexel Chemical Company	
		Prime Oil	WinField United (Winfield Solutions, LLC)	CA Reg. No. 979-50002-AA
				WA Reg. No. 1381-13004
		R.O.C. Rigo Oil Conc.	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Oil-based	Crop Oil Concentrate - cont.			
		Red River Forestry Oil	Red River Specialties, Inc.	
		Red River Pacer Crop Oil	Red River Specialties, Inc.	
		Superb HC	WinField United (Winfield Solutions, LLC)	WA Reg. No. 1381-06003
	Methylated Seed Oil			
		60/40 MSO	Chemorse Ltd.	WA Reg. No. 46059-15003
		Alligare MSO	Alligare, LLC	
		Alligare MSO West	Alligare, LLC	WA Reg. No. 81927-15002
		Atmos	WinField United (Winfield Solutions, LLC)	
		Conquer	Chemorse Ltd.	CA Reg. No. 1050984-50002-AA
				WA Reg. No. 46059-10001
		Combelt Base	Van Diest Supply Co.	
		Combelt Methylates Soy-Stik	Van Diest Supply Co.	
		Destiny HC	WinField United (Winfield Solutions, LLC)	WA Reg. No. 1381-09002
		Elite Supreme	Red River Specialties, Inc.	
		Glacier-EA	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50205
				WA Re. No. 2935-16001
		Hasten	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50160
				WA Reg. No. 2935-02004
		Hasten-EA	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50202
				WA Reg. No. 2935-15003
		Hot MES	Drexel Chemical Company	
		Inergy	WinField United (Winfield Solutions, LLC)	
		Kixyt	Precision Laboratories, LLC	WA Reg. No. 9349-12001
		MES-100	Drexel Chemical Company	CA Reg. No. 19713-50002-AA
				WA Reg. No. 19713-50002
		Methylated Spray Oil Conc.	Helena Agri-Enterprises, LLC (Helena Chemical Company)	
		Monterey M.S.O.	Monterey AgResources	CA Reg. No. 17545-50025
		MSO Concentrate (Alligare)	Alligare, LLC	
		MSO Concentrate (Loveland)	Loveland Products, Inc.	CA Reg. No. 34704-50067
				WA Reg. No. 34709-04009
		Persist Ultra	Precision Laboratories, LLC	CA Reg. No. 9349-50005
				WA Reg. No. 9349-13003
		Premium MSO	Helena Agri-Enterprises, LLC (Helena Chemical Company)	
		Red River Supreme	Red River Specialties, Inc.	
		Renegade 2.0	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50194
				WA Reg. No. 2935-13001
		Renegade-EA	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50201
				WA Reg. No. 2935-15002
		Sunburn	Red River Specialties, Inc.	
		SunEnergy	Brewer International	
		Sunset	Red River Specialties, Inc.	
		Sun Wet	Brewer International	
		Super Kix	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Super Spread MSO	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
	Methylated Seed Oil + Organosilicone			
		Alligare MVO Plus	Alligare, LLC	
		Turbulence	WinField United (Winfield Solutions, LLC)	

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Oil-based	Vegetable Oil			
		Amigo	Loveland Products, Inc.	CA Reg. No. 34704-50028-AA
				WA Reg. No. 34704-04002
		BeanOil	Drexel Chemical Company	
		Competitor	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50173
				WA Reg. No. AW-2935-04001
		Elite Natural	Red River Specialties, Inc.	
		Motion	Exacto, Inc.	
		Noble	WinField United (Winfield Solutions, LLC)	
		Vegetoil	Drexel Chemical Company	
Fertilizer-based				
	Nitrogen-based			
		Actamaster Soluble Spray Adjuvant	Loveland Products, Inc.	WA Reg. No. 34704-50001
		Actamaster Spray Adjuvant	Loveland Products, Inc.	WA Reg. No. 34704-50006
		Alliance	WinField United (Winfield Solutions, LLC)	CA Reg. No. 1381-50002-AA
				WA Reg. No.1381-05005
		AMS-All	Drexel Chemical Company	
		AMS-Supreme	Drexel Chemical Company	
		AMS-Xtra	Drexel Chemical Company	
		Bronc	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Bronc Max	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Bronc Max EDT	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Bronc Plus Dry	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Bronc Plus Dry EDT	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	WA Reg. No.2935-03002
		Bronc Total	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Cayuse Plus	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50171
		Class Act NG	WinField United (Winfield Solutions, LLC)	WA Reg. No. 1381-01004
		Combelt Gardian	Van Diest Supply Co.	
		Combelt Gardian Plus	Van Diest Supply Co.	
		Corral AMS Liquid	WinField United (Winfield Solutions, LLC)	WA Reg. No. 1381-01006
		Dispatch	Loveland Products, Inc.	
		Dispatch 111	Loveland Products, Inc.	
		Dispatch 2N	Loveland Products, Inc.	
		Dispatch AMS	Loveland Products, Inc.	
		Flame	Loveland Products, Inc.	
		Holzit	Drexel Chemical Company	
		Nitro-Surf	Drexel Chemical Company	
		Quest	Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50076-AA
		TransActive HC	Helena Agri-Enterprises, LLC (Helena Chemical Company)	
Special Function				
	Buffering Agent			
		Brimstone	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		BS-500	Drexel Chemical Company	
		Buffers P.S.	Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50062-ZA
		Oblique	Red River Specialties, Inc.	
		Spray-Aide	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50006-AA
		Tri-Fol	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50152
		Yardage	Exacto, Inc.	

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Special Function				
	Colorants/Dyes			
		Alligare Super Marking Dye	Alligare, LLC	
		BullsEye	Milliken Chemical	
		Elite Ruby	Red River Specialties, Inc.	
		Elite Sapphire	Red River Specialties, Inc.	
		Elite Sapphire WSB	Red River Specialties, Inc.	
		Elite Splendor	Red River Specialties, Inc.	
		Hash Mark Blue Liquid	Exacto, Inc.	
		Hash Mark Blue Liquid HC	Exacto, Inc.	
		Hash Mark Blue Powder	Exacto, Inc.	
		Hash Mark Green Liquid	Exacto, Inc.	
		Hash Mark Green Powder	Exacto, Inc.	
		Hi-Light	Becker-Underwood	
		Hi-Light WSP	Becker-Underwood	
		Marker Dye	Loveland Products, Inc.	
		Mark-It Blue	Monterey AgResources	
		Mark-It Red	Monterey AgResources	
		Mystic HC	WinField United (Winfield Solutions, LLC)	
		Signal	Precision Laboratories, LLC	
		SPI-Max Blue Spray Marker	PROKoZ	
		Spray Indicator XL	Helena Agri-Enterprises, LLC (Helena Chemical Company)	
		TurfTrax	Loveland Products, Inc.	
		TurfTrax Blue Spray Indicator	Loveland Products, Inc.	
	Compatibility/Suspension Agent			
		Convert	Precision Laboratories, LLC	WA Reg. No. 9349-13007
		E Z MIX	Loveland Products, Inc.	CA Reg. No. 36208-50006
		Mix	Drexel Chemical Company	
		Support	Loveland Products, Inc.	WA Reg. No. 34704-04011
	Defoaming Agent			
		Alligare Anti-Foamer	Alligare, LLC	
		Alligare Defoamer	Alligare, LLC	
		Combelt Defoamer	Van Diest Supply Co.	
		Defoamer	Brewer International	
		Fighter-F 10	Loveland Products, Inc.	
		Fighter-F Dry	Loveland Products, Inc.	
		Foam Buster	Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50072-AA
		Foambuster Max	Helena Agri-Enterprises, LLC (Helena Chemical Company)	
		Foam Fighter	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50005-AA
		Fome-Kil	Drexel Chemical Company	
		FTF Defoamer	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	WA Reg. No. 2935-13002
		Gundown Max	Precision Laboratories, LLC	WA Reg. No. 9349-13013
		No Foam	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50136
		Red River Defoamer	Red River Specialties, Inc.	
		Reverse	Exacto, Inc.	
		Suppression	Chemorse Ltd.	CA Reg. No. 1050984-50007
				WA Reg. No. 46059-12001
		Tripleline	Creative Marketing & Research, Inc.	CA Reg. No. 1050775-50023-AA
		Unfoamer	Loveland Products, Inc.	CA Reg. No. 34704-50062

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Special Function				
	Deposition Aid			
		Agripharm Drift Control	Walco International	
		Alligare Downforce	Alligare, LLC	
		Alligare Pattern	Alligare, LLC	CA Reg. No. 81927-50008-AA
		Bivert	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50163
		Border AQ	Precision Laboratories, LLC	WA Reg. No. 9349-13009
		Chem-Trol	Chemorse Ltd.	CA Reg. No. 1050984-50001-AA
				WA Reg. No. 1050984-50001
		Clasp	Helena Agri-Enterprises, LLC (Helena Chemical Company)	WA Reg. No. 5905-13002
		Compadre	Loveland Products, Inc.	CA Reg. No. 34704-50050
				WA Reg. No. 34704-06004
		Coverage G-20	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Crosshair	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		CWC Sharpshooter	CWC Chemical, Inc.	
		Cygnnet Plus	Brewer International	CA Reg. No. 1051114-50001
		Diligence	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Direct	Precision Laboratories, LLC	
		Droplex	WinField United (Winfield Solutions, LLC)	
		EDT Concentrate	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Elite Secure Ultra	Red River Specialties, Inc.	
		Exit	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50014-AA
		Grounded	Helena Agri-Enterprises, LLC (Helena Chemical Company)	
		Grounded - CA	Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50096-AA
		Grounded - W	Helena Agri-Enterprises, LLC (Helena Chemical Company)	WA Reg. No. 5905-13001
		Infuse	Loveland Products, Inc.	
		Intac Plus	Loveland Products, Inc.	
		Interlock	WinField United (Winfield Solutions, LLC)	
		Liberate	Loveland Products, Inc.	CA Reg. No. 34704-50030-AA
				WA Reg. No. 34704-04008
		LOX	Drexel Chemical Company	
		LOX PLUS	Drexel Chemical Company	
		Mist-Control	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50011-AA
		Offside	Exacto, Inc.	
		Pointblank	Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 52467-50008-AA-5905
		Poly Control 2	Brewer International	
		Reign	Loveland Products, Inc.	CA Reg. No. 34704-50045
				WA Reg. No. 34704-05010
		Reign LC	Loveland Products, Inc.	CA Reg. No. 34704-50048
		Secure Ultra	Red River Specialties, Inc.	
		Strike Zone DF	Helena Agri-Enterprises, LLC (Helena Chemical Company)	CA Reg. No. 5905-50084-AA
		Sustain	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50015-AA
		Syndetic	Chemorse Ltd.	CA Reg. No. 1050984-50003-ZA
		Volare DC	Precision Laboratories, LLC	CA Reg. No. 9349-50004-AA
				WA Reg. No. 9349-13006
		Weather Gard	Loveland Products, Inc.	CA Reg. No. 34704-50042-AA
	Diluent/Deposition Agent			
		Bark Oil	Crop Production Services	
		Bark Oil EC	Crop Production Services	
		Elite Premier	Red River Specialties, Inc.	
		Elite Premier Blue	Red River Specialties, Inc.	
		Hy-Grade EC	CWC Chemical, Inc.	

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Special Function				
	Diluent/Deposition Agent - cont.			
		Hy-Grade I	CWC Chemical, Inc.	
		Improved JLB Oil Plus	Brewer International	
		In-Place	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50169
		JLB Oil Plus	Brewer International	
		Red River Basal Oil	Red River Specialties, Inc.	
		Thinvert Concentrate	Waldrum Specialties, Inc.	
		Thinvert RTU	Waldrum Specialties, Inc.	
		W.E.B. Oil	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50166
				WA Reg. No. AW 2935-70023
	Foam Marker			
		Align	Helena Agri-Enterprises, LLC (Helena Chemical Company)	
		F.M.-160	Drexel Chemical Company	
		R-160	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Red River Foam Marker	Red River Specialties, Inc.	
		Trekker Trax	Loveland Products, Inc.	
		Tuff Trax Foam Concentrate	Loveland Products, Inc.	
	Invert Emulsion Agent			
		Redi-vert II	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50168
	Tank Cleaner			
		All Clear	Loveland Products, Inc.	
		Back Field	Exacto, Inc.	
		Combelt Tank-Aid	Van Diest Supply Co.	
		Elite Vigor	Red River Specialties, Inc.	
		Kutter	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Neutral-Clean	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Pro Tank	WinField United (Winfield Solutions, LLC)	
		Red River Tank Cleaner	Red River Specialties, Inc.	
		SSC-11	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Tank and Equipment Cleaner	Loveland Products, Inc.	
		Wipe Out	Helena Agri-Enterprises, LLC (Helena Chemical Company)	
	Water Conditioning			
		AccuQuest WM	Helena Agri-Enterprises, LLC (Helena Chemical Company)	
		Alligare Water Conditioner	Alligare, LLC	
		Blendmaster	Loveland Products, Inc.	
		Breeze	WinField United (Winfield Solutions, LLC)	WA Reg. No. 1381-13007
		Choice	Loveland Products, Inc.	CA Reg. No. 34704-50027-AA
				WA Reg. No. 34704-04004
		Choice Weather Master	Loveland Products, Inc.	CA Reg. No. 34704-50038-AA
				WA Reg. No. 34704-05005
		Choice Xtra	Loveland Products, Inc.	
		Climb	Wilbur-Ellis Co.	CA Reg. No. 2935-50181
				WA Reg. No. 2935-09001
		Completion	Exacto, Inc.	
		Combelt N-Tense	Van Diest Supply Co.	
		Cut-Rate	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	
		Cynder	Wilbur-Ellis Co. LLC (Wilbur-Ellis Co.)	CA Reg. No. 2935-50211

APPENDIX C
EXAMPLE OF BLM PESTICIDE USE PROPOSAL SUBMITTAL FORM

UNITED STATE DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
PESTICIDE USE PROPOSAL

STATE: _____
COUNTY: _____
DISTRICT: _____
DURATION OF PROPOSAL: _____
LOCATION: _____

DATE: _____
PROPOSAL NUMBER: _____
EA REFERENCE NUMBER: _____
DECISION RECORD (DR) NUMBER: _____

ORIGINATOR – NAME: _____
ORIGINATOR – COMPANY: _____
ORIGINATOR – CONTACT INFORMATION: _____
PROPOSAL PREPARER - NAME: _____
PROPOSAL PREPARER – COMPANY: _____
PROPOSAL PREPARER – CONTACT INFORMATION: _____

.....

I. APPLICATION INFORMATION – Including mixtures and adjuvants):

1. TRADE NAME(S): _____
2. COMMON NAME(S) _____
3. EPA REGISTRATION NUMBER(S): _____
4. MANUFACTURER(S): _____
5. METHOD OF APPLICATION: _____
6. MAXIMUM RATE OF APPLICATION – AS STATED IN THE EIS:
 - a. Pounds Active Ingredient or Acid Equivalent: _____
7. MAXIMUM RATE OF APPLICATION – AS STATED ON THE LABEL:
 - a. Formulated Product: _____
 - b. Pounds Active Ingredient or Acid Equivalent: _____
8. INTENDED RATE OF APPLICATION:
 - a. Formulated Product: _____
 - b. Pounds Active Ingredient or Acid Equivalent: _____
9. APPLICATION DATE(S): _____
10. NUMBER OF APPLICATIONS: _____

II. PEST [List specific pest(s) and reason(s) for the proposed application of the pesticide]:

III. DESIRED RESULTS OF THE APPLICATION – LINKED TO THE OBJECTIVES OF THE APPLICATION:

V. SENSITIVE ASPECTS AND PRECAUTIONS – (CONTINUED): (Describe sensitive areas – marsh, endangered, threatened, candidate, and sensitive species habitat – and distance to application site. List measures to be taken to avoid impact to these areas):

VI. NON-TARGET VEGETATION (Describe potential immediate and cumulative impacts to non-target pests in project area as a result of the pesticide application. Identify any planned mitigation measures that will be employed – BE GENERAL, SPECIFICS DISCUSSED IN THE EA):

VII. INTEGRATED PEST MANAGEMENT PRACTICES CONSIDERED IN THE OVERALL PROJECT :



VIII. SIGNATURES:

1. Pesticide Use Proposal’s Originator: _____ Date: _____
 - a. Company: _____
2. Certified Pesticide Applicator: _____ Date: _____
 - a. License Number: _____
 - b. Certifying Organization: _____
3. Field Office Pesticide/Noxious Weed Coordinator: _____ Date: _____
4. Field Office Manager _____ Date: _____
5. BLM State Pesticide Coordinator: _____ Date: _____
6. Deputy State Director: _____ Date: _____
 - Concur or Approved
 - Not Concur or Disapproved
 - Concur or Approved With Modifications
 - o Any changes (modifications) to this proposal by the State Pesticide Coordinator will be listed in an attached memo to the manager requesting approval from the Deputy State Director.

APPENDIX D
EXAMPLE OF A BLM PESTICIDE APPLICATION RECORD
FORM

U.S. Department of Interior

Bureau of Land Management

PESTICIDE USE PROPOSAL

State

County

District or Field Office

Location

(Attach maps or submit GIS Spatial Data)

Originator Name

Originator Company or Organization

Originator Contact Information

Estimated Number of Acres

General Description of Treatment Site

Proposal Number *(completed by the BLM)*

EA Reference Number

Project Name

Duration of Proposal

Date

Proposal Preparer Name

Proposal Preparer Organization

Proposal Preparer Contact Information

Desired Results of Treatment

Non-Target Impacts and Planned Mitigation

Integrated Pest Management Practices Considered

Sensitive Aspects and Precautions (Completed by the BLM)

Are there any Special Status Species in the proposed treatment area?

Yes No

If No, proceed to Site Description section

If Yes, are the Special Status Species considered threatened, endangered and proposed for listing?

Yes No

If No, proceed to Site Description section

If Yes, did your Field Office coordinate with the appropriate U.S Fish and Wildlife or National Marine Fisheries office?

Yes No

If No, proceed to Site Description section and explain

If Yes, was ESA Section 7 consultation completed?

Yes No

If No, proceed to Site Description section and explain

If yes, select extent of consultation and describe the outcome in the Site Description section

Site Description - Sensitive Aspects and Precautions (Completed by the BLM)

Provide appropriate explanations regarding the Special Status Species questions above. Also, identify and describe any BLM Special Status Species.

Signatures

Originator	<input type="text"/>	Date	<input type="text"/>
Field Office Coordinator	<input type="text"/>	Date	<input type="text"/>
Field Office Manager	<input type="text"/>	Date	<input type="text"/>
State Office Coordinator	<input type="text"/>	Date	<input type="text"/>
Deputy State Director	<input type="text"/>	Date	<input type="text"/>

Approved

Disapproved

Comments

Title 18 U.S.C Section 1001 and Title 43 U.S.C Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

APPENDIX E
WEED STIPULATIONS FOR CONSTRUCTION PROJECTS ON
BLM LAND

Weed Stipulations:

1. The Project proponent will limit the size of any vegetation and/or ground disturbance to the absolute minimum necessary to perform the activity safely as designed. The project proponent will avoid creating soil conditions that promote weed germination and establishment.
2. At the onset of Project planning in the NEPA analysis phase, the Project proponent, Project lead or the LVFO noxious weed coordinator will complete the Risk Assessment Form for Noxious/Invasive Weeds. This will provide information about the methods of weed treatments and weed prevention schedules for the management of noxious weeds within the Project footprint. This will identify the level of noxious weed management necessary for stipulation 3 below.
3. The Project proponent will coordinate Project activities with the BLM Weed Coordinator (702-515-5295) regarding any proposed herbicide treatment. If herbicide treatment is needed, the Project proponent will prepare, submit, obtain and maintain a PUP for the proposed action. Weed treatments may include the use of herbicides, and only those herbicides approved for use on public lands by the BLM.
4. Before ground-disturbing activities begin, the Project proponent will review the weed risk assessment and prepare an Integrated Weed Management Plan that will inventory and prioritize weed infestations for treatment within the Project footprint. Should the weeds spread beyond the Project footprint as a result of Project activity, these weeds will be treated as a part of the Project. This will include access routes.
5. The Project proponent will begin Project operations in weed-free areas whenever feasible before operating in weed-infested areas.
6. The Project proponent will locate pits and staging areas for the use of equipment storage, machine and vehicle parking or any other area needed for the temporary placement of people, machinery and supplies. These staging areas will be selected from locations that are relatively weed-free. The Project proponent will avoid or minimize all types of travel through weed-infested areas or restrict major activities to periods of time when the spread of seed or plant parts are least likely.
7. Project workers need to inspect, remove, and dispose of weed seed and plant parts found on their clothing and equipment. Disposal methods vary depending on the project.
8. The Project proponent will evaluate options, including area closures, to regulate the flow of traffic on sites where native vegetation needs to be established.
9. A noxious weed inventory will be performed for the Project footprint prior to any ground disturbing activities. The results of this initial inventory will be

incorporated into the Integrated Weed Management Plan. The type of survey needed will depend on the size of the Project foot- print.

10. The Project proponent shall be responsible for controlling all undesirable invading plant species (including listed noxious weeds and other invasive plants including as undesirable by federal, state or local authorities) within the boundaries of their authorization area and Bureau authorized ancillary facilities (e.g. access and utility corridors), including all operating and reclaimed areas, until revegetation activities have been deemed successful and responsibility released by the authorized officer. Control standards and measures proposed must conform to applicable state and federal regulations.
11. The Project proponent shall use weed-free seed for reclamation. Other organic products procured for erosion control, stabilization, or revegetation (e.g. straw bales, organic mulch) must be certified weed-free.
12. The Project proponent is responsible for ensuring that all Project related vehicles and equipment arriving at the site (including, but not limited to, drill rigs, dozers, support vehicles, pickups and passenger vehicles, including those of the operator, any contractor or subcontractor and invited visitors) do not transport noxious weeds onto the Project site. The Project proponent shall ensure that all such vehicles and equipment that will be traveling off constructed and maintained roads or parking areas within the Project area have been power-washed, including the undercarriage, since their last off-road use and prior to off-road use on the Project. When beginning off road use on the Project, such vehicles and equipment shall not harbor soil, mud or plant parts from another locale. Vehicles that have traveled in an off-road area known to have a significant weed population will have excessive dirt and debris knocked off that could harbor plant material or seeds from weeds. Seeds and plant parts will be collected, bagged and deposited in landfills through the waste disposal system when practical.
13. Should undesirable invasive plants become established on developed Project areas prior to reclamation reshaping; appropriate measures will be taken to ensure that invasive plants are eradicated prior to reclamation earthwork. Should undesirable invasive plants become established on reshaped areas prior to reclamation seeding; appropriate measures will be taken to ensure that invasive plants are eradicated prior to seeding the Project site.

Weed Survey Report

Eagle Shadow Mountain Solar Project

Noxious Weed Survey

Prepared By:

Heritage Environmental Consultants

April 2019

Introduction

This report describes the methods, results, and recommendations for a noxious weed survey for the proposed and alternative gen-tie routes for the Eagle Shadow Mountain Solar Project.

Methods

The Nevada state list of noxious weed species (Nevada Administrative Code 555.010) (**Attachment A**) as well as maps and GIS data files for the project were reviewed prior to the survey. The survey area was defined as the rights-of-way (ROWs) for the proposed and alternative gen-ties (**Figures 1a** and **1b**, **Attachment B**).

The survey was conducted on 17 and 18 April, 2019. Weather conditions during the survey were typical for the season, with midday temperatures in the 60° to 80°F range, sunny skies, light to moderate winds, and no precipitation (although it appeared there was precipitation the day prior to the survey). A qualified botanist conducted an intuitively controlled survey (BLM 2009) throughout the survey area. The botanist, using GPS as a guide, meandered within the ROW, making observations of typical plant species, any non-native species, and any state-listed noxious weed species (**Attachment C**). As necessary, GPS data, photographs (**Attachment D**), and field notes were taken to document observations. Taxonomy in this memo conforms to that in *The Jepson Manual* (Baldwin et. al. 2012).

Results

Vegetation in the survey area falls within the creosote bush (*Larrea tridentata*)-white bursage (*Ambrosia dumosa*) series, with varying dominance of these two species. Larger washes have higher diversity, with the appearance of species such as catclaw (*Senegalia greggii*) and big galleta (*Hilaria rigida*). Disturbance caused by vehicle traffic is common along the existing transmission and distribution lines, as well as along existing roads. Despite nearby disturbance areas, most of the proposed and alternative ROWs are undisturbed, containing intact biological soil crusts and desert pavement in some areas. The following sections discuss specific observations of noxious weeds, other non-native species, and incidental observations.

Noxious Weeds

The only species of noxious weed on the Nevada state list that was observed in the survey area was Sahara mustard (*Brassica tournefortii*) (**Photos 1** and **2**, **Attachment D**). **Table 1** lists the estimated size and number of plants for each occurrence of this species, as well as any relevant notes. The locations of these occurrences are shown on **Figures 1a** and **1b** (**Attachment B**). The documented size, location, and number of plants at each observed occurrence are estimates based on visual observations of the area and not on a detailed census or GPS mapping.

While not abundant in the survey area, Sahara mustard is present across the area in a general sense, in both disturbed and undisturbed habitats. This species was also observed anecdotally along nearby roads and transmission line ROWs. While perhaps more common in disturbed habitats and in areas of finer soil such as along washes, this species does not appear to be confined to these habitats. Some occurrences are located in undisturbed, upland locations with coarser soils.

Table 1 Occurrences of Sahara mustard (*Brassica tournefortii*)

Occurrence #	Plants (number, estimated)	Size (acres, estimated)	Notes
1	500	4.2	Contiguous with, but more dense than, Occ. #2. Continues to south in adjacent transmission line ROW.
2	50	3.6	Contiguous with, but less dense than, Occ. #1. Continues to south in adjacent transmission line ROW.
3	100	2.7	In large wash and on adjacent bench.
4	200	2.9	In wash complex.
5	30	1.8	In wash and slopes on side of wash, not adjacent uplands.
6	10	0.1	Small area
7	20	0.3	
8	10	0.3	On bench above wash
9	20	0.8	
10	20	0.1	
11	10	0.1	Near road along distribution line.
12	80	0.7	On finer soil of wash
13	10	0.1	Small area
14	15	0.1	
15	40	1.8	
16	200	6.2	Many in wash, some on adjacent disturbed uplands around railroad tracks, transmission line, roads.
Total	1,305	26.0	

Other Non-Native Species

Seven of the eight non-native plant species observed in the survey area are not designated as noxious weeds by the State of Nevada. None of these species were mapped because they were not the focus of this survey and because their control is not required by Nevada Revised Statute 555.150. Of the other non-native species observed (**Attachment C**), African mustard (*Strigosella africana*) (**Photos 3 and 4, Attachment D**) was by far the most abundant, and was one of the dominant plant species in the survey area. African mustard was observed in both disturbed and undisturbed habitats, under shrubs and out in the open, even colonizing intact desert pavement. Mediterranean grass (*Schismus* sp.) was common across the study area, especially under shrubs such as creosote bush. Red brome (*Bromus rubens*) was found scattered across the survey area, though generally not in dense stands, except along some washes and in disturbed areas. Cheatgrass (*Bromus tectorum*) was limited to wash margins and nearby north-facing slopes. Redstem filaree (*Erodium cicutarium*) was found scattered across the survey area, though generally not in dense stands, except in a few disturbed areas. As noted in **Table 2**, one occurrence of saltlover (*Halogeton glomeratus*) was observed (**Figure 1a**). Scattered individuals of hedge mustard (*Sisymbrium* sp.) were observed in disturbed areas.

Incidental Observations

Other than the occurrence of *Halogeton* mentioned above, the only incidental observation of note was an active red-tailed hawk nest on a small cliff above an unnamed wash (**Table 2**) (**Photos 5 and 6**,

Attachment D). The nest is located between the proposed and alternative ROWs (**Figure 1b**). On both occasions this area was passed during the survey, an adult red-tailed hawk left the nest, circled nearby, then returned once the surveyor had left the area.

Table 2 Incidental Observations

Observation	Notes
A	<i>Halogeton glomeratus</i> . About 200 plants in a disturbed rocky area.
B	Active red-tailed hawk nest, on cliff above wash.

Recommendations

Based on the results of this survey, the following recommendations were developed:

- Control of *Brassica tournefortii* could be attempted through a combination of pre-construction surveys and treatment in proposed disturbance areas, as well as post-construction monitoring and treatment in areas disturbed by the project. It should be noted that this species is present along adjacent ROWs and roads, as well as within nearby undisturbed habitats; therefore, effective long-term control may be difficult or impossible to achieve.
- Prior to entering the project area, all equipment would be cleaned of soils, seeds, vegetative matter, or other debris that could contain noxious weed seeds. Any vehicles working off-road in an area of known noxious weed infestation would be washed before leaving the area.
- Disturbance from construction should be minimized to avoid providing opportunities for other non-native species to increase.

References

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. The Jepson manual: vascular plants of California, second edition. University of California Press, Berkeley.

Bureau of Land Management. 2009. Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant Species. Retrieved on July 20, 2015 from <http://www.blm.gov/ca/dir/pdfs/2009/im/CAIM2009-026ATT1.pdf>.

Attachment A Nevada Noxious Weed List

NEVADA NOXIOUS WEED LIST BY CATEGORY

(NAC 555.010)

Category A Weeds:

Category A noxious weeds are weeds that are generally not found or that are limited in distribution throughout the State.

African rue	(<i>Peganum harmala</i>)
Austrian fieldcress	(<i>Rorippa austriaca</i>)
Swainsonpea	(<i>Sphaerophysa salsula</i>)
Black henbane	(<i>Hyoscyamus niger</i>)
Camelthorn	(<i>Alhagi maurorum</i>)
Common crupina	(<i>Crupina vulgaris</i>)
Dalmatian toadflax	(<i>Linaria dalmatica</i>)
Dyer's woad	(<i>Isatis tinctoria</i>)
Eurasian water-milfoil	(<i>Myriophyllum spicatum</i>)
Giant reed	(<i>Arundo donax</i>)
Giant salvinia	(<i>Salvinia molesta</i>)
Goatsrue	(<i>Galega officinalis</i>)
Crimson fountain grass	(<i>Pennisetum setaceum</i>)
Houndstongue	(<i>Cynoglossum officinale</i>)
Hydrilla	(<i>Hydrilla verticillata</i>)
Iberian starthistle	(<i>Centaurea iberica</i>)
Common St. Johnswort	(<i>Hypericum perforatum</i>)
Malta starthistle	(<i>Centaurea melitensis</i>)
Mayweed chamomile	(<i>Anthemis cotula</i>)
Mediterranean sage	(<i>Salvia aethiopis</i>)
Purple loosestrife	(<i>Lythrum salicaria, L. virgatum & cultivars</i>)
Purple starthistle	(<i>Centaurea calcitrapa</i>)
Rush skeletonweed	(<i>Chondrilla juncea</i>)
Sow thistle	(<i>Sonchus arvensis</i>)
Spotted knapweed	(<i>Centaurea maculosa</i>)
Squarrose knapweed	(<i>Centaurea virgata</i>)
Sulfur cinquefoil	(<i>Potentilla recta</i>)
Syrian bean caper	(<i>Zygophyllum fabago</i>)
Yellow starthistle	(<i>Centaurea solstitialis</i>)
Yellow toadflax	(<i>Linaria vulgaris</i>)

Category B Weeds:

Category B listed noxious weeds are weeds that are generally established in scattered populations in some counties of the State.

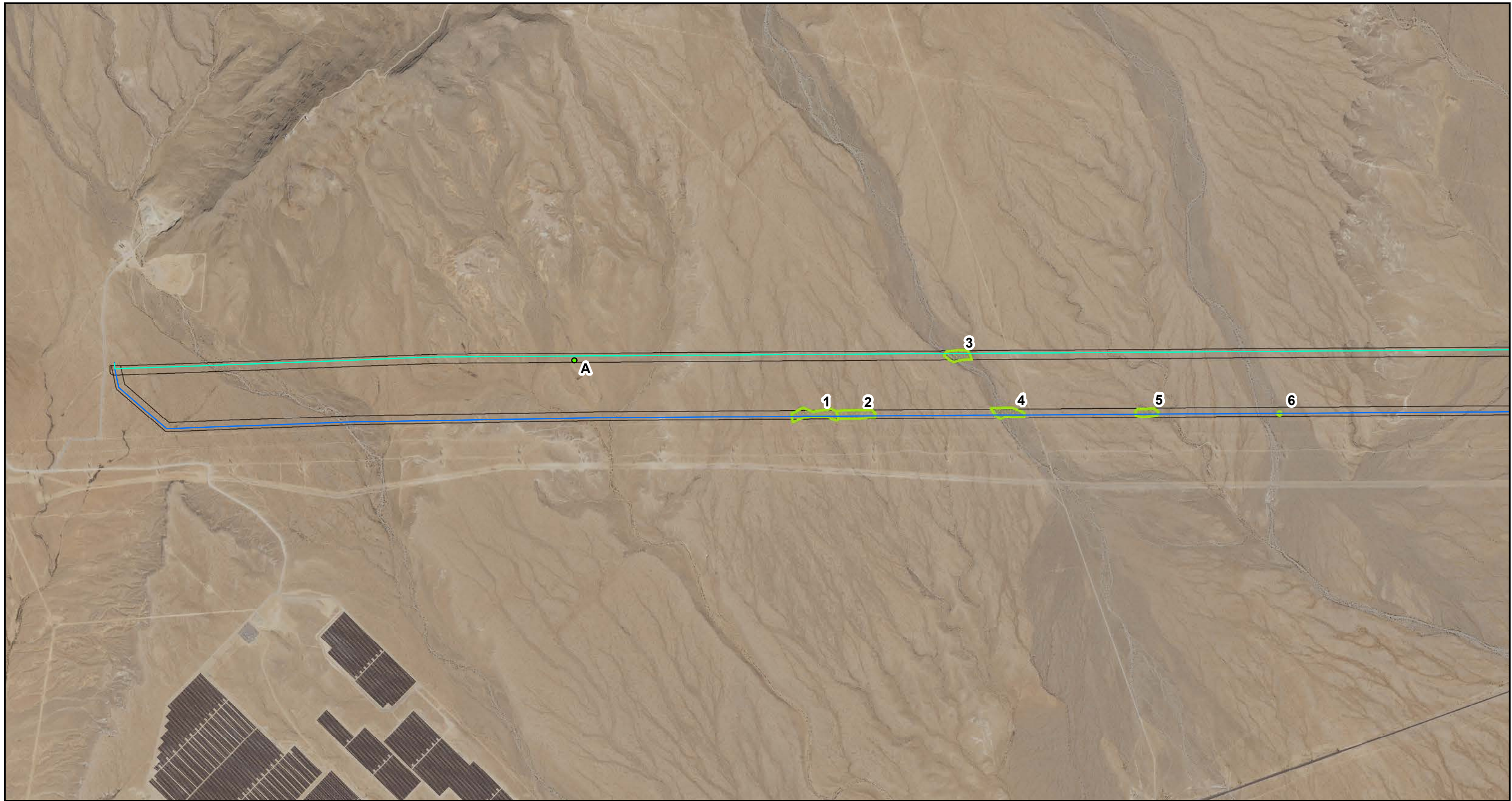
Horsenettle	(<i>Solanum carolinense</i>)
Diffuse knapweed	(<i>Centaurea diffusa</i>)
Leafy spurge	(<i>Euphorbia esula</i>)
Medusahead	(<i>Taeniatherum caput-medusae</i>)
Musk thistle	(<i>Carduus nutans</i>)
Russian knapweed	(<i>Acroptilon repens</i>)
African mustard	(<i>Brassica tournefortii</i>)
Scotch thistle	(<i>Onopordum acanthium</i>)
Silverleaf nightshade	(<i>Solanum elaeagnifolium</i>)






Category C Weeds:

Category C listed noxious weeds are weeds that are generally established and generally widespread in many counties of the State.

Canada thistle	(<i>Cirsium arvense</i>)
Hoary cress	(<i>Cardaria draba</i>)
Johnsongrass	(<i>Sorghum halepense</i>)
Perennial pepperweed	(<i>Lepidium latifolium</i>)
Poison-hemlock	(<i>Conium maculatum</i>)
Puncture vine	(<i>Tribulus terrestris</i>)
Salt cedar (tamarisk)	(<i>Tamarix spp.</i>)
Spotted water hemlock	(<i>Cicuta maculata</i>)

Attachment B Figures



-  Noxious Weed Observations
-  Other Observations
-  Centerline, proposed
-  Centerline, alternative
-  ROW



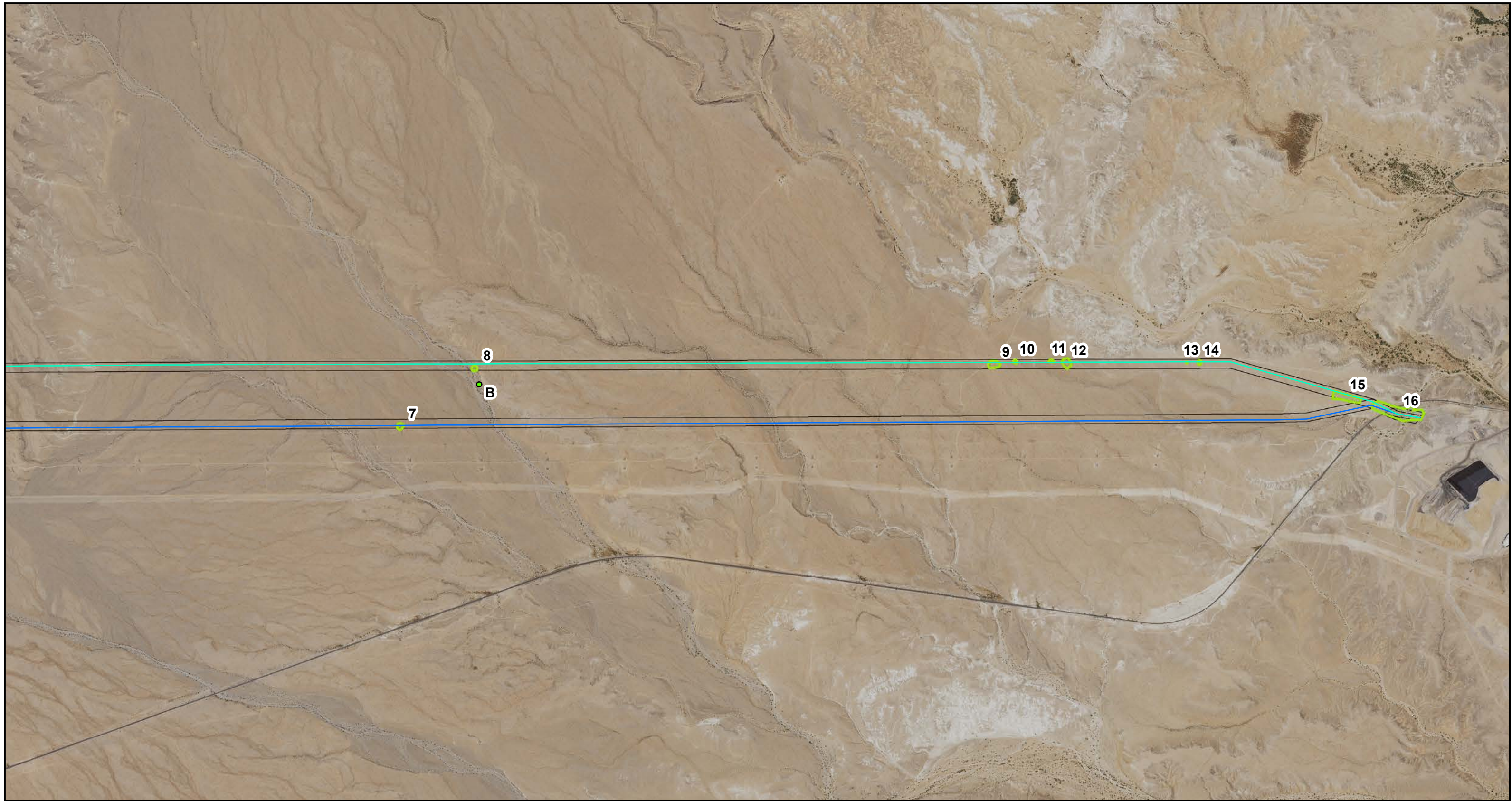
**Eagle Shadow Mountain
Solar Project**






**Figure 1a
Noxious Weed Survey**

Author: MS

Date: 24 April 2019

ESM\WeedSurvey_1a_190424.mxd



-  Noxious Weed Observations
-  Other Observations
-  Centerline, proposed
-  Centerline, alternative
-  ROW



**Eagle Shadow Mountain
Solar Project**

**Figure 1b
Noxious Weed Survey**

Author: MS

Date: 24 April 2019

ESM\WeedSurvey_1b_190424.mxd

Attachment C List of Plant Species Observed

Table C-1 List of Plant Species Observed

Family	Genus / Species	Common Name
Agavaceae	<i>Yucca schidigera</i>	Mohave yucca
Asteraceae	<i>Ambrosia dumosa</i>	White bursage
Asteraceae	<i>Baileya multiradiata</i>	Desert marigold
Asteraceae	<i>Encelia farinosa</i>	Brittlebush
Brassicaceae	<i>Brassica tournefortii</i> *	Sahara mustard
Brassicaceae	<i>Sisymbrium sp.</i> *	Hedge mustard
Brassicaceae	<i>Strigosella africana</i> *	African mustard
Cactaceae	<i>Cylindropuntia echinocarpa</i>	Silver cholla
Cactaceae	<i>Cylindropuntia ramosissima</i>	Pencil cholla
Cactaceae	<i>Echinocactus polycephalus</i>	Clustered barrel cactus
Cactaceae	<i>Echinocereus engelmannii</i>	Engelmann's hedgehog cactus
Cactaceae	<i>Ferocactus cylindraceus</i>	Barrel cactus
Cactaceae	<i>Opuntia basilaris</i> var. <i>basilaris</i>	Beavertail
Chenopodiaceae	<i>Grayia spinosa</i>	Spiny hopsage
Chenopodiaceae	<i>Halogeton glomeratus</i> *	Saltlover
Ephedraceae	<i>Ephedra</i> sp.	Ephedra
Euphorbiaceae	<i>Chamaesyce albomarginata</i>	White-margin sandmat
Fabaceae	<i>Senegalia greggii</i>	Catclaw
Geraniaceae	<i>Erodium cicutarium</i> *	Redstem filaree
Geraniaceae	<i>Erodium texanum</i>	Texas filaree
Krameriaceae	<i>Krameria erecta</i>	Rhatany
Lamiaceae	<i>Salvia dorrii</i>	Purple sage
Liliaceae	<i>Calochortus flexuosus</i>	Winding mariposa lily
Malvaceae	<i>Sphaeralcea ambigua</i>	Apricot mallow
Plantaginaceae	<i>Plantago ovata</i>	Plantain
Poaceae	<i>Bromus rubens</i> *	Red brome
Poaceae	<i>Bromus tectorum</i> *	Cheatgrass
Poaceae	<i>Hilaria rigida</i>	Big galleta
Poaceae	<i>Schismus sp.</i> *	Mediterranean grass
Polygonaceae	<i>Chorizanthe rigida</i>	Devil's spineflower
Polygonaceae	<i>Eriogonum inflatum</i>	Desert trumpet
Polygonaceae	<i>Rumex hymenosepalus</i>	Wild rhubarb
Solanaceae	<i>Lycium andersonii</i>	Box thorn
Zygophyllaceae	<i>Larrea tridentata</i>	Creosote bush

* Non-native

Attachment D Photographs



Photo 1. Close-up of *Brassica tournefortii*, Occurrence #16



Photo 2. From east end of ROWs, looking west. Occurrence #16 is in the wash in the foreground, up the slope behind, across the railroad tracks, to the second angle structure.



Photo 3. Close-up of *Strigosella africana*.



Photo 4. Typical appearance of *Strigosella africana* in the survey area. Almost all of the green plants in this picture are *S. africana*.

Appendix H

Decommissioning Plan

CONCEPTUAL DECOMMISSIONING PLAN

EAGLE SHADOW MOUNTIAN SOLAR PROJECT

CLARK COUNTY, NEVADA

June 2019

Table of Contents

1	Introduction	1
	1.1 Purpose of the Decommissioning Plan	1
2	Project Description	2
	2.1 Project Area	2
	2.2 Proposed Project	2
3	Regulatory Criteria	4
4	Project Decommissioning	5
	4.1 Pre-Decommissioning Activities	5
	4.2 Removal of Facilities	5
	4.3 Debris Management, Disposal, and Recycling	7
	4.4 Hazardous Waste Management	7
	4.5 Post-Demolition Site Stabilization	7
5	Project Decommissioning Costs and Bonding.....	8
6	References	9

FIGURES

- Figure 1: Project Location
- Figure 2: Project Area

Acronyms and Abbreviations

BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CSP	Concentrating Solar Power
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
NEPA	National Environmental Policy Act
O&M	Operations and Maintenance
Project	Eagle Shadow Mountain Solar Project
PV	Photovoltaic
PPA	Power Purchase Agreement
RCRA	Resource Conservation and Recovery Act
Reservation	Moapa River Indian Reservation
TSCA	Toxic Substances Control Act

1 Introduction

1.1 Purpose of the Decommissioning Plan

The purpose of this Decommissioning Plan is to establish the conceptual methodologies that would be employed for decommissioning activities associated with the permanent closure of the facilities at the Eagle Shadow Mountain Solar Project (Project or facility). The actions implemented during the facility closure would be determined based on the expected future use of the site. Therefore, a more detailed decommissioning plan would be developed in advance of the start of decommissioning activities.

The Project is expected to operate at a minimum for the life of the term of the Power Purchase Agreement with NV Energy (30 years). Because much of the needed electrical infrastructure will have been developed, it is possible that the solar field would continue to be upgraded and used to generate solar energy even beyond the term of the initial lease and energy purchase agreements, remaining in solar energy production for the foreseeable future. It is also possible that the Tribe could re-purpose the Project site at the termination of solar project. Certain facility components such as the access roads, electrical transmission lines, Operations and Maintenance (O&M) building, and others could be used to support other future uses on this site.

For purposes of developing this plan, it is assumed that if and when the Project is decommissioned, all Project structures and electrical equipment would be removed from the solar field and associated rights-of way (ROWs) and the disturbed areas would be reclaimed in accordance with the Restoration Plan.

This conceptual decommissioning plan addresses the following:

- Project Description
- Regulatory Criteria
- Decommissioning Activities
 - Pre-Decommissioning
 - Removal of Facilities
 - Hazardous Waste Management
 - Debris Management, Disposal, and Recycling
 - Post-Demolition Site Stabilization
- Project Decommissioning Costs and Bonding

As mentioned above, because this document addresses Project actions that would occur well in the future, it will be updated and finalized in the months prior to the scheduled decommissioning. This will ensure the final plan addresses the proposed future land use of the site and the applicable rules and regulations in place at that time.

2 Project Description

2.1 Project Area

The Proposed Project would be located approximately 30 miles northeast of Las Vegas in Clark County, Nevada. The solar project would be located on up to 2,200 acres of tribal trust land, west of I-15 and east of U.S. Highway 93, in Sections 1, 9, 10, 11, 14, 15, 16, 21 and 22 of Township 16 South, Range 64 East. These lands are currently vacant except for roads, pipelines, a tribal aggregate operation, and a well.

The portion of the proposed 12.5-mile gen-tie line located on Tribal lands within the designated utility corridor managed by the BLM occur within Sections 12, 13, and 14 in Township 16 South, Range 64 East; Sections 5, 6, and 7 in Township 16 South, Range 65 East; and Sections 12, 13, 14, 22, 23, 27, 28, 32, and 33 in Township 15 South, Range 65 East. The short segment on Federal lands managed by the BLM would be within Section 7 in Township 16 South, Range 66 East and the portion on private lands owned by NVE adjacent to the Reid-Gardner Substation would be within Sections 5 and 6 in Township 16 South, Range 66 East. All of these lands are adjacent to multiple existing linear electric transmission and pipeline utilities and private lands (owned by NV Energy) adjacent to the Reid-Gardner Substation.

2.2 Proposed Project

The following describes the major features of the proposed Project. For a comprehensive description of the proposed Project, refer to the associated Environmental Impact Statement for the Eagle Shadow Mountain Solar Project for the Project design details.

The Project will consist of an up to 300 megawatt alternating current (MWac) solar energy generating facility using photovoltaic (PV) technology and associated infrastructure. Project components include on-site facilities, off-site facilities, and temporary facilities needed to construct the Project. The solar site would be located entirely on Tribal lands. Major onsite facilities include the solar field comprised of multiple blocks of PV solar panels mounted on single-axis tracking systems, associated inverter and transformer equipment, an energy storage system (ESS), a project substation, and operation and maintenance (O&M) facilities.

The offsite facilities would include an approximately 12.5-mile dual-circuit 230kV gen-tie line located on Tribal lands, BLM-administered lands, and private lands owned by NV Energy. Most of the gen-tie would be within a Federally-designated utility corridor on Tribal lands. This line would require a right-of-way (ROW) width of 125 to 200 feet. The Applicant would construct the gen-tie from the Project substation to a structure located on BLM-administered land in the SW¼ of the NE¼ of Section 7 referred to as the Point of Change of Ownership (POCO). From the POCO structure, the remaining portion of the gen-tie would be constructed by NVE to the Reid Gardner Substation. Additional offsite facilities include an existing road that would provide access to the Project and electric distribution and communication lines.

Temporary facilities that would be removed at the end of construction include laydown and construction areas and water storage tanks also located on Tribal lands.

Power produced by the Project would be conveyed to the regional transmission system via the gen-tie interconnection to NVE's existing 230kV Reid-Gardner Substation.

Access Roads

The Project would require vehicular access for construction, operation, and maintenance. The access roads would be utilized for delivery of all Project components, and would be used by workers traveling to and from the site for construction. Main access to the ESMSP site for construction and through operations and decommissioning would be provided via existing roads. Access to this portion of the Reservation would be via I-15, US Highway 93, and North Las Vegas Boulevard to existing improved roads on the Reservation and would not be reclaimed.

Within the solar field, access ways would be built to provide vehicle access to the solar equipment (PV modules, inverters, transformers) for O&M activities. These access ways would be located around the arrays and between the panel rows in the solar field. The existing soil surface of all interior access ways would be graded. In addition to grading, interior access ways that lead to inverter stations would be compacted using onsite materials. The access roads within the solar facility would be reclaimed during decommissioning.

Most of the structures along the proposed gen-tie line would be accessed via new spur roads constructed from existing utility access roads. Where the proposed line does not parallel existing lines, a new road would be developed within the ROW to facilitate access to the gen-tie transmission structures. New gen-ties access roads and spur roads would typically be 12 feet wide and bladed and would be compacted to ensure stability if needed. Access roads parallel to the gen-tie alignment and spur roads would be left in place but would not be maintained following construction. New and existing gen-tie access roads would not be reclaimed during decommissioning.

3 Regulatory Criteria

During the decommissioning process, all activities will be conducted in compliance with all applicable Federal and Tribal regulations in place at the time. Consultation with the Tribe, BIA, BLM, and any other involved entities would be conducted to ensure that all Federal and Tribal requirements are addressed.

The primary guidance documents for decommissioning will be the Final Decommissioning Plan (prepared just in advance of project closure) and the Restoration Plan.

Federal requirements involving hazardous wastes and toxic substances will also be followed during decommissioning activities. Among these are the Toxic Substances Control Act (TSCA) (15 U.S.C. §2601) that requires reporting, record-keeping and testing requirements and restrictions relating to the use and disposal of chemical substances and/or mixtures. TSCA also addresses the production, importation, use and disposal of specific chemicals (EPA 2016). The Resource Conservation and Recovery Act (RCRA) (42 U.S.C. §6901) gives the EPA the authority to control hazardous waste from its generation until its disposal, including transportation, treatment, and storage (EPA 2011).

Coordination with the Tribe and agencies throughout the life of the Project, including decommissioning, is critical so that applicable regulations are not violated and the public and the environment are not impacted by the Project.

4 Project Decommissioning

The procedures described for decommissioning are designed to promote public health and safety, environmental protection and compliance with applicable regulations. It is assumed that decommissioning will begin approximately 30 or more years after Project operation is initiated. The Project decommissioning plan may incorporate the sale of some of the facility components via the used equipment market and recycling of components. Decommissioning will be conducted in accordance with a Final Decommissioning Plan that will be developed in the months prior to decommissioning being initiated.

This conceptual decommissioning plan assumes that all equipment and facilities within and associated with the solar field will be removed. The transmission lines and internal solar facility access roads would also be restored to as close to its original state as practicable. A compliance inspection would be performed by BLM on the Project's BLM lands.

4.1 Pre-Decommissioning Activities

Pre-decommissioning activities will be conducted to prepare the Project for demolition. This would include assessing the existing site conditions and development of the Final Decommissioning Plan and schedule as described above.

An Environmental Site Assessment (ESA) will be conducted before any decommissioning activities occur. The ESA will document the existing conditions of the solar field, including the location and presence of hazardous materials on the site. The results of the ESA will be used to define any remediation or cleanup methodologies that could be required and incorporated into the Final Decommissioning Plan. This documentation would ensure that areas containing hazardous materials can be decommissioned appropriately.

Other pre-decommissioning activities would include removing hazardous materials from the site including residues that occur in equipment. All operational liquids and chemicals are expected to be removed and disposed of as discussed in Section 4.4. Hazardous material and petroleum containers, , and other similar structures shall be rinsed clean, when feasible, and the waste liquid collected for off-site disposal.

Locations for decommissioned structures, non-hazardous waste, and debris will be designated on the Final Decommissioning Plan to facilitate the decommissioning process and off-site removal.

4.2 Removal of Facilities

Site decommissioning and equipment removal may take a year or more. Therefore, access roads, fencing, electrical power, and raw/sanitary water facilities will temporarily remain in place for use by the

decommissioning and restoration workers until no longer needed. Therefore, these components would be the last to be removed prior to site rehabilitation.

Solar Field Above- and Below-Ground Facilities

Structures that need to be dismantled during decommissioning include the onsite substation, energy storage system, onsite O&M area, perimeter fence, solar field, and transformers and inverters. These structures will be dismantled and moved to designated areas for either recycling or disposal at an approved landfill.

Above-ground structures will be removed through mechanical or other approved methods. Below-ground structures will be removed or, upon agency approval, may remain in place to minimize soil disturbance. Below-ground facilities/utilities that potentially may be removed include embedded foundations (if present), electrical lines and conduits, and concrete slabs.

While holding or evaporation ponds are not anticipated as part of the proposed project, any evaporation, stormwater holding, or construction/decommissioning water holding ponds will be closed by removing any non-biodegradable materials (e.g., high density polyethylene (HDPE) liners), along with any hard surface/non-draining layers that may have been used as base material. The pond(s) will then be filled with weed- and other contaminant free-fill and brought to grade level.

Gen-Tie Transmission Lines

If the gen-tie transmission lines will not continue to be used by the Tribe for another purpose at the time of Project decommissioning, the lines will be removed. Decommissioning of the gen-tie will consist of removal of all structures associated with the construction of the transmission line(s) to include, but not limited to overhead conductors and the removal of poles. All steel will be recycled and the foundations will be removed to a depth of at least 2 feet below the ground surface, unless the Tribe or BLM does not require removal of the foundations. Aluminum from overhead conductors will be recycled.

Roads

Access and on-site roads will remain in place to accomplish decommissioning at the end of the facility's life and would be one of the last Project components to be removed. If any on-site roads developed in the solar facility are not needed for other future uses by the Tribe, any aggregate and/or other base material would be removed and recycled or transported to an appropriate disposal site (where applicable).

After the road materials are removed, the roads will be restored to approximate preconstruction conditions in accordance with the Restoration Plan.

4.3 Debris Management, Disposal, and Recycling

Each type of removed material or demolition debris will be placed in designated locations within the solar field. Each stockpile will be transported off-site to either a used equipment market, off-site recycling center, or approved landfill depending on the material type. Debris will be broken down into manageable sizes so that transportation is simplified.

4.4 Hazardous Waste Management

All disposal and transportation of hazardous waste will be conducted under compliance with RCRA (42 U.S.C. §6901), and TSCA (15 U.S.C. §2601), and other regulations as needed. In areas where no record of hazardous waste exposure occurred, a visual inspection would be conducted as part of the post-operational ESA described earlier. If a concern is identified, further evaluation of the area shall occur and the area or structure will be treated accordingly. A licensed state waste contractor would be used to ensure that all required laws and regulations have been met and to address any remaining requirements needed to successfully close the Project.

4.5 Post-Demolition Site Stabilization

Since minimal grading is being proposed during project construction, and because vegetation cover will be managed during operation of the proposed project, disturbed areas will be restored to promote pre-project drainage patterns, with the goal of reducing the potential for erosion. These activities will occur following the removal of project equipment in a given area. Once the site is stabilized, restoration activities required to return the disturbed areas to a pre-construction function will be conducted in accordance with the plans prepared as part of the Project. These plans include:

- Site Restoration Plan
- Integrated Weed Management Plan

The objectives of these plans include the following:

- Reduce potential for erosion,
- Promote habitat reestablishment
- Implement the weed management program that minimizes the need for non-native species eradication.

5 Project Decommissioning Costs and Bonding

Prior to the issuance of full notice to proceed, the Applicant will provide performance and reclamation bonding in an amount sufficient to ensure the implementation of the approved Decommissioning Plan for restoration and performance.

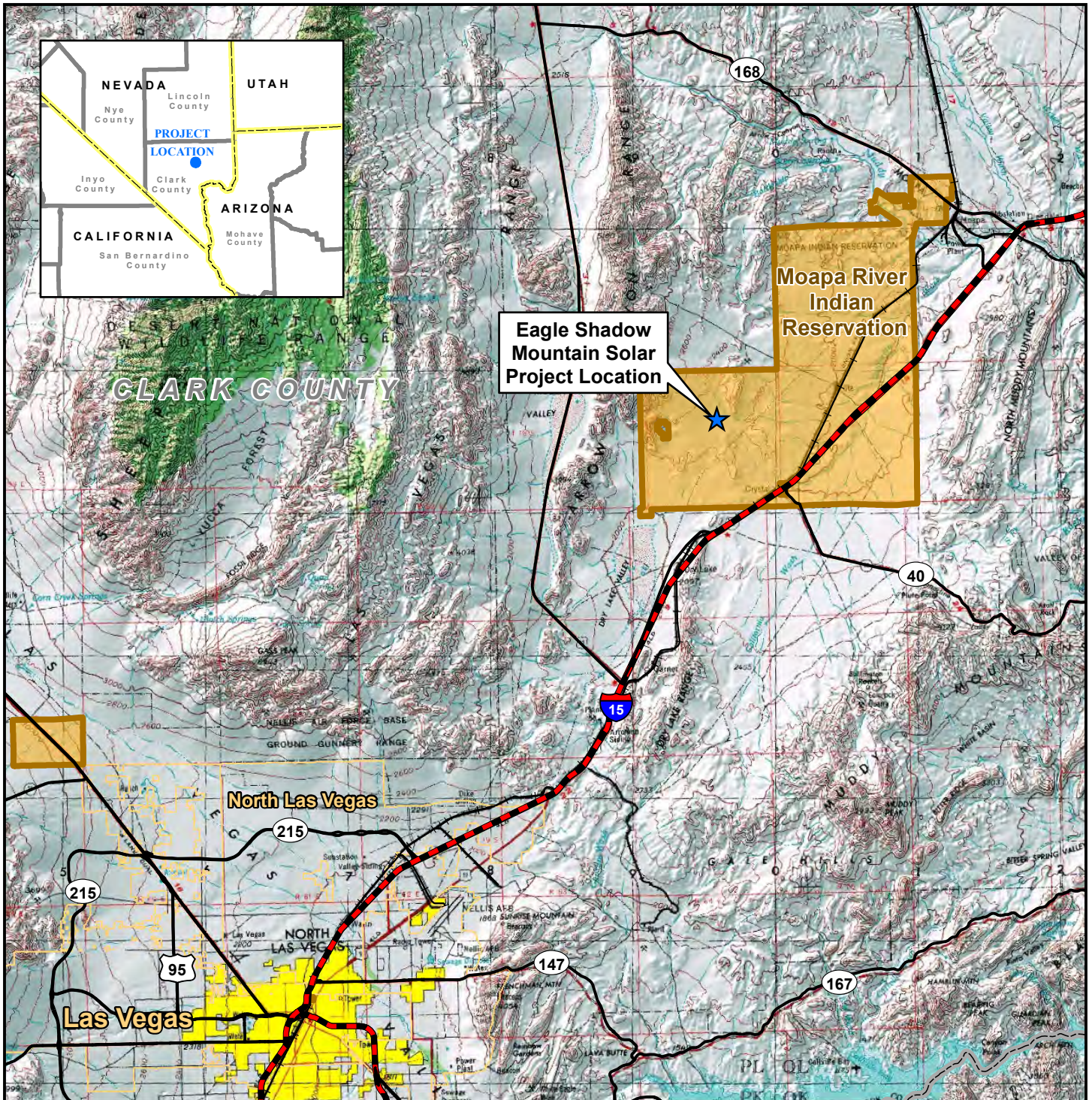
The bond instrument will be based on a decommissioning cost estimate provided by the Applicant and based on the final design of the Project. This estimate will consider any Project components that are expected to be left in place at the request of and for the benefit to the Tribe (e.g., gen-tie lines, access road). The decommissioning, performance and reclamation estimate will also include the residual value of any salvageable or recyclable property, as well as the then-current cost of decommissioning.

6 References

United States Environmental Protection Agency (EPA). 2011. Summary of the Resource Conservation and Recovery Act. <https://www.epa.gov/laws-regulations/summary-resource-conservation-and-recovery-act>.

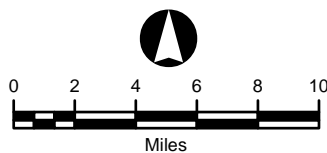
United States Environmental Protection Agency (EPA). 2016. Summary of the Toxic Substances Control Act. <https://www.epa.gov/laws-regulations/summary-toxic-substances-control-act>.

FIGURES



Legend

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



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

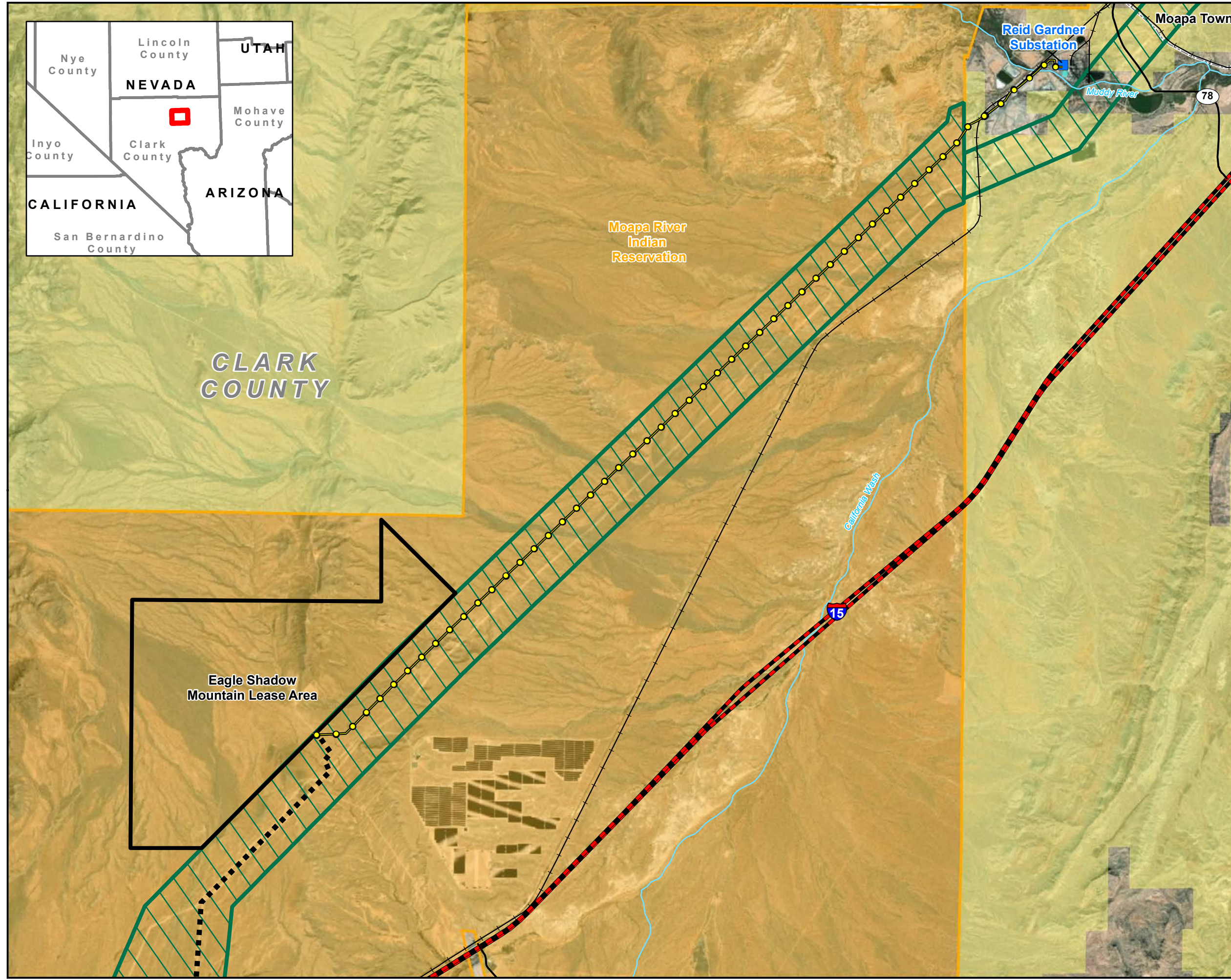
Eagle Shadow Mountain Solar Project

**FIGURE 1
PROJECT LOCATION**

Map Extent: Clark County, Nevada

Date: 11-06-18		Author: rnc
----------------	--	-------------

G:\Eagle Shadow Mountain Solar Project\MXD's\Project Location 8.5x11 110618.mxd



Legend

- Project Components**
- ESM Gen-Tie - Alternative
- Eagle Shadow Mountain Solar Project Area
- 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
- Existing Access Road



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

Eagle Shadow Mountain Solar Project

Figure 2
ESM Solar Project Components

Map Extent: Clark County, Nevada

Date: 03-20-19	Author: mc
G:\ESM\MXD's\Project Location_032019.mxd	

Appendix I

Jurisdictional Waters Report

March 1, 2019

U.S. Army Corps of Engineers

RE: Jurisdictional Delineation, Eagle Shadow Mountain Solar Project

To whom it may concern;

Submitted with this cover letter is the Jurisdictional Delineation for the 8minuteenergy Eagle Shadow Mountain Solar Project located near Moapa, NV. An approved jurisdictional determination is requested from the US Army Corps of Engineers. Feel free to contact me with any questions and/or comments.

Sincerely,



Andrew Butsavich
Project Manager/Environmental Scientist
Mobile: 702-813-8557
abutsavich@newfields.com

Preliminary Jurisdictional Determination Report

Eagle Shadow Mountain Solar Farm
February 2019



Prepared for:

325MK 8me LLC

250 Sutter Street, Suite 600
San Francisco, CA 94108

Prepared by:



3265 N. Fort Apache Road, Suite 110
Las Vegas, Nevada 89129

Prepared for:



Contents

Executive Summary	1
Section 1. Introduction	2
Section 2. Location	3
Section 3. Methods	4
3.1 Definitions and Federal Jurisdiction	5
Section 4. Existing Conditions	6
4.1 Landscape Setting.....	6
4.2 Climate.....	7
4.3 Soils.....	7
4.4 Hydrology.....	8
4.5 Land Use	8
4.6 Vegetation	8
Section 5. Results	9
5.1 Aquatic Resources	9
Section 6. References	13
Appendix A — Aquatic Resource Delineation Maps	A
Appendix B — Supporting Maps	B
Appendix C — Photographs	C
Appendix D — Plant List	D
Appendix E — OHWM Data Sheet	E
Appendix F — K Road Moapa Solar Jurisdictional Delineation	F
Appendix G — Hyperloop Verification	G

Acronyms and Abbreviations

BLM	Bureau of Land Management
Corps	United States Army Corps of Engineers
CWA	Clean Water Act
EPA	Environmental Protection Agency
GPS	global positioning system
I-15	Interstate 15
OHWM	ordinary high water mark
RPW	relatively permanent water
SSURGO	Soil Survey Geographic Database
TNW	traditional navigable water
USGS	United States Geological Service
UPRR	Union Pacific Rail Road
USDA	United States Department of Agriculture
WOUS	Waters of the United States

Executive Summary

325MK 8me LLC requested an evaluation of aquatic resources on lands proposed for development of the Eagle Shadow Mountain Solar Farm, primarily within the Moapa Band of Paiutes Moapa River Indian Reservation near Moapa, Nevada. 325MK 8me LLC proposes to construct a 300 megawatt alternating current solar photovoltaic energy generation facility and an approximately 12.4 mile transmission line.

The purpose of this evaluation was to determine if any wetlands or non-wetland Waters of the United States (WOUS) are present within the project area that may be regulated under the Clean Water Act and subject to the jurisdiction of the United State Army Corps of Engineers.

On August 22 through August 28, 2018, NewFields environmental scientists conducted field investigations to determine the extent of any potential jurisdictional WOUS occurring in the approximately 5,000-acre Project Area.

No wetlands were identified within the Project Area. 118,666 linear feet (22.442 acres) of drainages were delineated within the Project Area. However, due to a lack of hydrologic connectivity to traditional navigable waterways or other WOUS, only 3,440 linear feet (1.14 acres) of the delineated drainages within the Project transmission line were determined to be potential WOUS subject to the jurisdiction of the Corps.

Section 1. Introduction

325MK 8me LLC requested an evaluation of aquatic resources on lands proposed for the development of the Eagle Shadow Mountain Solar Farm (Proposed Project). The Proposed Project consists of the construction, operation, maintenance, and eventual decommissioning of a 300 megawatt alternating current solar photovoltaic energy generation facility, associated facilities, and an approximately 12.4-mile 230 kilovolt electrical generator intertie (gen-tie) transmission line. The solar energy generation facility would be located wholly on tribal trust lands within the Moapa Band of Paiutes Moapa River Indian Reservation (Reservation). The majority (up to approximately 10.8 miles) of the gen-tie would be located within an existing utility corridor managed by the Bureau of Land Management (BLM) on tribal trust land within the reservation. A small portion of the gen-tie (about 0.3 miles) would be located on BLM land contiguous with and outside of the Reservation, and the remaining approximately 1.3 miles of the gen-tie would be located on private land owned by NV Energy in unincorporated Clark County, Nevada. Two alternative, but similar, gen-tie routes are being evaluated: one that proceeds along the northwestern boundary of the existing utility corridor and another parallel route that is more centrally-located within the existing utility corridor. The Eagle Shadow Mountain Solar Farm Project Area (Project Area) evaluated for aquatic resources totals approximately 5,000 acres, which includes all areas that could potentially be disturbed during construction, operations, and maintenance of the solar energy generation facility and the potential right-of-way areas associated with the two gen-tie alternatives (Figure 1).

This report describes the results of a preliminary jurisdictional determination conducted within the approximately 5,000-acre Project Area. A preliminary determination is used to identify and map the extent of potential Waters of the U.S. (WOUS) and to provide information regarding jurisdictional issues. The purpose of this report is to provide the results of the delineation of wetlands and non-wetland aquatic resources (i.e., drainages) potentially subject to the jurisdiction of the U.S. Army Corps of Engineers (Corps) with respect to the Clean Water Act (CWA) that occur within the Project Area. Methods for delineating aquatic resources and assessing jurisdiction followed guidelines set forth by the Corps in the following documents:

- *Corps of Engineers Wetland Delineation Manual (Corps 1987)*
- *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (Corps 2008)*
- *Final Summary Report: Guidelines for Jurisdictional Delineations for Waters of the United States in the Arid Southwest (Corps 2001)*
- *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the United States (Lichvar and McColley 2008)*

This delineation was conducted in accordance with these documents.

Agent(s):

Mr. Andrew Butsavich
NewFields
3265 N. Fort Apache Road, Suite 110
Las Vegas, Nevada 89129
Phone: (702) 906-2500
Email: abutsavich@newfields.com

Delineators: Andrew Butsavich and Justin Romanowitz

Date Surveyed: August 22, 23, 24, 27, and 28, 2018

Owner and Applicant's Representative:

Luke Shillington
Director, Land Entitlement
8minutenergy Renewables LLC.
250 Sutter Street, Suite 600
San Francisco, CA 94108
Phone: (415) 818-5103
Email: lshillington@8minutenergy.com

Section 2. Location

The subject property is located on the United States Geological Survey (USGS) Arrow Canyon SE (solar facility and transmission), Ute (transmission), and Moapa West (transmission), NV 7.5-minute quadrangle map. The Project Area is located in:

Sections 1, 9, 10, 11, 12, 13, 14, 15, 16, 21 and 22 of Township 16 South Range 64 East, Mount Diablo Base Meridian;

Sections 5, 6, and 7 of Township 16 South, Range 65 East, Mount Diablo Base Meridian;

Sections 12, 13, 14, 22, 23, 27, 28, 29, 31, 32, and 33 of Township 15 South, Range 65 East, Mount Diablo Base Meridian;

Section 7 of Township 15 South, Range 66 East, Mount Diablo Base Meridian; Clark County, Nevada.

Study area center coordinates are 36.544756°, -114.801829°

Driving Directions from the Strip/McCarran Airport

From the airport, follow signs to Tropicana Avenue. Travel on Tropicana Avenue heading west for approximately 1.7 miles, then turn right (heading north) on Interstate 15 (I-15). Travel approximately 26.5 miles north on I-15 and exit on US-93/Great Basin Highway. From the interchange, travel west for approximately 500 feet and head northeast on North Las Vegas Boulevard. Travel approximately 7.7 miles on North Las Vegas Boulevard to where the pavement stops and head north on a dirt access road. Travel on the dirt access road for approximately 4.6

miles and head northwest on another dirt access road. Follow signs to the VT Construction gravel pit. Travel in a northwesterly direction on the dirt access road for approximately 1 mile to the Project Area. All access to the Project Area is controlled by the Moapa Band of Paiutes. Trespass permits are needed from the Moapa Band of Paiutes to access the Project Area.

Section 3. Methods

This section describes the methods used to determine the extent of aquatic resources within the Project Area.

Prior to the onsite delineation, NewFields staff reviewed aerial photography, topographic maps, the National Hydrography Dataset, and the National Wetlands Inventory to identify aquatic resources (i.e., wetlands, drainages, or water features) that could be potential WOUS.

On August 22nd through 28th, 2018, environmental scientists surveyed for aquatic resources (previously identified on satellite photos and publicly available geospatial datasets) within the Project Area for characteristics (e.g., Ordinary High Water Mark [OHWM]¹, wetland vegetation, hydric soils, wetland hydrology, etc.) that would classify these areas as potential jurisdictional WOUS. Data were recorded at several sample points along each drainage/water feature in the field.

Following the field survey, data from each sample point were compiled and sample point locations were mapped on aerial photography (Appendix A). At each sample point recorded data included sample point number, channel number, OHWM width, channel depth, channel substrate, channel gradient, side slope, vegetation, any drainage notes as well as coordinates and photos taken. These measurements were then mapped and measurements were averaged over the entire feature length in order to calculate acreage. A regional project vicinity map, soils map, and United State Geological Survey (USGS) topographic map were created using geospatial data acquired from a USGS web portal as well as a United States Department of Agriculture (USDA) Soil Survey Geographic Database (SSURGO)(Appendix B). At each sample point photographs were taken (Appendix C), vegetation was recorded (Appendix D), and the OHWM (where applicable) and other data were documented (Appendix E).

¹An ordinary high water mark is defined as:
... that line on the shore established by the fluctuations of water and indicated by physical characteristics such as [a] clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (33 CFR Part 328.3).

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 potentially jurisdictional aquatic features was delineated in accordance with Corps guidance in published manuals and field guides. Due to channel migration and historic channels that only convey flow during extremely large storm events within alluvial fan systems, only feeder channels, the current main distributary channels for the alluvial fan, and direct tributaries were delineated within alluvial fan systems in the Project Area. For smaller desert wash systems within the Project Area, the presence of continuous well-developed upland vegetation in the stream channel was used as an indicator that these areas only convey surface flow during extremely large storm events and therefore would not usually constitute a jurisdictional WOUS. The delineation was conducted for the dry land fluvial systems within the Project Area in a manner that captured the horizontal extent of potential Corps jurisdiction during small to moderate storm events; the delineation followed Corps guidance to ensure that the areas that only convey surface flows during 25-year, 50-year, or 100-year storm events were not delineated.

In accordance with Corps' guidelines, primary wash channels and tributaries of these channels were delineated until they degraded to sheet flow or lacked physical evidence of conveying flows during ordinary storm events (i.e., 2- to 5-year storm events).

3.1 Definitions and Federal Jurisdiction

This subsection describes the types of aquatic features regulated under the CWA and pertinent definitions of such waters based on guidance published by the Environmental Protection Agency (EPA) and Corps following the U.S. Supreme Court's Decision in *Rapanos v. United States* and *Carabell v. United States* (EPA and Corps 2008).

Traditional Navigable Waters (TNWs): TNWs are all tidal waters and waters that have been, could be, or are used in interstate or foreign commerce. TNWs are jurisdictional and any tributary that continually flows directly or indirectly at least seasonally into a TNW is also jurisdictional.

Relatively Permanent Waters (RPWs): RPWs are non-navigable tributaries of TNWs that flow year-round or have continuous flow at least seasonally.

Non-relatively Permanent Waters (non-RPWs): Non-RPWs are tributaries that do not have continuous flow at least seasonally.

The EPA and Corps have jurisdiction over wetlands and other WOUS that are subject to Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act. Based on current legal opinion, regulations, and guidance (EPA and Corps 2008), the Corps and EPA will assert jurisdiction over the following waters:

- TNWs and wetlands adjacent to TNWs
- RPWs and wetlands that directly abut such tributaries. A wetland that abuts a tributary has no distinction between the immediate edge of the tributary and the wetland itself.

The following waters will also be found jurisdictional based on a fact-specific analysis that they have a significant nexus with a TNW:

- Non-navigable tributaries that are non-RPWs
- Wetlands adjacent to non-RPWs
- Wetlands adjacent to but that do not directly abut a RPW
- Certain features (e.g., ditches and canals) that transport relatively permanent flow directly or indirectly into TNWs or between two (or more) jurisdictional waters, including wetlands

Certain other aquatic features generally are not jurisdictional waters:

- Erosional features such as gullies, swales, and small washes characterized by low volume, infrequent, short duration surface flows
- Uplands transporting over land sheet flow during precipitation events
- Ditches excavated wholly in and draining only uplands that do not carry a relatively permanent flow of water

Federal jurisdiction over non-tidal waters, excluding wetlands, extends to the OHWM. During the field delineation, aquatic features were first identified as being potentially jurisdictional by the presence of OHWM indicators, which distinguish these non-RPW features from gullies, swales, ditches, and other non-jurisdictional features. However, as discussed in greater detail in Section 5.1, few of the aquatic resources identified onsite were determined to be subject to Corps jurisdiction with respect to Section 404 of the CWA. There are drainages with clear connection to the Muddy River located on/near the transmission lines northern footprint, even the Muddy River itself, but do not anticipate disturbance within these WOUS. The proponent intends to span these WOUS with the overhead transmission line.

Section 4. Existing Conditions

This section presents the setting of the study area and discusses: (1) landscape setting, (2) climate (3) soils, (4) hydrology, (5) existing field conditions, and (6) vegetation and wildlife.

4.1 Landscape Setting

Southern Nevada is part of the Basin and Range province, an area stretching from southern Oregon and Idaho in the north to the Baja California Peninsula in the south and from the Sierra Nevada in the west to the Colorado Plateau in the east (Forrester 2009). The proposed project is located within the Creosote Bush-Dominated Basin ecoregion (Level IV, U.S. EPA, 14a), a subdivision of the greater Basin and Range ecoregion of Nevada. This region consists of the valleys between the various mountain ranges across the Mojave Desert. The study area is comprised of relatively flat and mostly undisturbed desert habitat dominated by creosote bursage scrub (Appendices A and B) with an approximate elevation range across the site of 2,500 to 2,200 feet above mean sea level.

4.2 Climate

The project area is in the low-elevation arid Mojave Desert, surrounded by desert mountain terrain, within Clark County, Nevada. The project is located approximately 28 miles north of Las Vegas and is a similar elevation and climate. Las Vegas maintains an arid climate year-round, with an average temperature of 69 degrees Fahrenheit. The hottest month is July with an average temperature of 93 degrees and the coldest month is December with an average temperature of 48 degrees. Average annual precipitation is 4.17 inches. Precipitation, primarily rainfall as snow is highly uncommon, occurs an average of 21 days a year, with the majority falling in the winter (U.S. Climate Data).

4.3 Soils

The soil within the study area is classified as Soils Formed in Mixed Alluvium by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soils survey maps as well as USDA SSURGO soils maps (Appendix B). No hydric soils or soils with hydric inclusions were observed onsite. Soil series descriptions from the USDA National Cooperative Soil Survey are listed below:

The **Badland Unit** consists of severely eroded and gullied side slopes of the mesa. It is made of exposures of the Muddy Creek Formation. The formation consists of highly stratified sand, silt, and clay that contain a large amount of gypsum and calcium carbonate. Slopes are commonly 15 to 50 percent, but can be as much as 100 percent in some areas, Run-off is very rapid, and the hazard or erosion is very high. This unit is described as generally eroded and barren of vegetation.

The **Bard Series** consists of The Bard series consists of shallow over cemented material, well-drained soils that formed in alluvium derived predominantly from limestone and dolomite with some sandstone and quartzite. The Bard soils are on dissected valley fill terraces, alluvial fans and fan remnants. Slope ranges from 0 to 15 percent. The mean annual precipitation is about 5 inches and the mean annual air temperature is about 62 degrees F.

The **Mormon Mesa Series** consist of shallow over petrocalcic, well drained soils that formed in material influenced by calcareous loess over mixed alluvium from predominantly limestone sources. The Mormon Mesa soils are on summits of fan remnants and mesas. Slope ranges from 0 to 15 percent. The mean annual precipitation is about 5 inches and the mean annual temperature is about 65 degrees F.

The **Overton series** consists of deep, very poorly drained soils that formed in clayey alluvium from sedimentary rocks. Overton soils are on flood plains and have less than 1 percent slope. The mean annual precipitation is about 5 inches and the mean annual air temperature is about 65 degrees F.

The **St. Thomas series** consists of very shallow and shallow, well drained soils that formed in residuum and colluvium derived from limestone and dolomite. The St. Thomas soils are on hills and mountains. Slope ranges from 2 to 75 percent. The mean annual precipitation is about 5 inches

and the mean annual air temperature is about 61 degrees F.

The **Tonopah series** consists of very deep, excessively to well drained soils that formed in mixed alluvium. Tonopah soils are on fan remnants and fan piedmonts. Slope ranges from 0 to 15 percent. The mean annual precipitation is about 6 inches and the mean annual temperature is about 65 degrees F.

The **Virgin River series** typically have light reddish-brown Ap or Al horizons, 5YR hue C horizons that are predominantly clay or silty clay textured, contain high chroma iron mottles above 40 inches, and are calcareous throughout. They have developed in clayey alluvium deposited by Virgin River flood waters from easily erodible mixed sedimentary rock sources, including shale, siltstone, limestone, and sandstone that are reddish in color. They occur at elevations of about 1,500 feet. The climate is arid having a mean annual rainfall of 4 to 6 inches and average annual air temperature is about 65 degrees F.

4.4 Hydrology

Certain erosional features 118,666 linear feet (22.442 acres) were identified on the site that have a well-defined OHWM, but most lacked a clear direct connection with downstream-regulated waters. 3,440 linear feet (1.14 acres) of features have a well-defined OHWM and exhibit a direct connection to downstream-regulated waters. Most connections were obstructed by low-lying areas that showed evidence of impounding surface waters under normal conditions, e.g. polygonally cracked crusts, continuous and well-developed upland vegetation, and no discernible evidence of bed and bank. The USGS classified the study area to be within sub basin 15010012, and the nearest USGS-identified blue line is the California Wash located approximately 5.3 miles to the east of the proposed project.

Moapa Southern Paiute Solar Facility (formerly K Road Solar Facility) is a similar adjacent 2,000-acre parcel to the east of the proposed Eagle Shadow Mountain Solar Project. The project received an approved jurisdictional determination (July 2011) from the Corps that determined the washes located with the project were non-jurisdictional for the same absence of connection exhibited in the project (SPK-2011-00060-SG). A copy of that jurisdictional delineation and Corps concurrence is located in Appendix F.

4.5 Land Use

Current land use of the study area includes undisturbed and disturbed desert. No observed or documented interstate or foreign commerce associated with aquatic resources was found within the study area.

4.6 Vegetation

The primary vegetation observed within the study area was creosote (*Larrea tridentata*) and white

bursage (*Ambrosia dumosa*). The source of plant species nomenclature is the Corps 2014 National Wetlands Plant List available at <http://rsgisias.crrel.usace.army.mil/NWPL/>. Appendix D contains a list of plants identified observed in the study area.

Section 5. Results

This section presents the results of the Preliminary Jurisdictional Delineation. No wetlands were identified within the Project Area. 118,666 linear feet (22.442 acres) of drainages were delineated within the Project Area. However, due to a lack of hydrologic connectivity to traditional navigable waterways or other WOUS, only 3,442 linear feet (1.14 acres) of drainages were determined to be potential WOUS subject to the jurisdiction of the Corps.

5.1 Aquatic Resources

The Project Area does not contain any wetlands, TNWs, or RPWs. Aquatic resources within the Project Area are limited to swales, erosional features, and non-RPWs. Of these, the non-RPWs with an OHWM were delineated and initially marked as potentially jurisdictional. However, few of the non-RPWs within the Project Area are hydrologically connected to a TNW or RPW that is a direct tributary to a TNW. Drainage locations and reference waypoints are shown in Appendix A, as is a detailed table containing data for each aquatic resource.

The majority of drainages within the project contain two distinct drainage characteristics; drainages that, during a significant precipitation event, flow into a dry lake and drainages that are not hydrologically connected to a tributary of a TNW. Both are discussed below.

Two drainages (ES-1 and ES-2) that are located on the southwestern boundaries are impounded in a dry lakebed located within the Dry Lake Valley. Dry Lake Valley is a closed basin; surface water runoff from the surrounding mountains is directed to the Alkali Flat Dry Lake. Surface runoff is very infrequent, occurring as flows in the ephemeral channels follow rainfall events. In the solar site vicinity, surface water generally flows from the project site toward the Alkali Flat Dry Lake under flooding characteristics of prehistoric dry lake basins (i.e., shallow flash flooding over large areas). The flow of water in these small drainage systems potentially only occurs only during infrequent storm events and has no nexus to the Muddy River system. Precedent was previously determined for the nearby Hyperloop Project, located approximately 9 miles southwest of the project site, where the Corps determined construction would not affect surface waters under jurisdiction of Section 404 of the Clean Water Act (USACE verification for SPK-2016-00266 provided in Appendix G).

The second type of disconnection occurred in areas that contain non-RPW's that could appear to connect to a TNW. These drainages had potential to connect to the Muddy River by way of the California Wash. Certain erosional features 118,666 linear feet (22.442 acres) were recorded as potential WOUS because they contained an OHWM, but many lack a hydrological connection to the nearest traditionally navigable waters (TNW): Muddy River (see Table 1 and Appendix E). Surface water from the site converges into nine separate drainages once they leave the overall project

boundary that have potential to connect to the California Wash. The California Wash is approximately 4 miles to the east from the solar site at its furthest point and approximately 1.3 miles from the transmission line at its closest point. The California Wash ultimately flows into the Muddy River approximately 9.75 miles northeast of the solar site.

Five of the twelve drainages are hydrologically disconnected from the downstream-regulated waters by natural impoundments, the Union Pacific Railroad and/or Interstate 15. These three levels of impoundments prevent ordinary rain events from reaching downstream-regulated waters. The conditions that created the defined bed and bank of the ephemeral washes were likely established during much larger than ordinary storm events. The residual channels are historic and there was no evidence they are actively conveying storm flows from the project area under ordinary conditions. These interruptions do not meet the waters of the US definition per 33 CFR 328.3(4)(iv) and result in the loss of connectivity to downstream waters and, therefore; ephemeral drainages upstream would not be considered jurisdictional. Precedent was previously determined for the adjacent K Road Moapa Solar Facility, located approximately 1 mile east of the project site, where the Corps determined construction would not affect surface waters under jurisdiction of Section 404 of the Clean Water Act (USACE verification and delineation for SPK-2011-00060-SG provided in Appendix F)

Ephemeral drainages that would convey stormwater off the project were evaluated to determine whether they were connected with downstream jurisdictional waters. In more than one location (Appendix A), downstream erosional features consistent with those described in 33 CFR 238.3(4)(vi) were identified between the project and downstream waters. Drainages were numbered from South to North and further organized into to group, non-jurisdictional aquatic resources and potential waters of the U.S.

Non-Jurisdictional Aquatic Resources

- **Drainage 1 (ES-1):** ES-1 is an ephemeral drainage that has a low slope and only potentially flows during and immediately after a rainfall event. Water from this feature would flow into the Alkali Flat Dry Lake south of the project site. Investigation of the downstream portions found a clear loss of connection to downstream-regulated waters, therefore ES-1 is not a WOUS (See Appendix A).
- **Drainage 2 (ES-2):** ES-2 is an ephemeral drainage that has a low slope and only potentially flows during and immediately after a rainfall event. Water from this feature would flow into the Alkali Flat Dry Lake south of the project site. Investigation of the downstream portions found a clear loss of connection to downstream-regulated waters, therefore ES-1 is not a WOUS (See Appendix A).
- **Drainage 3 (ES-3):** ES-3 is an ephemeral drainage that has a low slope and only potentially flows during and immediately after a rainfall event. Water from these features would flow into a drainage that impounds southeast of the project site before it reaches I-15, before it

could flow into the California Wash (See Appendix A).

Preliminary map review suggested the central portion of the proposed project could potentially convey water to the east into California Wash. Detailed field investigations were conducted downstream to ascertain whether the drainages were connected with downstream waters. Breaks in connectivity to downstream-regulated waters were identified. In ES-3, flows are naturally impounded for over 2,200 linear feet. This location shows surface characteristics consistent with impounded water (polygonally cracked crusts, continuous and well-developed upland vegetation, and no discernible evidence of bed and bank). Investigation of the downstream portions found a clear loss of connection to downstream-regulated waters, therefore ES-3 is not a WOUS.

- **Drainage 4 (ES-4):** ES-4 is an ephemeral drainage that has a low slope and only potentially flows during and immediately after a rainfall event. Water from these features flow into a drainage that impounds east of the project site at the UPRR, before it could travel to the California Wash. (See Appendix A).

Similar to ES-4, the northern portion of the proposed project could potentially convey water to the east into California Wash. Investigation of the downstream portions found a clear loss of connection to downstream-regulated waters. In ES-4, flows are diverted approximately 700 feet north by an elevated segment of the Union Pacific Rail Road (UPRR). From the diversion location, there is no OHWM for approximately 1,600 feet before the historic bed and bank is identifiable. This location shows surface characteristics consistent with impounded water (polygonally cracked crusts, continuous and well-developed upland vegetation, and no definable bed and bank). Investigation of the downstream portions found a clear loss of connection to downstream-regulated waters, therefore ES-4 is not a WOUS.

- **Drainage 8 (ES-8):** ES-8 is an ephemeral drainage that has a low slope and only potentially flows during and immediately after a rainfall event. Water from this feature flows into a drainage that impounds east of the transmission line at the UPRR, before water could reach the California Wash. Investigation of the downstream portions found a clear loss of connection to downstream-regulated waters, therefore ES-8 is not a WOUS (See Appendix A).

Potential Waters of the U.S.

- **Drainage 5 (ES-5):** ES-5 is an ephemeral drainage that has a low slope and only potentially flows during and immediately after a rainfall event. Water from this feature flows into a drainage that ultimately converges into the California Wash. Investigation of the downstream portions found a connection to downstream-regulated waters, therefore ES-5 is a WOUS (See Appendix A).

- **Drainage 6 (ES-6):** ES-6 is an ephemeral drainage that has a low slope and only potentially flows during and immediately after a rainfall event. Water from this feature flows into a single drainage that ultimately converges into the California Wash. Investigation of the downstream portions found a connection to downstream-regulated waters, therefore ES-6 is a WOUS (See Appendix A).
- **Drainage 7 (ES-7):** ES-7 is an ephemeral drainage that has a low slope and only potentially flows during and immediately after a rainfall event. Water from this feature flows into a single drainage that ultimately converges into the California Wash. Investigation of the downstream portions found a connection to downstream-regulated waters, therefore ES-7 is a WOUS (See Appendix A).
- **Drainage 9 (ES-9):** ES-9 is an ephemeral drainage that has a low slope and only potentially flows during and immediately after a rainfall event. Water from this feature flows into a drainage that ultimately converges into the California Wash. Investigation of the downstream portions found a connection to downstream-regulated waters, therefore ES-9 is a WOUS (See Appendix A).
- **Drainage 10 (ES-10):** ES-10 is an ephemeral drainage that has a low slope and only potentially flows during and immediately after a rainfall event. Water from this feature flows into a drainage that ultimately converges into the California Wash. Investigation of the downstream portions found a connection to downstream-regulated waters, therefore ES-10 is a WOUS (See Appendix A).
- **Drainage 11 (ES-11):** ES-11 is an ephemeral drainage that has a low slope and only potentially flows during and immediately after a rainfall event. Water from this feature flows into a drainage that ultimately converges into the California Wash. Investigation of the downstream portions found a connection to downstream-regulated waters, therefore ES-11 is a WOUS (See Appendix A).
- **Drainage 12 (ES-12):** ES-12 is an ephemeral drainage that has a low slope and only potentially flows during and immediately after a rainfall event. Water from this feature ultimately reaches the Muddy River. Investigation of the downstream portions found a connection to downstream-regulated waters, therefore ES-12 is a WOUS (See Appendix A).
- **Muddy River (MR):** It is anticipated that an overhead transmission line will cross the Muddy River on land owned by NV Energy. No disturbance is anticipated as the transmission structures will span the OHWM of this waterway.

Section 6. References

Environmental Protection Agency and U.S. Army Corps of Engineers. 2008. Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States* and *Carabell v. United States*. Memo dated December 2, 2008.

Lichvar R, McColley SM. 2008. A field guide to the identification of the ordinary high water mark (OHWM) in the arid west region of the United States: A delineation manual. ERDC/CRREL TR-08-12. Hanover (NH): Cold Regions Research and Engineering Laboratory, Corps Research and Development Center.

[Corps] U.S. Army Corps of Engineers. Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.

[Corps] U.S. Army Corps of Engineers. 2001. Final summary report: Guidelines for jurisdictional delineations for waters of the United States in the arid Southwest. San Francisco (CA): Corps South Pacific Division.

Corps and Environmental Protection Agency. 2007. U.S. Army Corps of Engineers jurisdictional delineation form instructional guidebook and approved jurisdictional delineation form (Appendix B). Littleton (CO): Corps.

[Corps] U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Appendix A — Aquatic Resource Delineation Maps

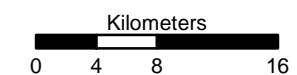
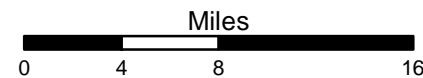


Eagle Shadow Mountain Solar

Jurisdictional Delineation
Location Map

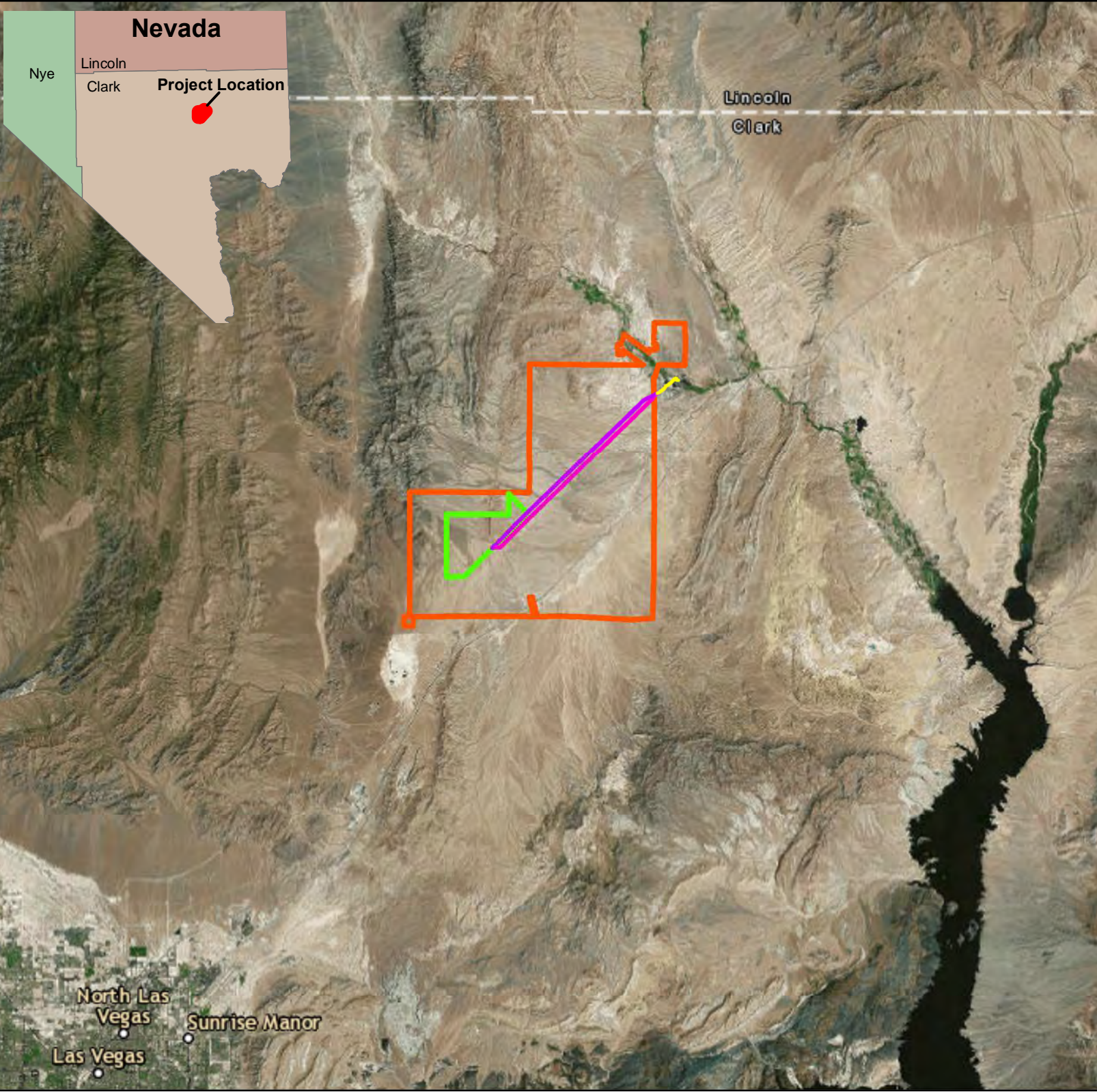
Legend

- ESMS Boundary
- Proposed Gen-Tie (Alt 2)
- Alt 3 Gen-Tie
- NVE Gen-Tie Reid Gardner
- Moapa Tribal Boundary



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 41,667 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap





Eagle Shadow Mountain Solar

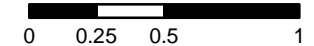
Jurisdictional Delineation
Site Overview Map

Legend

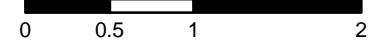
- ESMS Boundary
- JD Sample Points
- Non-Jurisdictional Drainages
- Non-Jurisdictional Drainage Outfall
- Potential Jurisdictional Drainages
- Potential WOUS Drainage Outfall
- Proposed Gen-Tie (Alt 2)
- Alt 3 Gen-Tie
- Development Exclusion Area
- Moapa Tribal Boundary



Miles



Kilometers

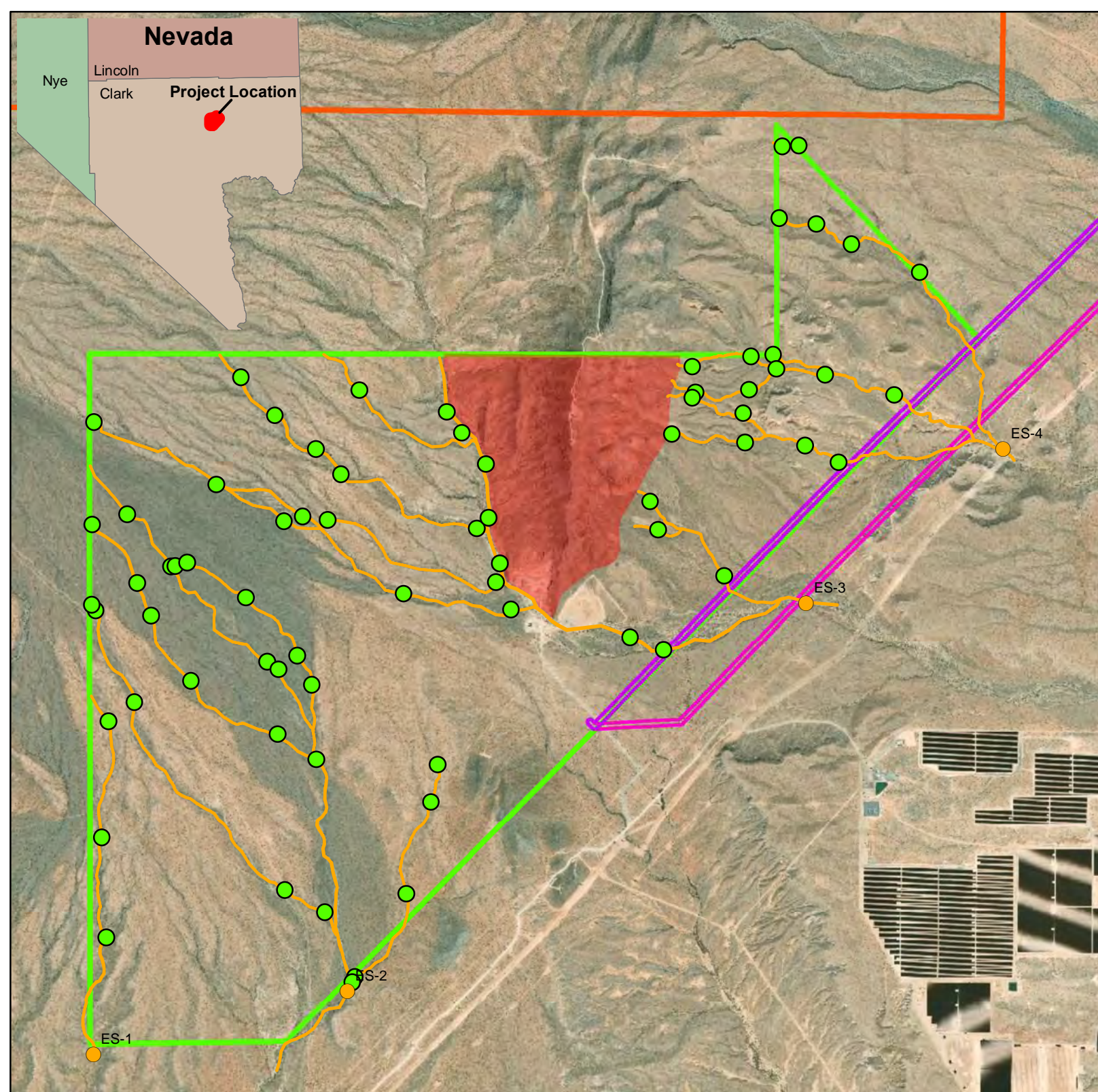


Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 3,750 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



January 19, 2019



Eagle Shadow Mountain Solar

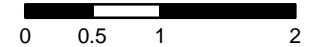
Jurisdictional Delineation
Gen-Tie Overview Map

Legend

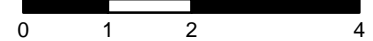
- ESMS Boundary
- JD Sample Points
- Non-Jurisdictional Drainages
- Non-Jurisdictional Drainage Outfall
- Potential Jurisdictional Drainages
- Potential WOUS Drainage Outfall
- Alt 3 Gen-Tie
- Proposed Gen-Tie (Alt 2)
- NVE Gen-Tie to Reid Gardner
- Development Exclusion Area
- Moapa Tribal Boundary



Miles



Kilometers



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
 Projection: Mercator Auxiliary Sphere
 Datum: WGS 1984
 1 in = 7,500 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

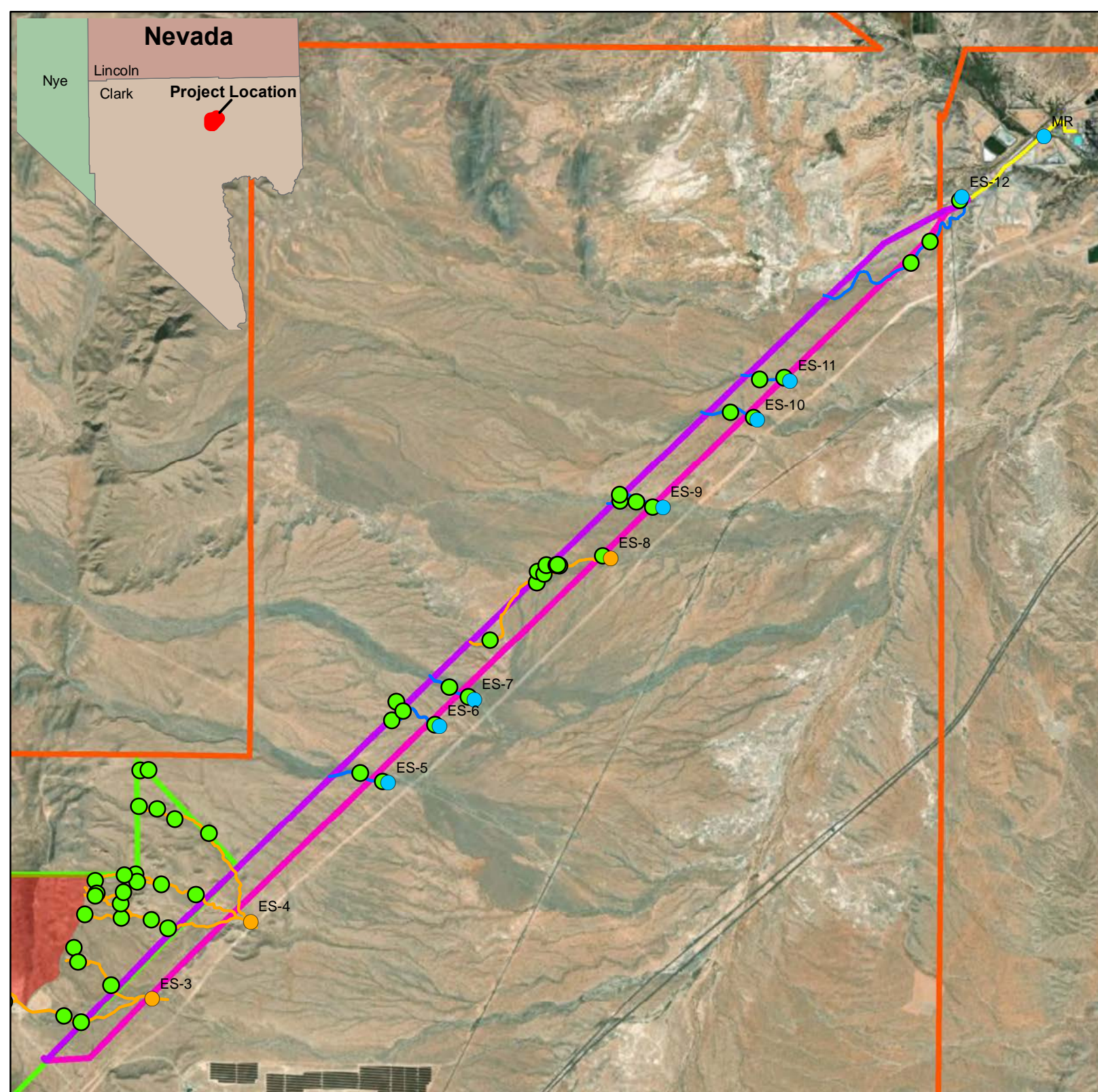


Table 1. Potential Aquatic Resources within the Study Area

Waters Name	Sample Point	Drainage	Cowadin Code	HGM Code	Area (acres)	Width (feet)	Linear (feet)	Waters Type	Lat. (dd)	Long. (dd)
Solar Field										
Unnamed wash 1	1	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	3.47	24'	6300	Non-RPW	36.5496	-114.805114
Unnamed wash 1	8	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	1.15	18'	2794	Non-RPW	36.55586	-114.806178
Unnamed wash 1	83	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.16	18'	377	Non-RPW	36.54413	-114.792181
Unnamed wash 1	300	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.49	24'	883	Non-RPW	36.54492	-114.794813
Unnamed wash 8	13	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.23	3'	3388	Non-RPW	36.55784	-114.808063
Unnamed wash 8	20	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.17	6'	1262	Non-RPW	36.56054	-114.816145
Unnamed wash 22	48	ES-1	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.33	6'	2389	Non-RPW	36.53229	-114.836412
Unnamed wash 22	51	ES-1	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.49	15'	1428	Non-RPW	36.52595	-114.836066
Unnamed wash 22	153	ES-1	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.32	4'	3478	Non-RPW	36.53961	-114.835908
Unnamed wash 32	68	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.10	4'	1063	Non-RPW	36.53687	-114.809984
Unnamed wash 32	70	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.05	1'	2355	Non-RPW	36.53449	-114.810492
Unnamed wash 32	77	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.07	5'	640	Non-RPW	36.52871	-114.812442
Unnamed wash 32	44	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE		3'		Non-RPW	36.52345	-114.816486
Unnamed wash 37	84	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.06	6'	455	Non-RPW	36.57597	-114.782844
Unnamed wash 37	85	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE		5'		Non-RPW	36.57602	-114.781532
Unnamed wash 40	88	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.24	10'	1054	Non-RPW	36.57142	-114.78308
Unnamed wash 40	90	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.01	6'	84	Non-RPW	36.57106	-114.780178

Table 1. Potential Aquatic Resources within the Study Area

Waters Name	Sample Point	Drainage	Cowadin Code	HGM Code	Area (acres)	Width (feet)	Linear (feet)	Waters Type	Lat. (dd)	Long. (dd)
Unnamed wash 40	93	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.04	5'	337	Non-RPW	36.56979	-114.777395
Unnamed wash 40	99	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.35	7'	2163	Non-RPW	36.56801	-114.772018
Unnamed wash 101	41	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.07	5'	621	Non-RPW	36.52755	-114.818848
Unnamed wash 101	46	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.10	4'	1090	Non-RPW	36.52893	-114.822017
Unnamed wash 101	135	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.03	6'	205	Non-RPW	36.54697	-114.837212
Unnamed wash 101	101	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.35	6'	2506	Non-RPW	36.54664	-114.836884
Unnamed wash 101	150	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	1.21	9'	5869	Non-RPW	36.54081	-114.833856
Unnamed wash 105	36	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.25	10'	1075	Non-RPW	36.53878	-114.822606
Unnamed wash 105	37	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	1.96	16'	5338	Non-RPW	36.53719	-114.819527
Unnamed wash 105	45	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE		9'		Non-RPW	36.52313	-114.816699
Unnamed wash 105	132	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.65	15'	1889	Non-RPW	36.55205	-114.837168
Unnamed wash 105	141	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.21	5'	1833	Non-RPW	36.54629	-114.832544
Unnamed wash 105	149	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.35	6'	2515	Non-RPW	36.54216	-114.829396
Unnamed wash 105	105	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.14	7'	843	Non-RPW	36.54837	-114.833629
Unnamed wash 107	31	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.17	6'	1236	Non-RPW	36.5429	-114.822503
Unnamed wash 107	107	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.31	4'	3413	Non-RPW	36.54941	-114.830961
Unnamed wash 107	131	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.37	5'	3197	Non-RPW	36.5527	-114.834424
Unnamed wash 107	145	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.03	4'	325	Non-RPW	36.54338	-114.823403

Table 1. Potential Aquatic Resources within the Study Area

Waters Name	Sample Point	Drainage	Cowadin Code	HGM Code	Area (acres)	Width (feet)	Linear (feet)	Waters Type	Lat. (dd)	Long. (dd)
Unnamed wash 109	32	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.11	6'	797	Non-RPW	36.54376	-114.821052
Unnamed wash 109	109	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.07	2'	1579	Non-RPW	36.54966	-114.829714
Unnamed wash 109	143	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.13	3'	1916	Non-RPW	36.54743	-114.825074
Unnamed wash 109	33	ES-2	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.20	5'	1718	Non-RPW	36.54194	-114.819895
Unnamed wash 112	63	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.13	10'	569	Non-RPW	36.54669	-114.804207
Unnamed wash 112	65	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.74	12'	2669	Non-RPW	36.54768	-114.812653
Unnamed wash 112	112	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.47	6'	3391	Non-RPW	36.55226	-114.822091
Unnamed wash 112	124	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.56	7'	3471	Non-RPW	36.55853	-114.83703
Unnamed wash 112	127	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.42	10'	1826	Non-RPW	36.55458	-114.827423
Unnamed wash 112c	113	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.73	12'	2633	Non-RPW	36.55256	-114.820588
Unnamed wash 114	26	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.15	4'	4588	Non-RPW	36.55236	-114.818657
Unnamed wash 114	28	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.02	4'	191	Non-RPW	36.54842	-114.805416
Unnamed wash 117	2	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.05	9'	226	Non-RPW	36.55179	-114.806896
Unnamed wash 117	24	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.26	3'	3826	Non-RPW	36.55524	-114.817589
Unnamed wash 117	117	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.23	12'	832	Non-RPW	36.55683	-114.819563
Unnamed wash 117	120	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.69	15'	1991	Non-RPW	36.56136	-114.825477
Unnamed wash 117	129	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.51	16'	1379	Non-RPW	36.55895	-114.822787
Unnamed wash 302	302	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.15	9'	710	Non-RPW	36.5488	-114.787429

Table 1. Potential Aquatic Resources within the Study Area

Waters Name	Sample Point	Drainage	Cowadin Code	HGM Code	Area (acres)	Width (feet)	Linear (feet)	Waters Type	Lat. (dd)	Long. (dd)
Unnamed wash 302	350	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.07	2'	2949	Non-RPW	36.55171	-114.79265
Unnamed wash 302b	340	ES-3	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.07	2'	1115	Non-RPW	36.55351	-114.793259
Unnamed wash 307	307	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.05	3'	734	Non-RPW	36.55599	-114.778437
Unnamed wash 307	315	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.08	4'	907	Non-RPW	36.55706	-114.781055
Unnamed wash 307	317	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.14	4'	1474	Non-RPW	36.55725	-114.785788
Unnamed wash 307	337	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.17	4'	1894	Non-RPW	36.55777	-114.791558
Unnamed wash 309	309	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.14	10'	610	Non-RPW	36.56023	-114.774062
Unnamed wash 309	313	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.20	3'	2862	Non-RPW	36.5628	-114.783561
Unnamed wash 309b	310	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.02	6'	119	Non-RPW	36.56154	-114.779479
Unnamed wash 309b	314	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.10	4'	1115	Non-RPW	36.5619	-114.783314
Unnamed wash 309b	331	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.05	3'	674	Non-RPW	36.56269	-114.785308
Unnamed wash 309b	332	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.08	2'	1777	Non-RPW	36.56202	-114.789928
Unnamed wash 309c	320	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.06	3'	804	Non-RPW	36.56057	-114.785468
Unnamed wash 309c	334	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.23	5'	2021	Non-RPW	36.56041	-114.789688
Unnamed wash 335	318	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.12	7'	751	Non-RPW	36.55909	-114.785922
Unnamed wash 335	335	ES-4	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.13	3'	1953	Non-RPW	36.56007	-114.789933
Transmission Line										
Unnamed wash 501	501	ES-12	R6 - RIVERINE, EPHEMERAL	RIVERINE	0	6'	--	Non-RPW	36.64277	-114.65847
Unnamed wash 501	503	ES-12	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.05	12'	165	Non-RPW	36.64794	-114.653765

Table 1. Potential Aquatic Resources within the Study Area

Waters Name	Sample Point	Drainage	Cowadin Code	HGM Code	Area (acres)	Width (feet)	Linear (feet)	Waters Type	Lat. (dd)	Long. (dd)
Unnamed wash 501	511	ES-12	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.06	3'	905	Non-RPW	36.64009	-114.661471
Unnamed wash 510	520	ES-11	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.01	3'	163	Non-RPW	36.62557	-114.68148
Unnamed wash 510	521	ES-11	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.02	4'	171	Non-RPW	36.6254	-114.685298
Unnamed wash 511	522	ES-10	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.03	9'	134	Non-RPW	36.62053	-114.686219
Unnamed wash 511	523	ES-10	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.05	12'	189	Non-RPW	36.62121	-114.689887
Unnamed wash 512	524	ES-9	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.04	13'	131	Non-RPW	36.60919	-114.70213
Unnamed wash 512	527	ES-9	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.07	16'	184	Non-RPW	36.61081	-114.707361
Unnamed wash 513	525	ES-9	R6 - RIVERINE, EPHEMERAL	RIVERINE	0	6'	--	Non-RPW	36.60987	-114.704713
Unnamed wash 513	526	ES-9	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.03	6'	236	Non-RPW	36.60999	-114.707264
Unnamed wash 901	901	ES-5	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.1	36'	147	Non-RPW	36.57451	-114.744673
Unnamed wash 901	904	ES-5	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.2	32'	218	Non-RPW	36.57564	-114.748175
Unnamed wash 904	907	ES-6	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.04	7'	227	Non-RPW	36.58231	-114.74324
Unnamed wash 904	909	ES-6	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.02	6'	150	Non-RPW	36.58345	-114.741442
Unnamed wash 905	908	ES-6	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.02	8'	129	Non-RPW	36.58467	-114.742525
Unnamed wash 905	910	ES-6	R6 - RIVERINE, EPHEMERAL	RIVERINE	0	25'	--	Non-RPW	36.58171	-114.736421
Unnamed wash 906	112-912b	ES-6	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.1	35'	125	Non-RPW	36.58644	-114.734184
Unnamed wash 906	911	ES-7	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.3	80'	166	Non-RPW	36.58525	-114.731141
Unnamed wash 908	913	ES-8	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.01	6'	80	Non-RPW	36.59241	-114.727758

Table 1. Potential Aquatic Resources within the Study Area

Waters Name	Sample Point	Drainage	Cowadin Code	HGM Code	Area (acres)	Width (feet)	Linear (feet)	Waters Type	Lat. (dd)	Long. (dd)
Unnamed wash 908	917	ES-8	R6 - RIVERINE, EPHEMERAL	RIVERINE		3'		Non-RPW	36.59973	-114.720396
Unnamed wash 913	528	ES-8	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.01	16'	40	Non-RPW	36.60306	-114.710031
Unnamed wash 913	529	ES-8	R6 - RIVERINE, EPHEMERAL	RIVERINE		16'		Non-RPW	36.60187	-114.716875
Unnamed wash 913	920	ES-8	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.02	17'	40	Non-RPW	36.60107	-114.720285
Unnamed wash 913	921	ES-8	R6 - RIVERINE, EPHEMERAL	RIVERINE		12'		Non-RPW	36.60074	-114.719239
Unnamed wash 914	922	ES-8	R6 - RIVERINE, EPHEMERAL	RIVERINE	0.002	2'	40	Non-RPW	36.60188	-114.718888
Unnamed wash 914	927	ES-8	R6 - RIVERINE, EPHEMERAL	RIVERINE		6'		Non-RPW	36.60193	-114.717117
Unnamed wash 914	926	ES-8	R6 - RIVERINE, EPHEMERAL	RIVERINE		3'	28	Non-RPW	36.60189	-114.717332
Total					21.302		115,226		Non-JD	
Total					1.14		3,440		Potential JD	
Project Total					22.442		118,666		Project Total	

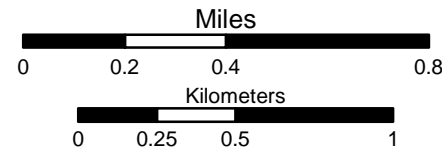
RPW = Relatively Permanent Waters

Eagle Shadow Mountain Solar

Jurisdictional Delineation
Aquatic Delineation Map 1

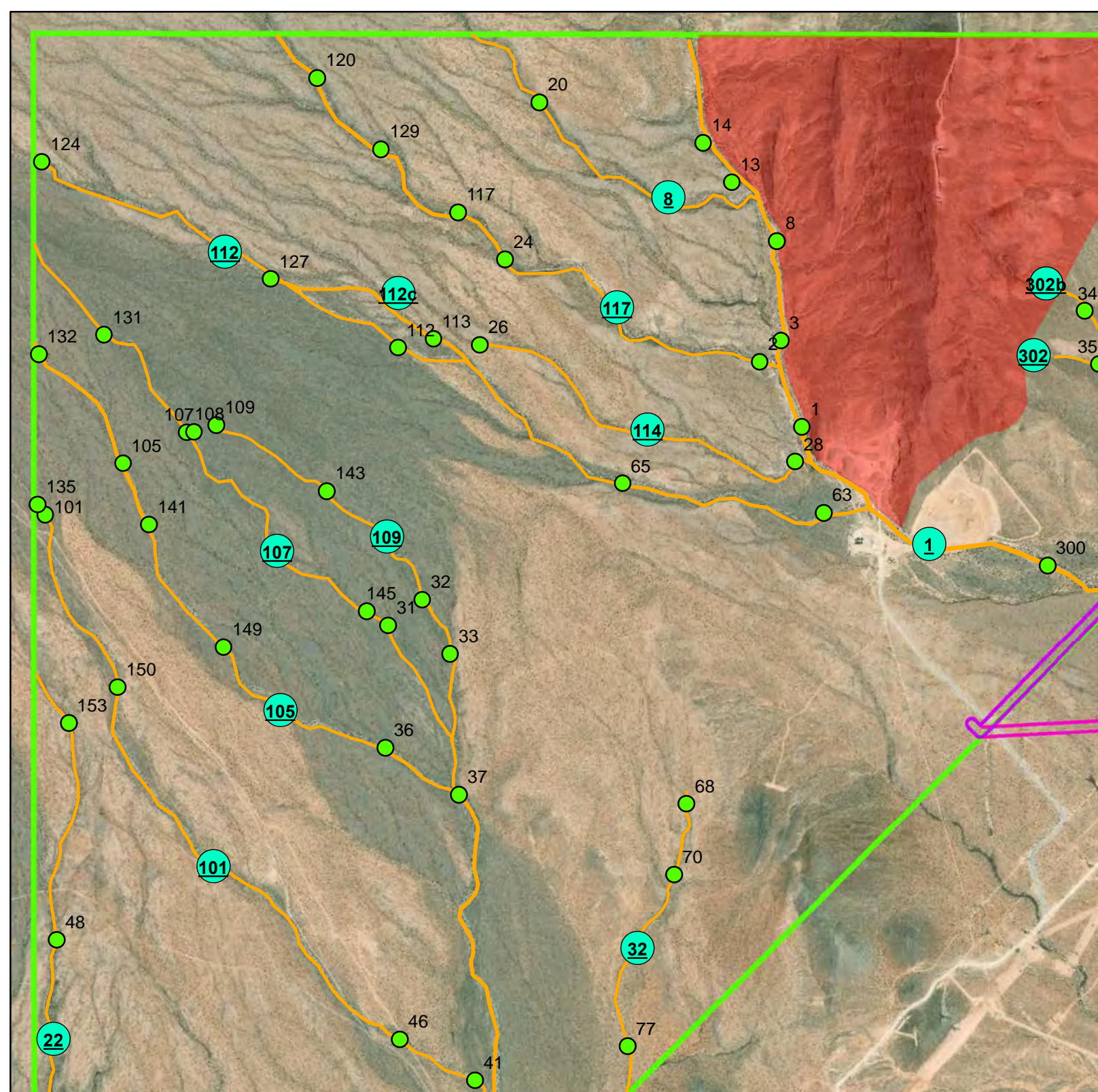
Legend

- ESMS Boundary
- JD Sample Points
- Non-Jurisdictional Drainages
- Non-Jurisdictional Drainage Outfall
- Potential Jurisdictional Drainages
- Potential WOUS Drainage Outfall
- Proposed Gen-Tie (Alt 2)
- Alt 3 Gen-Tie
- Development Exclusion Area
- Moapa Tribal Boundary



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
 Projection: Mercator Auxiliary Sphere
 Datum: WGS 1984
 1 in = 2,000 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community





Eagle Shadow Mountain Solar

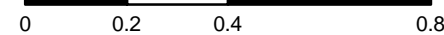
Jurisdictional Delineation
Aquatic Delineation Map 2

Legend

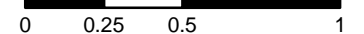
- ESMS Boundary
- JD Sample Points
- Non-Jurisdictional Drainages
- Non-Jurisdictional Drainage Outfall
- Potential Jurisdictional Drainages
- Potential WOUS Drainage Outfall
- Proposed Gen-Tie (Alt 2)
- Alt 3 Gen-Tie
- Development Exclusion Area
- Moapa Tribal Boundary



Miles



Kilometers



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 2,000 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



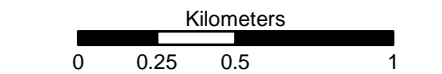
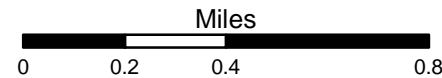
January 19, 2018

Eagle Shadow Mountain Solar

Jurisdictional Delineation
Aquatic Delineation Map 3

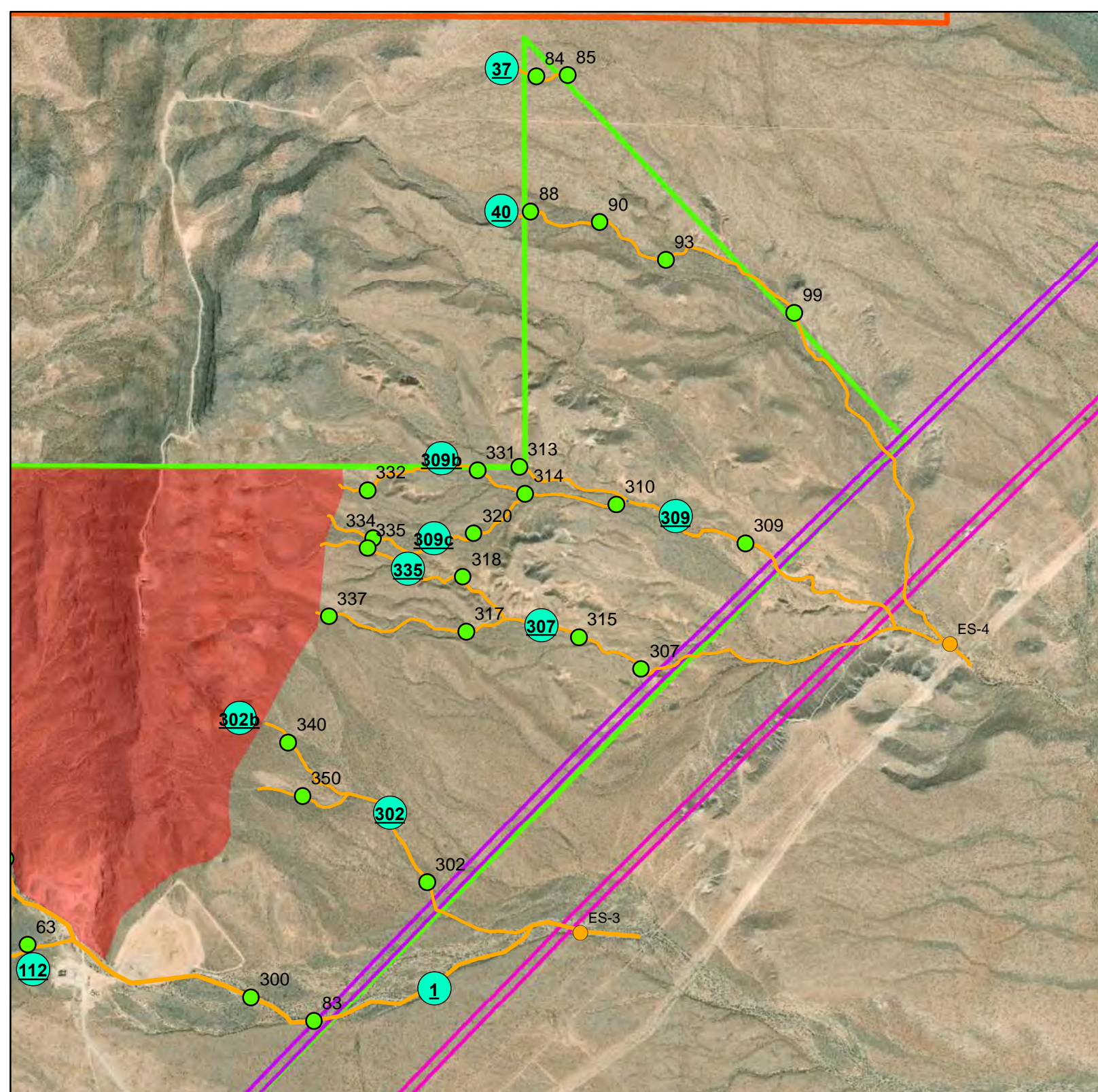
Legend

- ESMS Boundary
- JD Sample Points
- Non-Jurisdictional Drainages
- Non-Jurisdictional Drainage Outfall
- Potential Jurisdictional Drainages
- Potential WOUS Drainage Outfall
- Proposed Gen-Tie (Alt 2)
- Alt 3 Gen-Tie
- Development Exclusion Area
- Moapa Tribal Boundary



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
 Projection: Mercator Auxiliary Sphere
 Datum: WGS 1984
 1 in = 2,000 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community





Eagle Shadow Mountain Solar

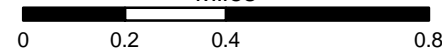
Jurisdictional Delineation
Aquatic Delineation Map 4

Legend

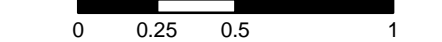
- ESMS Boundary
- JD Sample Points
- Non-Jurisdictional Drainages
- Non-Jurisdictional Drainage Outfall
- Potential Jurisdictional Drainages
- Potential WOUS Drainage Outfall
- Proposed Gen-Tie (Alt 2)
- Alt 3 Gen-Tie
- Development Exclusion Area
- Moapa Tribal Boundary



Miles



Kilometers

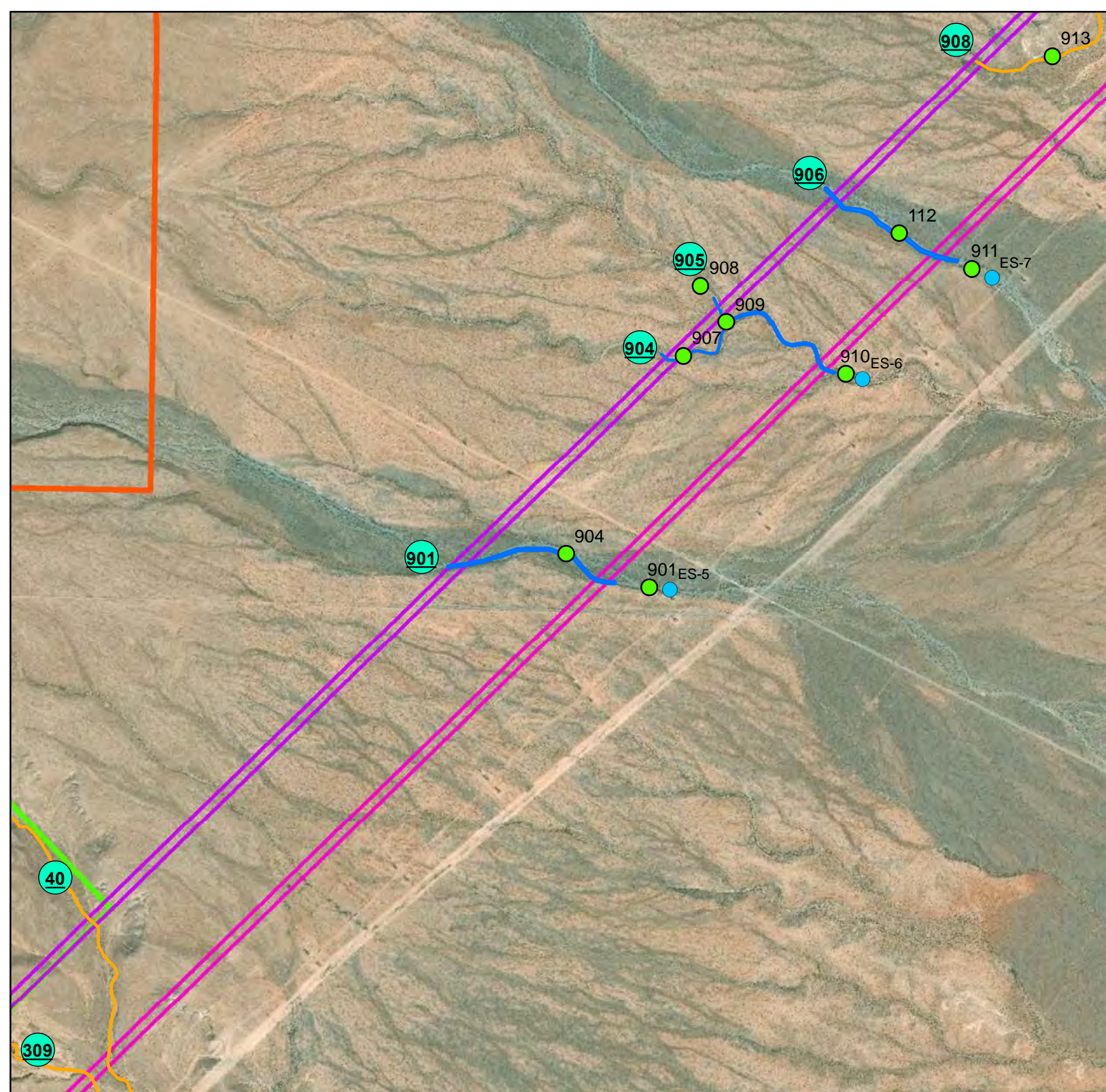


Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 2,000 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community













January 19, 2018



Eagle Shadow Mountain Solar

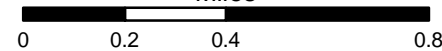
Jurisdictional Delineation
Aquatic Delineation Map 5

Legend

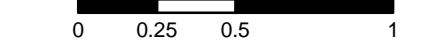
-  ESMS Boundary
-  JD Sample Points
-  Non-Jurisdictional Drainages
-  Non-Jurisdictional Drainage Outfall
-  Potential Jurisdictional Drainages
-  Potential WOUS Drainage Outfall
-  Proposed Gen-Tie (Alt 2)
-  Alt 3 Gen-Tie
-  Development Exclusion Area
-  Moapa Tribal Boundary



Miles

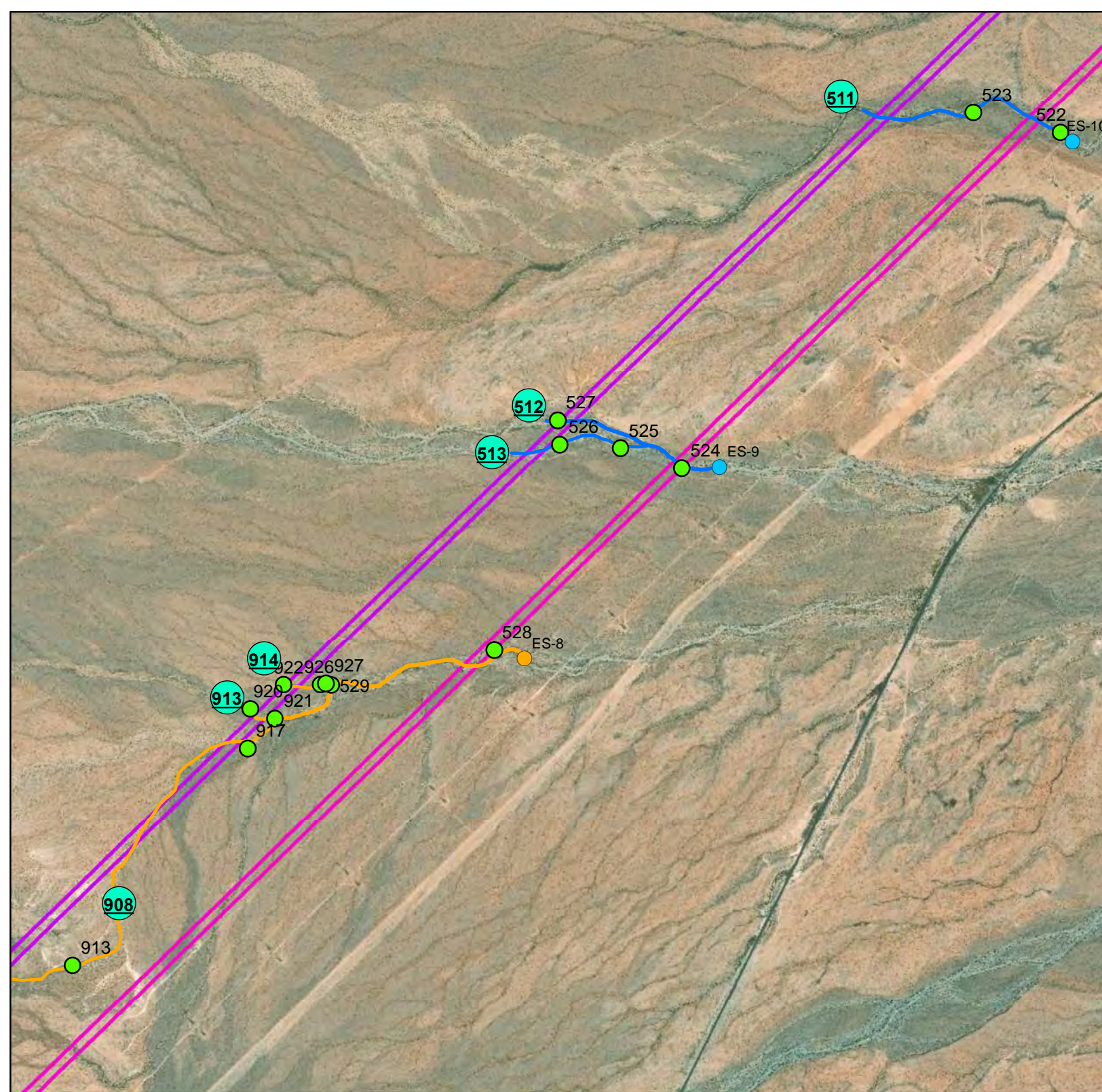


Kilometers



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
 Projection: Mercator Auxiliary Sphere
 Datum: WGS 1984
 1 in = 2,000 ft












Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Eagle Shadow Mountain Solar

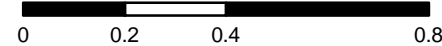
Jurisdictional Delineation
Aquatic Delineation Map 6

Legend

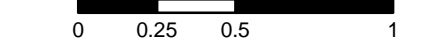
-  ESMS Boundary
-  JD Sample Points
-  Non-Jurisdictional Drainages
-  Non-Jurisdictional Drainage Outfall
-  Potential Jurisdictional Drainages
-  Potential WOUS Drainage Outfall
-  Proposed Gen-Tie (Alt 2)
-  Alt 3 Gen-Tie
-  NVE Gen-Tie to Reid Gardner
-  Development Exclusion Area
-  Moapa Tribal Boundary



Miles

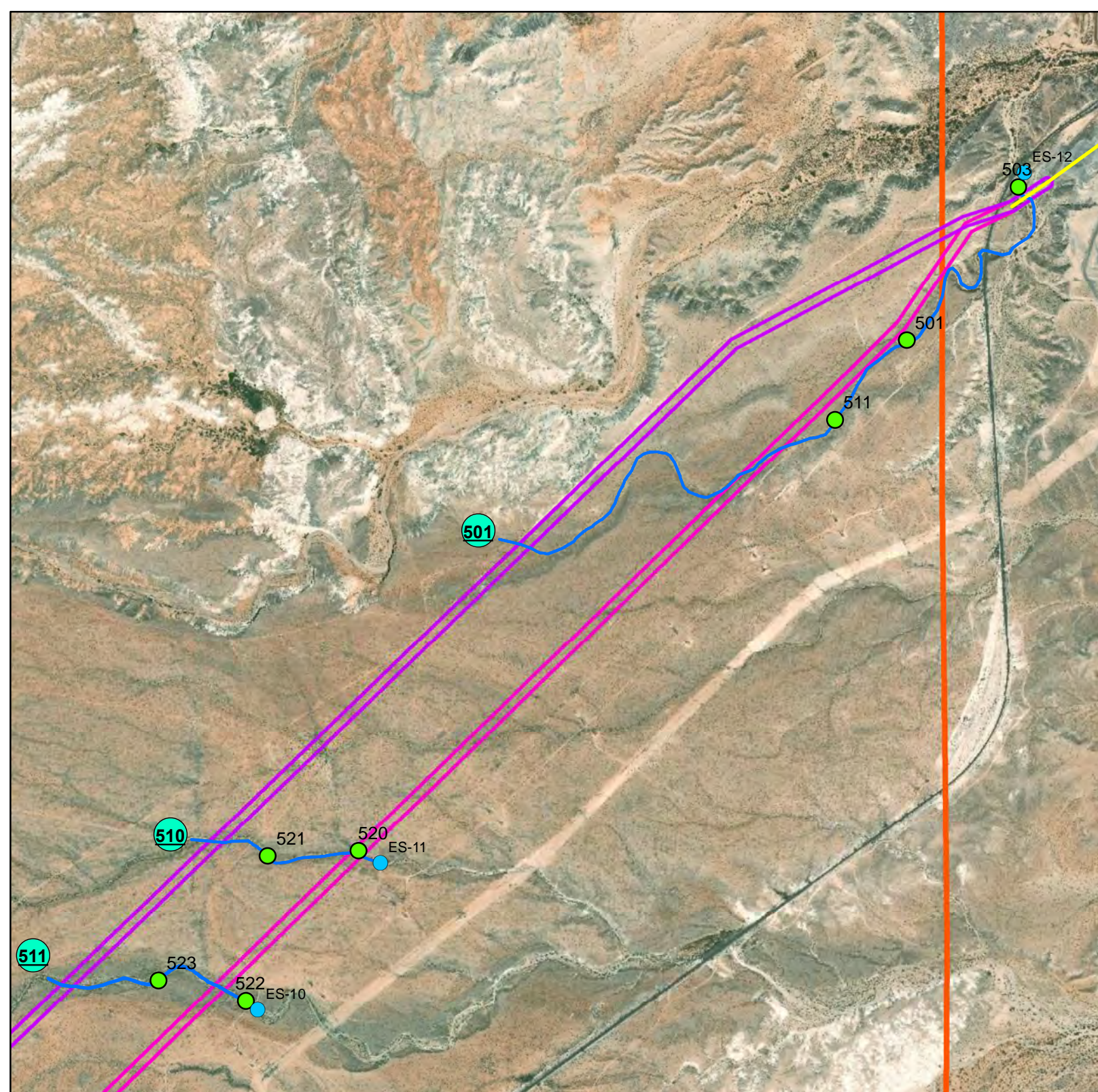


Kilometers



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
 Projection: Mercator Auxiliary Sphere
 Datum: WGS 1984
 1 in = 2,000 ft












Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Eagle Shadow Mountain Solar

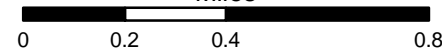
Jurisdictional Delineation
Aquatic Delineation Map 7

Legend

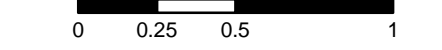
-  ESMS Boundary
-  JD Sample Points
-  Non-Jurisdictional Drainages
-  Non-Jurisdictional Drainage Outfall
-  Potential Jurisdictional Drainages
-  Potential WOUS Drainage Outfall
-  Proposed Gen-Tie (Alt 2)
-  Alt 3 Gen-Tie
-  NVE Gen-Tie to Reid Gardner
-  Development Exclusion Area
-  Moapa Tribal Boundary



Miles



Kilometers



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
 Projection: Mercator Auxiliary Sphere
 Datum: WGS 1984
 1 in = 2,000 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community








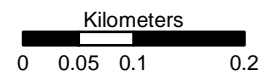
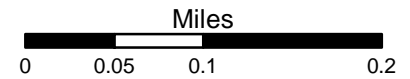


Eagle Shadow Mountain Solar

Jurisdictional Delineation
Potential Jurisdictional Feature
ES-5

Legend

-  JD Sample Points
-  Potential Jurisdictional Drainages
-  Potential WOUS Drainage Outfall
-  Proposed Gen-Tie (Alt 2)
-  Alt 3 Gen-Tie



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 569 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



January 19, 2019








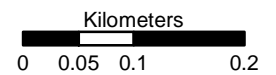
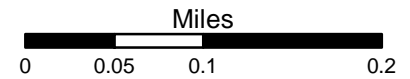


Eagle Shadow Mountain Solar

Jurisdictional Delineation
Potential Jurisdictional Feature
ES-6

Legend

-  JD Sample Points
-  Potential Jurisdictional Drainages
-  Potential WOUS Drainage Outfall
-  Proposed Gen-Tie (Alt 2)
-  Alt 3 Gen-Tie



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 569 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community








January 19, 2019

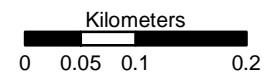
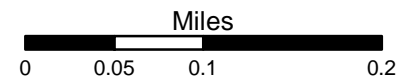


Eagle Shadow Mountain Solar

Jurisdictional Delineation
Potential Jurisdictional Feature
ES-7

Legend

-  JD Sample Points
-  Potential Jurisdictional Drainages
-  Potential WOUS Drainage Outfall
-  Proposed Gen-Tie (Alt 2)
-  Alt 3 Gen-Tie



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 569 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community








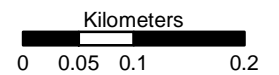
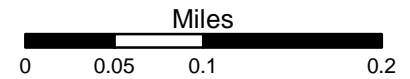


Eagle Shadow Mountain Solar

Jurisdictional Delineation
Potential Jurisdictional Feature
ES-9

Legend

-  JD Sample Points
-  Potential Jurisdictional Drainages
-  Potential WOUS Drainage Outfall
-  Proposed Gen-Tie (Alt 2)
-  Alt 3 Gen-Tie



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 569 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community








January 19, 2019

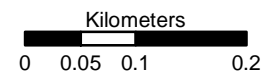
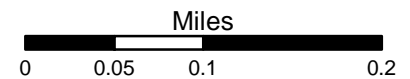


Eagle Shadow Mountain Solar

Jurisdictional Delineation
Potential Jurisdictional Feature
ES-10

Legend

-  JD Sample Points
-  Potential Jurisdictional Drainages
-  Potential WOUS Drainage Outfall
-  Proposed Gen-Tie (Alt 2)
-  Alt 3 Gen-Tie



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 569 ft






Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

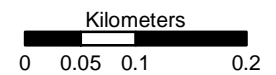
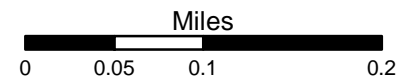


Eagle Shadow Mountain Solar

Jurisdictional Delineation
Potential Jurisdictional Feature
ES-11

Legend

-  JD Sample Points
-  Potential Jurisdictional Drainages
-  Potential WOUS Drainage Outfall
-  Proposed Gen-Tie (Alt 2)
-  Alt 3 Gen-Tie

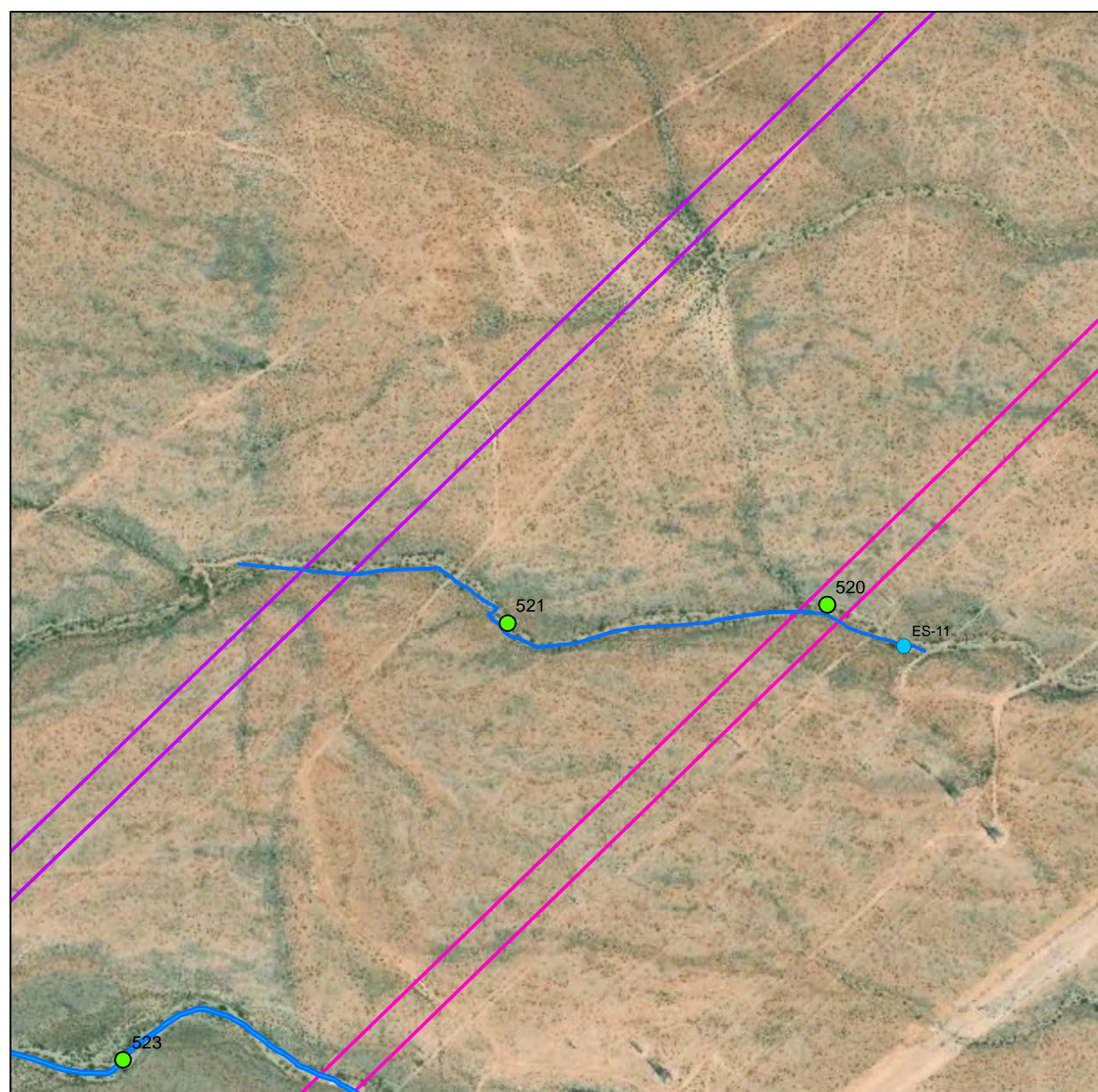


Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 569 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



January 19, 2019








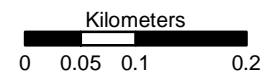
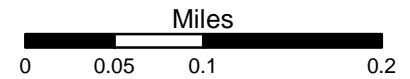


Eagle Shadow Mountain Solar

Jurisdictional Delineation
Potential Jurisdictional Feature
ES-12 map 1

Legend

-  JD Sample Points
-  Potential Jurisdictional Drainages
-  Potential WOUS Drainage Outfall
-  Proposed Gen-Tie (Alt 2)
-  Alt 3 Gen-Tie



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 569 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community









January 19, 2019

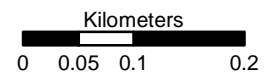
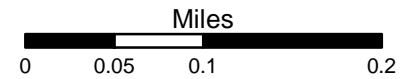


Eagle Shadow Mountain Solar

Jurisdictional Delineation
Potential Jurisdictional Feature
ES-12 map 2

Legend

-  JD Sample Points
-  Potential Jurisdictional Drainages
-  Potential WOUS Drainage Outfall
-  Proposed Gen-Tie (Alt 2)
-  Alt 3 Gen-Tie
-  NVE Gen-Tie to Reid Gardner

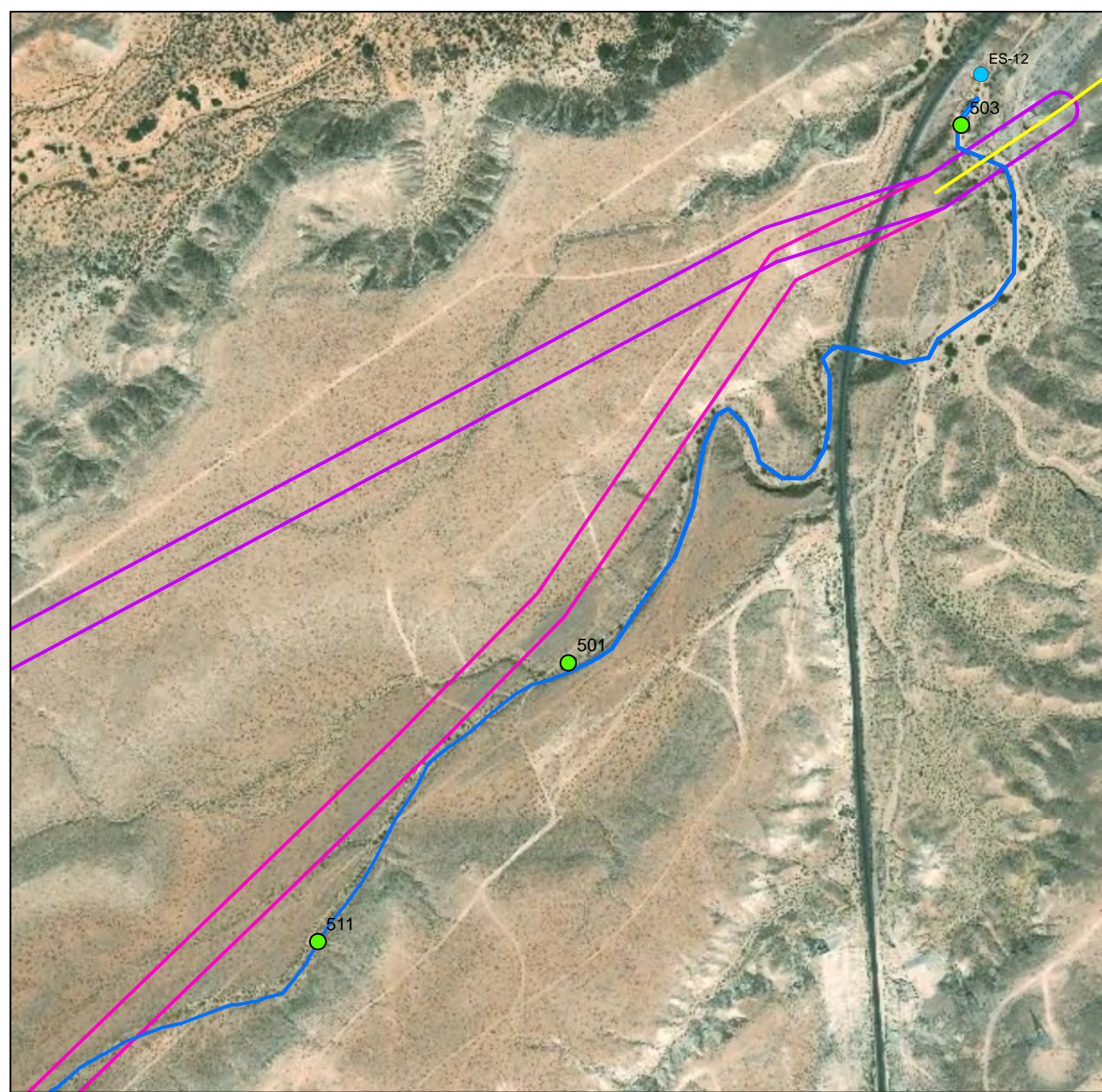


Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 569 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community









January 19, 2019

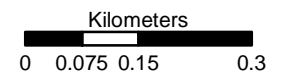
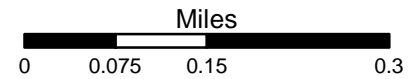


Eagle Shadow Mountain Solar

Jurisdictional Delineation
Potential Jurisdictional Feature
ES-MR

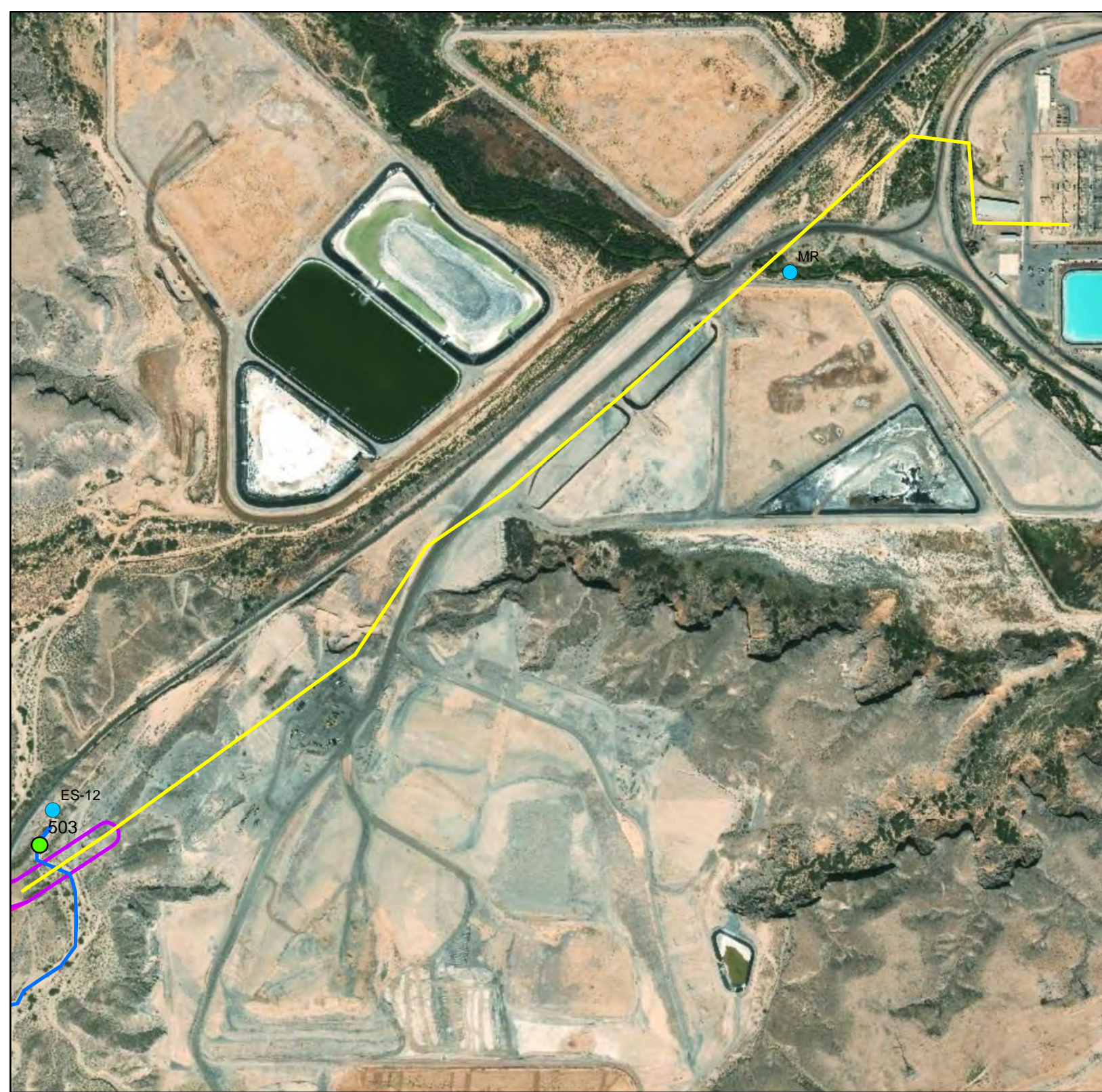
Legend

-  JD Sample Points
-  Potential Jurisdictional Drainages
-  Potential WOUS Drainage Outfall
-  Proposed Gen-Tie (Alt 2)
-  Alt 3 Gen-Tie
-  NVE Gen-Tie to Reid Gardner



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 833 ft

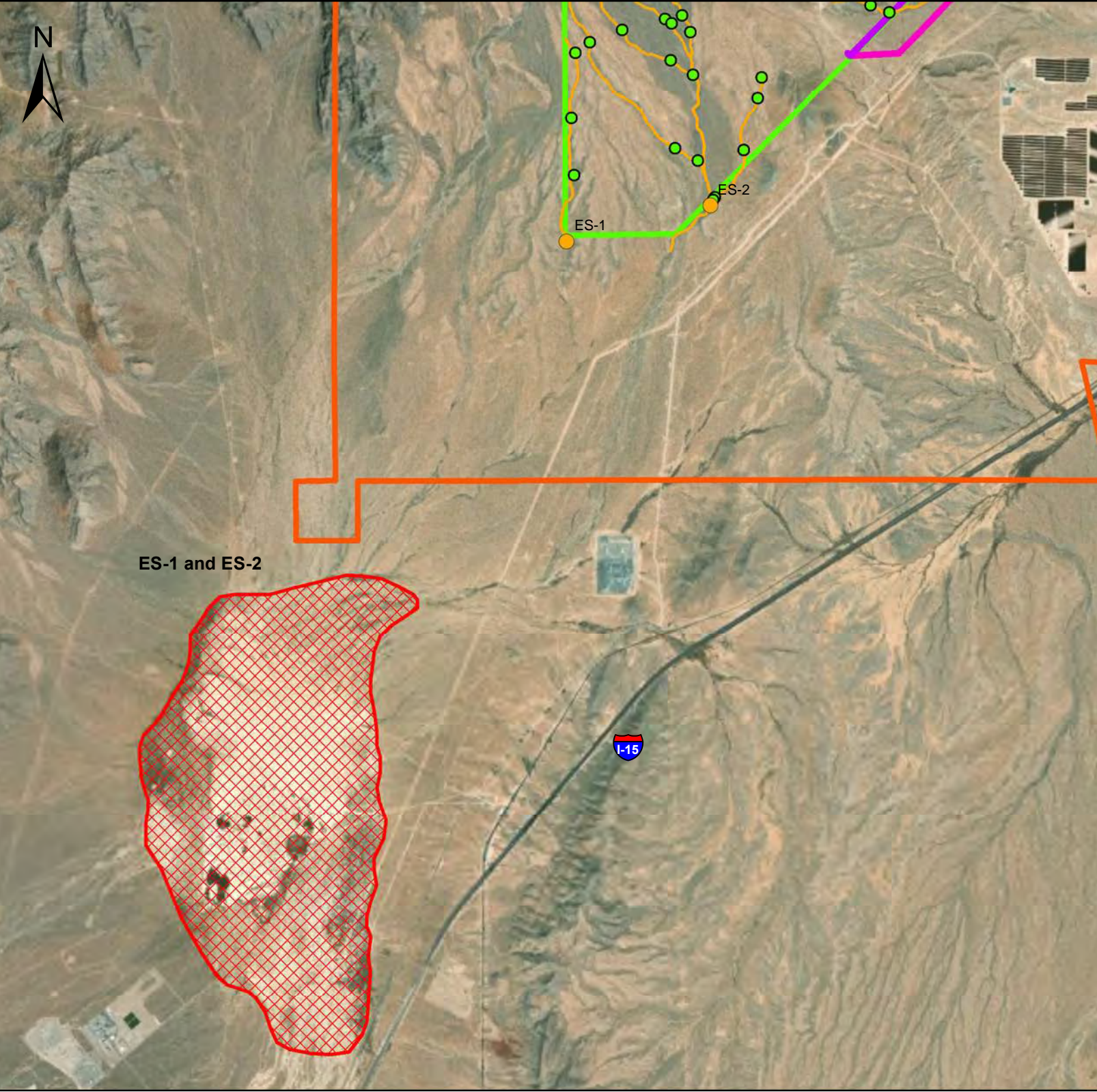
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
















Eagle Shadow Mountain Solar

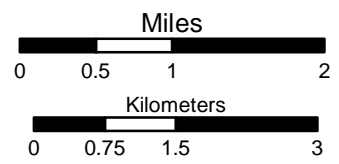
Jurisdictional Delineation
Impoundment Overview
ES-1 and ES-2



ES-1 and ES-2

Legend

-  ESMS Boundary
-  Proposed Gen-Tie (Alt 2)
-  Alt 3 Gen-Tie
-  Non-Jurisdictional Drainages
-  Non-Jurisdictional Drainage Outfall
-  Potential Jurisdictional Drainages
-  Potential WOUS Drainage Outfall
-  Impoundments
-  JD Sample Points
-  Development Exclusion Area
-  Moapa Tribal Boundary



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 6,667 ft

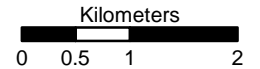
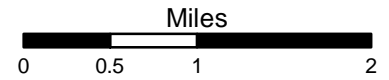
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap

Eagle Shadow Mountain Solar

Jurisdictional Delineation
Impoundment Overview
ES-3, ES-4 and ES-8

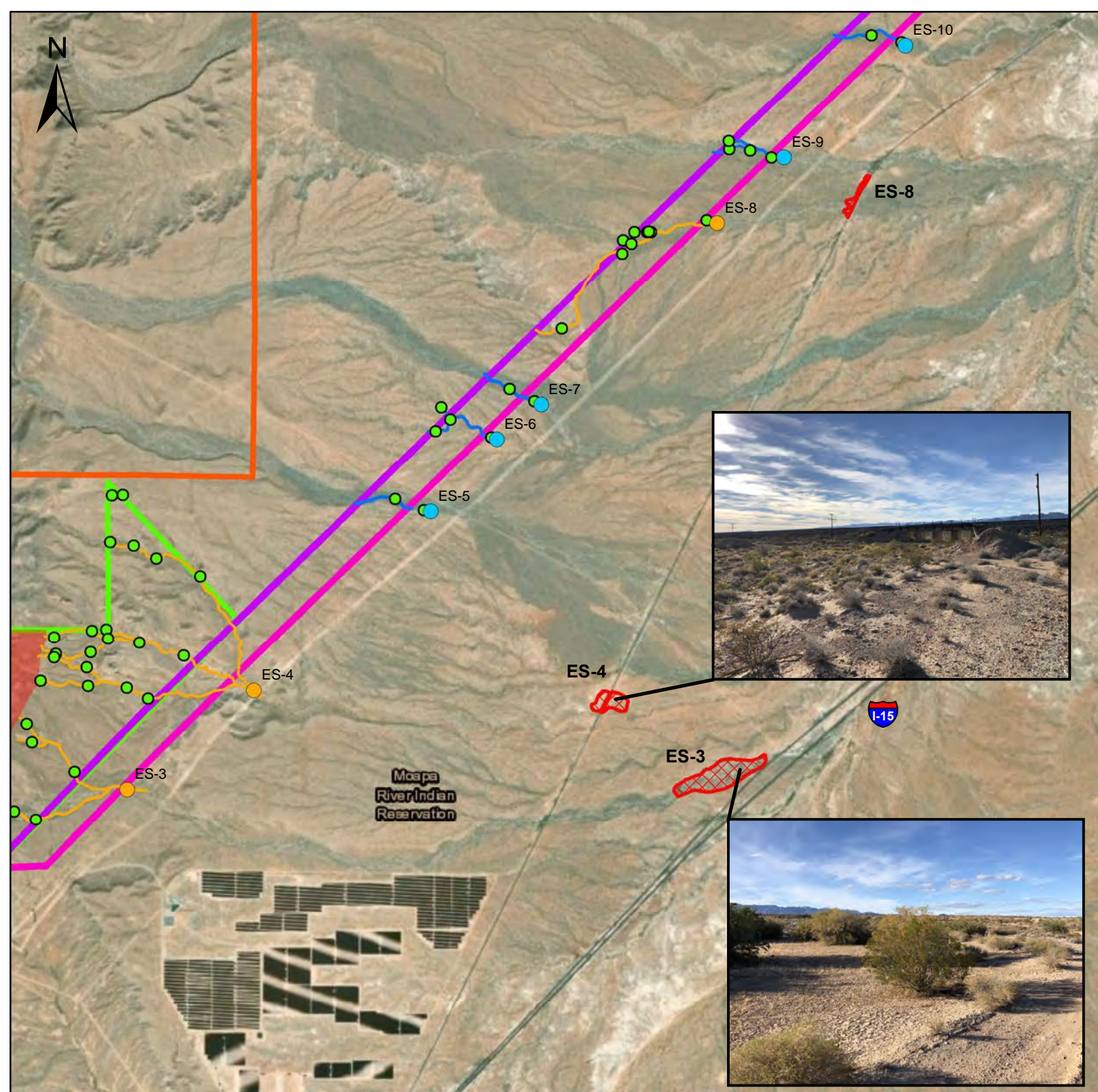
Legend

- ESMS Boundary
- Proposed Gen-Tie (Alt 2)
- Alt 3 Gen-Tie
- Non-Jurisdictional Drainages
- Non-Jurisdictional Drainage Outfall
- Potential Jurisdictional Drainages
- Potential WOUS Drainage Outfall
- Impoundments
- JD Sample Points
- Development Exclusion Area
- Moapa Tribal Boundary



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 5,833 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap



Appendix B — Supporting Maps

Eagle Shadow Mountain Solar

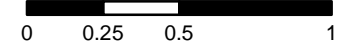
Jurisdictional Delineation
Topographical Map 1

Legend

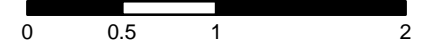
- ESMS Boundary
- JD Sample Points
- Non-Jurisdictional Drainages
- Non-Jurisdictional Drainage Outfall
- Potential Jurisdictional Drainages
- Potential WOUS Drainage Outfall
- Proposed Gen-Tie (Alt 2)
- Alt 3 Gen-Tie
- Development Exclusion Area
- Moapa Tribal Boundary



Miles

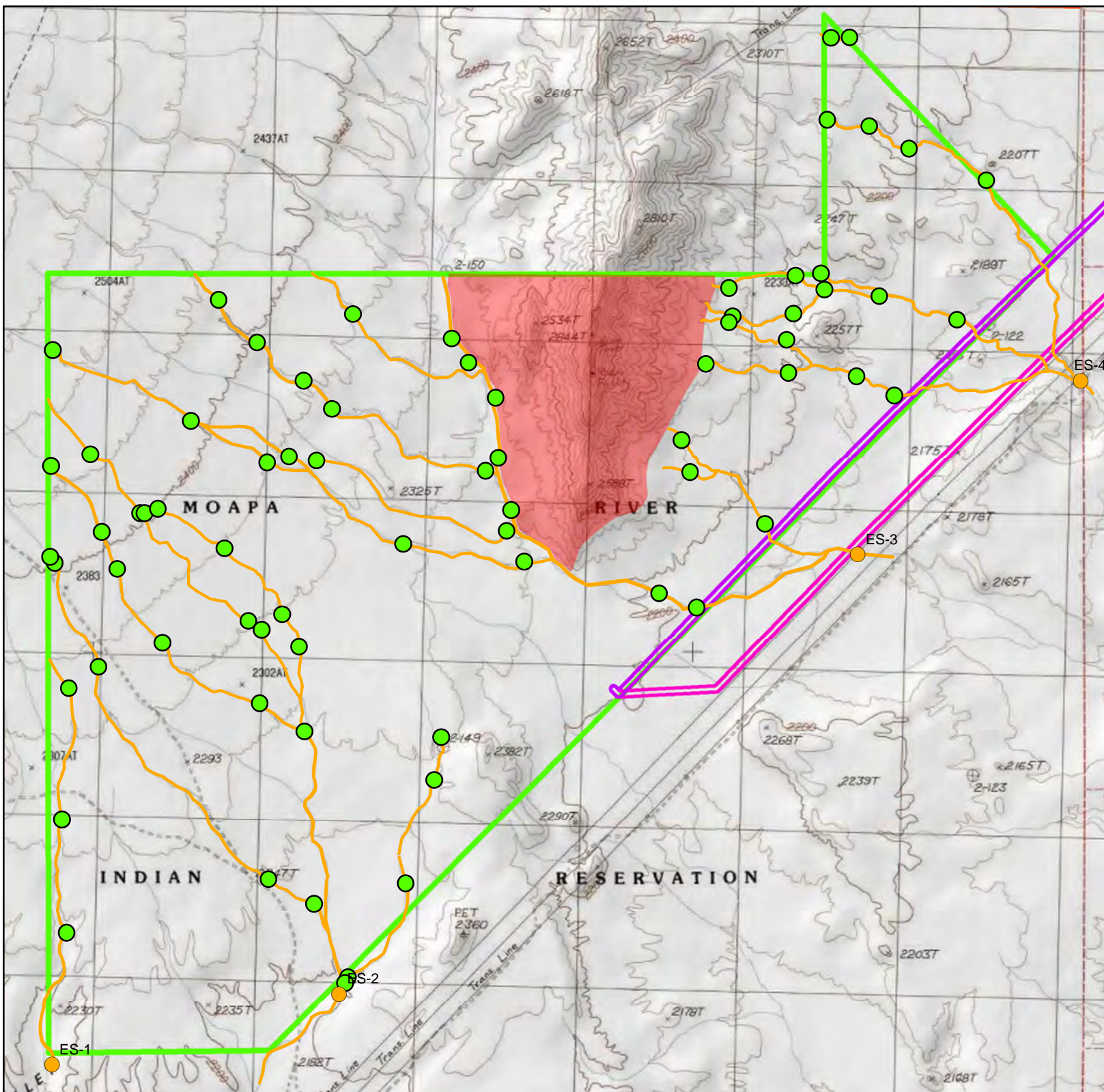


Kilometers



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
 Projection: Mercator Auxiliary Sphere
 Datum: WGS 1984
 1 in = 3,333 ft

Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed



Eagle Shadow Mountain Solar

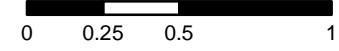
Jurisdictional Delineation
Topographical Map 2

Legend

- ESMS Boundary
- JD Sample Points
- Non-Jurisdictional Drainages
- Non-Jurisdictional Drainage Outfall
- Potential Jurisdictional Drainages
- Potential WOUS Drainage Outfall
- Proposed Gen-Tie (Alt 2)
- Alt 3 Gen-Tie
- Development Exclusion Area
- Moapa Tribal Boundary



Miles

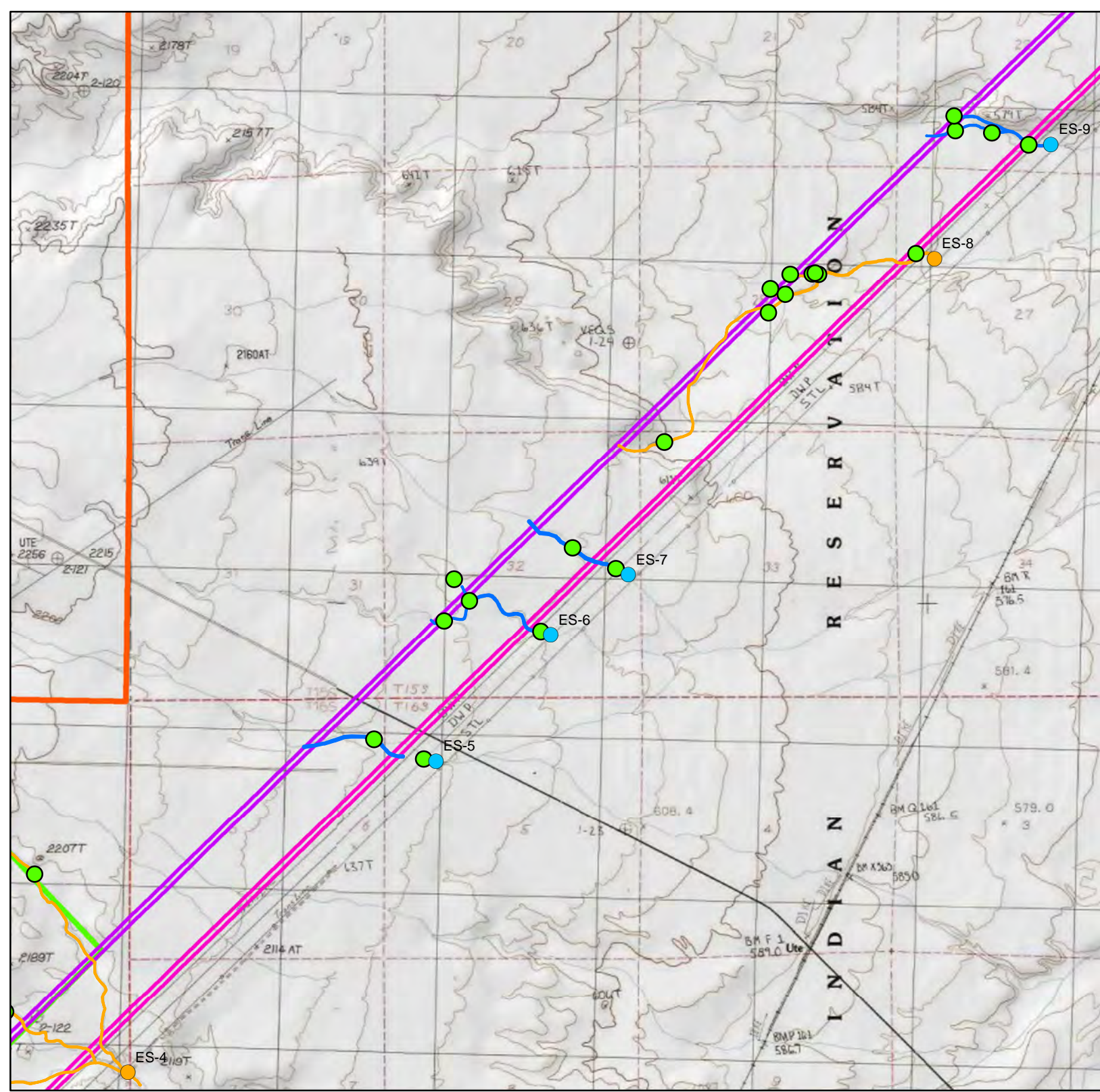


Kilometers



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
 Projection: Mercator Auxiliary Sphere
 Datum: WGS 1984
 1 in = 3,333 ft

Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed



Eagle Shadow Mountain Solar

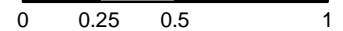
Jurisdictional Delineation
Topographical Map 3

Legend

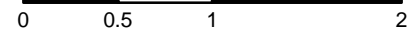
- ESMS Boundary
- JD Sample Points
- Non-Jurisdictional Drainages
- Non-Jurisdictional Drainage Outfall
- Potential Jurisdictional Drainages
- Potential WOUS Drainage Outfall
- Proposed Gen-Tie (Alt 2)
- Alt 3 Gen-Tie
- NVE Gen-Tie to Reid Gardner
- Development Exclusion Area
- Moapa Tribal Boundary



Miles

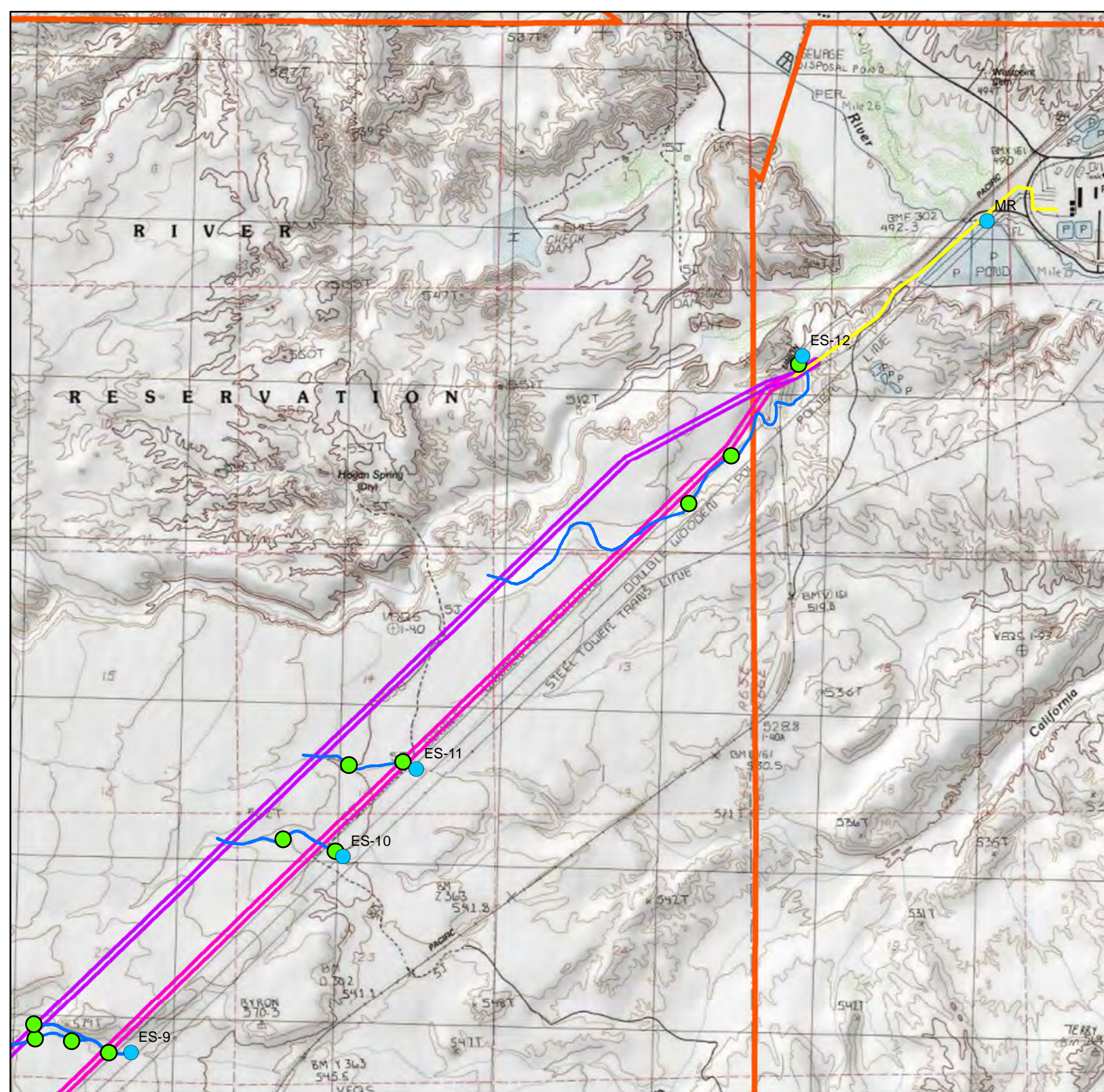


Kilometers



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984
1 in = 3,333 ft





Service Layer Credits: Copyright: © 2013 National Geographic Society, i-cubed










Eagle Shadow Mountain Solar

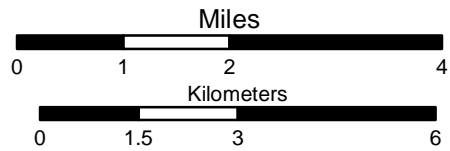
Jurisdictional Delineation
Soils Map

Legend

-  ESMS Boundary
-  Alt 3 Gen-Tie
-  Proposed Gen-Tie (Alt 2)
-  NVE Gen-Tie to Reid Gardner

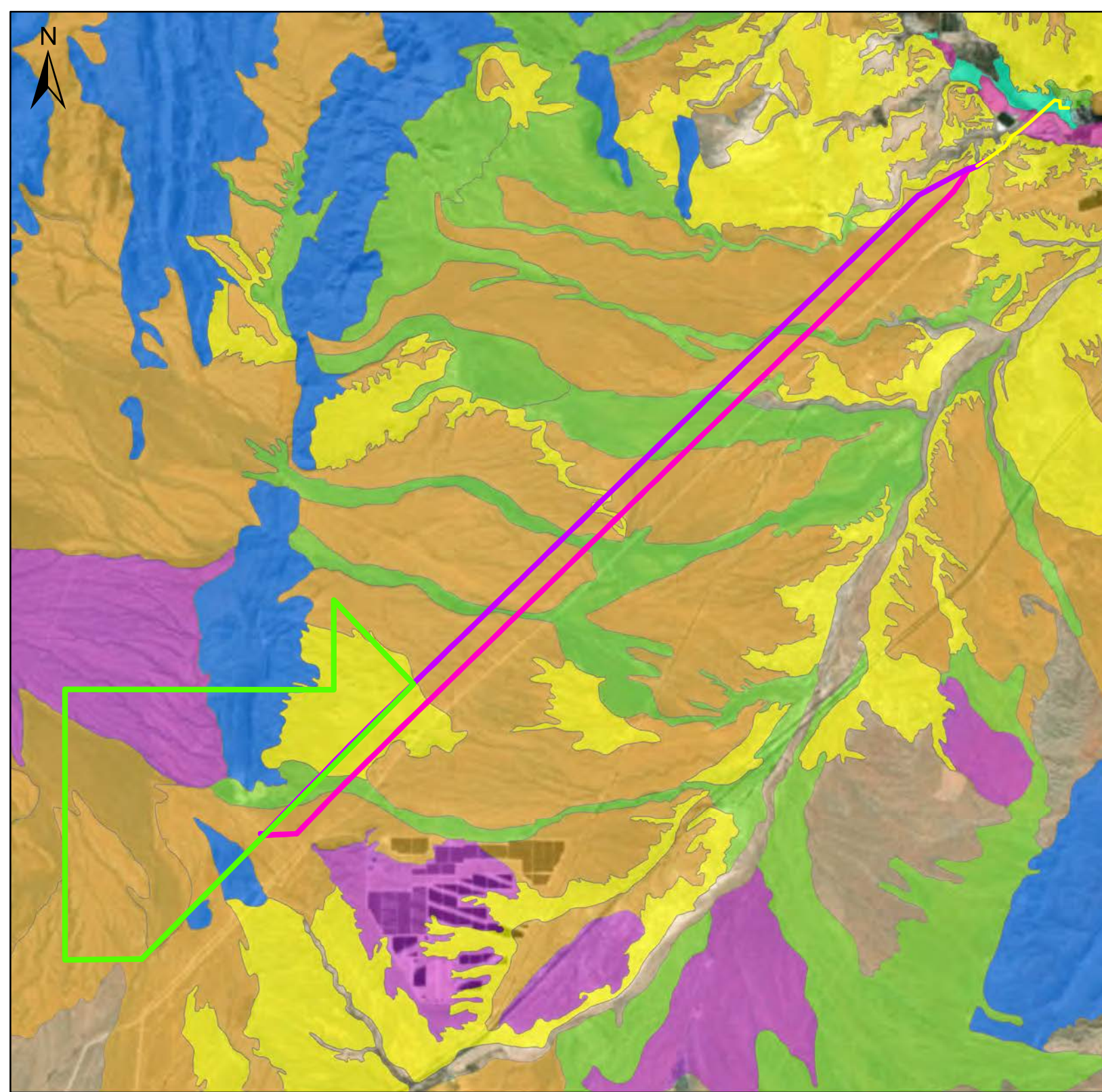
Soil Series

-  Badland Series
-  Bard Series
-  Mormon Mesa Series
-  Overton Series
-  St. Thomas Series
-  Tonopah Series
-  Virgin River Series



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
 Projection: Mercator Auxiliary Sphere
 Datum: WGS 1984
 1 in = 9,544 ft

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Appendix C — Photographs

Eagle Shadow Mountain Solar



Sample Point 1



Sample Point 2



Sample Point 8



Sample Point 20



Sample Point 24



Sample Point 26



Sample Point 28



Sample Point 31



Sample Point 32



Sample Point 33



Sample Point 36



Sample Point 37



Sample Point 41



Sample Point 44



Sample Point 45



Sample Point 46



Sample Point 48



Sample Point 51



Sample Point 63



Sample Point 65



Sample Point 68



Sample Point 70



Sample Point 77



Sample Point 83



Sample Point 84



Sample Point 85



Sample Point 88



Sample Point 90



Sample Point 93



Sample Point 99



Sample Point 101



Sample Point 105



Sample Point 107



Sample Point 108



Sample Point 109



Sample Point 112



Sample Point 113



Sample Point 117



Sample Point 120



Sample Point 124



Sample Point 127



Sample Point 129



Sample Point 131



Sample Point 132



Sample Point 135



Sample Point 141



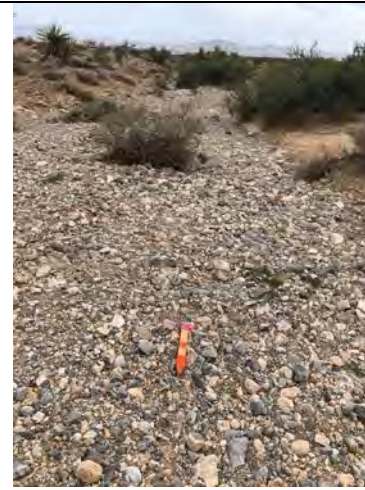
Sample Point 143



Sample Point 145



Sample Point 149



Sample Point 150



Sample Point 153



Sample Point 300



Sample Point 302



Sample Point 307



Sample Point 309



Sample Point 310



Sample Point 313



Sample Point 314



Sample Point 315



Sample Point 317



Sample Point 318



Sample Point 320



Sample Point 331



Sample Point 332



Sample Point 334



Sample Point 335



Sample Point 337



Sample Point 340



Sample Point 350



Sample Point 501



Sample Point 503



Sample Point 511



Sample Point 520



Sample Point 521



Sample Point 522



Sample Point 523



Sample Point 524



Sample Point 525



Sample Point 526



Sample Point 527



Sample Point 528



Sample Point 529



Sample Point 901



Sample Point 904



Sample Point 907



Sample Point 908



Sample Point 909



Sample Point 910



Sample Point 911



Sample Point 112-912b



Sample Point 913



Sample Point 917



Sample Point 920



Sample Point 921



Sample Point 922



Sample Point 926



Sample Point 927

Appendix D — Plant List

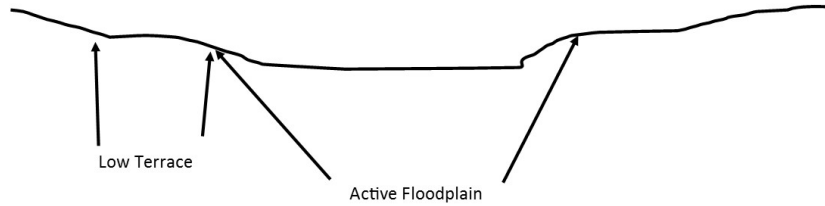
Family	Scientific Name	Common Name	WIS*
LILIOPSIDA – Monocots			
<i>Poaceae</i> – Grass Family			
	<i>Hilarai rigida</i>	Big galletta	NI
MAGNOLIOPSIDA – Dicots			
<i>Agavaceae</i> – Century-Plant Family			
	<i>Yucca schidigera</i>	Mojave yucca	UPL
<i>Asteraceae</i> – Sunflower Family			
	<i>Ambrosia dumosa</i>	burweed, white bursage	NI
	<i>Baileya multiradiata</i>	desert marigold	NI
	<i>Encelia farinosa</i>	brittle bush	NI
	<i>Encilia frutescens</i>	Buton brittle bush	NI
	<i>Hymenoclea salsola</i>	cheesebush	NI
	<i>Pluchea sericea</i>	Arrowweed	FACW
<i>Cactaceae</i> – Cactus Family			
	<i>Echinocactus polycephalus</i>	cotton top cactus	NI
<i>Ephedraceae</i> – <i>Ephedra</i> Family			
	<i>Ephedra nevadensis</i>	mormon tea	NI
<i>Fabaceae</i>			
	<i>Propsis glandulara</i>	honey mesquite	FAC
	<i>Psorothamnus arborescens</i>	Mojave indigo bush	NI
	<i>Senegalia greggii</i>	catclaw acacia	FACU
<i>Krameriaceae</i> – <i>Krameria</i> Family			
	<i>Krameria erecta</i>	rhatany	NI
<i>Malvaceae</i> – Mallow Family			
	<i>Sphaeralcea ambigua</i>	Desert globemallow	NI
<i>Solanaceae</i> – Nightshade Family			
	<i>Lycium spp</i>	wolfberry	NI
<i>Tamaricaceae</i> – <i>Tamarix</i> Family			
	<i>Tamarix</i>	Tamarisk	NI
<i>Zygophyllaceae</i> – Caltrop Family			
	<i>Larrea tridentata</i>	creosote bush	NI
*Indicates non-native and/or invasive plants			
* Wetland Indicator Status (WIS):			
OBL	=	occurs in aquatic resources > 99% of time	
FACW	=	occurs in aquatic resources 67-99% of time	
FAC	=	occurs in aquatic resources 34-66% of time	
FACU	=	occurs in aquatic resources 1-33% of time	
UPL	=	occurs in uplands > 99% of time	
NI	=	indicator status not known in this region	
~	=	unsure as to FAC or FACU	

Appendix E — OHWM Data Sheet

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Eagle Shadow Mountain Solar Project Number: ESMS 1 Stream: ESMS ES-1 Investigator(s): Andrew Butsavich and Justin Romanowitz	Date: August 23, 2018 Town: Moapa Reserv. Photo begin file#:	Time: State: Nevada Photo end file#:				
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input type="checkbox"/> / N <input checked="" type="checkbox"/> Is the site significantly disturbed?	Location Details: Projection: UTM Zone 11 Datum: NAD 83 Coordinates: 36.518821° -114.837028°					
Potential anthropogenic influences on the channel system: No anthropogenic sources influence this channel system.						
Brief site description: The project area is in the low-elevation arid Mojave Desert, surrounded by desert mountain terrain. Elevation ranges from 2,370 to 2,170 feet above mean sea level. Soils are shallow alluvium with a shallow caliche layer. Vegetation is dominated by a creosote bursage scrub with typical Mojave Desert species.						
Checklist of resources (if available): <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event </td> </tr> </table>			<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event		
<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event					
Hydrogeomorphic Floodplain Units 						
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM: <ol style="list-style-type: none"> 1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site. 2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units. 3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units. <ol style="list-style-type: none"> a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit. c) Identify any indicators present at the location. 4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section. 5. Identify the OHWM and record the indicators. Record the OHWM position via: <table style="width: 100%; border: none; margin-top: 5px;"> <tr> <td style="width: 50%;"><input checked="" type="checkbox"/> Mapping on aerial photograph</td> <td style="width: 50%;"><input type="checkbox"/> GPS</td> </tr> <tr> <td><input checked="" type="checkbox"/> Digitized on computer</td> <td><input type="checkbox"/> Other:</td> </tr> </table> 			<input checked="" type="checkbox"/> Mapping on aerial photograph	<input type="checkbox"/> GPS	<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:
<input checked="" type="checkbox"/> Mapping on aerial photograph	<input type="checkbox"/> GPS					
<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:					

Cross section drawing:



OHWM

GPS point: 36.518821° -114.837028°

Indicators:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Change in average sediment texture | <input checked="" type="checkbox"/> Break in bank slope |
| <input type="checkbox"/> Change in vegetation species | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Change in vegetation cover | <input type="checkbox"/> Other: _____ |

Comments:

Evidence of sorting

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Course sand to gravel

Total veg cover: 25 % Tree: 0 % Shrub: 20 % Herb: 5 %

Community successional stage:

- | | |
|---|--|
| <input type="checkbox"/> NA | <input checked="" type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|---|--|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input type="checkbox"/> Drift and/or debris | <input checked="" type="checkbox"/> Other: <u>sediment sorting</u> |
| <input type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

Channel lacks clear definition between active floodplain and low flow channel.

Project ID: ESMS

Cross section ID: ESMS ES-1

Date: 8/23/18

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Course sand

Total veg cover: 25 % Tree: 0 % Shrub: 20 % Herb: 5 %

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

Upland vegetation across active floodplain.

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: silt to sand

Total veg cover: 20 % Tree: _____ % Shrub: 15 % Herb: 5 %

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Eagle Shadow Mountain Solar Project Number: ESMS 2 Stream: ESMS ES-2 Investigator(s): Andrew Butsavich and Justin Romanowitz	Date: August 23, 2018 Town: Moapa Reserv. Photo begin file#:	Time: State: Nevada Photo end file#:
--	---	---

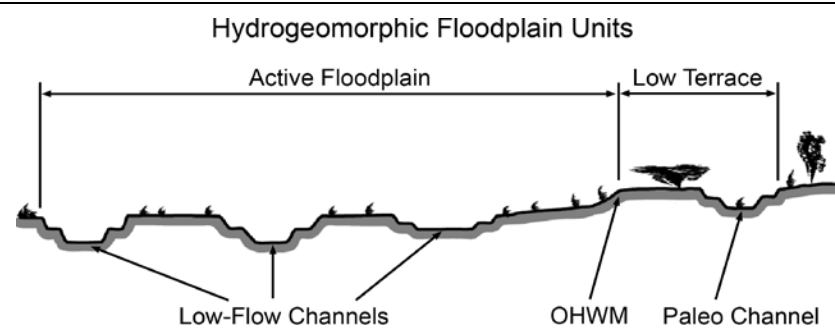
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input type="checkbox"/> / N <input checked="" type="checkbox"/> Is the site significantly disturbed?	Location Details: Projection: UTM Zone 11 Datum: NAD 83 Coordinates: 36.523050° -114.816717°
--	--

Potential anthropogenic influences on the channel system:
 Multiple OHV roads that primarily travel east to west (only 1 active) influence the channel system.

Brief site description:
 The project area is in the low-elevation arid Mojave Desert, surrounded by desert mountain terrain. Elevation ranges from 2,490 to 2,180 feet above mean sea level. Soils are shallow alluvium with a shallow caliche layer. Vegetation is dominated by a creosote bursage scrub with typical Mojave Desert species.

Checklist of resources (if available):

<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event
--	---

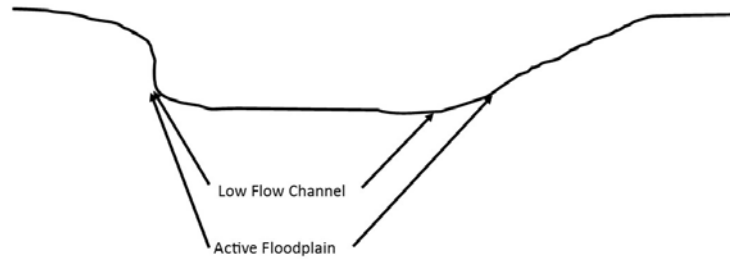


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
 - a) Record the floodplain unit and GPS position.
 - b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
 - c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

<input checked="" type="checkbox"/> Mapping on aerial photograph	<input checked="" type="checkbox"/> GPS
<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:

Cross section drawing:



OHWM

GPS point: 36.523050° -114.816717°

Indicators:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Change in average sediment texture | <input checked="" type="checkbox"/> Break in bank slope |
| <input checked="" type="checkbox"/> Change in vegetation species | <input type="checkbox"/> Other: _____ |
| <input checked="" type="checkbox"/> Change in vegetation cover | <input type="checkbox"/> Other: _____ |

Comments:

total removal of vegetation within OHWM.

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Gravel

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- | | |
|---|--|
| <input checked="" type="checkbox"/> NA | <input checked="" type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|--|--|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input checked="" type="checkbox"/> Drift and/or debris | <input checked="" type="checkbox"/> Other: <u>sediment sorting</u> |
| <input checked="" type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

Project ID: ESMS

Cross section ID: ESMS ES-2

Date: 8/23/18

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: silt to sand

Total veg cover: 40 % Tree: _____ % Shrub: 30 % Herb: 10 %

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Eagle Shadow Mountain Solar Project Number: ESMS 3 Stream: ESMS ES-3 Investigator(s): Andrew Butsavich and Justin Romanowitz	Date: August 27, 2018 Town: Moapa Reserv. Photo begin file#:	Time: State: Nevada Photo end file#:
--	---	---

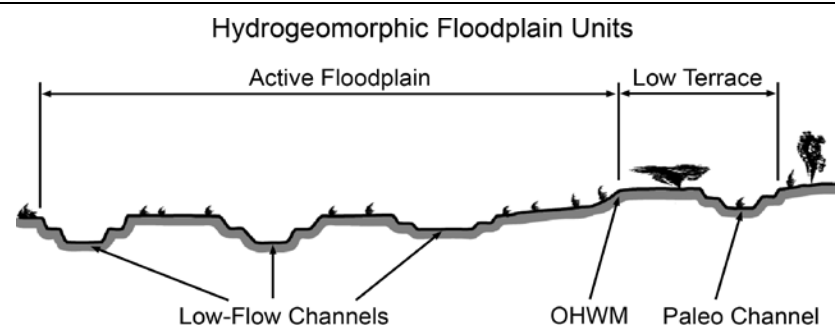
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input type="checkbox"/> / N <input checked="" type="checkbox"/> Is the site significantly disturbed?	Location Details: Projection: UTM Zone 11 Datum: NAD 83 Coordinates: 36.544293° -114.791197°
--	--

Potential anthropogenic influences on the channel system:
 A gravel pit and single dirt road influence this channel system.

Brief site description:
 The project area is in the low-elevation arid Mojave Desert, surrounded by desert mountain terrain. Elevation ranges from 2,525 to 2,190 feet above mean sea level. Soils are shallow alluvium with a shallow caliche layer. Vegetation is dominated by a creosote bursage scrub with typical Mojave Desert species.

Checklist of resources (if available):

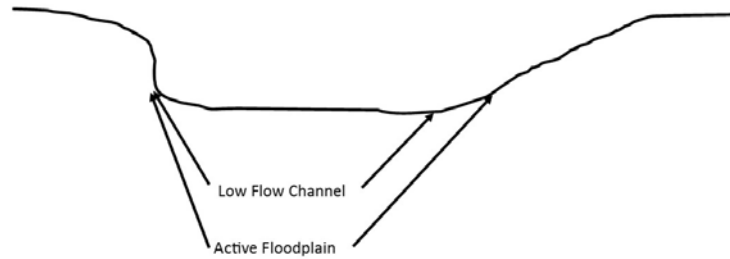
<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event
--	---



- Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**
1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
 2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
 3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
 - a) Record the floodplain unit and GPS position.
 - b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
 - c) Identify any indicators present at the location.
 4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
 5. Identify the OHWM and record the indicators. Record the OHWM position via:

<input checked="" type="checkbox"/> Mapping on aerial photograph	<input checked="" type="checkbox"/> GPS
<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:

Cross section drawing:



OHWM

GPS point: 36.544293° -114.791197°

Indicators:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Change in average sediment texture | <input checked="" type="checkbox"/> Break in bank slope |
| <input checked="" type="checkbox"/> Change in vegetation species | <input type="checkbox"/> Other: _____ |
| <input checked="" type="checkbox"/> Change in vegetation cover | <input type="checkbox"/> Other: _____ |

Comments:

total removal of vegetation within OHWM. 18' wide.

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Gravel

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- | | |
|---|--|
| <input checked="" type="checkbox"/> NA | <input checked="" type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|--|--|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input checked="" type="checkbox"/> Drift and/or debris | <input checked="" type="checkbox"/> Other: <u>sediment sorting</u> |
| <input checked="" type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

Project ID: ESMS

Cross section ID: ESMS ES-3

Date: 8/27/18

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

Limited definition between low flow channel and active floodplain.

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: 30 % Tree: _____ % Shrub: 25 % Herb: 5 %

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

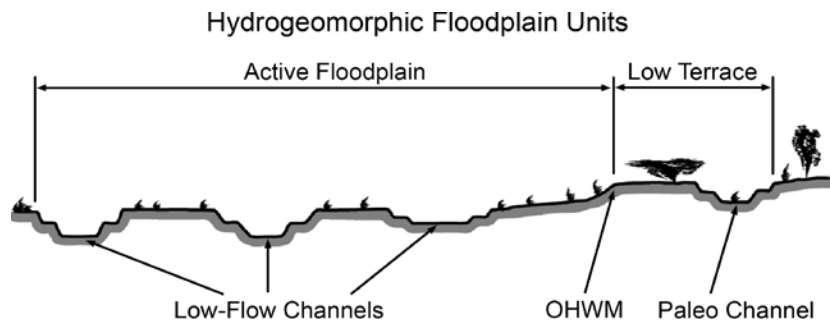
Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Eagle Shadow Mountain Solar Project Number: ESMS 4 Stream: ESMS ES-4 Investigator(s): Andrew Butsavich and Justin Romanowitz	Date: August 24, 2018 Town: Moapa Reserv. Photo begin file#:	Time: State: Nevada Photo end file#:
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input type="checkbox"/> / N <input checked="" type="checkbox"/> Is the site significantly disturbed?	Location Details: Projection: UTM Zone 11 Datum: NAD 83 Coordinates: 36.556596° -114.765195°	
Potential anthropogenic influences on the channel system: None		

Brief site description:
 The project area is in the low-elevation arid Mojave Desert, surrounded by desert mountain terrain. Elevation ranges from 2,290 to 2,115 feet above mean sea level. Soils are shallow alluvium with a shallow caliche layer. Vegetation is dominated by a creosote bursage scrub with typical Mojave Desert species.

Checklist of resources (if available):

<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event
--	---

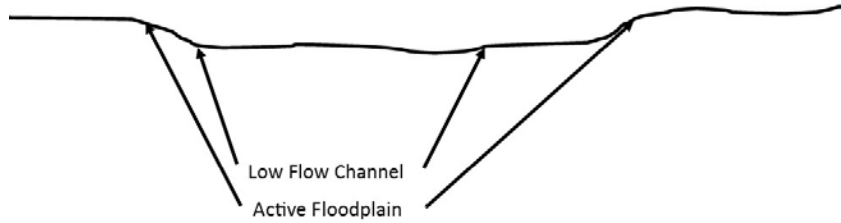


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
 - a) Record the floodplain unit and GPS position.
 - b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
 - c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

<input checked="" type="checkbox"/> Mapping on aerial photograph	<input type="checkbox"/> GPS
<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:

Cross section drawing:



OHWM

GPS point: 36.556596° -114.765195°

Indicators:

- Change in average sediment texture
- Change in vegetation species
- Change in vegetation cover
- Break in bank slope
- Other: _____
- Other: _____

Comments:

total removal of vegetation within OHWM.

Floodplain unit:

- Low-Flow Channel
- Active Floodplain
- Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand
 Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- NA
- Early (herbaceous & seedlings)
- Mid (herbaceous, shrubs, saplings)
- Late (herbaceous, shrubs, mature trees)

Indicators:

- Mudcracks
- Ripples
- Drift and/or debris
- Presence of bed and bank
- Benches
- Soil development
- Surface relief
- Other: sediment sorting
- Other: _____
- Other: _____

Comments:

Project ID: ESMS

Cross section ID: ESMS ES-4

Date: 8/24/18

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: Sorting

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

Limited definition between low flow channel and active floodplain.

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: 20 % Tree: _____ % Shrub: 15 % Herb: 5 %

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Eagle Shadow Mountain Solar Project Number: ESMS 5 Stream: ESMS ES-5 Investigator(s): Andrew Butsavich and Justin Romanowitz	Date: August 28, 2018 Town: Moapa Reserv. Photo begin file#:	Time: State: Nevada Photo end file#:
--	---	---

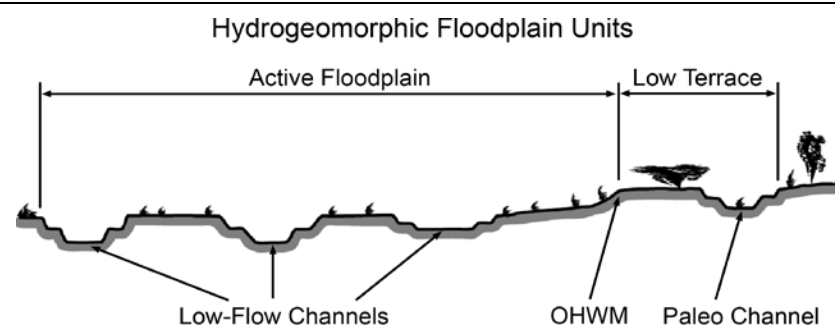
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input type="checkbox"/> / N <input checked="" type="checkbox"/> Is the site significantly disturbed?	Location Details: Projection: UTM Zone 11 Datum: NAD 83 Coordinates: 36.574445° -114.744441°
--	--

Potential anthropogenic influences on the channel system:
None

Brief site description:
The project area is in the low-elevation arid Mojave Desert, surrounded by desert mountain terrain. Elevation ranges from 2,107 to 2,085 feet above mean sea level. Soils are shallow alluvium with a shallow caliche layer. Vegetation is dominated by a creosote bursage scrub with typical Mojave Desert species.

Checklist of resources (if available):

<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event
--	---

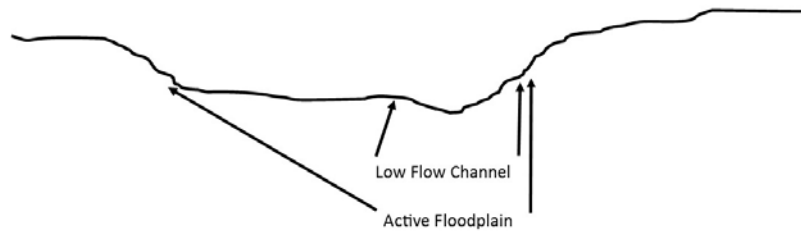


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
 - a) Record the floodplain unit and GPS position.
 - b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
 - c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

<input checked="" type="checkbox"/> Mapping on aerial photograph	<input checked="" type="checkbox"/> GPS
<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:

Cross section drawing:



OHWM

GPS point: 36.574445° -114.744441°

Indicators:

- Change in average sediment texture
- Change in vegetation species
- Change in vegetation cover
- Break in bank slope
- Other: _____
- Other: _____

Comments:

Total removal of vegetation within OHWM.

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand and gravel

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- NA
- Early (herbaceous & seedlings)
- Mid (herbaceous, shrubs, saplings)
- Late (herbaceous, shrubs, mature trees)

Indicators:

- Mudcracks
- Ripples
- Drift and/or debris
- Presence of bed and bank
- Benches
- Soil development
- Surface relief
- Other: sediment sorting
- Other: _____
- Other: _____

Comments:

Project ID: ESMS

Cross section ID: ESMS ES-5

Date: 8/28/18

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand and gravel

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: Sorting

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

Limited definition between low flow channel and active floodplain.

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: 30 % Tree: _____ % Shrub: 25 % Herb: 5 %

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

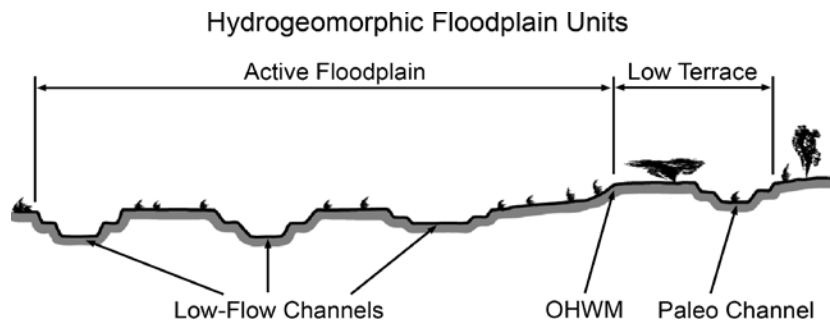
Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Eagle Shadow Mountain Solar Project Number: ESMS 6 Stream: ESMS ES-6 Investigator(s): Andrew Butsavich and Justin Romanowitz	Date: August 28, 2018 Town: Moapa Reserv. Photo begin file#:	Time: State: Nevada Photo end file#:
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input type="checkbox"/> / N <input checked="" type="checkbox"/> Is the site significantly disturbed?	Location Details: Projection: UTM Zone 11 Datum: NAD 83 Coordinates: 36.581654° -114.736232°	
Potential anthropogenic influences on the channel system: None		

Brief site description:
 The project area is in the low-elevation arid Mojave Desert, surrounded by desert mountain terrain. Elevation ranges from 2,064 to 2,020 feet above mean sea level. Soils are shallow alluvium with a shallow caliche layer. Vegetation is dominated by a creosote bursage scrub with typical Mojave Desert species.

Checklist of resources (if available):

<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event
--	---

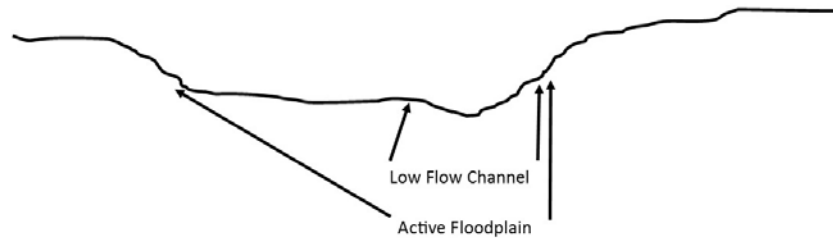


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
 - a) Record the floodplain unit and GPS position.
 - b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
 - c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

<input checked="" type="checkbox"/> Mapping on aerial photograph	<input checked="" type="checkbox"/> GPS
<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:

Cross section drawing:



OHWM

GPS point: 36.581654° -114.736232°

Indicators:

- Change in average sediment texture
- Change in vegetation species
- Change in vegetation cover
- Break in bank slope
- Other: _____
- Other: _____

Comments:

Total removal of vegetation within OHWM.

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand
Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

- Community successional stage:
- NA
 - Early (herbaceous & seedlings)
 - Mid (herbaceous, shrubs, saplings)
 - Late (herbaceous, shrubs, mature trees)

Indicators:

- Mudcracks
- Ripples
- Drift and/or debris
- Presence of bed and bank
- Benches
- Soil development
- Surface relief
- Other: sediment sorting
- Other: _____
- Other: _____

Comments:

Channel lacks clear definition between active floodplain and low flow channel.

Project ID: ESMS

Cross section ID: ESMS ES-6

Date: 8/28/18

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

NA

Early (herbaceous & seedlings)

Mid (herbaceous, shrubs, saplings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Ripples

Drift and/or debris

Presence of bed and bank

Benches

Soil development

Surface relief

Other: _____

Other: _____

Other: _____

Comments:

Upland vegetation across active floodplain.

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

NA

Early (herbaceous & seedlings)

Mid (herbaceous, shrubs, saplings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Ripples

Drift and/or debris

Presence of bed and bank

Benches

Soil development

Surface relief

Other: _____

Other: _____

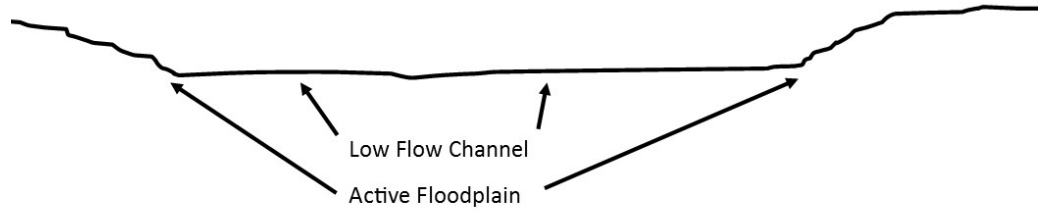
Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Eagle Shadow Mountain Solar Project Number: ESMS 7 Stream: ESMS ES-7 Investigator(s): Andrew Butsavich and Justin Romanowitz	Date: August 28, 2018 Town: Moapa Reserv. Photo begin file#:	Time: State: Nevada Photo end file#:				
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input type="checkbox"/> / N <input checked="" type="checkbox"/> Is the site significantly disturbed?	Location Details: Projection: UTM Zone 11 Datum: NAD 83 Coordinates: 36.585146° -114.730990°					
Potential anthropogenic influences on the channel system: None						
Brief site description: The project area is in the low-elevation arid Mojave Desert, surrounded by desert mountain terrain. Elevation ranges from 2,043 to 2,020 feet above mean sea level. Soils are shallow alluvium with a shallow caliche layer. Vegetation is dominated by a creosote bursage scrub with typical Mojave Desert species.						
Checklist of resources (if available): <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event </td> </tr> </table>			<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event		
<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event					
Hydrogeomorphic Floodplain Units 						
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM: <ol style="list-style-type: none"> 1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site. 2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units. 3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units. <ol style="list-style-type: none"> a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit. c) Identify any indicators present at the location. 4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section. 5. Identify the OHWM and record the indicators. Record the OHWM position via: <table style="width: 100%; border: none; margin-top: 5px;"> <tr> <td style="width: 50%;"><input checked="" type="checkbox"/> Mapping on aerial photograph</td> <td style="width: 50%;"><input checked="" type="checkbox"/> GPS</td> </tr> <tr> <td><input checked="" type="checkbox"/> Digitized on computer</td> <td><input type="checkbox"/> Other:</td> </tr> </table> 			<input checked="" type="checkbox"/> Mapping on aerial photograph	<input checked="" type="checkbox"/> GPS	<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:
<input checked="" type="checkbox"/> Mapping on aerial photograph	<input checked="" type="checkbox"/> GPS					
<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:					

Cross section drawing:



OHWM

GPS point: 36.585146° -114.730990°

Indicators:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Change in average sediment texture | <input type="checkbox"/> Break in bank slope |
| <input type="checkbox"/> Change in vegetation species | <input type="checkbox"/> Other: _____ |
| <input checked="" type="checkbox"/> Change in vegetation cover | <input type="checkbox"/> Other: _____ |

Comments:

Total removal of vegetation within OHWM.

Floodplain unit:

- Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand and gravel

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- | | |
|---|--|
| <input checked="" type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|---|--|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input checked="" type="checkbox"/> Drift and/or debris | <input checked="" type="checkbox"/> Other: <u>sediment sorting</u> |
| <input type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

Channel lacks definition between active floodplain and low flow channel.

Project ID: ESMS

Cross section ID: ESMS ES-7

Date: 8/28/18

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand _____

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

NA

Early (herbaceous & seedlings)

Mid (herbaceous, shrubs, saplings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Ripples

Drift and/or debris

Presence of bed and bank

Benches

Soil development

Surface relief

Other: _____

Other: _____

Other: _____

Comments:

Upland vegetation across active floodplain.

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand _____

Total veg cover: 30 % Tree: _____ % Shrub: 25 % Herb: 5 %

Community successional stage:

NA

Early (herbaceous & seedlings)

Mid (herbaceous, shrubs, saplings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Ripples

Drift and/or debris

Presence of bed and bank

Benches

Soil development

Surface relief

Other: _____

Other: _____

Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Eagle Shadow Mountain Solar Project Number: ESMS 8 Stream: ESMS ES-8 Investigator(s): Andrew Butsavich and Justin Romanowitz	Date: August 28, 2018 Town: Moapa Reserv. Photo begin file#:	Time: State: Nevada Photo end file#:
--	---	---

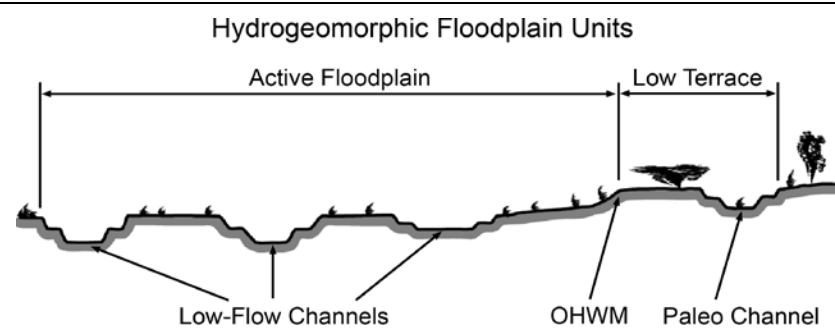
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input type="checkbox"/> / N <input checked="" type="checkbox"/> Is the site significantly disturbed?	Location Details: Projection: UTM Zone 11 Datum: NAD 83 Coordinates: 36.602939° -114.709808°
--	--

Potential anthropogenic influences on the channel system:
None

Brief site description:
The project area is in the low-elevation arid Mojave Desert, surrounded by desert mountain terrain. Elevation ranges from 2,043 to 2,020 feet above mean sea level. Soils are shallow alluvium with a shallow caliche layer. Vegetation is dominated by a creosote bursage scrub with typical Mojave Desert species.

Checklist of resources (if available):

<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event
--	---

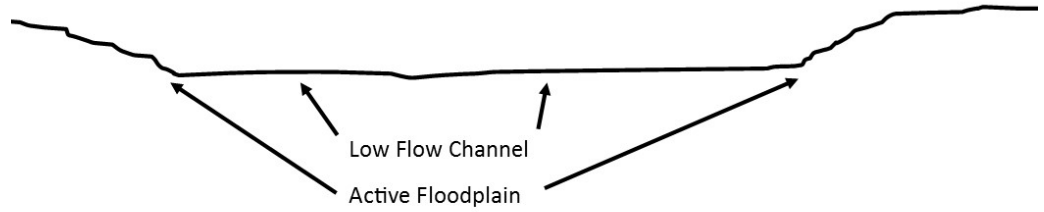


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
 - a) Record the floodplain unit and GPS position.
 - b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
 - c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

<input checked="" type="checkbox"/> Mapping on aerial photograph	<input checked="" type="checkbox"/> GPS
<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:

Cross section drawing:



OHWM

GPS point: 36.602939° -114.709808°

Indicators:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Change in average sediment texture | <input type="checkbox"/> Break in bank slope |
| <input type="checkbox"/> Change in vegetation species | <input type="checkbox"/> Other: _____ |
| <input checked="" type="checkbox"/> Change in vegetation cover | <input type="checkbox"/> Other: _____ |

Comments:

Total removal of vegetation within OHWM.

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand and gravel

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- | | |
|---|--|
| <input checked="" type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|---|--|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input checked="" type="checkbox"/> Drift and/or debris | <input checked="" type="checkbox"/> Other: <u>sediment sorting</u> |
| <input type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

Channel lacks definition between active floodplain and low flow channel.

Project ID: ESMS

Cross section ID: ESMS ES-8

Date: 8/28/18

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand and gravel

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

NA

Early (herbaceous & seedlings)

Mid (herbaceous, shrubs, saplings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Ripples

Drift and/or debris

Presence of bed and bank

Benches

Soil development

Surface relief

Other: _____

Other: _____

Other: _____

Comments:

Upland vegetation across active floodplain.

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: 30% Tree: _____% Shrub: 20% Herb: 10%

Community successional stage:

NA

Early (herbaceous & seedlings)

Mid (herbaceous, shrubs, saplings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Ripples

Drift and/or debris

Presence of bed and bank

Benches

Soil development

Surface relief

Other: _____

Other: _____

Other: _____

Comments:

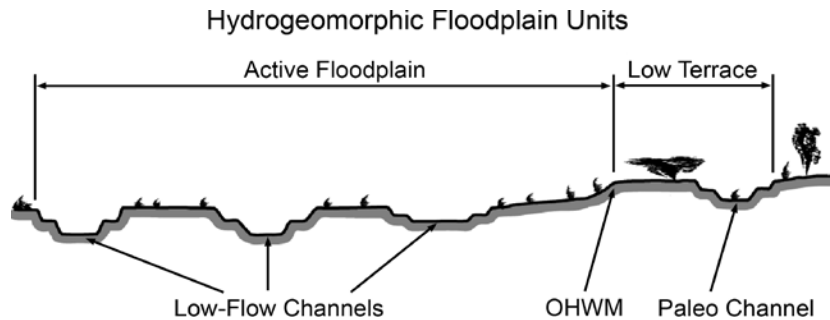
Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Eagle Shadow Mountain Solar Project Number: ESMS 9 Stream: ESMS ES-9 Investigator(s): Andrew Butsavich and Justin Romanowitz	Date: August 28, 2018 Town: Moapa Reserv. Photo begin file#:	Time: State: Nevada Photo end file#:
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input type="checkbox"/> / N <input checked="" type="checkbox"/> Is the site significantly disturbed?	Location Details: Projection: UTM Zone 11 Datum: NAD 83 Coordinates: 36.609188° -114.701904°	
Potential anthropogenic influences on the channel system: None		

Brief site description:
 The project area is in the low-elevation arid Mojave Desert, surrounded by desert mountain terrain. Elevation ranges from 1,853 to 1,831 feet above mean sea level. Soils are shallow alluvium with a shallow caliche layer. Vegetation is dominated by a creosote bursage scrub with typical Mojave Desert species.

Checklist of resources (if available):

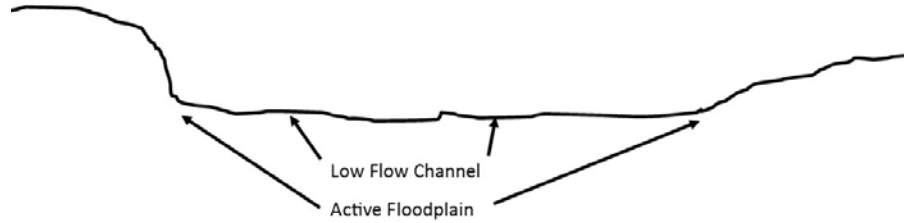
<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event
--	---



- Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**
1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
 2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
 3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
 - a) Record the floodplain unit and GPS position.
 - b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
 - c) Identify any indicators present at the location.
 4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
 5. Identify the OHWM and record the indicators. Record the OHWM position via:

<input checked="" type="checkbox"/> Mapping on aerial photograph	<input checked="" type="checkbox"/> GPS
<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:

Cross section drawing:



OHWM

GPS point: 36.609188° -114.701904°

Indicators:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Change in average sediment texture | <input type="checkbox"/> Break in bank slope |
| <input type="checkbox"/> Change in vegetation species | <input type="checkbox"/> Other: _____ |
| <input checked="" type="checkbox"/> Change in vegetation cover | <input type="checkbox"/> Other: _____ |

Comments:

Total removal of vegetation within OHWM.

Floodplain unit:

- Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand and gravel

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- | | |
|---|--|
| <input checked="" type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|--|---|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input checked="" type="checkbox"/> Drift and/or debris | <input checked="" type="checkbox"/> Other: sediment sorting |
| <input checked="" type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

Channel lacks definition between active floodplain and low flow channel.

Project ID: ESMS

Cross section ID: ESMS ES-9

Date: 8/28/18

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand and gravel

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: 30% Tree: _____% Shrub: 20% Herb: 10%

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

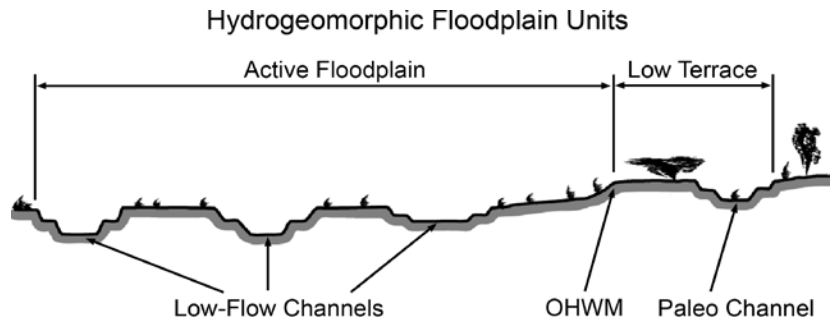
Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Eagle Shadow Mountain Solar Project Number: ESMS 10 Stream: ESMS ES-10 Investigator(s): Andrew Butsavich and Justin Romanowitz	Date: August 28, 2018 Town: Moapa Reserv. Photo begin file#:	Time: State: Nevada Photo end file#:
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input type="checkbox"/> / N <input checked="" type="checkbox"/> Is the site significantly disturbed?	Location Details: Projection: UTM Zone 11 Datum: NAD 83 Coordinates: 36.620539° -114.686412°	
Potential anthropogenic influences on the channel system: None		

Brief site description:
 The project area is in the low-elevation arid Mojave Desert, surrounded by desert mountain terrain. Elevation ranges from 1,834 to 1,812 feet above mean sea level. Soils are shallow alluvium with a shallow caliche layer. Vegetation is dominated by a creosote bursage scrub with typical Mojave Desert species.

Checklist of resources (if available):

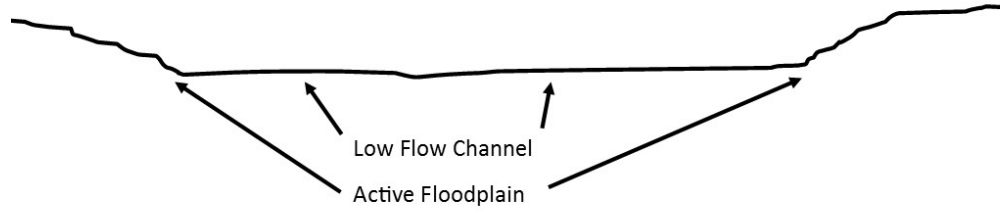
<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event
--	---



- Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**
1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
 2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
 3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
 - a) Record the floodplain unit and GPS position.
 - b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
 - c) Identify any indicators present at the location.
 4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
 5. Identify the OHWM and record the indicators. Record the OHWM position via:

<input checked="" type="checkbox"/> Mapping on aerial photograph	<input checked="" type="checkbox"/> GPS
<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:

Cross section drawing:



OHWM

GPS point: 36.620539° -114.686412°

Indicators:

- Change in average sediment texture
- Change in vegetation species
- Change in vegetation cover
- Break in bank slope
- Other: _____
- Other: _____

Comments:

Total removal of vegetation within OHWM.

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand and gravel

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- NA
- Early (herbaceous & seedlings)
- Mid (herbaceous, shrubs, saplings)
- Late (herbaceous, shrubs, mature trees)

Indicators:

- Mudcracks
- Ripples
- Drift and/or debris
- Presence of bed and bank
- Benches
- Soil development
- Surface relief
- Other: sediment sorting
- Other: _____
- Other: _____

Comments:

Channel lacks definition between active floodplain and low flow channel.

Project ID: ESMS

Cross section ID: ESMS ES-10 Date: 8/28/18

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand and gravel

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: 30% Tree: _____% Shrub: 20% Herb: 10%

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

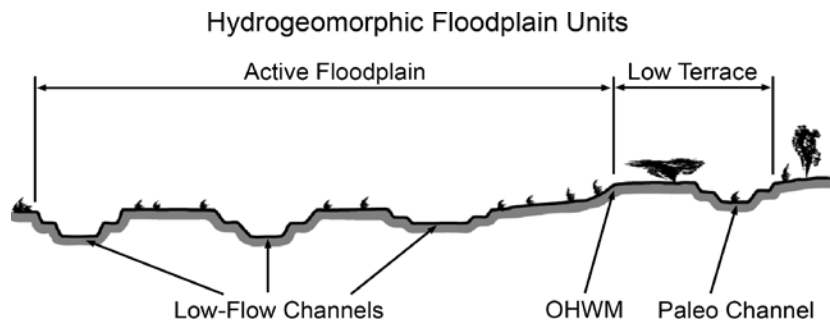
Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Eagle Shadow Mountain Solar Project Number: ESMS 11 Stream: ESMS ES-11 Investigator(s): Andrew Butsavich and Justin Romanowitz	Date: August 28, 2018 Town: Moapa Reserv. Photo begin file#:	Time: State: Nevada Photo end file#:
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input type="checkbox"/> / N <input checked="" type="checkbox"/> Is the site significantly disturbed?	Location Details: Projection: UTM Zone 11 Datum: NAD 83 Coordinates: 36.625398° -114.681374°	
Potential anthropogenic influences on the channel system: None		

Brief site description:
 The project area is in the low-elevation arid Mojave Desert, surrounded by desert mountain terrain. Elevation ranges from 1,819 to 1,797 feet above mean sea level. Soils are shallow alluvium with a shallow caliche layer. Vegetation is dominated by a creosote bursage scrub with typical Mojave Desert species.

Checklist of resources (if available):

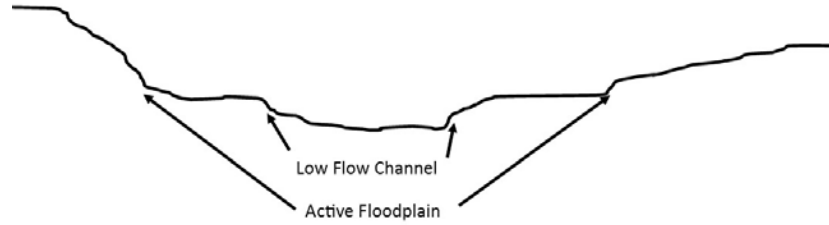
<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event
--	---



- Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**
1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
 2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
 3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
 - a) Record the floodplain unit and GPS position.
 - b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
 - c) Identify any indicators present at the location.
 4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
 5. Identify the OHWM and record the indicators. Record the OHWM position via:

<input checked="" type="checkbox"/> Mapping on aerial photograph	<input checked="" type="checkbox"/> GPS
<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:

Cross section drawing:



OHWM

GPS point: 36.625398° -114.681374°

Indicators:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Change in average sediment texture | <input type="checkbox"/> Break in bank slope |
| <input type="checkbox"/> Change in vegetation species | <input type="checkbox"/> Other: _____ |
| <input checked="" type="checkbox"/> Change in vegetation cover | <input type="checkbox"/> Other: _____ |

Comments:

Total removal of vegetation within OHWM.

Floodplain unit:

- Low-Flow Channel
 Active Floodplain
 Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand and gravel

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- | | |
|---|--|
| <input checked="" type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|--|--|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input checked="" type="checkbox"/> Drift and/or debris | <input checked="" type="checkbox"/> Other: <u>sediment sorting</u> |
| <input checked="" type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input checked="" type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

Project ID: ESMS

Cross section ID: ESMS ES-11 Date: 8/28/18

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand and gravel

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: 30% Tree: _____% Shrub: 20% Herb: 10%

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

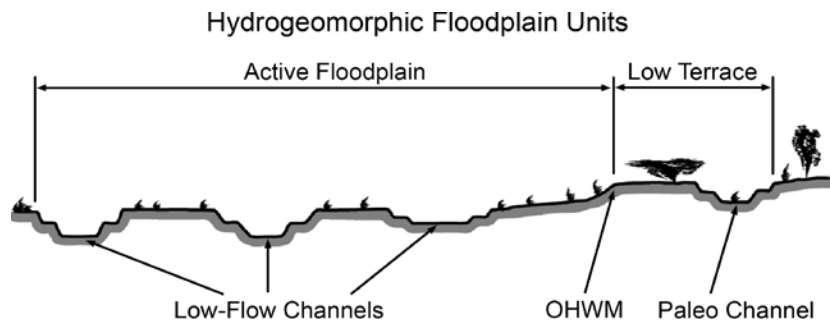
Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Eagle Shadow Mountain Solar Project Number: ESMS 12 Stream: ESMS ES-12 Investigator(s): Andrew Butsavich and Justin Romanowitz	Date: August 28, 2018 Town: Moapa Reserv. Photo begin file#:	Time: State: Nevada Photo end file#:
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input type="checkbox"/> / N <input checked="" type="checkbox"/> Is the site significantly disturbed?	Location Details: Projection: UTM Zone 11 Datum: NAD 83 Coordinates: 36.648477° -114.653861°	
Potential anthropogenic influences on the channel system: None		

Brief site description:
 The project area is in the low-elevation arid Mojave Desert, surrounded by desert mountain terrain. Elevation ranges from 1,763 to 1,637 feet above mean sea level. Soils are shallow alluvium with a shallow caliche layer. Vegetation is dominated by a creosote bursage scrub with typical Mojave Desert species.

Checklist of resources (if available):

<input checked="" type="checkbox"/> Aerial photography Dates: 5-13-17 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input checked="" type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event
--	---

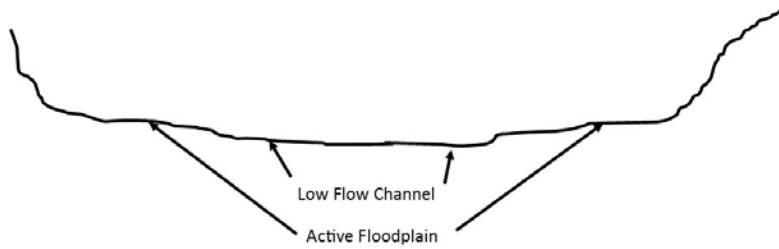


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
 - a) Record the floodplain unit and GPS position.
 - b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
 - c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

<input checked="" type="checkbox"/> Mapping on aerial photograph	<input checked="" type="checkbox"/> GPS
<input checked="" type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:

Cross section drawing:



OHWM

GPS point: 36.648477° -114.653861°

Indicators:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Change in average sediment texture | <input checked="" type="checkbox"/> Break in bank slope |
| <input type="checkbox"/> Change in vegetation species | <input type="checkbox"/> Other: _____ |
| <input checked="" type="checkbox"/> Change in vegetation cover | <input type="checkbox"/> Other: _____ |

Comments:

Total removal of vegetation within OHWM.

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand and gravel

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- | | |
|---|--|
| <input checked="" type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|--|--|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input checked="" type="checkbox"/> Drift and/or debris | <input checked="" type="checkbox"/> Other: <u>sediment sorting</u> |
| <input checked="" type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input checked="" type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

Channel lacks definition between active floodplain and low flow channel.

Project ID: ESMS

Cross section ID: ESMS ES-12 Date: 8/28/18

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand and gravel

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

Other: _____

Comments:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: 30% Tree: _____% Shrub: 20% Herb: 10%

Community successional stage:

NA

Mid (herbaceous, shrubs, saplings)

Early (herbaceous & seedlings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Soil development

Ripples

Surface relief

Drift and/or debris

Other: _____

Presence of bed and bank

Other: _____

Benches

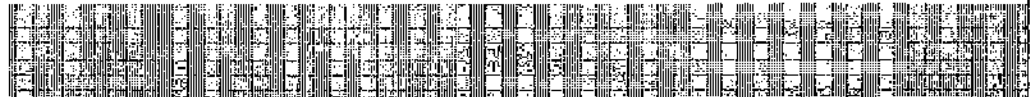
Other: _____

Comments:

Appendix F — K Road Moapa Solar Jurisdictional Delineation

Appendix K

U.S. Army Corps of Engineers Jurisdictional Determination Report and Consultation



This page intended to be blank.



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

July 1, 2011

Regulatory Division SPK-2011-00060-SG

Scott Walker
Malcolm Pirnie
100 Congress Avenue
Austin, Texas 78701

Dear Mr. Walker:

This concerns your proposed K Road Moapa Solar project in or near California Wash. The project is located on or near California Wash, Section 35, Township 16 S, Range 64 E, Mount Diablo Meridian, Latitude 36.502737145477°, Longitude -114.795970900769°, Moapa, Clark County, Nevada.

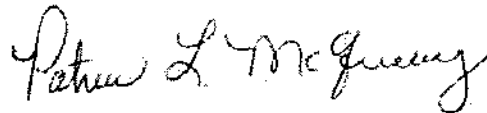
Based on the information you have provided, we have determined that the proposed work will not result in the discharge of dredged or fill material within waters of the United States. Therefore, a Department of the Army Permit is not required for this work. Measures should be taken to prevent construction materials and/or activities from entering any waters of the United States. Appropriate soil erosion and sediment controls should be implemented onsite to achieve this end.

Our disclaimer of jurisdiction is only for this activity as it pertains to Section 404 of the Federal Clean Water Act and does not refer to, nor affect jurisdiction over any waters present on site. Other Federal, State, and local laws may apply to your activities. Therefore, in addition to contacting other Federal and local agencies, you should also contact state regulatory authorities to determine whether your activities may require other authorizations or permits.

We appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing the customer survey at <http://per2.nwp.usace.army.mil/survey.html> and select Sacramento District – St. George Office on page 2 of the survey form.

Please refer to identification number SPK-2011-00060-SG in any correspondence concerning this project. If you have any questions, please contact Patricia McQueary at 321 North Mall Drive, Suite L-101, St. George, Utah 84790, email Patricia.L.McQueary@usace.army.mil, or telephone 435-986-3979. For more information regarding our program, please visit our website at www.spk.usace.army.mil/regulatory.html.

Sincerely,

A handwritten signature in black ink, reading "Patricia L. McQueary". The signature is written in a cursive style with a large initial "P" and "M".

Patricia L. McQueary
Chief, St. George Regulatory Office
Sacramento District



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

July 1, 2011

Regulatory Division SPK-2011-00060-SG

Scott Walker
Malcolm Pirnie
100 Congress Avenue
Austin, Texas 78701

Dear Mr. Walker:

We are responding to your February 15, 2011 request for an approved jurisdictional determination for the K Road Moapa Solar project. The approximately 2000-acre site is located on or near California Wash, Section 35, Township 16 S, Range 64 E, Mount Diablo Meridian, Latitude 36.502°, Longitude -114.7959°, Moapa, Clark County, Nevada.

Based on available information, **we concur with the findings of Malcolm Pirnie in the "Preliminary Jurisdictional Determination Report for the K Road Solar Project on the Moapa River Indian Reservation" dated February 2011.** The waters identified as D1-D6 in the above document were determined to be non-jurisdictional based on guidance found in "U.S. Army Corps of Engineers Jurisdictional Determination (JD) Form Instructional Guidebook" and "A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States". These waters do not meet the definition of "Waters of the U.S." and because of a lack of an ordinary high water mark, defined bed and bank, and lack of a connection to downstream sources, these waters are not currently regulated by the Corps of Engineers. This disclaimer of jurisdiction is only for Section 404 of the Federal Clean Water Act. Other Federal, State, and local laws may apply to your activities. In particular, you may need authorization from the U.S. Fish and Wildlife Service.

This verification is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date. This letter contains an approved jurisdictional determination for your subject site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331.

A Notification of Appeal Process (NAP) and Request for Appeal (RFA) form is enclosed. If you request to appeal this determination you must submit a completed RFA form to the South Pacific Division Office at the following address: Administrative Appeal Review Officer, Army Corps of Engineers, South Pacific Division, CESPD-PDS-O, 1455 Market Street, San Francisco, California 94103-1399, Telephone: 415-503-6574, FAX: 415-503-6646.

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the NAP. Should you decide to submit an RFA form, it must be received at the above address by 60 days from the date of this letter. It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this letter.

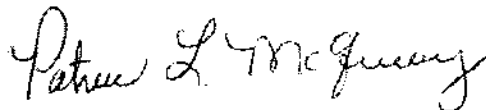
You should provide a copy of this letter and notice to all other affected parties, including any individual who has an identifiable and substantial legal interest in the property.

This determination has been conducted to identify the limits of Corps of Engineers' Clean Water Act jurisdiction for the particular site identified in this request. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

We appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing the customer survey at <http://per2.nwp.usace.army.mil/survey.html> and select Sacramento District – St. George Office on page 2 of the survey form.

Please refer to identification number SPK-2011-00060-SG in any correspondence concerning this project. If you have any questions, please contact Patricia McQueary at 321 North Mall Drive, Suite L-101, St. George, Utah 84790, email Patricia.L.McQueary@usace.army.mil, or telephone 435-986-3979. For more information regarding our program, please visit our website at www.spk.usace.army.mil/regulatory.html.

Sincerely,



Patricia L. McQueary
Chief, St. George Regulatory Office
Sacramento District

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: K Road Solar Power

File No.: SPK-2011-00060-SG

Date: July 1, 2011

Attached is:

See Section below

	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <http://www.usace.army.mil/inet/functions/cw/cecwo/reg> or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer (address on reverse). This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer (address on reverse). This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer (address on reverse). This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:
Patricia McQueary
Regulatory Project Manager
U.S. Army Corps of Engineers
321 N Mall Drive, Suite L-101, St. George, Utah 84790
Phone: 435-986-3979, FAX 435-986-3981
Email: Patricia.L.McQueary@usace.army.mil
(Use this address for submittals to the district engineer)

If you only have questions regarding the appeal process you may also contact:
Thomas J. Cavanaugh
Administrative Appeal Review Officer
U.S. Army Corps of Engineers
1455 Market Street
San Francisco, California 94103-1399
Phone: 415-503-6574, FAX 415-503-6646
Email: Thomas.J.Cavanaugh@usace.army.mil
(Use this address for submittals to the division engineer)

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.

Date:

Telephone number:

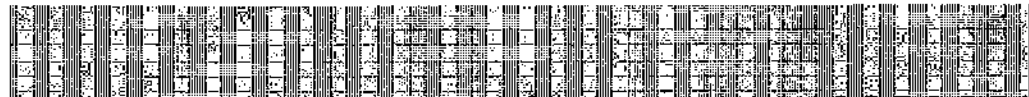
kRoad Solar Power

K Road Solar Power

• San Diego, California

Preliminary Jurisdictional Determination Report

February 2011



Report Prepared By:

Malcolm Pirnie, Inc.

100 Congress Ave.
Suite 1485
Austin, Texas 78701

6923001

**MALCOLM
PIRNIE**

This page intended to be blank.

Contents

1. Introduction	1-1
2. Determination Methods	2-1
2.1. Existing Information	2-1
2.2. USGS 7.5' Topographic Survey.....	2-2
2.3. National Wetlands Inventory	2-2
2.4. Climate	2-2
2.5. Vegetation	2-3
2.6. Clark County Soil Survey	2-3
2.7. Site photographs	2-4
2.8. Pertinent Supreme Court Decisions	2-4
3. Determination Results	3-1
3.1. Traditional Navigable Waters.....	3-1
3.2. Relatively Permanent Waters	3-1
3.3. Non-relatively Permanent Waters	3-1
3.4. Drainages.....	3-1
4. Summary	4-1
5. References	5-1

List of Tables

Table 3-1: Preliminary Jurisdictional Waters	3-3
Table 3-2: Watershed Acres Associated with Each Drainage.....	3-3

Appendices

Appendix A: Figures

- Figure 1: Site Vicinity Map
- Figure 2: USGS Topography Map
- Figure 3: Clark County Soil Survey
- Figure 4: Photographic Location Map
- Figure 5: Jurisdictional Waters Map
- Figure 6: Watershed Areas Associated with Drainages

Appendix B: Site Photographs

Appendix C: OHWM Data Sheets

Appendix D: Jurisdictional Determination Form

1. Introduction

This report describes the results of a preliminary jurisdictional determination conducted within the 2,000-acre K Road Solar Project area. A preliminary jurisdiction determination is used to identify and map the extent of the wetlands and waters of the United States (U.S.) and to provide information regarding jurisdictional issues. The proposed project is located in its entirety on undeveloped lands within the boundaries of the Moapa Indian Reservation approximately 30 miles north of Las Vegas, Nevada (see Appendix A, Figures 1 and 2). The proposed project is the construction, operation, and maintenance of up to 350 megawatts (MW) of capacity solar power generating facility.

The purpose of this report is to provide the results of the delineation of wetlands and non-wetland waters of the U.S. under the jurisdiction of the U.S. Army Corps of Engineers (USACE) with respect to the Clean Water Act that occur in the survey area, assess impacts, and propose mitigation for the Solar Project. Methods for delineating potentially jurisdictional areas followed guidelines set forth by the USACE, including the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 1987, 2006) and A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (USACE 2008).

This page intended to be blank.

2. Determination Methods

Wetland determination methods followed guidelines outlined in the USACE *Wetlands Delineation Manual* (USACE 1987). Malcolm Pirnie used the Routine Wetland Determination Method provided in the USACE manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. Ordinary High Water Mark determinations were based on A Field Guide to the Identification of the OHWM in the Arid West Region of the Western United States and guidelines outlined in the USACE *Ordinary High Water Mark Identification* regulatory guidance letter (USACE 2005). A review of resource maps was performed to prepare for the field work.

An ordinary high watermark is defined as:

... that line on the shore established by the fluctuations of water and indicated by physical characteristics such as [a] clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (33 CFR Part 328.3).

A pedestrian survey was completed for the entire project area. All mapping of potentially jurisdictional features was based on data collected with a sub-meter Global Positioning System (GPS) unit and in-house geographic information system (GIS) processing.

2.1. Existing Information

The proposed project is located in the Basin and Range physiographic province in the north central portion of the Mojave Desert. Basin and Range structure in the Mojave Desert is characterized by rather abrupt mountain ranges, generally of moderate height, that consist primarily of exposed bedrock that is deeply cut by ravines, and is surrounded by aprons of pediments and/or low-profile bajada slopes, which drain to interior closed basins. This interior drainage with no outlets results in the formation of evaporite playa lakes, such as Dry Lake south of the proposed project, in the valley bottoms (Benson and Darrow 1981; Longwell et al. 1965).

The proposed project is situated in the north end of the Dry Lake Valley. The mountains bounding the Dry Lake Valley include the Arrow Canyon Range to the west, Dry Lake Range to the south and North Muddy Mountains to the east. The Arrow Canyon Range is comprised primarily of carbonate rocks of the Bird Spring Formation that are Ordovician to Permian in age (Longwell et al. 1965). Elevations of the project range from

approximately 2,038 feet at the intersection of the main Project access road at Interstate Highway 15 to 2,200 feet.

Site soils are generally shallow, rarely in excess of 18 inches in depth, even in areas away from the base of the mountains, and are typically about 4 inches in depth over an underlying caliche layer. The poorly developed soils, almost completely absent in some areas, are mostly clayey sands, usually with abundant caliche-coated rocks present. Near the base of the Arrow Canyon Range the valley fills give way to bedrock pediment and eventually to an abrupt upward change in slope at the base of the core of the mountain where benched outcrops of sedimentary facies are exposed. On the core of the mountain, shallow soils are typically present only in small areas where the gradient is less steep.

2.2. USGS 7.5' Topographic Survey

The shape of the area is an irregular pentagon with drainage that flows from West to East, exiting the watershed via five culverts, flowing into two separate drainages and emptying into the California Wash (a blue lined stream on the USGS map), approximately 20,000 feet east of the site. The California Wash flows into the Muddy River, 63,000 feet northeast of the project site. The area is hydrologically precluded from the normal watershed by the Union Pacific Railroad and Interstate 15. Water flows off the project site via 5 culverts (Culverts 1-5 on Figure 2 in Appendix A).

2.3. National Wetlands Inventory

Review of the National Wetlands Inventory (NWI) maps for Clark County (USDOI 2007) identified no potential wetland features within the Project area.

2.4. Climate

Clark County depicts a subtropical arid climate. The summers are long and hot and the winters short and mild (NOAA 2005). Summer temperatures above 100° F occur rather frequently in the south and occasionally over the rest of the State (NOAA 2005). During the summer months of June through September, average daytime highs range from 94 – 104 °F (34 to 40°C) with nighttime lows ranging from 69 – 78°F (21–26°C). There are an average of 133 days per year that exceed 90°F (32°C) and 72 days that exceed 100 °F (38°C). The extreme temperatures are most often during July and August. Humidity is often under 10 percent.

The winter season is generally mild and of shorter duration. Average daytime highs are 60 °F (16°C) with nighttime lows around 40 °F (4°C). Although temperatures can sometimes drop to freezing, 32 °F (0°C), rarely do the nighttime temperatures dip below 30 °F. Snowfall occurs in the surrounding mountains, but is rare in the valley.

Widespread episodes of blowing dust and sand are common during the winter and spring seasons. Strong winds are the most hazardous weather experience in the area. Although uncommon, winds of over 50mph can occur during vigorous storms.

On average, sunny days are recorded 85 percent of the time (Gorelow 2005). There are approximately 300 sunny days per year with roughly 4.2 inches of rainfall.

2.5. Vegetation

There are approximately 200 endemic plant species found in the Mojave Desert. The most commonly found species is the creosote bush (*Larrea tridentate*). Approximately 70% of the Mojave Desert is covered by creosotebush-white bursage (*Ambrosia dumosa*) associations. Species associated with creosotebush-white bursage communities in the Mojave Desert include Shockley's goldenhead (*Acamptopappus shockleyi*), Anderson's wolfberry (*Lycium andersonii*), range ratany (*Krameria parvifolia*), Mojave yucca (*Yucca schidigera*), California jointfir (*Ephedra funerea*), spiny hopsage (*Grayia spinosa*), and winterfat (*Krascheninnikovia lanata*) (Feller 2010). Creosotebush also occurs in the Mojave Desert scrub association with shadscale (*A. confertifolia*), white burrobrush (*Hymenoclea salsola*), blackbrush (*Coleogyne ramosissima*), desertsenna (*Cassia armata*), Catclaw (*Acacia greggi*) and Nevada ephedra (*Ephedra nevadensis*) (Feller, 2010).

Common cacti found are the barrel cactus (*Ferocactus acanthodes*), beavertail cactus (*Opuntia basilaris*), cottontop cactus (*Echinocactus polycephalus*), hedgehog cactus (*Echinocereus engelmannii* var. *chrysocentrus*), pencil cholla (*Opuntia ramosissima*), silver cholla (*Opuntia echinocarpa*) and teddybear cholla (*Opuntia bigelovii*).

Grasses regularly found are big galleta (*Hilaria rigida*), Indiana rice grass (*Oryzopsis hymenoides*), bush muhly (*Muhlenbergia porteri*), fluff grass (*Erioneuron pulchella*), red brome (*Bromus rubens*), Desert needle (*Stipa speciosa*), Arabian grass (*Schismus arabicus*), snakeweed (*Gutierrezia*), Desert trumpet (*Eriogonum inflatum*), four winged saltbush (*Atriplex canescens*), and Desert grass (*Blepharidachne kingii*).

2.6. Clark County Soil Survey

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil survey maps (USDA NRCS 2007) used to determine the soil information for the property and surrounding area are provided as Figure 3 (Appendix A). Mapped soil types for the project area were compared to the Hydric Soils List (USDA NRCS 2007). Tonopah Gravel, Bard Gravel, Badland, and Mormon Mesa are the soil types on the project area. The following is a description of these soil types:

The **Tonopah series** consists of very deep, excessively to well drained soils that formed in mixed alluvium. Tonopah soils are on fan remnants and fan piedmonts. Slope ranges

from 0 to 15 percent. The mean annual precipitation is about 6 inches and the mean annual temperature is about 65 °F. The present vegetation is mainly creosotebush and white bursage.

The **Bard series** consists of shallow over cemented material, well drained soils that formed in alluvium derived predominantly from limestone and dolomite with some sandstone and quartzite. The Bard soils are on dissected valley fill terraces, alluvial fans and fan remnants. Slope ranges from 0 to 15 percent. The mean annual precipitation is about 5 inches and the mean annual air temperature is about 62 degrees F. The vegetation is mainly creosotebush, white bursage, annual buckwheat, cholla and other cacti.

The **Badland unit** consists of severely eroded and gullied sideslopes of the mesa. It is made of exposures of the Muddy Creek Formation. The Formation consists of highly stratified sand, silt, and clay that contain a large amount of gypsum and calcium carbonate. Slopes are commonly 15 to 50 percent, but can be as much as 100 percent in some areas. Run-off is very rapid, and the hazard of erosion is very high. This unit is described as generally eroded and barren of vegetation.

The **Mormon Mesa series** consist of shallow over petrocalcic, well drained soils that formed in material influenced by calcareous loess over mixed alluvium from predominantly limestone sources. The Mormon Mesa soils are on summits of fan remnants and mesas. Slope ranges from 0 to 15 percent. The mean annual precipitation is about 5 inches and the mean annual temperature is about 65 °F. The vegetation is scattered white bursage, yucca, and creosotebush with some big galleta and Indian ricegrass.

2.7. Site photographs

Site photographs and GPS points were taken along each of the swale crossings and culverts under the railroad. A map showing the GPS points at photo locations is presented as Figure 4 in Appendix A. Each photograph is labeled with the direction it was taken and a description (See Appendix B).

2.8. Pertinent Supreme Court Decisions

Three Supreme Court cases have shaped the current understanding of federal jurisdiction over wetlands and waters of the U.S. In 1985, the court decision in *United States v. Riverside Bayview Homes, Inc.* (474 U.S. 121) upheld USACE jurisdiction and Section 404's applicability to interstate waters, "navigable waters," and waters and wetlands adjacent to or connected to navigable waters (Pooley 2002). In the *Riverside Bayview* case, the Court found that "Congress' concern" for the protection of water quality and

aquatic ecosystems indicated its intent to regulate wetlands “inseparably bound up with” jurisdictional waters (474 U.S. at 134; ACOE 2003).

On January 9, 2001, the Supreme Court of the United States issued a decision on *Solid Waste Agency of Northern Cook County (SWANCC) v. United States Army Corps of Engineers, et al.* with respect to whether the use of an isolated, intrastate pond by migratory birds is sufficient interstate commerce to warrant USACE jurisdiction over that pond pursuant to Section 404 of the Clean Water Act (CWA). As federal regulatory authority only extends to activities that affect interstate commerce pursuant to Article 1, Section 8 of the U.S. Constitution, USACE restricted its jurisdiction on isolated (intrastate) waters, such as ponds or vernal pools lacking connection to waters of the U.S. prior to 1985.

On September 12, 1985, the Environmental Protection Agency (EPA) issued a memorandum asserting USACE jurisdiction over isolated waters that are used or could be used by migratory birds or endangered species (USACE 1998). This assertion became known as the “Migratory Bird Rule.” Consequently, the definition of “waters of the United States” in USACE regulations was modified to include isolated waters, such as vernal pools or mining ponds, which qualified under the Migratory Bird Rule.

In SWANCC, the Supreme Court essentially stated that the Migratory Bird Rule does not sufficiently qualify an isolated pond for USACE jurisdiction. The SWANCC ruling, however, did not refute the 1985 decision made by the Court in *Riverside Bayview*. The SWANCC ruling denied USACE jurisdiction over “non-navigable, isolated, intrastate” waters based only on use by migratory birds, but did not strike down any regulation or definition of “water of the United States” or adjacency.

The *Rapanos v. United States* and *Carabell v. United States* cases (referred to collectively as the Rapanos case) heard by the Supreme Court in 2006 questioned whether the CWA covers wetlands that do not contain, and are not adjacent to, traditional navigable waters (Environmental Law Institute [ELI] 2007). The consolidated case included two lower court cases in which the USACE had asserted jurisdiction over two different scenarios. At the first site, the wetlands shared a surface water connection with non-navigable tributaries of navigable waters. At the second site, the wetlands were Jurisdictional Delineation Report for the Calavo Drive Drainage Improvement Project separated by a berm from non-navigable tributaries of navigable waters. The Supreme Court overturned the USACE’s assertion of jurisdiction at each of these sites and returned the cases back to the lower courts with a 5-4 decision; however, the 5-4 decision was split 4-1-4. The four dissenting justices, in an opinion authored by Justice Stevens, concluded that EPA’s and the Corps’ interpretation of “waters of the United States” was a reasonable interpretation of the Clean Water Act (USACE 2007). The five justices invalidating the lower court’s decision did not agree on the reason the wetlands were not jurisdictional. Justice Scalia,

representing the four justices in agreement, and Justice Kennedy, in a solo opinion, wrote separate opinions, thereby, providing two separate tests or approaches from which the lower courts would now need to apply (ELI 2007). Justice Scalia's opinion would limit CWA jurisdiction to wetlands that are both adjacent to and have a continuous surface connection with "relatively permanent" bodies of water "connected to" traditional interstate navigable waters. Justice Kennedy wrote in his opinion that he concurred with the judgment to return the cases to the lower courts and defined CWA jurisdiction over wetlands adjacent to non-navigable tributaries where the wetlands have a "significant nexus" with navigable waters (ELI 2007).

Due to the split decision on the Rapanos case, there is some uncertainty as to how the lower courts will apply the decision. Justice Kennedy's opinion that a "significant nexus" is required seems to have become the criteria from which to determine CWA jurisdiction for many courts, including the Ninth Circuit Court.

On June 5, 2007, the EPA and the USACE issued guidance on how agency representatives will deal with CWA jurisdiction in light of the Rapanos decision. The effect of the joint guidance is that each jurisdictional delineation will include a determination of significant nexus and that each jurisdictional determination made by the USACE will be coordinated with the EPA. The public review period for the guidance expired on January 21, 2008. On January 28, 2008, the USACE published a memorandum outlining the coordination procedures for all jurisdictional determinations involving a significant nexus determination.

3. Determination Results

This chapter is a presentation of aquatic resources and their jurisdictional status based on U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook (USACE, 2007). There are no Traditional Navigable Waters (TNW) within the Project area. Six drainages were mapped within the Project area (Figure 5); however, none were considered potentially jurisdictional. Table 3-1 provides a summary of the identified resources, the presence of wetlands, feature length, feature area, OHWM average width and proximity to Relatively Permanent Waters (RPW).

3.1. Traditional Navigable Waters

TNWs are all tidal waters and waters that have been, could be, or are used in interstate or foreign commerce. TNWs are jurisdictional and any tributary that continually flows directly or indirectly at least seasonally into a TNW is also jurisdictional. There are no TNWs within the Project area.

3.2. Relatively Permanent Waters

RPWs are tributaries that flow year round or have continuous flow at least seasonally, and that flow directly or indirectly into a TNW. A wetland that abuts a tributary has no distinction between the immediate edge of the tributary and the wetland itself. An adjacent tributary has a barrier between itself and the tributary, but is connected by surface flow. A wetland adjacent to a RPW or Non-RPW must have a significant nexus. A significant nexus is a more than speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW (USACE 2007). There are no RPWs within the Project area.

3.3. Non-relatively Permanent Waters

Non-RPWs are tributaries that do not have continuous flow at least seasonally. Non-RPWs are jurisdictional where there is a significant nexus to a TNW. The six drainages discussed below drain into a Non-RPW approximately 1-mile east of the site.

3.4. Drainages

Drainages are swales, erosional features, or small washes that are characterized by low flow volume, infrequent and short duration flow; ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water; uplands transporting overland flow generated from precipitation (USACE 2007). Drainages are not jurisdictional. There are six drainages

within the Project area that need discussion. The Arid West Ephemeral and Intermittent Streams OHWM Datasheet for each feature is included in Appendix C and the Jurisdictional Determination Forms are included in Appendix D.

Drainage 1 (D-1): D-1 is an erosional feature. D-1 has a very low slope and only flows during and immediately after a rainfall event. No OHWM was observed for this feature and the vegetation within the feature is consistent with the surrounding area. Water from this feature flows through a culvert (culvert 1) under the elevated railroad tracks. D-1 has a subwatershed size of 146 acres (See Figure 6 Appendix A).

Drainage 2 (D-2): D-2 is an erosional feature. D-2 has a very low slope and only flows during and immediately after a rainfall event. No OHWM was observed for this feature and the vegetation within the feature is consistent with the surrounding area. Water from this feature flows through a culvert (culvert 2) under the elevated railroad tracks. D-2 has a subwatershed size of 200 acres (See Figure 6 Appendix A).

Drainage 3 (D-3): D-3 is an erosional feature. D-3 has a very low slope and only flows during and immediately after a rainfall event. No OHWM was observed for this feature and the vegetation within the feature is consistent with the surrounding area. Water from this feature flows through a culvert (culvert 3) under the elevated railroad tracks. D-3 has a subwatershed size of 465 acres (See Figure 6 Appendix A).

Drainage 4 (D-4): D-4 is a vegetated drainage way consisting of braided channels that start and stop abruptly and only flows during and immediately after a rainfall event. The identified OHWM was considered discontinuous. These channels are not connected, have vegetation in the bottom of the channel, and there are considerable distances without any channels at all. Water from this feature flows through a culvert (culvert 4) under the elevated railroad tracks. D-4 has a subwatershed size of 481 acres (See Figure 6 Appendix A).

Drainage 5 (D-5): D-5 is an erosional feature. D-5 has a very low slope and only flows during and immediately after a rainfall event. No OHWM was observed for this feature and the vegetation within the feature is consistent with the surrounding area. Water from this feature flows through a culvert (culvert 5) under the elevated railroad tracks. D-5 has a subwatershed size of 140 acres (See Figure 6 Appendix A).

Drainage 6 (D-6): D-6 is an erosional feature. D-6 has a very low slope and only flows during and immediately after a rainfall event. The identified OHWM was considered discontinuous and the channel was vegetated. Water from this feature flows into an off-site impoundment created by the elevated railroad track. This water would be considered isolated. D-6 has a subwatershed size of 322 acres (See Figure 6 Appendix A).

**Table 3-1:
Preliminary Jurisdictional Waters**

Feature ID	Resource Type	Classification	Abutting Wetlands	Adjacent Wetlands	Total Feature (linear feet) on site	Total Area (acres)	OHWM Width (feet)	Feature Abuts RPW	Adjacent RPW
D-1	Desert Swale	Non-jurisdictional	None	None	2,445	0.14	2-3	None	None
D-2	Desert Swale	Non-jurisdictional	None	None	10,190	0.58	2-3	None	None
D-3	Desert Swale	Non-jurisdictional	None	None	3,018	0.17	2-3	None	None
D-4	Desert Swale	Non-jurisdictional	None	None	9,941	0.91	4	None	None
D-5	Desert Swale	Non-jurisdictional	None	None	2,788	0.16	2-3	None	None
D-6	Isolated Swale	Non-jurisdictional	None	None	6,356	0.36	2	None	None
				Total	34,378	2.34			

Contour data for the site was collected and processed. Utilizing GIS, the watersheds for each drainage were mapped and the areas calculated (See Figure 6). Table 3-2 shows the acres of each watershed associated with the drainages.

**Table 3-2:
Watershed Acres Associated with Each Drainage**

Drainage	Watershed Acres
Drainage 1	146.0
Drainage 2	200.7
Drainage 3	465.6
Drainage 4	481.8
Drainage 5	140.1
Drainage 6	322.4

It should be noted that the site exists on a mesa top with the general flow from the west side to the east side. No drainage has a watershed larger than one square mile. In addition, due to the topography, water on a small portion of the west side flows west off the site and water on the northern side flows north off-site (See figure 6).

4. Summary

All aquatic resources on the project site were documented and mapped. This preliminary jurisdictional determination report represents Malcolm Pirnie's best professional judgment based on field work conducted in December 2010. A total of six desert drainage swales and no wetlands were identified, on-site, during the assessment. One foot contour data was collected for the site. The contour data was used to calculate the watershed for each of the 6 drainages. All of the drainage subwatersheds were calculated to be smaller than one square mile (640 acres). As discussed in greater detail within the Jurisdictional Determination Form (Appendix D), the OHWM were considered discontinuous and water flows in these feature only during and after a significant rainfall event. These drainages meet the definition of Desert Swale, included in the USACE Jurisdictional Determination Form Instructional Guidebook. All the aquatic features on-site flow through five culverts under the railroad track on the east side.

This page intended to be blank.

5. References

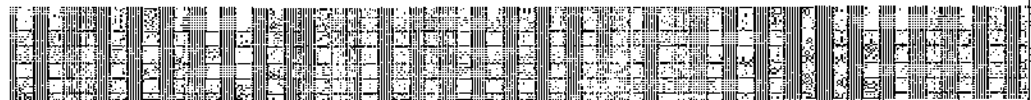
- Benson, L.; Darrow, R.A. 1981. *Trees and Shrubs of the Southwest Deserts*. Tucson, AZ: University of Arizona Press. 68p.
- Environmental Law Institute (ELI) 2007 Clean Water Act Jurisdictional Handbook. Washington D.C. Available for download at <http://www.elistore.org>.
- Feller, Walter. No date. *Mojave Desert Plants*. Accessed December 22, 2010. <http://mojavedesert.net/plants/>
- Gorelow, Andrew S. 2005 *Climate of Las Vegas, Nevada*. <http://www.wrh.noaa.gov/vef/climate/Las%20Vegas%20Climate%20Book.pdf>. Accessed December 22, 2010.
- Longwell, C.R., Pampeyan, E.H., Bowyer, B., and Roberts, R.J., 1965, *Geology and Mineral Deposits of Clark County, Nevada*. Nevada Bureau of Mines and Geology, Bulletin 62, 218 p., with 1:250,000 scale geologic map.
- National Oceanic and Atmospheric Administration. 2005. *Climate of Nevada*. http://cdo.ncdc.noaa.gov/climatenormals/clim60/states/Clim_NV_01.pdf. Accessed December 22, 2010.
- Pooley, D.S. 2002. *The Future of Wetlands Regulation in the Wake of the SWANCC Decision*. The Environmental Monitor, Association of Environmental Professionals. Sacramento, CA.
- U.S. Army Corps of Engineers. 1987 *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, Department of the Army. January.
- U.S. Army Corps of Engineers. 2003 *Federal Register Vol 68 No. 10. Joint Memorandum of Regarding the Clean Water Act Definition of Waters of the U.S. in Light of SWANCC*.
- U.S. Army Corps of Engineers. 2006 *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region*. Prepared by U.S. Army Engineer Research and Development Center. December.
- U.S. Army Corps of Engineers. 2007 *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision In Rapanos v. United States & Carabell v. United States*. Memorandum dated June 5.

- U.S. Army Corps of Engineers. 2008 A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States Prepared by U.S. Army Engineer Research and Development Center.
- U.S. Department of Agriculture, Natural Resources Conservation Service. 2007. National Cooperative Soil Survey, Web Soil Survey, Accessed December 21st at:
<http://websoilsurvey.nrcs.usda.gov/app/>.
- U.S. Department of the Interior. 2007. Clark County, Nevada. National Wetlands Inventory Map. Accessed December 21st at:
<http://wetlandsfws.er.usgs.gov/wtlnds/viewer.htm>.

kRoad Solar Power

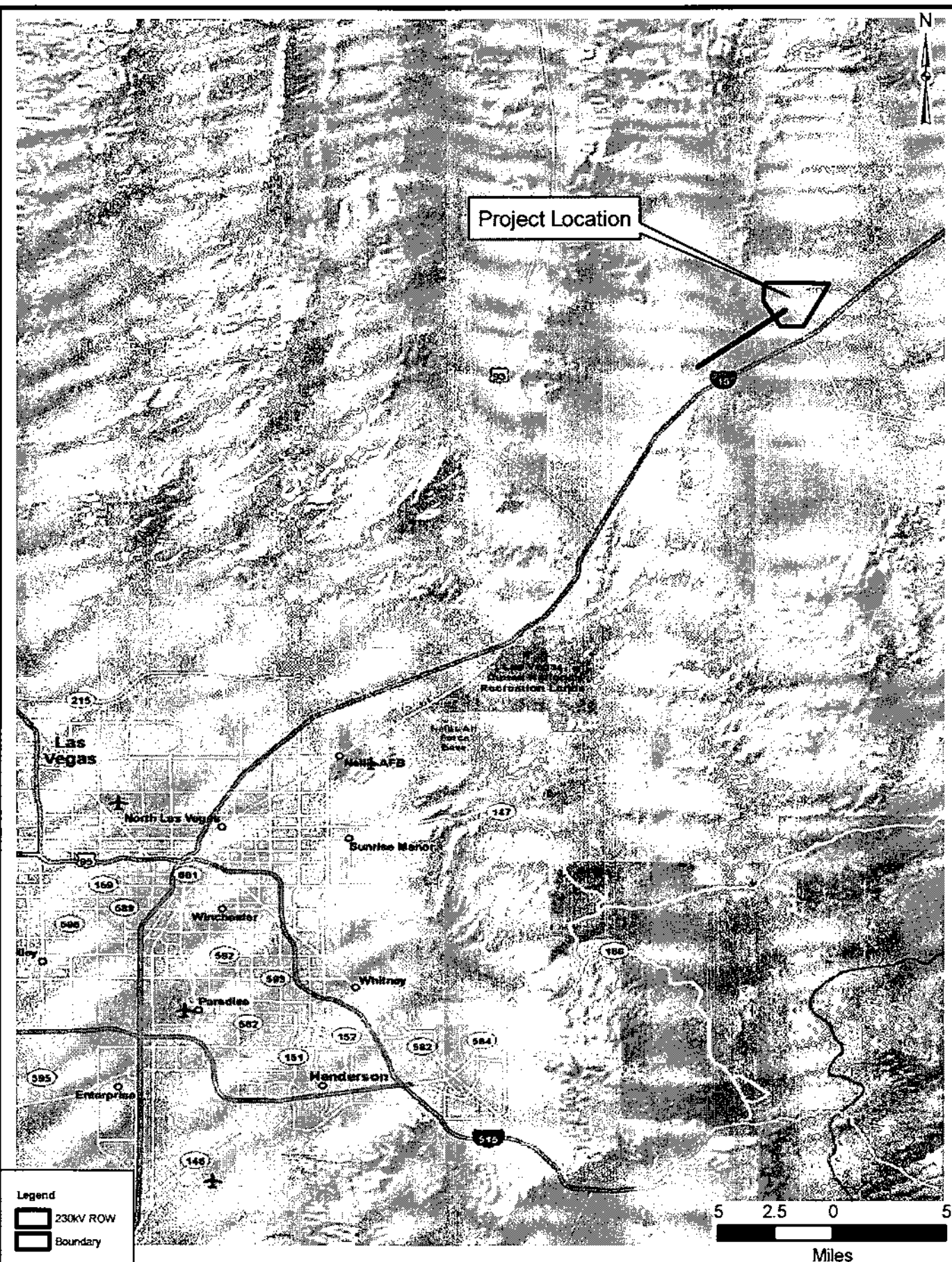
K Road Solar Power
Preliminary Jurisdictional Determination Report

Appendix A: Figures



This page intended to be blank.

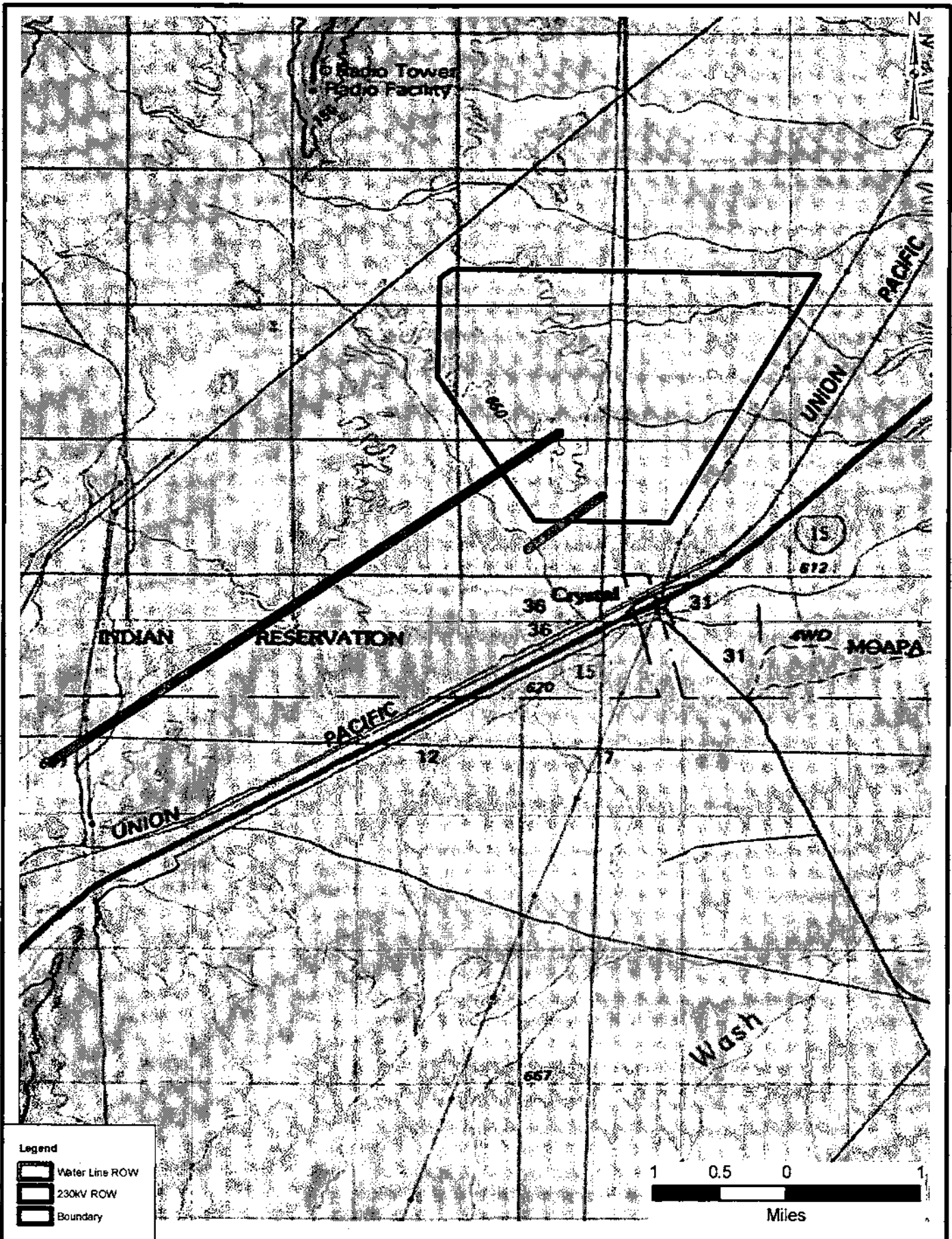
Map Document: Austin6823001/G:\S\MXD\BA Figure 2-1



KRoad Power
San Diego, California
KRoad Moapa Solar Project

Moapa Reservation
**Jurisdictional Determination
Site Vicinity Map**

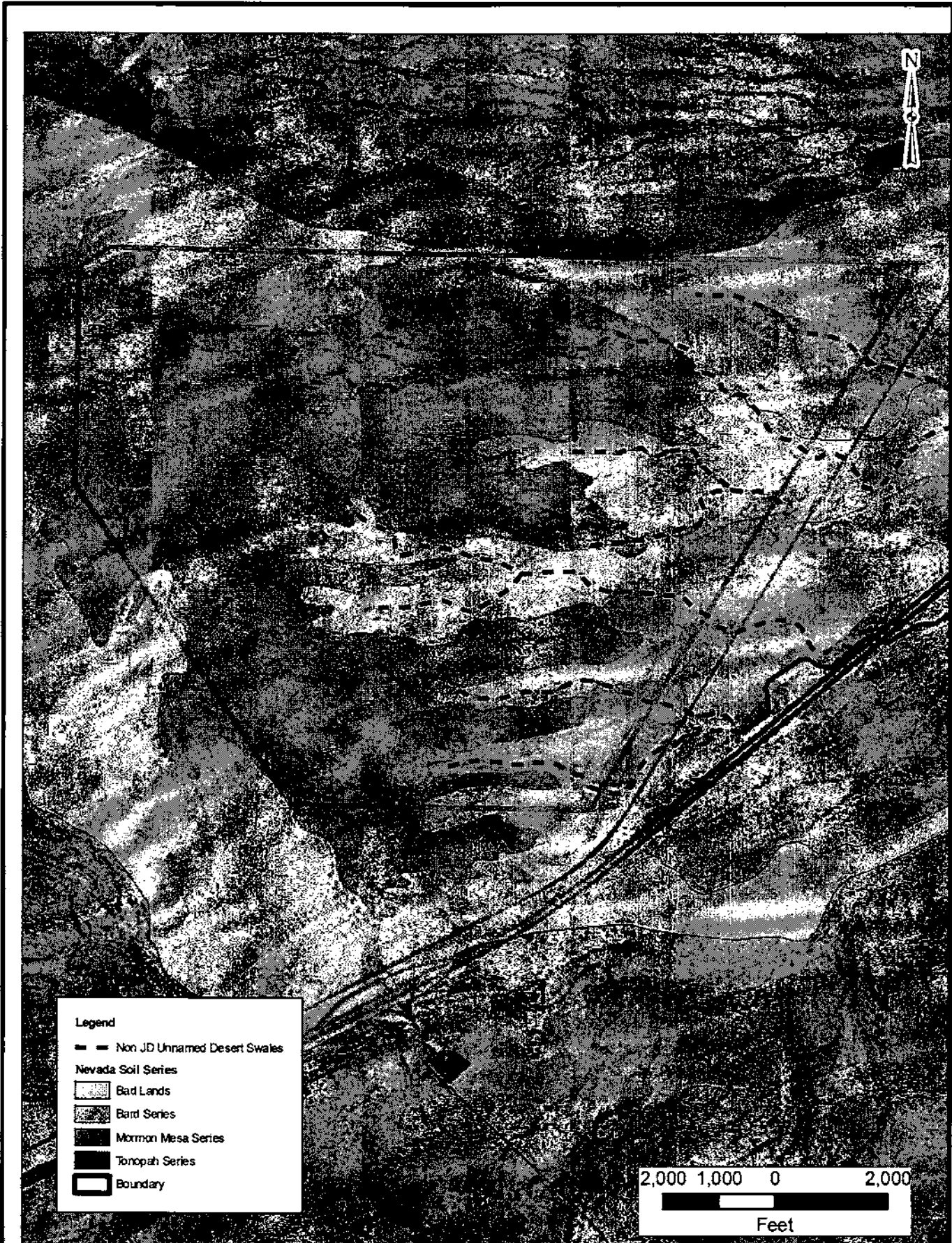
MALCOLM PIRNIE, INC.
2011
FIGURE 1



KRoad Power
San Diego, California
KRoad Moapa Solar Project

Moapa Reservation
Jurisdictional Determination
USGS Topography Map

MALCOLM PIRNIE, INC.
2011
FIGURE 2



KRoad Power
San Diego, California

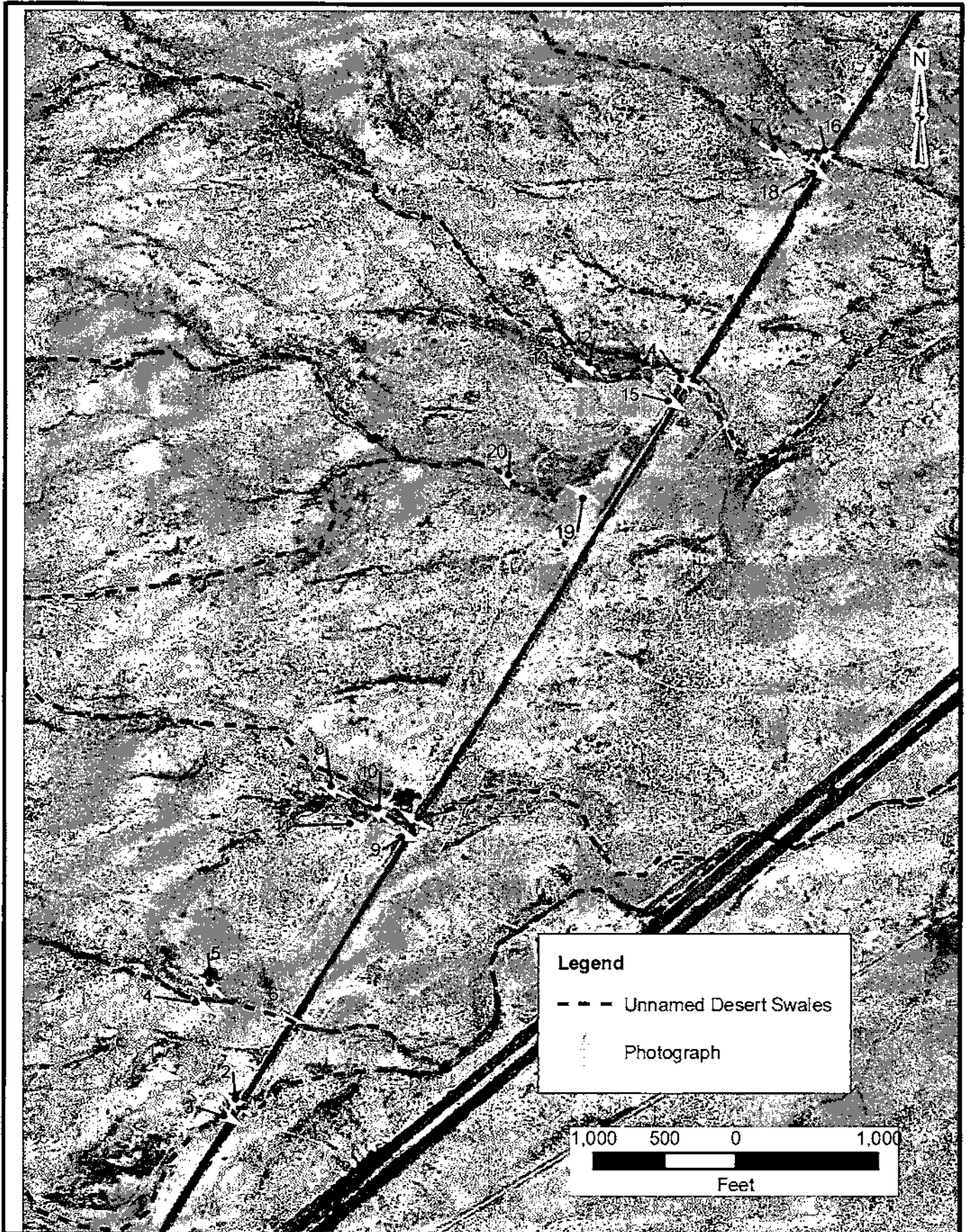
KRoad Moapa Solar Project

Moapa Reservation

Jurisdictional Determination
Clark County Soil Survey

MALCOLM PIRNIE, INC.

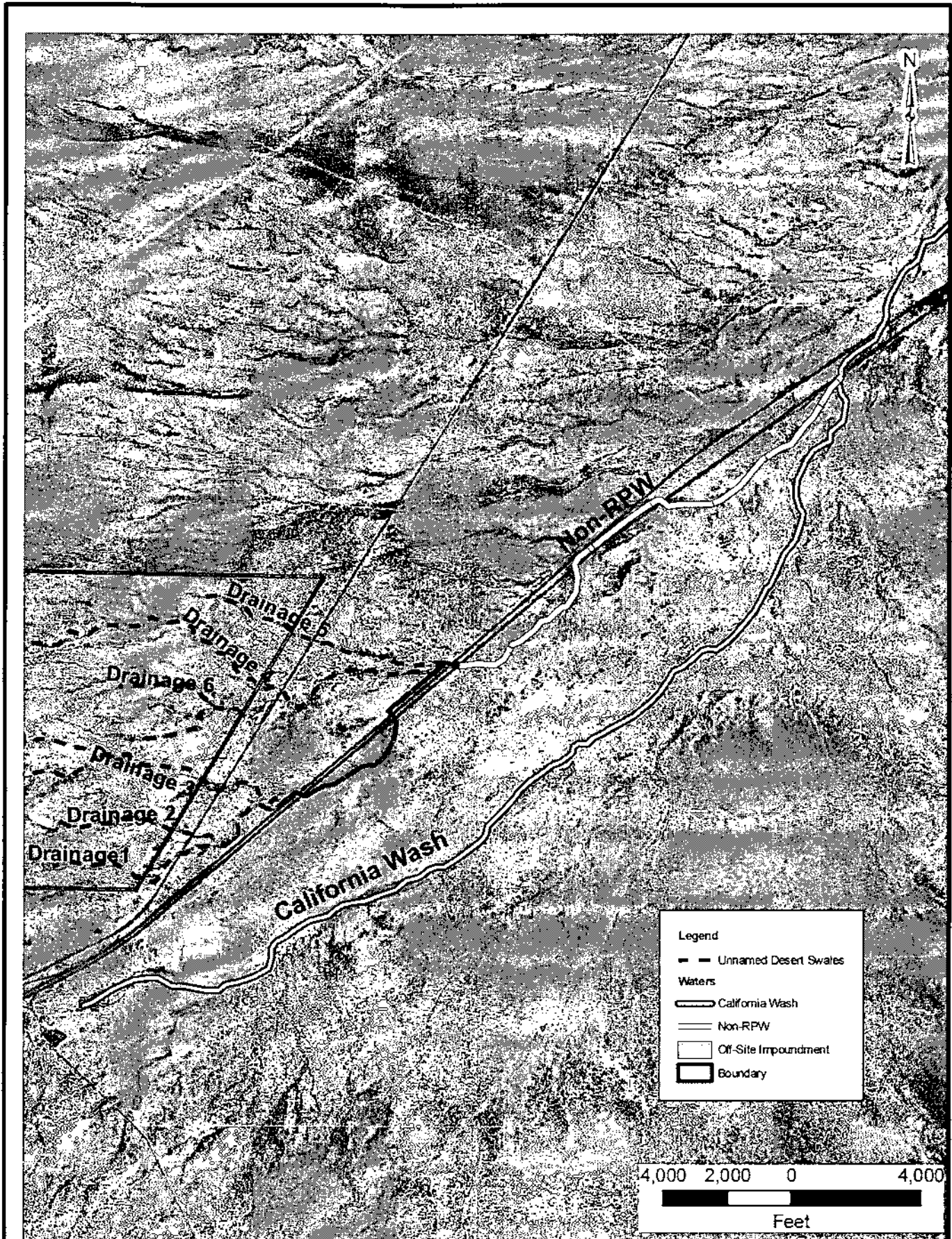
2011
FIGURE 3



KRoad Power
San Diego, California
KRoad Moapa Solar Project

Moapa Reservation
Jurisdictional Determination
Photographic Location Map

MALCOLM PIRNIE, INC.
2011
FIGURE 4



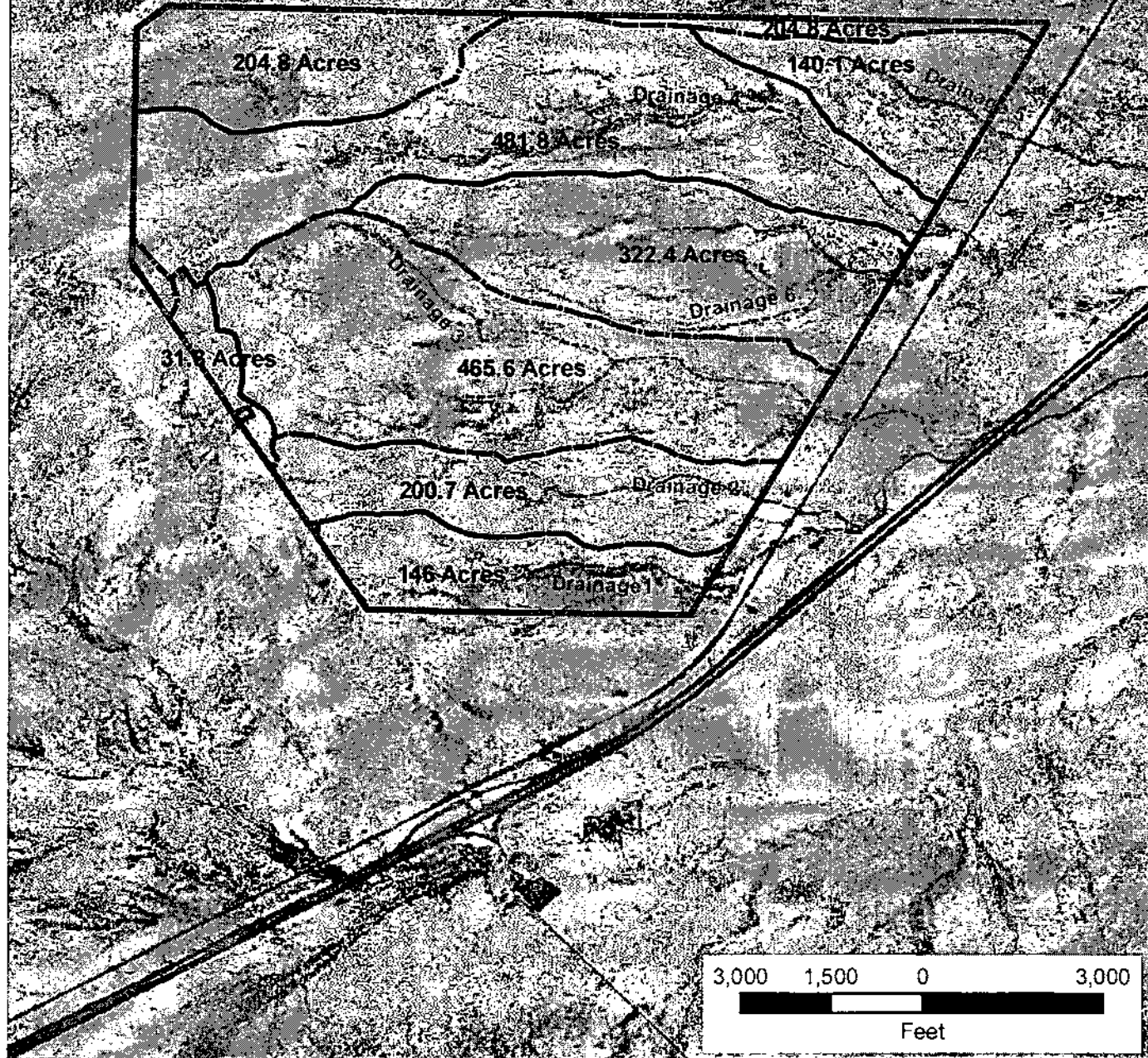
KRoad Power
San Diego, California
KRoad Moapa Solar Project

Moapa Reservation
Jurisdictional Waters Map

MALCOLM PIRNIE, INC.
2011
FIGURE 5

Legend

- Desert Swales
- ▭ Sub-Watershed
- ▭ Boundary (2,000 Acres)



KRoad Power
San Diego, California
KRoad Moapa Solar Project

Moapa Reservation
Watershed Areas
Associated with
Drainages

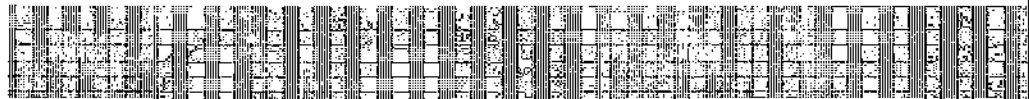
MALCOLM PIRNIE, INC.

2011
FIGURE 6

kRoad Solar Power

K Road Solar Power
Preliminary Jurisdictional Determination Report

Appendix B: Site Photographs



This page intended to be blank.

PHOTOGRAPHIC LOG

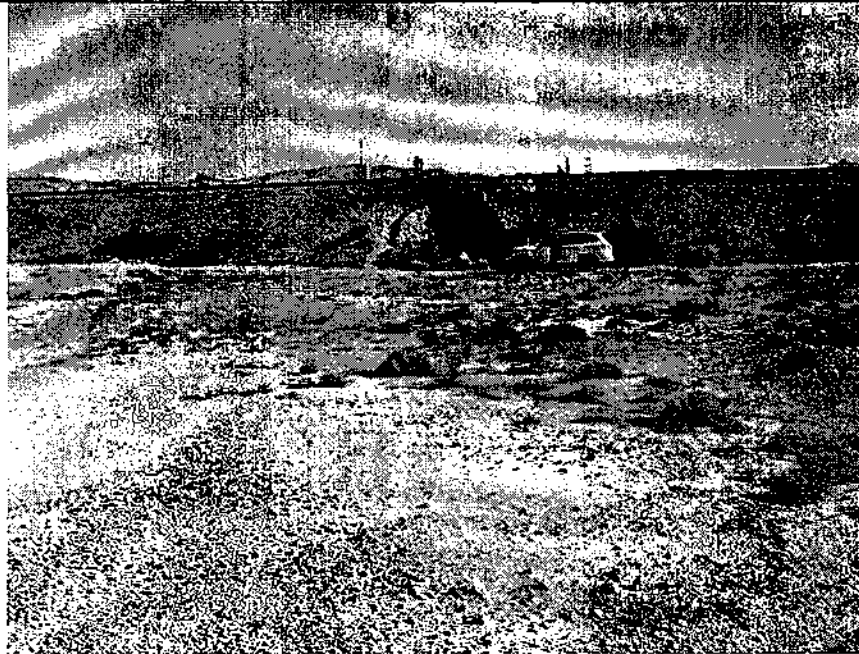
Property Name: KRoad Solar Project	Location: Moapa Reservation Clark County, Nevada	Project No. 6923001
--	--	-------------------------------

Photo No. 1	Date: 12/13/10
-----------------------	--------------------------

Direction Photo Taken:
East

Description:

Drainage 1.
Looking from the site boundary to the culvert under the Railroad.
Note: the lack of bed and bank or OHWM.



PHOTOGRAPHIC LOG

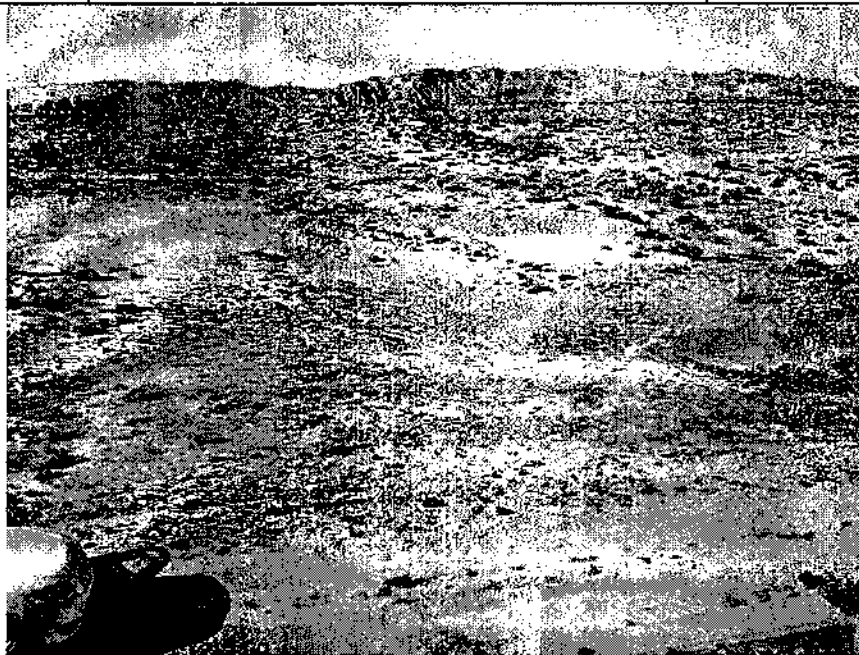
Property Name: KRoad Solar Project	Location: Moapa Reservation Clark County, Nevada	Project No. 6923001
--	--	-------------------------------

Photo No. 2	Date: 12/13/10
-----------------------	--------------------------

Direction Photo Taken:
West

Description:

Drainage 2.
Looking from the Railroad west across the sites. Note the lack of bed and bank or OHWM.



PHOTOGRAPHIC LOG

Property Name:

KRoad Solar Project

Location:

Moapa Reservation Clark County, Nevada

Project No.

6923001

Photo No.

3

Date:

12/13/10

Direction Photo

Taken:

East

Description:

Drainage 1.

Looking from the Railroad east towards interstate 15. Note the lack of bed and bank or OHWM.



PHOTOGRAPHIC LOG

Property Name:

KRoad Solar Project

Location:

Moapa Reservation Clark County, Nevada

Project No.

6923001

Photo No.

4

Date:

12/13/10

Direction Photo

Taken:

East

Description:


Drainage 2.

Looking from the site boundary to the culvert under the Railroad. Note: the lack of bed and bank, OHWM, or vegetation shift.



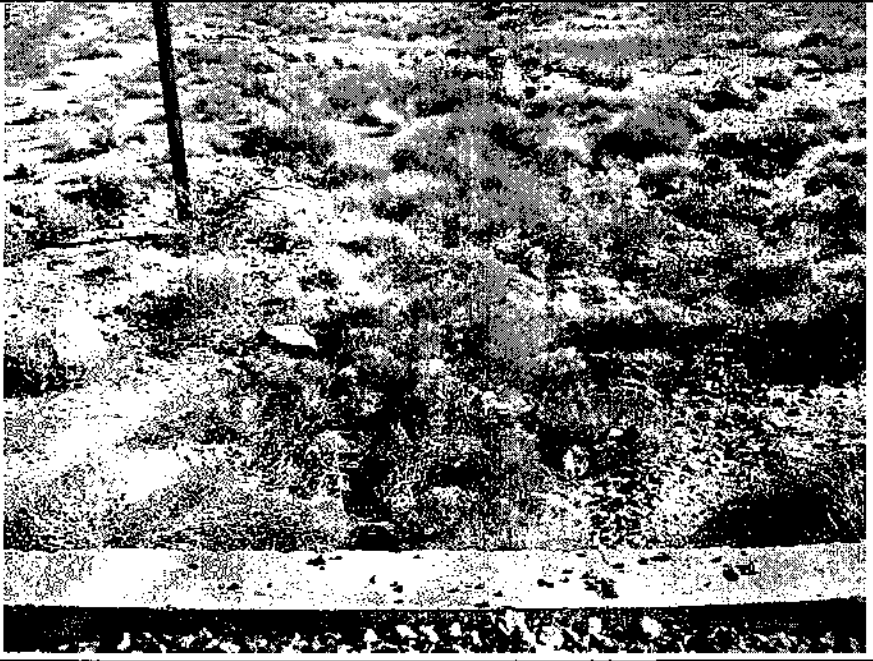


PHOTOGRAPHIC LOG

Property Name: KRoad Solar Project		Location: Moapa Reservation Clark County, Nevada	Project No. 6923001
Photo No. 5	Date: 12/13/10		
Direction Photo Taken: East			
Description: Drainage 2. Looking from the site boundary across the site.			



PHOTOGRAPHIC LOG

Property Name: KRoad Solar Project		Location: Moapa Reservation Clark County, Nevada	Project No. 6923001
Photo No. 6	Date: 12/13/10		
Direction Photo Taken: East			
Description: Drainage 2. Looking from the railroad east towards interstate 15. Note the lack of bed and bank or OHWM.			



PHOTOGRAPHIC LOG

Property Name:
KRoad Solar Project

Location:
Moapa Reservation Clark County, Nevada

Project No.
6923001

Photo No.
7

Date:
12/13/10

Direction Photo Taken:
West



Description:
Drainage 3.
Looking from the Railroad toward project site. Note the lack of bed and bank or OHWM.



PHOTOGRAPHIC LOG

Property Name:
KRoad Solar Project

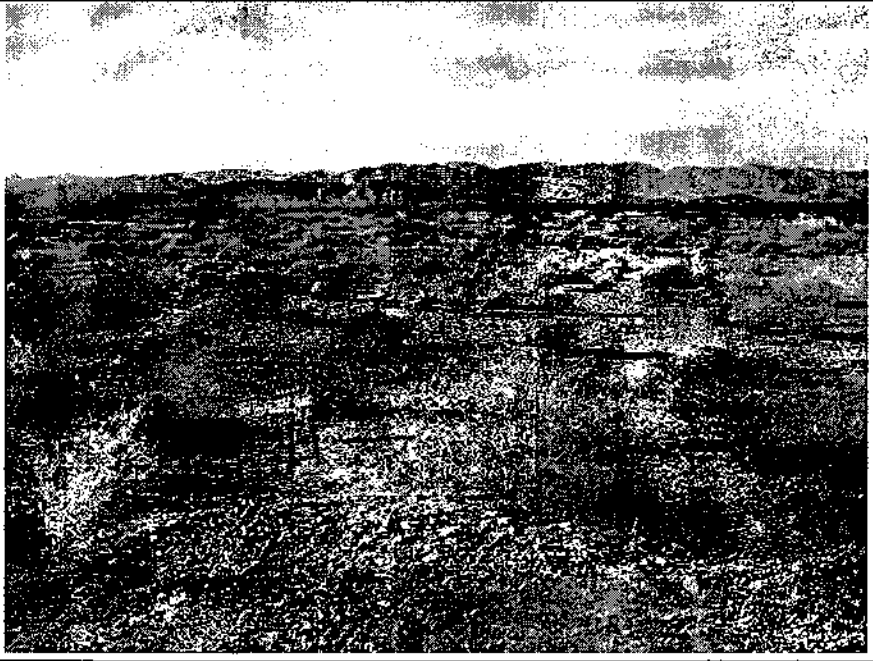
Location:
Moapa Reservation Clark County, Nevada

Project No.
6923001

Photo No.
8

Date:
12/13/10

Direction Photo Taken:
West



Description:
Drainage 3
Looking from the site boundary across the site. Note the lack of bed and bank or OHWM.



PHOTOGRAPHIC LOG

Property Name:
KRoad Soiar Project

Location:
Moapa Reservation Clark County, Nevada

Project No.
6923001

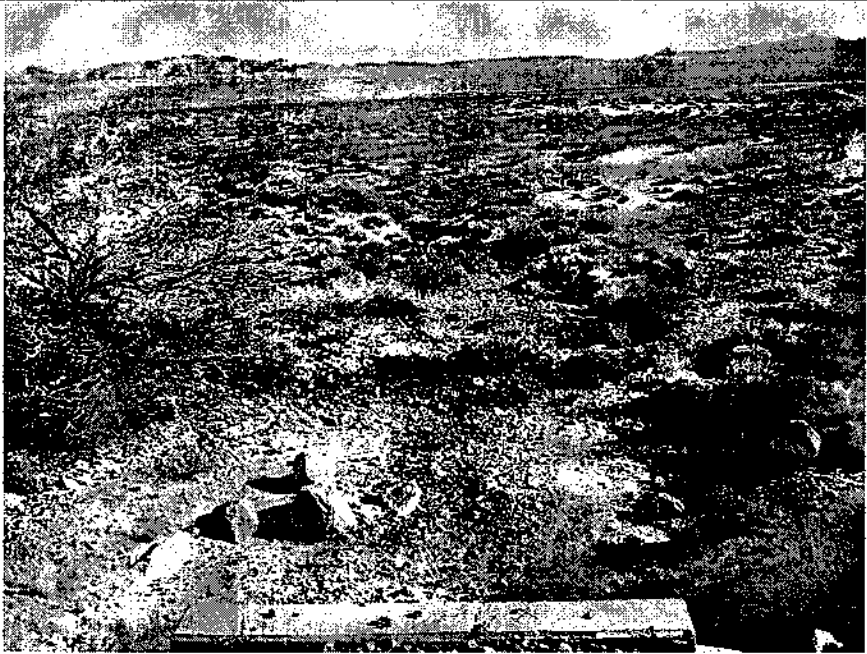
Photo No.
9

Date:
12/13/10

Direction Photo Taken:
West

Description:
Drainage 3.

Looking from the railroad east towards interstate 15. Note the lack of continuous bed and bank.



PHOTOGRAPHIC LOG

Property Name:
KRoad Solar Project

Location:
Moapa Reservation Clark County, Nevada

Project No.
6923001

Photo No.
10

Date:
12/13/10

Direction Photo Taken:
East

Description:
Drainage 3.

Looking across the site boundary from a point adjacent to the culvert under the Railroad. Note the lack of bed and bank or OHWM.





PHOTOGRAPHIC LOG

Property Name:
KRoad Solar Project

Location:
Moapa Reservation Clark County, Nevada

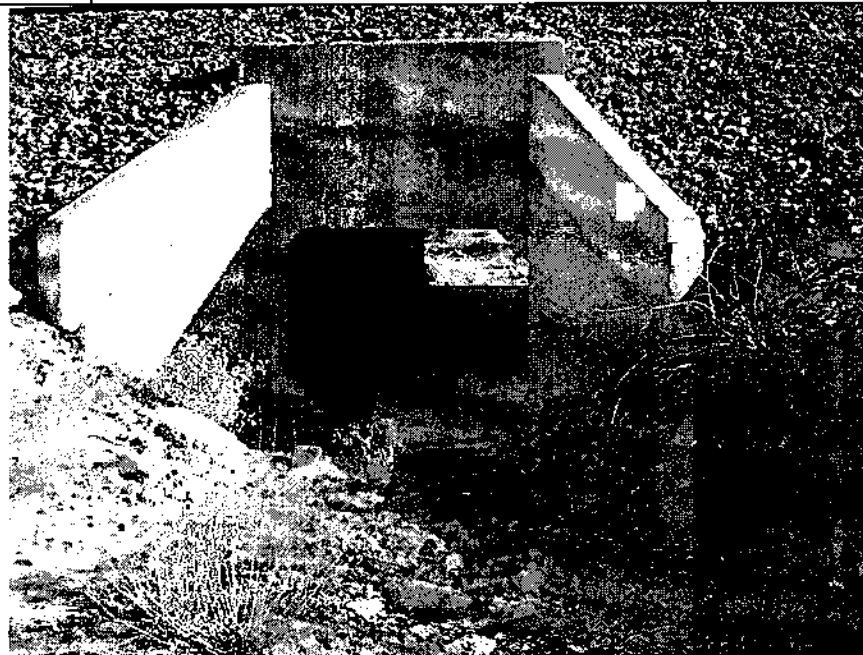
Project No.
6923001

Photo No.
11

Date:
12/13/10

Direction Photo Taken:
West

Description:
Drainage 3.
Looking at the culvert under the Railroad.



PHOTOGRAPHIC LOG

Property Name:
KRoad Solar Project

Location:
Moapa Reservation Clark County, Nevada

Project No.
6923001

Photo No.
12

Date:
12/13/10

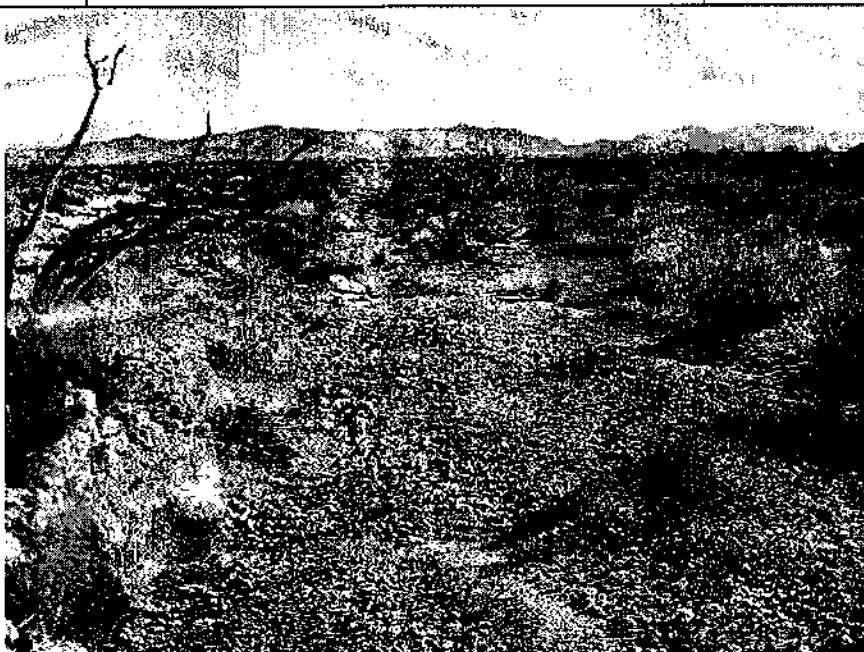
Direction Photo Taken:
West

Description:
Drainage 4.
Looking from the site boundary towards the center of the site.



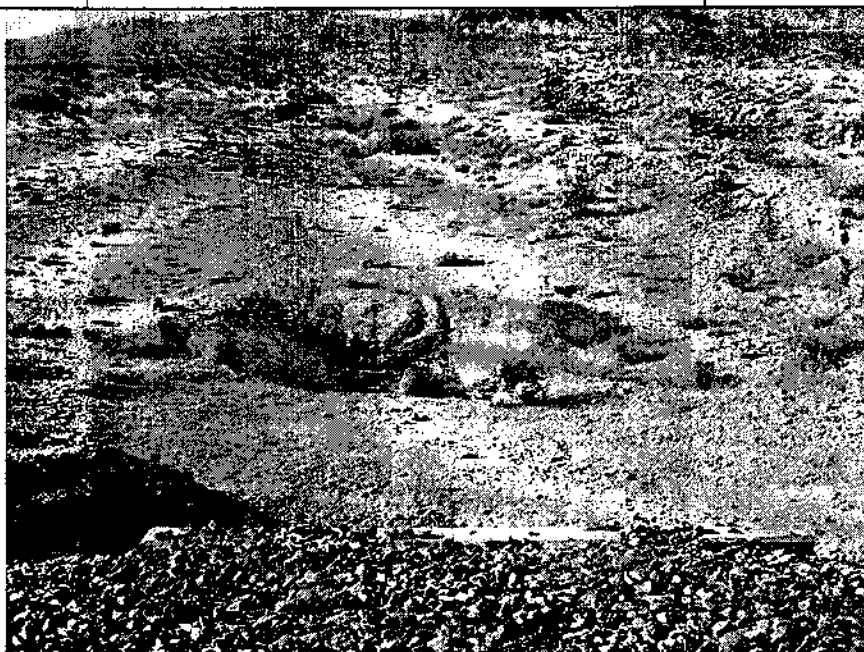


PHOTOGRAPHIC LOG

Property Name: KRoad Solar Project		Location: Moapa Reservation Clark County, Nevada	Project No. 6923001
Photo No. 13	Date: 12/13/10		
Direction Photo Taken: East			
Description: Drainage 4. Looking from site boundary east towards the culvert under the Railroad. Photo location is in low spot on channel.			



PHOTOGRAPHIC LOG

Property Name: KRoad Solar Project		Location: Moapa Reservation Clark County, Nevada	Project No. 6923001
Photo No. 14	Date: 12/13/10		
Direction Photo Taken: East			
Description: Drainage 4. Looking from the Railroad across the project site.			

PHOTOGRAPHIC LOG

Property Name:
KRoad Solar Project

Location:
Moapa Reservation Clark County, Nevada

Project No.
6923001

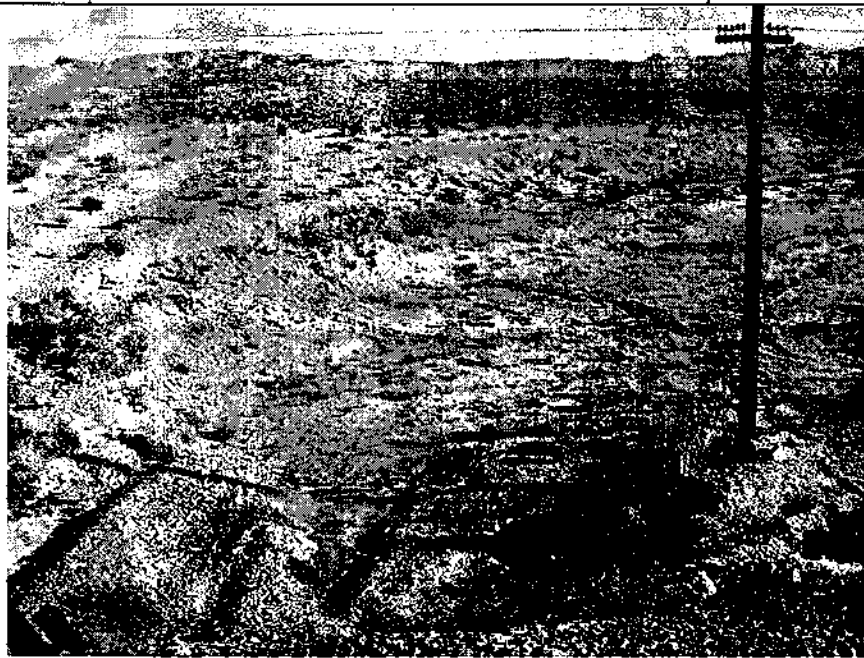
Photo No.
15

Date:
12/13/10

Direction Photo Taken:
East

Description:

Drainage 4.
Looking from the
railroad east towards
interstate 15.



PHOTOGRAPHIC LOG

Property Name:
KRoad Solar Project

Location:
Moapa Reservation Clark County, Nevada

Project No.
6923001

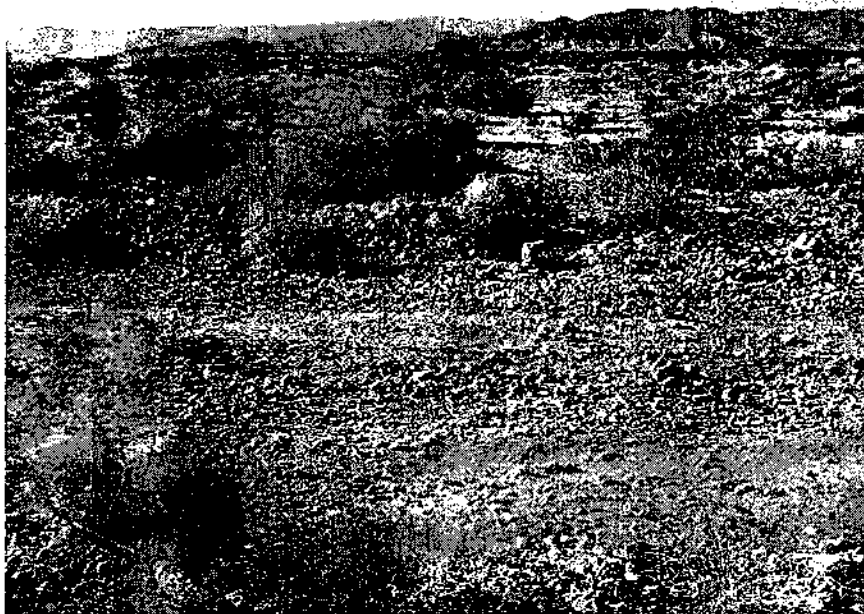
Photo No.
16

Date:
12/13/10

Direction Photo Taken:
West


Description:

Drainage 5
Looking from the site
boundary Across the
site. Note the lack of
bed and bank or
OHWM.



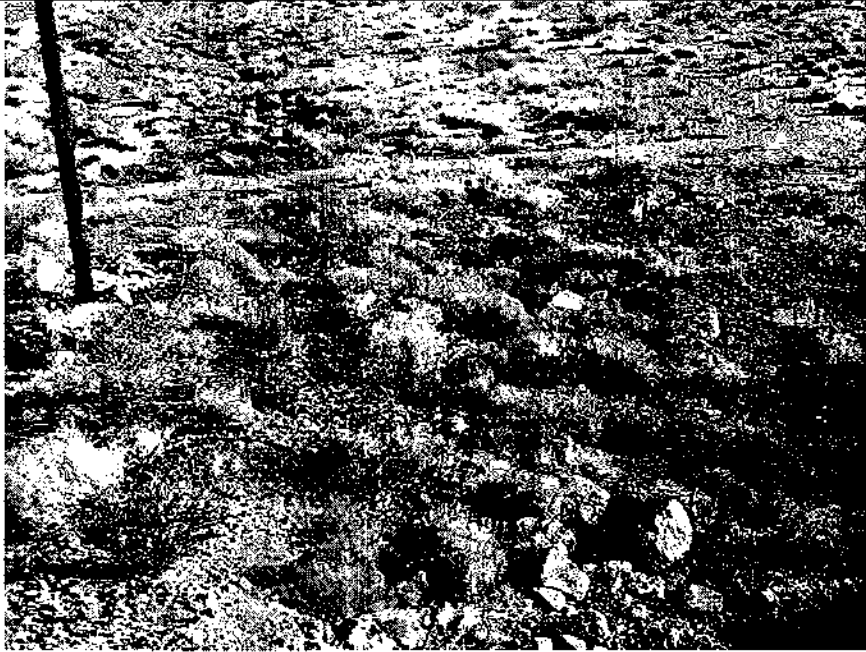


PHOTOGRAPHIC LOG

Property Name: KRoad Solar Project		Location: Moapa Reservation Clark County, Nevada	Project No. 6923001
Photo No. 17	Date: 12/13/10		
Direction Photo Taken: East			
Description: Drainage 5. Looking at the culvert under the Railroad. Note the lack of bed and bank or OHWM.			



PHOTOGRAPHIC LOG

Property Name: KRoad Solar Project		Location: Moapa Reservation Clark County, Nevada	Project No. 6923001
Photo No. 18	Date: 12/13/10		
Direction Photo Taken: East			
Description: Drainage 5. Looking from the site boundary to the culvert under the Railroad. Note the lack of bed and bank or OHWM.			



PHOTOGRAPHIC LOG

Property Name:
KRoad Solar Project

Location:
Moapa Reservation Clark County, Nevada

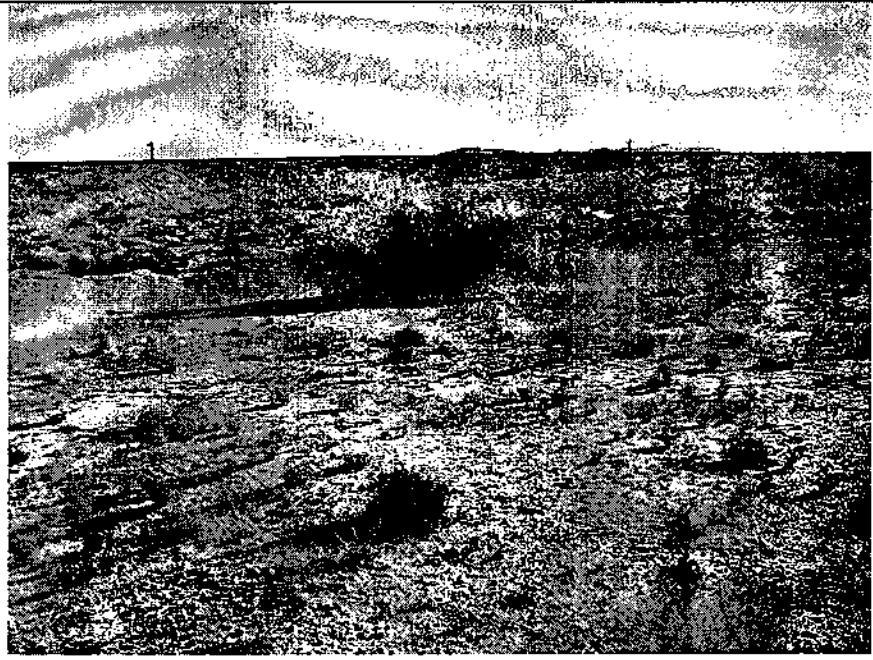
Project No.
6923001

Photo No.
19

Date:
12/13/10

Direction Photo Taken:
East

Description:
Drainage 6.
Looking at the built up
railroad track from the
off-site impoundment.
Note the lack of culvert
under the railroad.



PHOTOGRAPHIC LOG

Property Name:
KRoad Solar Project

Location:
Moapa Reservation Clark County, Nevada

Project No.
6923001

Photo No.
20

Date:
12/13/10

Direction Photo Taken:
West

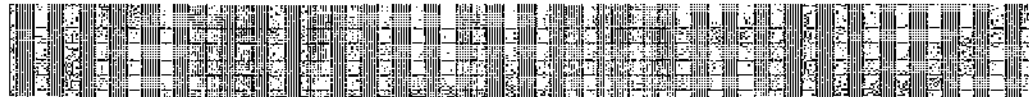
Description:
Drainage 6.
Looking up the
drainage. Note the
lack of bed and bank or
OHWM.



kRoad Solar Power

K Road Solar Power
Preliminary Jurisdictional Determination Report

Appendix C: OHWM Data Sheets



This page intended to be blank.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: KRoad Solar Project Project Number: Stream: Drainage 1 Investigator(s): A. Mathes and S. Walker	Date: 12/13/10 Town: Moapa Photo begin file#: 1	Time: State: Nevada Photo end file#: 3				
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Is the site significantly disturbed?	Location Details: Culvert 1 under Railroad Projection: Datum: Coordinates:					
<p>Potential anthropogenic influences on the channel system: The channel flows through a culvert under the railroad track. In addition the railroad was constructed on a large berm that required scraping from the adjacent landscape.</p>						
<p>Brief site description: The proposed project is situated in the north end of the Dry Lake Valley. Elevations of the project range from approximately 2,038 feet at the intersection of the main project access road at Interstate Highway 15 to 2,200 feet. Soils are shallow (4 inches) over caliche layer.</p>						
<p>Checklist of resources (if available):</p> <table style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Aerial photography Dates: 2006 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input checked="" type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event </td> </tr> </table>			<input checked="" type="checkbox"/> Aerial photography Dates: 2006 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input checked="" type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event		
<input checked="" type="checkbox"/> Aerial photography Dates: 2006 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input checked="" type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event					
<p>Hydrogeomorphic Floodplain Units</p>						
<p>Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:</p> <ol style="list-style-type: none"> 1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site. 2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units. 3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units. <ol style="list-style-type: none"> a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit. c) Identify any indicators present at the location. 4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section. 5. Identify the OHWM and record the indicators. Record the OHWM position via: <table style="width: 100%; margin-left: 20px;"> <tr> <td><input type="checkbox"/> Mapping on aerial photograph</td> <td><input type="checkbox"/> GPS</td> </tr> <tr> <td><input type="checkbox"/> Digitized on computer</td> <td><input checked="" type="checkbox"/> Other:</td> </tr> </table> 			<input type="checkbox"/> Mapping on aerial photograph	<input type="checkbox"/> GPS	<input type="checkbox"/> Digitized on computer	<input checked="" type="checkbox"/> Other:
<input type="checkbox"/> Mapping on aerial photograph	<input type="checkbox"/> GPS					
<input type="checkbox"/> Digitized on computer	<input checked="" type="checkbox"/> Other:					

Project ID:

Cross section ID:

Date: 12-13-10

Time:

Cross section drawing:



OHWM

GPS point: No OHWM was located for this feature.

Indicators:

- | | |
|---|--|
| <input type="checkbox"/> Change in average sediment texture | <input type="checkbox"/> Break in bank slope |
| <input type="checkbox"/> Change in vegetation species | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Change in vegetation cover | <input type="checkbox"/> Other: _____ |

Comments:

The drainage lacked indications of a high water mark (Changes in sediment, changes in vegetation, or a break in slope). This waterway was determined to be a storm water drainage.

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- | | |
|---|--|
| <input type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|---|---|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input type="checkbox"/> Drift and/or debris | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

No floodplain unit was identified for this drainage.

Project ID:

Cross section ID:

Date:

Time:

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- | | |
|---|--|
| <input type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|---|---|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input type="checkbox"/> Drift and/or debris | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- | | |
|---|--|
| <input type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

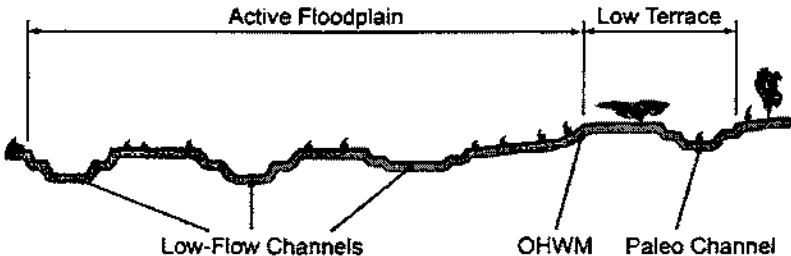
Indicators:

- | | |
|---|---|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input type="checkbox"/> Drift and/or debris | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

This page intended to be blank.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: KRoad Solar Project Project Number: Stream: Drainage 2 Investigator(s): A. Mathes and S. Walker	Date: 12/13/10 Town: Moapa Photo begin file#: 4	Time: State: Nevada Photo end file#: 6
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Is the site significantly disturbed?	Location Details: Culvert 2 under Railroad Projection: Datum: Coordinates:	
Potential anthropogenic influences on the channel system: The channel flows through a culvert under the railroad track. In addition the railroad was constructed on a large berm that required scraping from the adjacent landscape.		
Brief site description: The proposed project is situated in the north end of the Dry Lake Valley. Elevations of the project range from approximately 2,038 feet at the intersection of the main project access road at Interstate Highway 15 to 2,200 feet. Soils are shallow (4 inches) over caliche layer.		
Checklist of resources (if available): <input checked="" type="checkbox"/> Aerial photography Dates: 2006 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input checked="" type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies <input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event		
Hydrogeomorphic Floodplain Units 		
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM: 1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site. 2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units. 3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units. a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit. c) Identify any indicators present at the location. 4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section. 5. Identify the OHWM and record the indicators. Record the OHWM position via: <input type="checkbox"/> Mapping on aerial photograph <input type="checkbox"/> GPS <input type="checkbox"/> Digitized on computer <input checked="" type="checkbox"/> Other:		

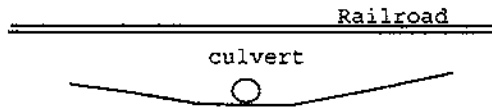
Project ID:

Cross section ID:

Date: 12-13-10

Time:

Cross section drawing:



OHWM

GPS point: No OHWM was located for this feature.

Indicators:

- | | |
|---|--|
| <input type="checkbox"/> Change in average sediment texture | <input type="checkbox"/> Break in bank slope |
| <input type="checkbox"/> Change in vegetation species | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Change in vegetation cover | <input type="checkbox"/> Other: _____ |

Comments:

The drainage lacked indications of a high water mark (Changes in sediment, changes in vegetation, or a break in slope). This waterway was determined to be a storm water drainage.

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- | | |
|---|--|
| <input type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|---|---|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input type="checkbox"/> Drift and/or debris | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

No floodplain unit was identified for this drainage.

Project ID:

Cross section ID:

Date:

Time:

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- | | |
|---|--|
| <input type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|---|---|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input type="checkbox"/> Drift and/or debris | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- | | |
|---|--|
| <input type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|---|---|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input type="checkbox"/> Drift and/or debris | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

This page intended to be blank.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: KRoad Solar Project Project Number: Stream: Drainage 3 Investigator(s): A. Mathes and S. Walker	Date: 12/13/10 Town: Moapa Photo begin file#: 7	Time: State: Nevada Photo end file#: 10				
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Is the site significantly disturbed?	Location Details: Culvert 3 under Railroad Projection: Datum: Coordinates:					
Potential anthropogenic influences on the channel system: The channel flows through a culvert under the railroad track. In addition the railroad was constructed on a large berm that required scraping from the adjacent landscape.						
Brief site description: The proposed project is situated in the north end of the Dry Lake Valley. Elevations of the project range from approximately 2,038 feet at the intersection of the main project access road at Interstate Highway 15 to 2,200 feet. Soils are shallow (4 inches) over caliche layer.						
Checklist of resources (if available): <input checked="" type="checkbox"/> Aerial photography Dates: 2006 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input checked="" type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies <input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event						
Hydrogeomorphic Floodplain Units 						
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM: <ol style="list-style-type: none"> 1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site. 2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units. 3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units. <ol style="list-style-type: none"> a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit. c) Identify any indicators present at the location. 4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section. 5. Identify the OHWM and record the indicators. Record the OHWM position via: <table style="width: 100%; margin-left: 20px;"> <tr> <td><input type="checkbox"/> Mapping on aerial photograph</td> <td><input type="checkbox"/> GPS</td> </tr> <tr> <td><input type="checkbox"/> Digitized on computer</td> <td><input checked="" type="checkbox"/> Other:</td> </tr> </table> 			<input type="checkbox"/> Mapping on aerial photograph	<input type="checkbox"/> GPS	<input type="checkbox"/> Digitized on computer	<input checked="" type="checkbox"/> Other:
<input type="checkbox"/> Mapping on aerial photograph	<input type="checkbox"/> GPS					
<input type="checkbox"/> Digitized on computer	<input checked="" type="checkbox"/> Other:					

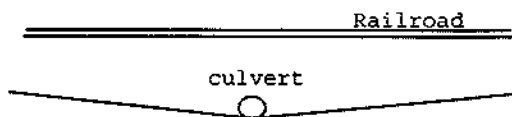
Project ID:

Cross section ID:

Date: 12-13-10

Time:

Cross section drawing:



There was no change in vegetation or sediment size across the drainage area.

OHWM

GPS point: No OHWM was located for this feature.

Indicators:

- | | |
|---|--|
| <input type="checkbox"/> Change in average sediment texture | <input type="checkbox"/> Break in bank slope |
| <input type="checkbox"/> Change in vegetation species | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Change in vegetation cover | <input type="checkbox"/> Other: _____ |

Comments:

The drainage lacked indications of a high water mark (Changes in sediment, changes in vegetation, or a break in slope). This waterway was determined to be a storm water drainage.

Floodplain unit:

- Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- | | |
|---|--|
| <input type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|---|---|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input type="checkbox"/> Drift and/or debris | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

No floodplain unit was identified for this drainage.

Project ID:

Cross section ID:

Date:

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

NA

Early (herbaceous & seedlings)

Mid (herbaceous, shrubs, saplings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Ripples

Drift and/or debris

Presence of bed and bank

Benches

Soil development

Surface relief

Other: _____

Other: _____

Other: _____

Comments:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

NA

Early (herbaceous & seedlings)

Mid (herbaceous, shrubs, saplings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Ripples

Drift and/or debris

Presence of bed and bank

Benches

Soil development

Surface relief

Other: _____

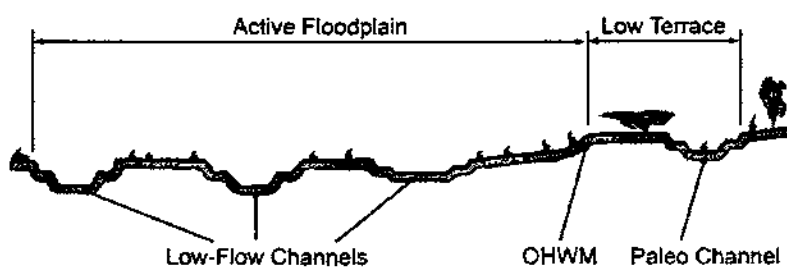
Other: _____

Other: _____

Comments:

This page intended to be blank.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: KRoad Solar Project Project Number: Stream: Drainage 4 Investigator(s): A. Mathes and S. Walker	Date: 12/13/10 Town: Moapa Photo begin file#: 11	Time: State: Nevada Photo end file#: 15				
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Is the site significantly disturbed?	Location Details: Culvert 4 under Railroad Projection: Datum: Coordinates:					
Potential anthropogenic influences on the channel system: The channel flows through a culvert under the railroad track. In addition the railroad was constructed on a large berm that required scraping from the adjacent landscape.						
Brief site description: The proposed project is situated in the north end of the Dry Lake Valley. Elevations of the project range from approximately 2,038 feet at the intersection of the main project access road at Interstate Highway 15 to 2,200 feet. Soils are shallow (4 inches) over caliche layer.						
Checklist of resources (if available): <table style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Aerial photography Dates: 2006 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input checked="" type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event </td> </tr> </table>			<input checked="" type="checkbox"/> Aerial photography Dates: 2006 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input checked="" type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event		
<input checked="" type="checkbox"/> Aerial photography Dates: 2006 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input checked="" type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: Period of record: <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event					
Hydrogeomorphic Floodplain Units 						
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM: <ol style="list-style-type: none"> 1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site. 2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units. 3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units. <ol style="list-style-type: none"> a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit. c) Identify any indicators present at the location. 4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section. 5. Identify the OHWM and record the indicators. Record the OHWM position via: <table style="width: 100%; margin-top: 5px;"> <tr> <td><input type="checkbox"/> Mapping on aerial photograph</td> <td><input checked="" type="checkbox"/> GPS</td> </tr> <tr> <td><input type="checkbox"/> Digitized on computer</td> <td><input type="checkbox"/> Other:</td> </tr> </table> 			<input type="checkbox"/> Mapping on aerial photograph	<input checked="" type="checkbox"/> GPS	<input type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:
<input type="checkbox"/> Mapping on aerial photograph	<input checked="" type="checkbox"/> GPS					
<input type="checkbox"/> Digitized on computer	<input type="checkbox"/> Other:					

Project ID:

Cross section ID:

Date: 12-13-10

Time:

Cross section drawing:



There was no change in vegetation or sediment size; however, there was a break in slope that indicates a OHWM is present.

OHWM

GPS point: _____

Indicators:

- Change in average sediment texture
- Change in vegetation species
- Change in vegetation cover
- Break in bank slope
- Other: _____
- Other: _____

Comments:

The drainage lacked changes in sediment or changes in vegetation; however, there is a break in slope. While mapping the OHWM it was noted that several expanses lacked a bed and bank and the OHWM was discontinuous.

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: Cobble and sand

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: 40 %

Community successional stage:

- NA
- Early (herbaceous & seedlings)
- Mid (herbaceous, shrubs, saplings)
- Late (herbaceous, shrubs, mature trees)

Indicators:

- Mudcracks
- Ripples
- Drift and/or debris
- Presence of bed and bank
- Benches
- Soil development
- Surface relief
- Other: _____
- Other: _____
- Other: _____

Comments:

A relic floodplain was evident based on surface topology; however, vegetation and sediment remained consistent throughout the area.

Project ID:

Cross section ID:

Date:

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

NA

Early (herbaceous & seedlings)

Mid (herbaceous, shrubs, saplings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Ripples

Drift and/or debris

Presence of bed and bank

Benches

Soil development

Surface relief

Other: _____

Other: _____

Other: _____

Comments:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

NA

Early (herbaceous & seedlings)

Mid (herbaceous, shrubs, saplings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Ripples

Drift and/or debris

Presence of bed and bank

Benches

Soil development

Surface relief

Other: _____

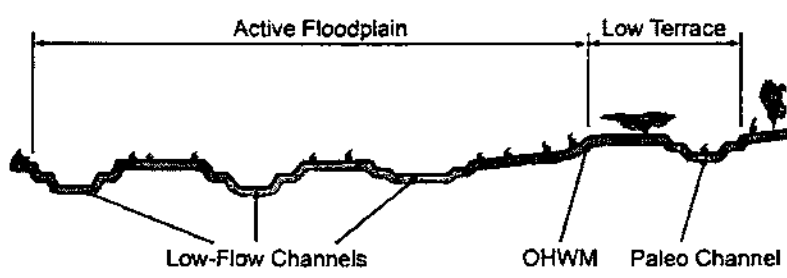
Other: _____

Other: _____

Comments:

This page intended to be blank.

Arid West Ephemeral and Intermittent Streams OHW M Datasheet

Project: KRoad Solar Project Project Number: Stream: Drainage 5 Investigator(s): A. Mathes and S. Walker	Date: 12/13/10 Town: Moapa Photo begin file#: 16	Time: State: Nevada Photo end file#: 18				
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Is the site significantly disturbed?	Location Details: Culvert 5 under Railroad Projection: _____ Datum: _____ Coordinates: _____					
Potential anthropogenic influences on the channel system: The channel flows through a culvert under the railroad track. In addition the railroad was constructed on a large berm that required scraping from the adjacent landscape.						
Brief site description: The proposed project is situated in the north end of the Dry Lake Valley. Elevations of the project range from approximately 2,038 feet at the intersection of the main project access road at Interstate Highway 15 to 2,200 feet. Soils are shallow (4 inches) over caliche layer.						
Checklist of resources (if available): <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input checked="" type="checkbox"/> Aerial photography Dates: 2006 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input checked="" type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Stream gage data Gage number: _____ Period of record: _____ <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event </td> </tr> </table>			<input checked="" type="checkbox"/> Aerial photography Dates: 2006 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input checked="" type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: _____ Period of record: _____ <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event		
<input checked="" type="checkbox"/> Aerial photography Dates: 2006 <input checked="" type="checkbox"/> Topographic maps <input type="checkbox"/> Geologic maps <input type="checkbox"/> Vegetation maps <input type="checkbox"/> Soils maps <input type="checkbox"/> Rainfall/precipitation maps <input checked="" type="checkbox"/> Existing delineation(s) for site <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies	<input type="checkbox"/> Stream gage data Gage number: _____ Period of record: _____ <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event					
Hydrogeomorphic Floodplain Units 						
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM: 1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site. 2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units. 3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units. a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit. c) Identify any indicators present at the location. 4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section. 5. Identify the OHWM and record the indicators. Record the OHWM position via: <table style="width: 100%; border: none; margin-top: 5px;"> <tr> <td style="width: 50%;"><input type="checkbox"/> Mapping on aerial photograph</td> <td style="width: 50%;"><input type="checkbox"/> GPS</td> </tr> <tr> <td><input type="checkbox"/> Digitized on computer</td> <td><input checked="" type="checkbox"/> Other:</td> </tr> </table>			<input type="checkbox"/> Mapping on aerial photograph	<input type="checkbox"/> GPS	<input type="checkbox"/> Digitized on computer	<input checked="" type="checkbox"/> Other:
<input type="checkbox"/> Mapping on aerial photograph	<input type="checkbox"/> GPS					
<input type="checkbox"/> Digitized on computer	<input checked="" type="checkbox"/> Other:					

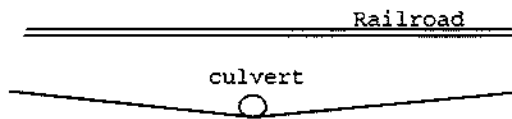
Project ID:

Cross section ID:

Date: 12-13-10

Time:

Cross section drawing:



There was no change in vegetation or sediment size across the drainage area.

OHWM

GPS point: No OHWM was located for this feature.

Indicators:

- | | |
|---|--|
| <input type="checkbox"/> Change in average sediment texture | <input type="checkbox"/> Break in bank slope |
| <input type="checkbox"/> Change in vegetation species | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Change in vegetation cover | <input type="checkbox"/> Other: _____ |

Comments:

The drainage lacked indications of a high water mark (Changes in sediment, changes in vegetation, or a break in slope). This waterway was determined to be a storm water drainage.

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____
 Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%
 Community successional stage:

- | | |
|---|--|
| <input type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|---|---|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input type="checkbox"/> Drift and/or debris | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

No floodplain unit was identified for this drainage.

Project ID:

Cross section ID:

Date:

Time:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

NA

Early (herbaceous & seedlings)

Mid (herbaceous, shrubs, saplings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Ripples

Drift and/or debris

Presence of bed and bank

Benches

Soil development

Surface relief

Other: _____

Other: _____

Other: _____

Comments:

Floodplain unit:

Low-Flow Channel

Active Floodplain

Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

NA

Early (herbaceous & seedlings)

Mid (herbaceous, shrubs, saplings)

Late (herbaceous, shrubs, mature trees)

Indicators:

Mudcracks

Ripples

Drift and/or debris

Presence of bed and bank

Benches

Soil development

Surface relief

Other: _____

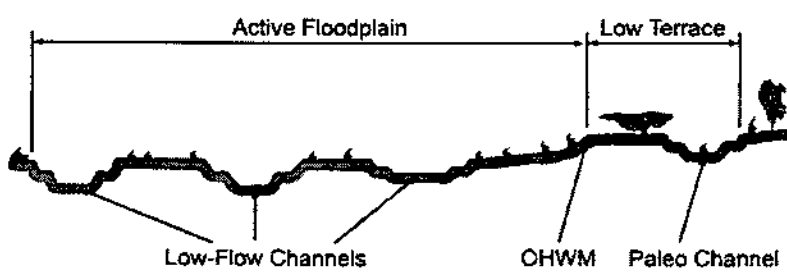
Other: _____

Other: _____

Comments:

This page intended to be blank.

Arid West Ephemeral and Intermittent Streams OHW M Datasheet

Project: KRoad Solar Project Project Number: Stream: Drainage 6 Investigator(s): A. Mathes and S. Walker	Date: 12/13/10 Town: Moapa Photo begin file#: 19	Time: State: Nevada Photo end file#: 20				
Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Do normal circumstances exist on the site? Y <input checked="" type="checkbox"/> / N <input type="checkbox"/> Is the site significantly disturbed?	Location Details: Isolated Desert Swale Drainage 6 Projection: Datum: Coordinates:					
Potential anthropogenic influences on the channel system: The channel flows off-site into an impoundment adjacent to the railroad track. No culvert was constructed in the railroad to allow natural flow.						
Brief site description: The proposed project is situated in the north end of the Dry Lake Valley. Elevations of the project range from approximately 2,038 feet at the intersection of the main project access road at Interstate Highway 15 to 2,200 feet. Soils are shallow (4 inches) over caliche layer.						
Checklist of resources (if available): <input checked="" type="checkbox"/> Aerial photography <input type="checkbox"/> Stream gage data Dates: 2006 Gage number: <input checked="" type="checkbox"/> Topographic maps Period of record: <input type="checkbox"/> Geologic maps <input type="checkbox"/> History of recent effective discharges <input type="checkbox"/> Vegetation maps <input type="checkbox"/> Results of flood frequency analysis <input type="checkbox"/> Soils maps <input type="checkbox"/> Most recent shift-adjusted rating <input type="checkbox"/> Rainfall/precipitation maps <input type="checkbox"/> Gage heights for 2-, 5-, 10-, and 25-year events and the <input checked="" type="checkbox"/> Existing delineation(s) for site most recent event exceeding a 5-year event <input checked="" type="checkbox"/> Global positioning system (GPS) <input type="checkbox"/> Other studies						
Hydrogeomorphic Floodplain Units 						
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM: <ol style="list-style-type: none"> 1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site. 2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units. 3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units. <ol style="list-style-type: none"> a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit. c) Identify any indicators present at the location. 4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section. 5. Identify the OHWM and record the indicators. Record the OHWM position via: <table style="width: 100%; margin-left: 20px;"> <tr> <td><input type="checkbox"/> Mapping on aerial photograph</td> <td><input type="checkbox"/> GPS</td> </tr> <tr> <td><input type="checkbox"/> Digitized on computer</td> <td><input checked="" type="checkbox"/> Other:</td> </tr> </table> 			<input type="checkbox"/> Mapping on aerial photograph	<input type="checkbox"/> GPS	<input type="checkbox"/> Digitized on computer	<input checked="" type="checkbox"/> Other:
<input type="checkbox"/> Mapping on aerial photograph	<input type="checkbox"/> GPS					
<input type="checkbox"/> Digitized on computer	<input checked="" type="checkbox"/> Other:					

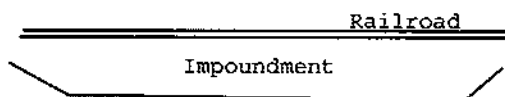
Project ID:

Cross section ID:

Date: 12-13-10

Time:

Cross section drawing:



The drainage swale emptied into a small impoundment adjacent to the railroad, off-site. This impoundment did not have a significant nexus to any other swales or water bodies.

OHW

GPS point: _____

Indicators:

- Change in average sediment texture
- Change in vegetation species
- Change in vegetation cover
- Break in bank slope
- Other: _____
- Other: _____

Comments:

The drainage lacked a continuous high water mark (Changes in sediment, changes in vegetation, or a break in slope). This waterway was determined to be a storm water drainage. This water way flows into an impoundment off-site.

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____
Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- NA
- Early (herbaceous & seedlings)
- Mid (herbaceous, shrubs, saplings)
- Late (herbaceous, shrubs, mature trees)

Indicators:

- Mudcracks
- Ripples
- Drift and/or debris
- Presence of bed and bank
- Benches
- Soil development
- Surface relief
- Other: _____
- Other: _____
- Other: _____

Comments:

No floodplain unit was identified for this drainage.

Project ID:

Cross section ID:

Date:

Time:

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- | | |
|---|--|
| <input type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|---|---|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input type="checkbox"/> Drift and/or debris | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

Comments:

Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____% Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- | | |
|---|--|
| <input type="checkbox"/> NA | <input type="checkbox"/> Mid (herbaceous, shrubs, saplings) |
| <input type="checkbox"/> Early (herbaceous & seedlings) | <input type="checkbox"/> Late (herbaceous, shrubs, mature trees) |

Indicators:

- | | |
|---|---|
| <input type="checkbox"/> Mudcracks | <input type="checkbox"/> Soil development |
| <input type="checkbox"/> Ripples | <input type="checkbox"/> Surface relief |
| <input type="checkbox"/> Drift and/or debris | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Presence of bed and bank | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Benches | <input type="checkbox"/> Other: _____ |

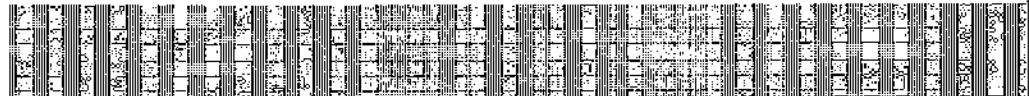
Comments:

This page intended to be blank.

kRoad Solar Power

K Road Solar Power
Preliminary Jurisdictional Determination Report

Appendix D: Jurisdictional Determination Form



This page intended to be blank.

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: Nevada County/parish/borough: Clark County City:
Center coordinates of site (lat/long in degree decimal format): Lat. 36.526881° N, Long. -114.7588889° W
Universal Transverse Mercator:

Name of nearest waterbody: California Wash

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: California Wash

Name of watershed or Hydrologic Unit Code (HUC): 15010012

Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

Check if other sites (e.g., offsite mitigation sites, disposal sites, etc...) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

Office (Desk) Determination. Date:

Field Determination. Date(s): 12-13-10

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There ~~are no~~ "navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [Required]

Waters subject to the ebb and flow of the tide.

Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There ~~are no~~ "waters of the U.S." within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [Required]

1. Waters of the U.S.

a. Indicate presence of waters of U.S. in review area (check all that apply):¹

- TNWs, including territorial seas
- Wetlands adjacent to TNWs
- Relatively permanent waters² (RPWs) that flow directly or indirectly into TNWs
- Non-RPWs that flow directly or indirectly into TNWs
- Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
- Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
- Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
- Impoundments of jurisdictional waters
- Isolated (interstate or intrastate) waters, including isolated wetlands

b. Identify (estimate) size of waters of the U.S. in the review area:

Non-wetland waters: linear feet: width (ft) and/or acres.

Wetlands: acres.

c. Limits (boundaries) of jurisdiction based on: ~~Not Applicable~~

Elevation of established OHWM (if known):

2. Non-regulated waters/wetlands (check if applicable):³

- Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: During the field survey six drainages were mapped within the project; however, none were considered jurisdictional. It was noted that drainage 1,2,3 and 5 did not have OWWM and the OHWM on drainages 4 and 6 were discontinuous between the site boundary and the Railroad track boundary. In addition, there was no obvious change in vegetation or sediment across the drainage areas. The drainages convey water across upland areas during and

¹ Boxes checked below shall be supported by completing the appropriate sections in Section III below.

² For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

³ Supporting documentation is presented in Section III.F.

immediately following a storm event and do not flow for any length of time. The swale areas meet the definition and description of non jurisdictional desert swales as described in the USACE Jurisdictional Determination Form Instructional Guidebook. Drainages 1, 2, and 3 flow off-site into a non-RPW that flows Under Interstate 15; drainage 4 and 5 flow off-site into a different non-RPW that joins the flow of drainages 1, 2, and 3 at Interstate 15. The water flows through a culvert under Interstate 15 and into a road side ditch, before flowing into California Wash.

One foot contour data for the project area was developed. Utilizing the contour data, in GIS, the sub-watershed areas were calculated for each drainage: Drainage 1=146.0; Drainage 2=200.7, Drainage 3=465.6; Drainage 4=481.8; Drainage 5=140.1; and Drainage 6=322.4 acres. Due to the small catchment area, modified channels (flowing under the Railroad track and Interstate 15, and discontinuous channelization that water within these drainages will not reach a TNW (except in extreme rainfall events).

Due to the dry nature of these drainages that only have water immediately after a rainfall event, use by migratory birds is considered minimal and the drainages will not support any aquatic wildlife.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW

Identify TNW: No TNW on site or adjacent to site.

Summarize rationale supporting determination:

2. Wetland adjacent to TNW

Summarize rationale supporting conclusion that wetland is "adjacent": No wetlands on site.

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody⁴ is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:

Watershed size: Pick List
Drainage area: Pick List
Average annual rainfall: 4.2 inches
Average annual snowfall: 0 inches

(ii) Physical Characteristics:

(a) Relationship with TNW:

- Tributary flows directly into TNW.
 Tributary flows through 2 tributaries before entering TNW.

Project waters are 5-10 river miles from TNW.
Project waters are 2-5 river miles from RPW.
Project waters are 5-10 aerial (straight) miles from TNW.
Project waters are 2-5 aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain:

Identify flow route to TNW⁵: Water flows through swale, under railroad, through swale east under Interstate 15, and into non-RPW and west under Interstate 15 to California Wash.

⁴ Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

⁵ Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

Tributary stream order, if known:

(b) General Tributary Characteristics (check all that apply):

Tributary is: Natural
 Artificial (man-made). Explain:
 Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):

Average width: feet
Average depth: feet
Average side slopes: Pick List

Primary tributary substrate composition (check all that apply):

Silts Sands Concrete
 Cobbles Gravel Muck
 Bedrock Vegetation. Type/% cover:
 Other. Explain:

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain:

Presence of run/riffle/pool complexes. Explain:

Tributary geometry: Pick List

Tributary gradient (approximate average slope): %

(c) Flow:

Tributary provides for: Pick List

Estimate average number of flow events in review area/year: Pick List

Describe flow regime:

Other information on duration and volume:

Surface flow is: Pick List. Characteristics:

Subsurface flow: Pick List. Explain findings:

Dye (or other) test performed:

Tributary has (check all that apply):

Bed and banks
 OHWM⁶ (check all indicators that apply):
 clear, natural line impressed on the bank the presence of litter and debris
 changes in the character of soil destruction of terrestrial vegetation
 shelving the presence of wrack line
 vegetation matted down, bent, or absent sediment sorting
 leaf litter disturbed or washed away scour
 sediment deposition multiple observed or predicted flow events
 water staining abrupt change in plant community
 other (list):
 Discontinuous OHWM.⁷ Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

High Tide Line indicated by: Mean High Water Mark indicated by:
 oil or scum line along shore objects survey to available datum;
 fine shell or debris deposits (foreshore) physical markings;
 physical markings/characteristics vegetation lines/changes in vegetation types.
 tidal gauges
 other (list):

(iii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain:

Identify specific pollutants, if known:

⁶A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

⁷Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- Riparian corridor. Characteristics (type, average width):
- Wetland fringe. Characteristics:
- Habitat for:
 - Federally Listed species. Explain findings:
 - Fish/spawn areas. Explain findings:
 - Other environmentally-sensitive species. Explain findings:
 - Aquatic/wildlife diversity. Explain findings:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain:

Wetland quality. Explain:

Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain:

Surface flow is: **Pick List**

Characteristics:

Subsurface flow: **Pick List**. Explain findings:

Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

Directly abutting

Not directly abutting

Discrete wetland hydrologic connection. Explain:

Ecological connection. Explain:

Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List**.

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:

Identify specific pollutants, if known:

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- Riparian buffer. Characteristics (type, average width):
- Vegetation type/percent cover. Explain:
- Habitat for:
 - Federally Listed species. Explain findings:
 - Fish/spawn areas. Explain findings:
 - Other environmentally-sensitive species. Explain findings:
 - Aquatic/wildlife diversity. Explain findings:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately () acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)

Size (in acres)

Directly abuts? (Y/N)

Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:
2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:
3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
 - TNWs: linear feet width (ft), Or, acres.
 - Wetlands adjacent to TNWs: acres.
2. **RPWs that flow directly or indirectly into TNWs.**
 - Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:
 - Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):

Tributary waters: linear feet width (ft).

Other non-wetland waters: acres.

Identify type(s) of waters: .

3. Non-RPWs⁸ that flow directly or indirectly into TNWs.

- Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):

Tributary waters: linear feet width (ft).

Other non-wetland waters: acres.

Identify type(s) of waters: .

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.

- Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
- Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
- Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.

- Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.

- Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. Impoundments of jurisdictional waters.⁹

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.

- Demonstrate that impoundment was created from "waters of the U.S.," or
- Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
- Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):¹⁰

- which are or could be used by interstate or foreign travelers for recreational or other purposes.
- from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- which are or could be used for industrial purposes by industries in interstate commerce.
- Interstate isolated waters. Explain: .
- Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

⁸See Footnote # 3.

⁹To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

¹⁰Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.

Provide estimates for jurisdictional waters in the review area (check all that apply):

Tributary waters: linear feet width (ft).

Other non-wetland waters: acres.

Identify type(s) of waters:

Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.

Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.

Prior to the Jan 2001 Supreme Court decision in "SWANCC," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).

Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:

Other: (explain, if not covered above): **Waters do not have a continuous OHWM.**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

Non-wetland waters (i.e., rivers, streams): linear feet width (ft).

Lakes/ponds: acres.

Other non-wetland waters: acres. List type of aquatic resource:

Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

Non-wetland waters (i.e., rivers, streams): **34,378** linear feet, **2-4** width (ft).

Lakes/ponds: acres.

Other non-wetland waters: acres. List type of aquatic resource:

Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:

Data sheets prepared/submitted by or on behalf of the applicant/consultant.

Office concurs with data sheets/delineation report.

Office does not concur with data sheets/delineation report.

Data sheets prepared by the Corps:

Corps navigable waters' study:

U.S. Geological Survey Hydrologic Atlas:

USGS NHD data.

USGS 8 and 12 digit HUC maps.

U.S. Geological Survey map(s). Cite scale & quad name:

USDA Natural Resources Conservation Service Soil Survey. Citation:

National wetlands inventory map(s). Cite name:

State/Local wetland inventory map(s):

FEMA/FIRM maps:

100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)

Photographs: Aerial (Name & Date):

or Other (Name & Date):

Previous determination(s). File no. and date of response letter:

Applicable/supporting case law:

Applicable/supporting scientific literature:

Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:

Appendix G — Hyperloop Verification



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

May 16, 2016

Regulatory Division SPK-2016-00266

Hyperloop Technologies, Inc.
Attn: Mr. Afshin Pischevar
2161 Sacramento Street
Los Angeles, CA 90021

Dear Mr. Pischevar:

We are responding to your April 4, 2016 request for an approved jurisdictional determination for the Hyperloop Property, Las Vegas, Nevada site. The approximately 1100-acre project site is located approximately 18 miles northeast of the city of Las Vegas, 4.25 miles west of Interstate 95, and with the northern tip of the study area bordering Highway 93 in Clark County, Nevada. The center point of the project is: Latitude 36.404698°, Longitude -114.96531° (enclosure 1).

Based on available information, the 43 ephemeral washes totaling approximately 11,098 linear feet as identified on the enclosed April 14, 2016 drawing, titled "Hyperloop Sample Point Overview and Project Location" and prepared by NewFields Consultants, are intrastate isolated waters with no apparent interstate or foreign commerce connection. As such, these waters are not currently regulated by the Corps of Engineers. This disclaimer of jurisdiction is only for Section 404 of the Federal Clean Water Act. Other Federal, State, and local laws may apply to your activities.

This determination is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 Code of Federal Regulations (CFR) Part 331.

A combined Notification of Appeal Process and Request for Appeal form is enclosed (enclosure 3). If you request to appeal this determination you must submit a completed Request for Appeal form to the South Pacific Division Office at the following address: Administrative Appeal Review Officer, Army Corps of Engineers, South Pacific Division, CESPDPDO, 1455 Market Street, 2052B, San Francisco, California 94103-1399, Telephone: 415-503-6574, FAX: 415-503-6646.

In order for a Request for Appeal to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the Notification of Appeal Process. Should you decide to submit a Request for Appeal form,

it must be received at the above address by 60 days from the date of this letter. It is not necessary to submit a Request for Appeal form to the Division Office if you do not object to the determination in this letter.

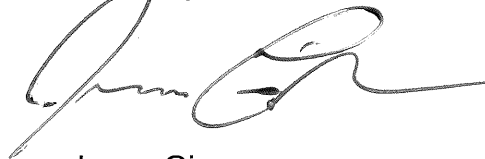
You should provide a copy of this letter and notice to all other affected parties, including any individual who has an identifiable and substantial legal interest in the property.

This determination has been conducted to identify the limits of Corps of Engineers' Clean Water Act jurisdiction for the particular site identified in this request. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are U.S. Department of Agriculture (USDA) program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

We appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing our national customer survey from the link on our website.

Please refer to identification number SPK-2016-00266 in any correspondence concerning this project. If you have any questions, please contact Craig Brown, at the St. George Field Office, 196 East Tabernacle Street, Suite 30, St. George, Utah 84770, by email at Craig.J.Brown@usace.army.mil, or telephone at 435-986-3979. For more information regarding our program, please visit our website at www.spk.usace.army.mil/Missions/Regulatory.aspx.

Sincerely,

A handwritten signature in black ink, appearing to read "Jason Gipson", written over a white background.

Jason Gipson
Chief, Utah-Nevada Branch
Regulatory Division

Enclosure:

cc: (w-Encl 1-2)

Mr. Ken MacDonald: kmacdonald@newfields.com

Appendix J

Site Restoration Plan

SITE RESTORATION PLAN

EAGLE SHADOW MOUNTAIN SOLAR PROJECT

CLARK COUNTY, NEVADA

June 2019

Table of Contents

1	Introduction	1
1.1	Purpose.....	1
2	Roles and Responsibilities.....	3
3	Project Summary.....	4
3.1	Project Location.....	4
3.2	Project Description	4
4	Vegetation.....	6
4.1	Federally-Listed and Candidate, Threatened or Endangered Plant Species	6
4.2	State Protected, Regulated, Listed and BLM Special Status Vegetation Species	7
5	Restoration Actions.....	10
5.1	Pre-Construction Tasks	10
5.2	Post-Construction Tasks	10
6	Phases of Restoration	12
6.1	Post-Construction	12
6.2	Post-Decommissioning	12
7	Weed Management	13
8	References	14

FIGURES

Figure 1	Project Location
Figure 2	Project Area

APPENDICES

Appendix A - Plant Species Observed on Proposed Project Site

TABLES

TABLE 1-1 – PROCEDURES AND TASK MATRIX	2
TABLE 4-1 – STATE PROTECTED AND REGULATED CACTI OBSERVED ON PROPOSED PROJECT SITE.....	8

Acronyms and Abbreviations

BIA	Bureau of Indian Affairs
BMP	Best Management Practice
BLM	Bureau of Land Management
SRP	Site Restoration Plan
NDOW	Nevada Department of Wildlife
NRS	Nevada Revised Statute
O&M	Operations and Maintenance
Project	Eagle Shadow Mountain Solar Project
PV	Photovoltaic
Reservation	Moapa River Indian Reservation
ROW	right-of-way

1 Introduction

1.1 Purpose

The purpose of this Site Restoration Plan (SRP) is to describe the proposed Eagle Shadow Mountain Solar Project (ESMSP or Project), considerations related to restoration and revegetation, and the various factors and methods to be applied toward restoring the site to as close to pre-project conditions as practicable. The goal of this SRP and its successful implementation is to mitigate the potential impacts associated with the proposed Project and to facilitate managed and natural restoration of the site and impacted areas toward achieving pre-project or similar drainage patterns.

The Environmental Impact Statement, Appendix C – Applicant Proposed Mitigation and Best Management Practices (BMPs) – Soils / Erosion and Biological Resources, states the following:

A Site Restoration would be implemented as needed to limit impacts to temporary disturbance areas as much as practicable; and

Potential closure activities could include re-grading and restoration of original site contours and re-vegetation of areas disturbed by closure activities in accordance with the Site Reclamation Plan. Revegetation seed mixes will be composed of native plant species.

The following procedure and task matrix (Table 1-1) identifies the specific Best Management Practices (BMPs) that will be implemented, as needed, to minimize disturbance and implement restoration of the Project site.

**Table 1-1
Procedures and Task Matrix**

BMP #	Site Procedure(s)	Task Assignment and Schedule
1	Minimize temporary disturbance areas as much as practicable.	Construction Supervisors and Staff will coordinate and perform work to minimize temporary disturbance areas as much as practicable.
2	Minimize grading to only those areas where necessary to meet the construction and operational requirements of the Project.	Construction Supervisors and Staff will coordinate and perform work to minimize unnecessary grading as much as practicable.
3	All work area boundaries will be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers, equipment, vehicles, and construction materials shall remain within the ROW, existing roads, and designated areas. Staging areas will be located in previously disturbed areas whenever possible.	Qualified Biologists and Environmental Managers will coordinate with Construction Supervisors and Staff to ensure that all work area boundaries are clearly marked as much as practicable and that all workers stay on designated roadways and in designated areas.
4	Preserve site-specific materials for use in the restoration phase, where practicable.	Construction Supervisors and Staff will preserve materials, as practicable, prior to the start of work.
5	Implement restoration practices in a timely manner, thereby reducing secondary effects including soil erosion and establishment of noxious plant species.	Construction Supervisors and Environmental Managers will coordinate to ensure revegetation occurs within a timely manner.

2 Roles and Responsibilities

All site Project construction and operation employees, contractors, and sub-contractors will be familiar with the SRP and will be responsible for implementing aspects of this SRP.

All Workers, Contractors, and Contractor Staff shall:

- Minimize initial disturbance within the proposed Project area;
- Preserve site-specific materials for use in the restoration phase where practicable;

Environmental Managers and/or Construction Supervisors shall:

- Implement restoration practices in a timely manner, thereby reducing secondary effects including soil erosion and establishment of noxious plant species; and
- Return temporary disturbance areas to conditions similar to those that existed prior to Project-initiation by restoring soils and topography, as feasible.

Individuals responsible for general program auditing and reporting include:

- Environmental Managers and Representatives, as they relate to restoration measures.

3 Project Summary

3.1 Project Location

The proposed Project would be located approximately 30 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1**), west of I-15 and east of U.S. Highway 93. The ESMSP would be located on up to 2,200 leased acres within a study area of approximately 4,770 acres on the Reservation in Township 16 South, Range 64 East, Sections 1, 9, 10, 11, 14, 15, 16, 21 and 22, Mount Diablo Base Meridian. These lands are currently vacant except for roads, pipelines, a tribal aggregate mine, and two operating water wells. These existing tribal facilities will be excluded from the final lease and solar site area.

The proposed 12.5-mile gen-tie line would be located in Township 16 South, Ranges 64 and 65 East and Township 15 South, Ranges 65 and 66 East. The gen-tie line would be located within an existing utility corridor, adjacent to multiple existing linear electric transmission and pipeline utilities. Project components would include onsite facilities, offsite facilities, and temporary facilities needed to construct the Project (**Figure 2**).

3.2 Project Description

The following describes the major features of the proposed Project. For a comprehensive description of the proposed Project, refer to the associated Eagle Shadow Mountain Solar Project Draft Environmental Impact Statement (EIS) for the Project design details (subject to minor design changes).

325MK 8me LLC (Applicant), a subsidiary of 8minutenergy, has entered into an agreement with the Moapa Band of Paiute Indians to lease land, up to 50 years, on the Moapa River Indian Reservation (Reservation) for the purposes of constructing, operating, and maintaining the ESMSP, a 300 megawatt (MW) AC solar generating facility using photovoltaic (PV) technology and associated infrastructure.

The proposed solar generating facility would be constructed on up to 2,200 acres within a study area of approximately 4,770 acres of tribal trust land within the Reservation. The Project infrastructure would include a 230 kilovolt (kV) electric transmission generation interconnection (gen-tie) line. The gen-tie line would cross tribal as well as small sections of BLM and private lands. Main access to the ESMSP site for construction and through operations and decommissioning would be provided via existing roads. Access to this portion of the Reservation 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 include the road built to provide access to the nearby existing K Road Solar Facility and the road providing access to the existing tribal aggregate operation and water wells that would be adjacent to the ESMSP.

Temporary disturbance areas would include laydown areas, temporary disturbance areas needed for construction of the gen-tie and solar field, and parking areas needed for construction and staging of materials.

4 Vegetation

The Mojave Desert hosts a wide variety of vegetation, including approximately 250 species of annual herbaceous plants, at least 80 of which are endemic (Randall et al. 2010). Native Mojave Desert vegetation is typically tolerant of low humidity, prolonged droughts, desiccating winds, high alkalinity or salinity, rocky or very sandy soils, and the periodic influx of high quantities of water in the form of surface flooding (NDOW 2012).

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

The proposed Project area is dominated by open stands of creosote bush and white bursage. North American warm desert riparian, introduced desert riparian, Mojave desert riparian, mesquite bosque, Sonoran-Mojave mixed salt desert scrub, microphytic playa, North American warm desert pavement, and developed habitat types are also present in low quantities. Cactus and yucca species observed during the biological surveys were the Mojave yucca (*Yucca schidigera*) beavertail pricklypear (*Opuntia basilaris*), buckhorn cholla (*Cylindropuntia acanthocarpa*), cottontop cactus (*Echinocactus polycephalus*), Engelmann's hedgehog cactus (*Echinocereus engelmannii*), clustered barrel cactus (*Echinocactus polycephalus*), barrel cactus (*Ferocactus cylindraceus*), and common fishhook cactus (*Mammillaria tetracistra*). The majority of the proposed Project area was homogeneous creosote bush – white bursage with sporadic inclusions of other species.

A list of plant species observed in the proposed Project area is presented in **Appendix A**.

4.1 Federally-Listed and Candidate, Threatened or Endangered Plant Species

4.1.1 Las Vegas Buckwheat

In April 2008, the Center for Biological Diversity (CBD) petitioned the U.S. Fish and Wildlife Service (USFWS) to protect the Las Vegas buckwheat (*Eriogonum corymbosum nilesii*) under the federal

Endangered Species Act (ESA). The Las Vegas buckwheat was designated as a candidate for ESA listing on December 10, 2008. The Las Vegas buckwheat is also designated as a sensitive species by the BLM and is listed as “at risk” under the Nevada Natural Heritage Program (NNHP). The Las Vegas buckwheat is native to Las Vegas and is found in Clark and Lincoln counties.

In 2009 the Desert Conservation Program (DCP) developed two coarse soil GIS models to understand the distribution of rare plants covered under the Clark County Multiple Species Habitat Conservation Plan (MSHCP) (Hamilton and Kokos 2011). Results of this modeling show potential suitable habitat (gypsiferous soils) for Las Vegas buckwheat near, but not within, the proposed Project area (Hamilton 2019) and it was not observed within the proposed Project area during project surveys.

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

The following section applies to BLM and private lands; the BIA has the discretion to utilize existing State regulatory guidelines as appropriate.

In the State of Nevada cacti and yucca are afforded protection. According to the Nevada Revised Statute (NRS 527.100):

“It is unlawful....to cut, destroy, mutilate, remove or possess any Christmas tree, cactus, yucca or branches thereof, or knowingly transport or sell any Christmas tree, cactus, yucca or its branches from any of the lands owned by or under the jurisdiction of the State of Nevada or its counties, or any reserved or unreserved lands owned by the United States, or from any privately owned lands, without permission from the legal owner, or the legal owner’s duly authorized agent, specifying locality by legal land description and number of plants to be removed or possessed.”

4.2.1 Vegetation Species Not Present on Project Site

The following state-protected, regulated, listed and BLM special-status vegetation species were not detected on or near the Project site during biological reconnaissance surveys, and are lacking suitable habitat for the species within the Project area:

- Blue diamond cholla (*Cylindropuntia multigeniculata*)
- Three-corner milkvetch (*Astragalus geyeri* var. *triquetrus*)
- Beaverdam breadroot (*Pediomelum castoreum*)

4.2.2 Mojave Yucca

The sale and transport of Mojave yucca is protected and regulated by the State of Nevada under Nevada Revised Statute (NRS) and Nevada Administrative Code (NAC) Chapter 527. Mojave yucca is a

common inhabitant of the creosote desert flats. This plant provides browse for a number of wildlife species during spring, summer, and fall. The flowerstalks and foliage of Mojave yucca are palatable to rodents and some wild ungulates during much of the year (Gucker 2006) and it provides shelter and shade for many mammals, birds and reptiles. There is an obligate, mutualistic relationship between the Mojave yucca and the small white yucca moth (*Tegeticula yuccasella*). Mojave yucca is present on the ESMSP solar site and was observed during biological reconnaissance surveys (Newfields 2018).

4.2.3 State Protected and Regulated Cacti Species

Cacti are another type of vegetation common to the proposed Project site. Cacti and yuccas, which are protected under Nevada state law (NRS 527.100 – Protection and Preservation of Timbered Lands, Trees and Flora), were found throughout the upland portions of the proposed Project site (**Table 4-1**).

Scientific Name	Common Name	Protection Status
<i>Mammillaria tetrancistra</i>	Common fishhook	CY
<i>Echinocactus polycephalus</i>	Cottontop cactus	CY
<i>Opuntia basilaris</i>	Beavertail prickly pear cactus	CY
<i>Yucca schidigera</i>	Mojave yucca	CY
<i>Echinocereus engelmannii</i>	Engelmann’s hedgehog cactus	CY
<i>Ferocactus cylindraceus</i>	Barrel cactus	CY
<i>Echinocactus polycephalus</i>	Clustered barrel cactus	CY
<i>Cylindropuntia acanthocarpa</i>	Buckhorn cholla	CY
<i>Cylindropuntia echinocarpa</i>	Silver cholla	CY
<i>Cylindropuntia ramosissima</i>	Pencil cholla	CY
Source: Nevada Natural Heritage 2010. CY = Protected as a Cactus, Yucca, or Christmas tree		

4.2.4 Nye Milkvetch

Nye milkvetch (*Astragalus nyensis*) is not designated a sensitive species by the BLM or protected by the State of Nevada, though it is on the NNHP At-Risk Tracking List (G3 S3 [NNHP 2001]). It is found in the foothills of desert mountains, calcareous outwash fans and gravelly flats, and sometimes in sandy soil. Associated plants are creosotebush, white bursage, and cheesebush, which are present throughout the ESMSP area. Nye milkvetch has the potential to be present within the Project area.

4.2.5 White Bearpoppy

The white bearpoppy (*Arctomecon merriamii*) is an evergreen perennial herb that blooms from April through July. This species is considered BLM sensitive and is on the NNHP At-Risk Tracking List (G3 S2 [NNHP 2016]). White bearpoppy is found in Nevada from Clark, Nye, and Lincoln counties on wide variety of dry to sometimes moist basic soils, including alkaline clay and sand, gypsum, calcareous alluvial gravels, and carbonate rock outcrops in chenopod scrub and rocky Mojave Desert communities from

1,600 to 6,280 feet. Suitable habitat for this species is limited to the badland areas on the western side of the proposed solar site. The biological reconnaissance survey did not detect this species within the ESMSP solar site or along the linear facilities but this species has a potential to be present within the Project solar site.

4.2.6 Rosy Twotone Beardtongue

The rosy twotone beardtongue (*Penstemon bicolor* ssp. *roseus*) is a perennial herb known in Nevada from Clark and Nye counties. This species is considered BLM sensitive and is on the NNHP At-Risk Tracking List (G3 S2 [NNHP 2016]). This species is found on rocky, calcareous, granitic, or volcanic soils in washes, roadsides, scree at outcrop bases, rock crevices, or similar places receiving enhanced runoff in creosote-bursage, blackbrush, mixed-shrub, Joshua tree woodland, and Mojave Desert communities from 1,800 to 4,084 feet. Suitable habitat for this species exists throughout the ESMSP area and it has the potential to be present within the Project area.

5 Restoration Actions

5.1 Pre-Construction Tasks

As previously described, aspects of the proposed Project occur on Tribal lands within the Moapa River Indian Reservation, on land managed by BLM, and on private land. In instances of cacti and yucca relocation and salvaging, both the Tribe and BLM will be consulted for guidance. Cacti or yucca that occur in areas that are proposed for permanent disturbance may be subject to salvage operations and either transplanted at an approved off-site location, or in areas on-site that are not proposed for disturbance and suitable to supporting these plants. The Tribe will be consulted prior to transplanting cacti or yucca to off-site Tribal lands.

The BLM manages cacti and yucca as special forest products with a commercial value. As appropriate, cacti and yucca that occur in areas proposed for temporary disturbance on BLM land will be removed and maintained onsite until temporary disturbance has concluded and appropriate restoration efforts have occurred to support replanting these plants in their original habitats.

On BLM land, all cacti and yucca planting activities shall be conducted by a qualified salvage contractor. BLM requires contractors to have at least three years of experience in Mojave Desert plant salvaging, including maintaining cacti and yucca. The contractor will also be required to use the BLM salvage protocol (included as **Appendix A**).

5.2 Post-Construction Tasks

Restoration efforts at temporarily disturbed sites will begin as soon as practical after completing the soil disturbing activities for the entire project. For sites that may be disturbed again during the construction phase, temporary soil covering, erosion control, and weed monitoring would occur.

Temporarily disturbed areas are limited to the construction laydown areas, construction trailers, temporary roads, and gen-tie line structure locations and at locations required for conductor stringing, splicing, and pulling operations to accommodate construction of the gen-tie, and do not include the areas where the vegetation has been mowed (e.g. under the solar arrays, where native vegetation will be left in place and mowed to a height of 18 inches leaving the roots intact and construction equipment would drive over and crush the vegetation during installation of the arrays). Temporarily disturbed areas will be reclaimed as much as practicable. Where appropriate, disturbed sites would be recontoured to pre-disturbance elevations and soils would be decompacted. The soil surface would then be textured. Seeding with local and weed-free seed mixes recommended by BIA or BLM would be conducted on suitable areas as necessary during appropriate months following construction. Temporary roads built for construction could be reclaimed or could be maintained for use during the operational life of the Project. The portions of construction roads to be reclaimed would be determined at the end of construction.

All restoration efforts should be implemented as soon as practical after disturbance of a site has concluded and prior to the typical rainy season of late summer and early fall. This will minimize the potential for soil loss and establishment of noxious weeds.

6 Phases of Restoration

Restoration and revegetation activities will occur primarily in two phases; 1) post-construction and 2) post-decommission.

6.1 Post-Construction

Post-construction restoration activities focus on areas that have been temporarily disturbed and will not experience additional surface disturbing activities (e.g. service roads required during construction, equipment and material laydown areas, stringing, splicing, and pulling sites, etc.). The restoration areas do not include areas where the vegetation has been mowed (e.g. under the solar arrays) since the mowing is performed to facilitate regrowth during operations since the roots are left intact. Seeds of native herbaceous plants may be used to revegetate temporary work areas and other areas that will not be disturbed following construction.

6.2 Post-Decommissioning

Post-decommissioning restoration efforts will focus on all areas within the solar facility. Other features that occur beyond the solar facility on BLM administered lands, including roads and transmission lines, will not be restored or revegetated. Post-decommission restoration will be based on similar regulations, guidelines, practices, and techniques as previously described in this report. The goal of post-decommission restoration is to restore the Project site to pre-construction conditions to the greatest extent practicable.

7 Weed Management

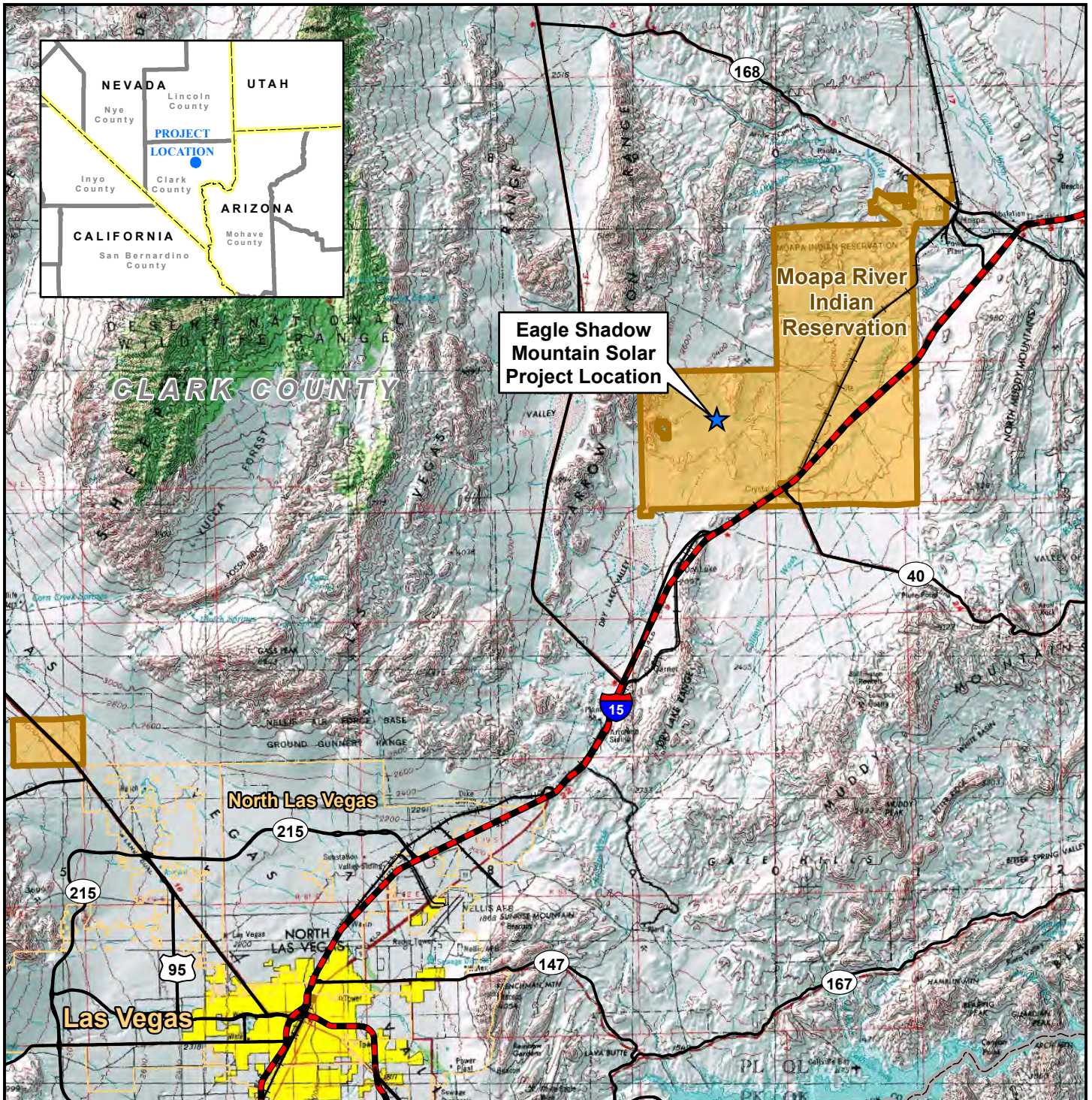
Weed management for this Project will be conducted throughout the life of the Project and in accordance with the Project-specific Weed Management Plan (Appendix F in Draft EIS).

8 References

- Gucker, Corey L. 2006. *Yucca schidigera*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <https://www.fs.fed.us/database/feis/plants/shrub/yucsch/all.html> Accessed: June 2019.
- Hamilton, M.E. and S.R. Kokos. 2011. Clark County Rare Plant Habitat Modeling. Prepared for the Bureau of Land Management Las Vegas Field Office.
<http://www.clarkcountynv.gov/airquality/dcp/Documents/Library/other%20reports/collab/BLM%20CC%20Rare%20Plant%20Habitat%20Modeling%20Report%20Jul2011.pdf>. Accessed: June 2019
- Hamilton, M.E. 2019. *Eriogonum corymbosum* Habitat Model. EPG, Inc.
<https://www.arcgis.com/home/item.html?id=81bfdde6ec84415ab2abf666789e9bba#overview>. Accessed: June 2019.
- Heritage Environmental Consultants. 2019. Eagle Shadow Mountain Solar Project: Noxious Weed Survey Report. 15 pages.
- Nevada Department of Wildlife (NDOW). 2012. Nevada Wildlife Action Plan. Available on the internet at http://www.ndow.org/Nevada_Wildlife/Conservation/Nevada_Wildlife_Action_Plan/. Accessed: June 2019 .
- Newfields. 2018. Eagle Shadow Mountain Solar Biological Reconnaissance Report. 8 pages.
- Newfields. 2019. Preliminary Jurisdictional Determination Report. Eagle Shadow Mountain Solar Farm. January 2019. 196 pages
- NNHP. 2001 Nevada rare plant atlas. <http://heritage.nv.gov/atlas>. Accessed April 2019
- NNHP. 2016. Plant and Animal At-Risk Tracking List. Department of Conservation and Natural Resources. http://heritage.nv.gov/sites/default/files/other_docs/track.pdf. Accessed: June 2019.
- Randall, J. M., S.S. Parker, J. Moore, B. Cohen, L. Crane, B. Christian, D. Cameron, J. MacKenzie, K. Klausmeyer, S. Morrison. 2010. Mojave Desert Ecoregional Assessment. Unpublished Report. The Nature Conservancy, San Francisco, California. 106 pages + appendices. Available at: <http://conserveonline.org/workspaces/mojave/documents/mojave-desert-ecoregional-2010/@@view.html>. Accessed: June 2019.

United States Department of Agriculture. 2010. Forest Service. Index of Species Information.
<http://www.fs.fed.us/database/feis/plants/shrub/ambdum/all.html>. Accessed January 3, 2010.

FIGURES



Eagle Shadow Mountain Solar Project Location

Moapa River Indian Reservation

North Las Vegas

Las Vegas

Legend

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

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

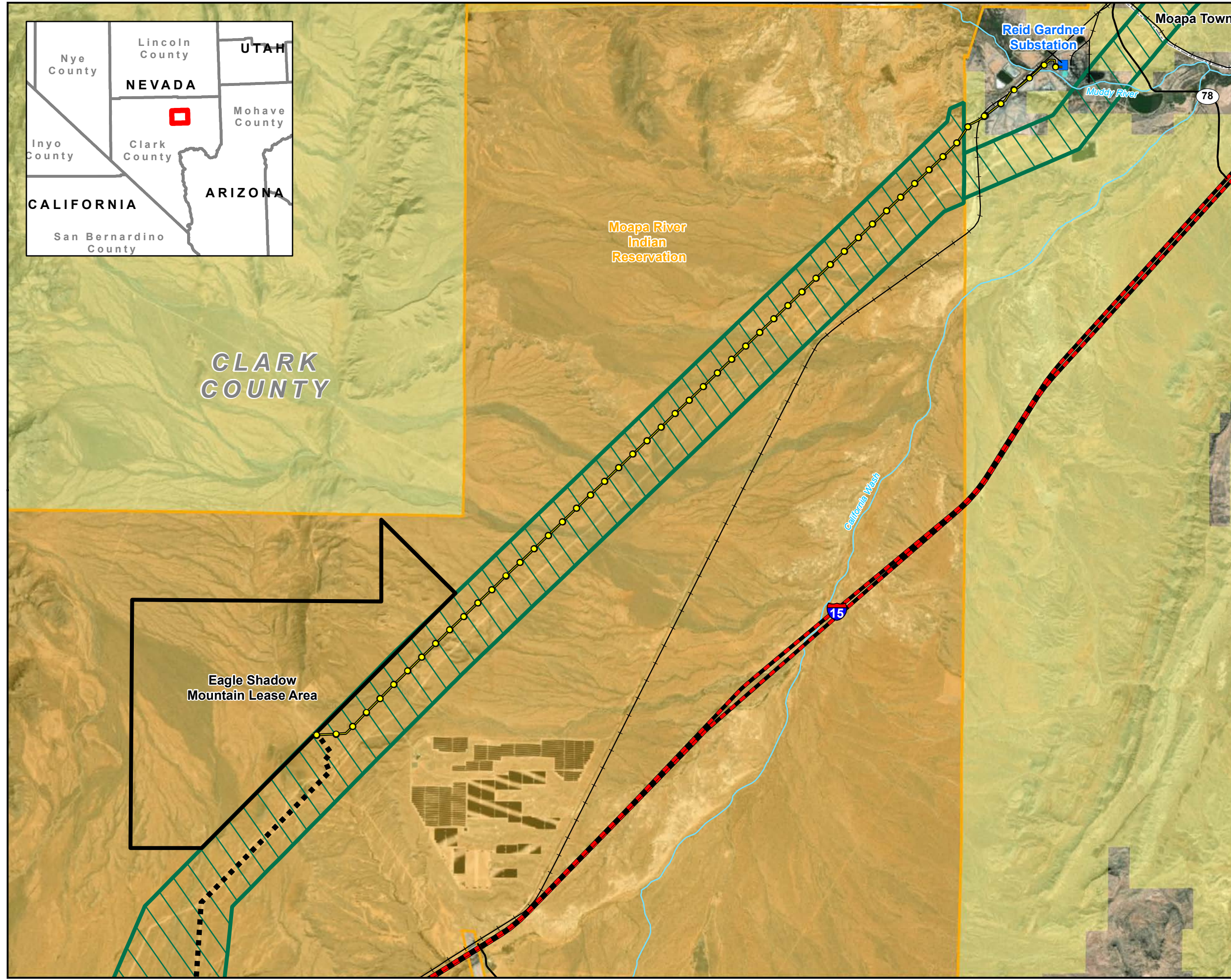
Eagle Shadow Mountain Solar Project

**FIGURE 1
PROJECT LOCATION**

Map Extent: Clark County, Nevada

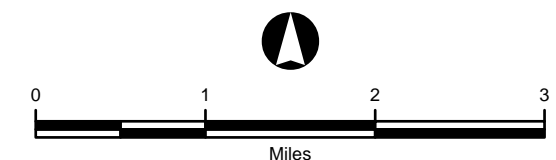
Date: 11-06-18	Author: rnc
----------------	-------------

G:\Eagle Shadow Mountain Solar Project\MXD's\Project Location 8.5x11 110618.mxd



Legend

- Project Components**
 - ESM Gen-Tie - Alternative
 - Eagle Shadow Mountain Solar Project Area
- 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
 - Existing Access Road



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

Eagle Shadow Mountain Solar Project

Figure 2
ESM Solar Project Components

Map Extent: Clark County, Nevada

Date: 03-20-19	Author: mrc
G:\ESM\MXD's\Project Location_032019.mxd	

APPENDIX A

Plant Species Observed on Proposed Project Site

APPENDIX A	
PLANT SPECIES OBSERVED ON PROPOSED PROJECT SITE	
<i>Common Name</i>	<i>Scientific Name</i>
Creosote bush	<i>Larrea tridentata</i>
White bursage	<i>Ambrosia dumosa</i>
Desert senna	<i>Senna armata</i>
Desert trumpet	<i>Eriogonum inflatum</i>
Big galleta	<i>Pleuraphis rigida</i>
Beavertail pricklypear	<i>Opuntia basilaris</i>
Buckhorn cholla	<i>Cylindropuntia acanthocarpa</i>
Devil's spineflower	<i>Chorizanthe rigida</i>
Desert globemallow	<i>Sphaeralcea ambigua</i>
Catclaw acacia	<i>Acacia greggii</i>
Rough jointfir	<i>Ephedra nevadensis</i>
Compact brome	<i>Bromus madritensis</i>
Mediterranean grass	<i>Schismus barbatus</i>
Threeawn	<i>Aristida purpurea</i>
Desert marigold	<i>Baileya multiradiata</i>
Wingnut cryptanth	<i>Cryptantha pterocarya</i>
Cleftleaf phacelia	<i>Phacelia crenulata</i>
Red brome	<i>Bromus tectorum</i>
Russian thistle	<i>Salsola tragus</i>
Gilia	<i>Gilia sp.</i>
Buckwheat	<i>Eriogonum sp.</i>
Threadleaf snakeweed	<i>Gutierrezia microcephala</i>
Cottontop cactus	<i>Echinocactus polycephalus</i>
Common fishhook cactus	<i>Mammillaria tetracistra</i>
Pincushion flower	<i>Chaenactis fremontii</i>
Brownplume wirelettuce	<i>Stephanomeria pauciflora</i>
Four o'clock	<i>Mirabilis sp.</i>
Desert indianwheat	<i>Plantago ovata</i>
Desert needlegrass	<i>Achnatherum speciosum</i>
Indian ricegrass	<i>Achnatherum hymenoides</i>
Low woollygrass	<i>Erioneuron pulchella</i>
Arrowweed	<i>Pluchea sericea</i>
Honey mesquite	<i>Prosopis glandulara</i>
Tamarisk	<i>Tamarix sp.</i>
Cheesebush	<i>Hymenoclea salsola</i>
Brittlebush	<i>Encelia farinosa</i>
Sahara mustard	<i>Brassica tournefortii</i>
Hedge mustard	<i>Sisymbrium sp.</i>
African mustard	<i>Strigosella africana</i>
Silver cholla	<i>Cylindropuntia echinocarpa</i>
Engelmann's hedgehog cactus	<i>Echinocereus engelmannii</i>
Pencil cholla	<i>Cylindropuntia ramosissima</i>

APPENDIX A	
PLANT SPECIES OBSERVED ON PROPOSED PROJECT SITE	
<i>Common Name</i>	<i>Scientific Name</i>
Clustered barrel cactus	<i>Echinocactus polycephalus</i>
Barrel cactus	<i>Ferocactus cylindraceus</i>
Spiny hopsage	<i>Grayia spinose</i>
Saltlover	<i>Hologeton glomeratus</i>
Ephedra	<i>Ephedra sp.</i>
White-margin sandmat	<i>Chamaesyce albomarginata</i>
Redstem filaree	<i>Erodium circuitarium</i>
Texas filaree	<i>Erodium texanum</i>
Rhatany	<i>Krameria erecta</i>
Purple sage	<i>Salvia dorrii</i>
Winding mariposa lily	<i>Calochortus flexuosus</i>
Apricot mallow	<i>Sphaeralcea ambigua</i>
Plantain	<i>Plantago ovata</i>
Cheatgrass	<i>Bromus tectorum</i>
Wild rhubarb	<i>Rumex hymenosepalus</i>
Box thorn	<i>Lycium andersonii</i>
Mojave Yucca	<i>Yucca schidigera</i>
Source: Newfields 2018, 2019, Heritage 2019	

Appendix K

Raven Control Plan

RAVEN CONTROL PLAN

Eagle Shadow Mountain Solar Project

Clark County, Nevada

June 2019

Table of Contents

1	<i>Introduction</i>	1
1.1	Purpose of the Plan	1
2	<i>Roles and Responsibilities</i>	2
2.1	General Roles and Responsibilities	2
3	<i>Project Summary</i>	3
3.1	Project Location	3
3.2	Project Description	3
4	<i>Biological and Regulatory Setting</i>	4
4.1	Biological Setting	4
4.2	Regulatory Setting	5
5	<i>Raven Avoidance and Minimization Measures</i>	7
5.1	Education	9
5.2	Reduce Access to Food and Water Resources	9
5.2.1	Waste Management.....	9
5.2.2	Prohibition on Intentionally Feeding Ravens and other Wildlife	9
5.2.3	Limit Availability of Water	10
5.3	Discourage Nesting	10
5.3.1	Nesting Prevention and Discouragement during Construction and O&M	10
5.3.2	Discourage Nesting Following Decommissioning	11
5.4	Discourage Perching	11
5.4.1	Perch Prevention Prior to Construction	11
5.4.2	Perch Prevention during Construction	11
5.4.3	Perch Prevention During O&M	11
6	<i>Monitoring and Reporting</i>	13
6.1	Monitoring	13
6.1.1	Construction Monitoring	13
6.1.2	Operation and Maintenance Monitoring.....	13
6.2	Reporting	15
6.3	Adaptive Management	16
7	<i>References</i>	17

Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
APLIC	Avian Power Line Interaction Committee
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CRMP	Common Raven Management Plan for Energy Development within the BLM Southern Nevada District
EIS	Environmental Impact Statement
ESA	Endangered Species Act
I-15	Interstate 15
kV	Kilovolt
MBTA	Migratory Bird Treaty Act
Mph	Miles per Hour
MW	Megawatt
NDOW	Nevada Department of Wildlife
O&M	Operations and maintenance
PV	Photovoltaic
RCP	Raven Control Plan
ROW	Right of way
SPGP	Solar Power Generation Plant
USFWS	U.S. Fish and Wildlife Service

1 Introduction

1.1 Purpose of the Plan

This Raven Control Plan (RCP) addresses activities at the proposed Eagle Shadow Mountain Solar Project (ESMSP; “Project”) that will occur during construction and operation that may attract the common raven (*Corvus corax*). As summarized below, for activities and structures along the gen-tie line, the project will follow the Common Raven Management Plan for Energy Development within the BLM Southern Nevada District (CRMP) (BLM 2014). The portions of the project on lands controlled by the Moapa Band of Paiute Indians (Band) and private lands will primarily follow the Common Raven Management Plan for Energy Development within the BLM Southern Nevada District CRMP, and the project-specific mitigation measures identified in the EIS. References to “raven” or “common raven” in this RCP should be interpreted to mean the common raven and other avian scavengers.

The desert tortoise (*Gopherus agassizii*) is a federally-listed threatened species known to occur in and proximal to the project area. The proposed project area is not located in designated Critical Habitat for the desert tortoise or in any BLM Area of Critical Environmental Concern (ACEC). This RCP has been developed as a mitigation measure to reduce the effects of common raven and other avian (raptors) predation on the desert tortoise and other native wildlife species as a result of increased human presence, the addition of potential roost and nest site substrate, increased availability of water sources, and facility operation.

The following list summarizes the raven-control avoidance and minimization measures (AMMs) that will be utilized in the design, construction, operational and decommissioning phases of the Project, and are explained in further detail in the body of this RCP.

- Employee, contractor, and visitor special status species (e.g., desert tortoise) and environmental awareness program education;
- Prohibitions on feeding wildlife;
- Trash and litter control;
- Limiting availability of water;
- Anti-perching and nesting – design of transmission line support and other facility structures;
- Removal of nesting material – inactive nests;
- Structure removal at the end of Project; and
- Monitoring and reporting during construction and operational phases.

The boundaries of the Project’s PV solar power generation facility (SPGF) portion, and associated access roads are entirely located on Tribal lands; the Project gen-tie line would include 12.5 miles located on Tribal lands, BLM-administered lands and private lands.

This RCP is being submitted by the Eagle Shadow Mountain Solar Project (325MK 8me LLC (Applicant), a wholly owned subsidiary of 8minutenergy Renewables or project proponent) to the Bureau of Land Management (BLM), Nevada Division of Wildlife (NDOW), United States Fish and Wildlife Service (USFWS), and Bureau of Indian Affairs (BIA) for approval prior to implementation. Once approved, the Applicant and its contractors will be responsible for implementing the plan.

2 Roles and Responsibilities

2.1 General Roles and Responsibilities

All site project employees, contractors, and sub-contractors will be familiar with applicable sections of the RCP and will be responsible for implementing aspects of this RCP. In addition, Project employees and Contractors/Sub-Contractors shall:

- Complete all required Worker Environmental Awareness Program (WEAP) training before starting work; raven management procedures will be a part of the WEAP training;
- Report potential raven control issues to their supervisors;
- Follow raven control procedures including:
 - Strict no littering polices;
 - Minimizing ponding water;
 - Limit speed limits to under 25 mph to reduce the potential for road kill, which attracts birds and increases roosting;
 - Reporting nests and signs of predation to onsite supervisors or environmental staff.

Environmental Managers and/or Construction Supervisors shall:

- Ensure that workers receive appropriate raven management training (including new or transferred personnel);
- Ensure all potential raven nests are identified and that nest surveys are being conducted per this RCP;
- Notify the Site or Corporate Environmental Manager when changes in operation increase the risk of potential raven control issues;
- Monitor work areas for potential raven control issues;
- Enforce raven control requirements in accordance with this plan and all applicable codes, regulations, and standards.

Individuals responsible for general program auditing and reporting include:

- Environmental Managers and Representatives, as they relate to raven control measures,

3 Project Summary

3.1 Project Location

The Proposed Project would be located approximately 30 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1**). The solar project would be located on up to 2,200 acres of tribal trust land, west of I-15 and east of U.S. Highway 93, in Sections 1, 9, 10, 11, 14, 15, 16, 21 and 22 of Township 16 South, Range 64 East. These lands are currently vacant except for roads, pipelines, a tribal aggregate operation, and a well.

The portion of the proposed 12.5-mile gen-tie line located on Tribal lands within the designated utility corridor managed by the BLM occur within Sections 12, 13, and 14 in Township 16 South, Range 64 East; Sections 5, 6, and 7 in Township 16 South, Range 65 East; and Sections 12, 13, 14, 22, 23, 27, 28, 32, and 33 in Township 15 South, Range 65 East. The short segment on Federal lands managed by the BLM would be within Section 7 in Township 16 South, Range 66 East and the portion on private lands owned by NVE adjacent to the Reid-Gardner Substation would be within Sections 5 and 6 in Township 16 South, Range 66 East. All of these lands are adjacent to multiple existing linear electric transmission and pipeline utilities and private lands (owned by NV Energy) adjacent to the Reid-Gardner Substation.

3.2 Project Description

The following describes the major features of the proposed Project (**Figure 2**). For a comprehensive description of the proposed Project, refer to the associated Environmental Impact Statement for the Eagle Shadow Mountain Solar Project for the Project design details.

The Project will consist of an up to 300 megawatt alternating current (MWac) solar energy generating facility using photovoltaic (PV) technology and associated infrastructure. Project components include on-site facilities, off-site facilities, and temporary facilities needed to construct the Project. The solar site would be located entirely on Tribal lands. Major on-site facilities include the solar field comprised of multiple blocks of PV solar panels mounted on single-axis tracking systems, associated inverter and transformer equipment, an energy storage system (ESS), a project substation, and operation and maintenance (O&M) facilities.

The offsite facilities would include an approximately 12.5-mile dual-circuit 230kV gen-tie line located on Tribal lands, BLM-administered lands, and private lands owned by NV Energy. Most of the gen-tie would be within a Federally-designated utility corridor on Tribal lands. This line would require a right-of-way (ROW) width of 125 to 200 feet. The Applicant would construct the gen-tie from the Project substation to a structure located on BLM-administered land in the SW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 7 referred to as the Point of Change of Ownership (POCO). From the POCO structure, the remaining portion of the gen-tie would be constructed by NVE to the Reid Gardner Substation. Additional offsite facilities include an existing road that would provide access to the Project and electric distribution and communication lines. Temporary facilities that would be removed at the end of construction include laydown and construction areas and water storage tanks also located on Tribal lands.

Power produced by the Project would be conveyed to the regional transmission system via the gen-tie interconnection to NVE's existing 230kV Reid-Gardner Substation.

4 Biological and Regulatory Setting

4.1 Biological Setting

As outlined in the EIS, the Project infrastructure may indirectly cause mortality to wildlife by increasing the risk of predation on certain species by native predators such as ravens and raptor species. The list of federally threatened or endangered species occurring in Clark County was reviewed for potential occurrence in and around the project area. Three species listed under the Endangered Species Act (ESA) (1974) and one species protected by the Bald and Golden Eagle Protection Act (BGEPA) were identified as potentially occurring in or around the project area and potentially impacted by the Proposed Project. These include the desert tortoise, Yuma Ridgeway's rail, southwestern willow flycatcher and golden eagle. Surveys for special status species and habitat analysis was conducted for desert tortoise and these surveys confirmed that desert tortoise are present within and near the proposed ESMSP site (Newfields 2018).

The Proposed Project is not near any designated area of critical environmental concerns (ACECs) or other sensitive land use areas. More detail can be found in the Biological Assessment that has been prepared concurrently with the EIS (Appendix L of the EIS).

According to information summarized in the CRMP, over the past four decades local common raven numbers have increased between 1,000 to 1,500%, which is reflective of the economic and urban growth in the Mojave Desert region (Boarman 1993, Boarman 2003). Ravens are known to readily use structures associated with power lines for nesting and perching. Ravens have been demonstrated to prey on hatchling and juvenile desert tortoises by pulling off the head and limbs or pecking holes through the soft carapace or plastron. Coincident to the increase in raven populations, predation on desert tortoise hatchlings and juveniles has shifted the composition of desert tortoise populations to predominantly adults. Avoiding or minimizing the addition of new perch and nest site features and other raven attractants in desert tortoise habitat is an important objective in attempting to reduce desert tortoise predation.

Ravens are the largest of all North American passerine (song) birds, are very intelligent, and highly adaptable to a wide range of habitats and foods, thereby allowing them to thrive in human-altered habitats. The raven is a diurnally active (daytime hours), year-round resident of the Mojave and Great Basin deserts. While ravens are generally omnivores, they are successful predators of arthropods, amphibians, reptiles, birds (adults, chicks, and eggs), and small mammals. In the Mojave Desert, ravens spend an equal amount of time scavenging and live hunting. They have been documented foraging within 1.6 km (one mile) of linear rights-of-way (roads, railways, transmission power lines, and telephone lines) and spending 49 percent of the time foraging directly on linear rights-of-way. When human-subsidized food is present, ravens often concentrate their feeding at these food sources and may travel significantly shorter distances. Ravens typically concentrate their feeding activity in the morning and late afternoon, often coinciding with principal activity periods of species like the desert tortoise.

Raven nest material is made up primarily of sticks from various origins including those broken from a live source or pieces collected from old nests. Nest bases are located on a variety of substrates and are made up of sticks approximating 0.9 m (3 feet) long by 3-25 mm (approximately 1/10 to 1 inch) diameter. Generally, only one brood is raised per year. Nesting, egg hatching, and fledgling of young

may generally span the period of late January through mid-June. Seasonally, the majority of raven predation on desert tortoises can be expected to occur during the spring (April and May) when desert tortoises are most active, and ravens are feeding their young. Data also suggest that ravens in the eastern Mojave Desert spend 75 percent of their foraging time within 400 meters (1300 feet) of their nests. Therefore, the establishment of a new nest can have significant adverse effects on the local juvenile desert tortoise population.

4.2 Regulatory Setting

In addressing impacts involving special status species, avian management considerations include compliance with the Migratory Bird Treaty Act of 1918 (MBTA) and its subsequent amendments (16 U.S.C. 703-711). A 1972 amendment to the MBTA provided legal protection to corvids, which includes the raven. In brief, it is illegal for anyone to take, possess, import, export, transport, sell, 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. In 2017 the Department of Interior issued a memorandum (M-37050) which found that the MBTA did not prohibit take of covered bird species if the activity causing such take were otherwise legal and the take was incidental to that activity (i.e., takings and/or killings that directly and foreseeable result from, but are not the purpose of, an activity).

It is the mission of the Bureau of Land Management (BLM) to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations. Multiple-use activities on BLM-managed lands include but are not limited to recreational uses, mineral extraction, environmental education, livestock grazing, lands and realty actions, and energy development. In considering potential effects associated with the variety of public lands uses, BLM provides policy for certain biological resources in its Manual 6840 - Special Status Species Management (BLM 2008). BLM Manual 6840 establishes policy: 1) to conserve and/or recover species protected under the federal Endangered Species Act (ESA) and the ecosystems on which they depend so that ESA protections are no longer needed for these species; 2) to initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive species to minimize the likelihood and need to list these species under the ESA; and, 3) to manage the species and its habitat, once it is declared sensitive, to minimize or eliminate threats affecting the status of the species or to improve the condition of the species' habitat.

Since the Mojave population of the desert tortoise was ESA-listed as threatened on April 2, 1990 (USFW 1994), the BLM has identified management actions needed to address impacts of various land-use activities. BIA is expected to implement similar actions for desert tortoise on tribal lands. Relative to energy development, potential impacts to the desert tortoise include the installation and operation of power generation facilities, transmission lines and tie-ins (gen-tie lines), and other infrastructure. Particular to power transmission lines, the BLM assesses the potential for direct effects such as take¹ of ESA listed species during project construction, operation and maintenance, habitat loss, and fragmentation. Indirect impacts are attributable to post-construction factors like access-related disturbances introduced by increased frequency of vehicle use on new and existing maintenance roads and increased vulnerability of desert tortoises to predation. In consideration of the latter is the response by mammalian (e.g., coyote, foxes, skunks) and avian predators (e.g., raptors and common ravens) that

commonly investigate project areas to scavenge and hunt displaced or exposed prey. Avian predators often take advantage of the new perching and nesting subsidies afforded by power transmission projects, notably tower structures and substations.

5 Raven Avoidance and Minimization Measures

Avoidance and minimization measures (AMMs) provided in this RCP and provided by the CRMP are designed to discourage raven (and other avian scavenger) presence and use of energy projects while in compliance with the MBTA. Each measure below is based on the recent CRMP issued by the BLM. The following table summarizes the best management practices (BMPs) that the Project will utilize to address each mitigation measure as well as the CRMP guidelines; references to Sections of this RCP to consult for further detail on each BMP are also included in the matrix.

TABLE 1 ESMSP RAVEN CONTROL MITIGATION MATRIX		
BMP#	Site Procedure(s)	RCP Section, Task Assignment and Schedule
1	Education: personnel involved with on-site construction, O&M, and commissioning will be presented a special status species (e.g., desert tortoise) and environmental awareness program prior to initiation of activities.	5.1 – Training will be provided to all employees prior to start of work on site
2	Waste Management: A litter and waste control program shall be implemented to reduce the attractiveness of the area to opportunistic predators such as kit foxes, coyotes, and ravens. Waste and food items will be disposed of properly in predator-proof containers with predator-proof lids. To reduce the possibility of ravens or other scavengers, such as coyotes, from ripping into the bags and exposing waste, plastic bags containing waste will not be left out for pickup. Instead, waste containers will be emptied and removed as needed from the project area and disposed of in an approved landfill. The project area will be kept free of waste for the life of the project. The proponent will also dispose of any animal road-kills on the project site and along the access road as encountered. Because predators are capable of locating and then excavating buried remains, road-kills will be deposited into predator-proof trash bins or another secure method until proper disposal is undertaken	5.2.1 – Project management will ensure appropriate waste and litter containers are readily available and all employees will be trained on the proper waste management policies and procedures
3	Prohibition on Intentionally Feeding Ravens and Other Wildlife: All workers (construction, O&M, and decommissioning) are prohibited from intentionally feeding ravens and other wildlife on and in the vicinity of the project site; this will be communicated in the environmental awareness training program.	5.2.2 – All employees will be instructed on this measure through the awareness program and will be responsible for complying with this measure
4	Limit Availability of Water, Control of Standing Rainwater, Ponding Water, and Construction/Decommissioning Water Storage Pond(s): The project proponent will ensure that ponds constructed for the project, if applicable, are not available to ravens or other wildlife. If evaporation ponds are required during project construction or decommissioning phases, tortoise-proof fencing will be installed around the perimeter of each pond to prevent access by desert tortoises. All ponds will be lined. If project biologists	5.2.3 – All employees will be trained on and expected to follow the proper water control policies and procedures

**TABLE 1
ESMSP RAVEN CONTROL MITIGATION MATRIX**

BMP#	Site Procedure(s)	RCP Section, Task Assignment and Schedule
	<p>observe evaporation ponds being utilized by ravens, ponds may need to be covered</p> <p>Water used for dust suppression will be applied at a rate that discourages ponding.</p>	
5	<p>Anti-Perching and Anti Nesting: Transmission line support structures and other facility structures will be designed to discourage their use by raptors for perching or nesting (e.g., by use of anti-perching devices) in accordance with the most current APLIC guidelines (APLIC 2006) and the Avian Power Line Interaction Committee (APLIC 2006) and Reducing Avian Collisions with Power Lines by the U.S. Fish and Wildlife Service and the APLIC (APLIC 2012)¹. Exact locations of perch deterrent poles would be determined in consultation with wildlife agencies prior to construction of the line. For the gen-tie line on BLM land, the applicant will provide BLM the design plan indicating which deterrent types will be used, and BLM will approve the final design based on the best available science.</p> <p>The proponent will remove raven nests that are found on its structures immediately outside of the current breeding season or once a nest is determined inactive in accordance with USFWS, BLM, and NDOW approval.</p>	5.3, 5.4 – The project shall incorporate these designs as required
6	<p>Monitoring and Reporting (Construction): The applicant will follow the CRMP guidelines and inspect all Project structures annually during construction for nesting ravens and other predatory birds and report observations of nests on an annual basis to the appropriate agencies (USFWS, BIA, BLM). Incidental sightings during daily activities by onsite biologists or regular Project personnel will be recorded on standardized data forms.</p>	6.1.1 – The project will follow the CRMP guidelines presented in Section 6.1.1
7	<p>Monitoring and Reporting (Operations): For the gen-tie line: inspections will be conducted monthly during the raven breeding season for three years following construction during operation of the Project per CRMP guidelines, then annually for the life of the project, reporting requirements also apply, and incidental sightings during normal activities by biologists or regular Project personnel will be recorded on standardized data forms.</p>	6.1.2, 6.2 – The project shall follow the CRPM monitoring requirements for the applicable areas of the project
8	<p>Structure Removal Following Decommissioning: All elevated structures related to the project, including poles and towers, will be removed when the project is decommissioned if not utilized as a part of the integral part of the utility power grid.</p>	5.3.2 – This requirement will be met per Section 5.3.2

Implementing the raven AMMs will be the responsibility of the project for the life of the project. AMMs pertaining to construction, operation and maintenance (O&M), and/or decommissioning will be identified as such under each AMM heading below.

5.1 Education

As referenced in the terms and conditions of a project's right-of-way grant and/or other governing permit documents, all personnel involved with on-site construction, O&M, and decommissioning will be presented a special status species (e.g., desert tortoise) and environmental awareness program prior to initiation of activities. The program will include information concerning:

- the biology and distribution of special status species (desert tortoise, or other species as applicable);
- species conservation efforts, regulatory status, and occurrence in the project area;
- the definition of "take" and associated penalties;
- responsibilities of workers, monitors, and biologists;
- reporting procedures to be implemented in case of encounters with desert tortoise and other special status species, or non-compliance with project-related stipulations.

The program will also present information concerning the impact of ravens on the desert tortoise and project-specific AMMs being implemented to discourage the presence of ravens.

5.2 Reduce Access to Food and Water Resources

5.2.1 Waste Management

Waste management will occur during the construction, O&M, and decommissioning phases. A litter and waste control program shall be implemented to reduce the attractiveness of the area to opportunistic predators such as kit foxes, coyotes, and ravens. Waste and food items will be disposed of properly in predator-proof containers with predator-proof lids. To reduce the possibility of ravens or other scavengers, such as coyotes, from ripping into the bags and exposing waste, plastic bags containing waste will not be left out for pickup. Instead waste containers will be emptied and removed as needed from the project area and disposed of in an approved landfill. The project area will be kept free of waste for the life of the project; the gen-tie portion of the Project on BLM-managed land may be inspected by BLM during project renewals or other times.

The proponent will also dispose of any animal road-kills on the project site and along the access road as encountered. Because predators are capable of locating and then excavating buried remains, road-kills will be deposited into predator-proof trash bins or another secure method until proper disposal is undertaken.

5.2.2 Prohibition on Intentionally Feeding Ravens and other Wildlife

All workers (construction, O&M, and decommissioning) are prohibited from intentionally feeding ravens and other wildlife on and in the vicinity of the project site. The project-specific environmental awareness program will inform all personnel that they are prohibited from intentionally feeding ravens, and it will explain why feeding wildlife is detrimental to wildlife in the project area and under certain circumstances it may have public safety implications.

5.2.3 Limit Availability of Water

Water is a highly limited and valuable resource in the desert. Any natural or human-caused available water sources encourage greater visitation by wildlife, including ravens, during drier seasons of the year. While holding or evaporation ponds are not anticipated as part of the proposed project, the project proponent will make reasonable attempts to ensure that any holding or evaporation ponds constructed for the project are not available to ravens or other wildlife. If evaporation ponds are required during project construction or decommissioning phases, tortoise-proof fencing will be installed around the perimeter of each pond to prevent access by desert tortoises. All ponds will be lined. If project biologists observe evaporation or holding ponds being utilized by ravens, ponds may need to be covered or anti-perching devices installed along the perimeter pond fencing.

Truck cleaning areas will be kept free of standing water. Water used for dust suppression or PV panel washing will be applied at a rate that discourages ponding.

5.3 Discourage Nesting

Buildings, signs, utility poles, communication towers, landscape trees, and other structures in the BLM Southern Nevada District have augmented raven nesting opportunities that were otherwise absent or very limited. Over time, the density and distribution of human-related structures and activities over the desert landscapes increased suitable raven nest sites, which consequently resulted in proliferation of raven abundance and distribution. Raven predation on juvenile desert tortoises has been evidenced in the Mojave Desert by direct observations of desert tortoise carcasses and remains under raven nests, and by carcasses discovered having distinctive raven damage (Boarman 1992). Data suggest that ravens in the Mojave Desert spend 75 percent of their foraging time within 400 meters (1300 feet) of their nest (Sherman 1993). Therefore, the establishment of a new nest can have significant adverse effects on the local juvenile desert tortoise population.

5.3.1 Nesting Prevention and Discouragement during Construction and O&M

To prevent nesting on Project structures, the Applicant will implement the following measures during construction and maintain them throughout the O&M phase:

- **Utility structures.** The proponent will remove raven nests that are found on its structures immediately outside of the current breeding season or once a nest is determined inactive in accordance with USFWS, BLM, and NDOW approval, where appropriate. An inactive nest is defined by USFWS as the continuous absence of any adult, egg, or dependent young. The bird breeding season in the Southern Nevada District is generally from February 15 through August 31. Raptors and ravens, however, may breed earlier than February 15. Perch deterrents will also help prevent nesting and are discussed in **Section 5.4 - Discourage Perching**.
- **Building Structures.** The proponent will document when raven nests are found in/on any of the structures associated with the project (as stated under Section 6.0 Monitoring and Reporting).
- **Hazing.** The proponent will emphasize preventing or limiting raven attractants, such as nesting subsidies and artificially introduced food and water resources, rather than active hazing. Unless implemented properly, hazing could have unintended consequences; therefore, hazing will not be implemented.

5.3.2 Discourage Nesting Following Decommissioning

Elevated structures, including utility poles and towers, will be removed when decommissioned and dormant. However, any components of transmission lines that have become integral parts of the utility power grid would continue to be maintained and operated. Those retained components will fall under the annual monitoring and reporting requirements (see Sections 6.1 and 6.2).

5.4 Discourage Perching

Elevated perch locations offer ravens a view of their surroundings and prey below. Vertical structures provide perching opportunities in areas where natural perch sites are otherwise absent or limited. If allowed to perch or roost on new structures, raven predation on the desert tortoise will likely increase. Existing literature presents considerations in selecting perch deterrent designs and local environmental considerations.

Power line support structures and other facility structures shall be designed to discourage their use by ravens for perching or nesting in accordance with the most current APLIC guidelines. Innovation of novel approaches, or improvements to existing designs, which result in effective perch deterrents is encouraged. Deterrent types should be selected based on the most current and best available science. For the gen-tie line on BLM lands, the types of perch deterrents used will be proposed by the applicant and submitted to BLM for approval.

Anti-perching devices will be installed under the scenarios described in the sections below.

5.4.1 Perch Prevention Prior to Construction

As the Proposed Project is not near any designated ACECs or other sensitive land use areas, gen-tie towers are not required to consist of monopoles. New transmission lines that are the only lines on the landscape within non-critical tortoise habitat (and not co-located with existing lines) will have perch deterrents installed (though, note that the majority of the gen-tie line would be collocated with existing lines). The proponent will provide BLM the design plan indicating which deterrent types will be used, and BLM will approve the final design based on the best available science.

5.4.2 Perch Prevention during Construction

Construction activities may create temporary perch sites for ravens by introducing equipment or materials to the landscape that prove suitable for ravens. Area monitoring will evaluate the presence of ravens during construction. Methods for monitoring during construction are outlined under section 6.1.1 - Construction Monitoring. Measures will be taken to reduce the perching suitability of these materials and the location of such materials may be changed if ravens are regularly observed perching on building materials, equipment, waste piles, or other construction debris.

5.4.3 Perch Prevention During O&M

Contingency measures will be implemented on a case-by-case basis, in consultation with the BIA or BLM (as appropriate depending on the location of the area in question), if it becomes apparent that a particular structure is providing a favorable location for perching. This could include, for example,

installation of flight diverters, triangles, cones, and other deterrents to discourage nesting, per the APLIC Guidelines (APLIC 2006) and should be based upon the best available science. The APLIC document discusses the use of devices intended to discourage perching as well as the modification of structures to be avian-safe.

Perching may also occur on other project structures including buildings and fences. If this behavior is being documented in the annual reports (summarized in Section 6), or if desert tortoise remains are reported in these areas, deterrent structures will be installed in order to prevent perching from occurring in the future.

6 Monitoring and Reporting

6.1 Monitoring

The project proponent will monitor for the increased presence of ravens, other potential human subsidized predators in the vicinity of the project area, and frequency of occurrence and behavior in those areas as summarized below. The purpose of the monitoring will be to identify and document the sources of human-created resources and raven activity related to the project.

Inactive nests are not protected by the Migratory Bird Treaty Act (MBTA) and removal would be conducted prior to the next breeding season. Should nesting activity become a long-term issue, alternate measures to discourage nesting activities and removal of nesting materials prior to eggs being laid would be implemented. Prior to removing or relocating any nests, facility personnel would consult with USFWS and when necessary, proper permitting would be obtained. Nests will be identified during the inspection/monitoring with frequencies and duration described in this RCP, and removed during the appropriate time in the breeding season.

6.1.1 Construction Monitoring

Monitoring should focus on all potential attractant areas during construction, including waste disposal areas, erected structures, staging and lay-down sites where large equipment or material may be stored, batch plants and holding or evaporation ponds, any area where water is applied for fugitive dust control and erosion, and where there are recent surface disturbances. This monitoring can be done concomitantly with authorized desert tortoise biologists and/or desert tortoise monitors working on site during construction. Any raven witnessed nesting or perching by the biologists/monitors shall be documented (e.g., time/date accounts, GPS points in UTM's, dated photos). Any tortoise predation witnessed should be documented, as stated below, and BLM and the USFWS should be notified by e-mail or phone within 24 hours.

Biologists/monitors will be instructed to document raven observations during clearance surveys, when monitoring construction activity and environmental compliance, while conducting translocations of desert tortoises, and when monitoring translocated desert tortoises. All incidental observations of raven use along the gen-tie line on BLM lands, nest sightings, and desert tortoise predation during construction will be documented on an Incidental Raven Sighting Form (included in Appendix A of this plan) and submitted to the USFWS, BIA, and BLM (for gen-tie portion located on BLM land) at the end of each calendar year during construction and upon completion of construction.

6.1.2 Operation and Maintenance Monitoring

Monitoring for the entire length of the gen-tie line, both on Tribal and BLM managed lands will conform to the requirements within the CRMP as summarized below. A biologist will be assigned to oversee and conduct raven monitoring and will be responsible for implementing the Plan while ensuring that all monitoring and reporting requirements are met. The biologist, and other project biologists, will conduct surveys for ravens following project construction once operation has begun (pre-construction surveys are not part of this document). Generally, monitoring will consist of personnel conducting vehicular surveys of the project area, the nearby transmission alignments, substations, vertical structures, and

surrounding areas.

6.1.2.1 Gen-Tie Portion of Project

For the gen-tie portion of the project, monitoring will be conducted a minimum of once per month between February and September for 3 years following construction (monitoring reports will be submitted annually to BLM). Data for the gen-tie line will be documented using the Raven Monitoring form, the Bird Nest and Carcass form, and the Dead or Injured Bird form contained in the CRMP and included in Appendix A of this plan. The project biologist(s) working and implementing the Plan shall be approved by the project proponent. Names of the approved biologist(s) shall be submitted to the BLM and resumes made available upon request. All biologists will have the following minimum qualifications:

- A bachelor's degree in biological sciences, zoology, botany, ecology, or a related field and 3 years of experience with biology fieldwork; and,
- At least one year of field experience with biological resources in the Mojave Desert or similar ecosystem.

Specific methods for conducting monitoring are as follows. Roads will be driven slowly searching for ravens, nests, and reproductive behavior (e.g., carrying nest material, courtship, copulation). Binoculars and spotting scopes will be used to observe raven activity on the proponent's lines and/or vertical structures and any adjacent transmission lines/structures. Monitoring must be completed from a vantage point where all potential nesting areas are thoroughly visible. If tower structures contain platforms, the platform material should be grated for see-through visibility from the ground. If platforms are made of opaque material, they will be surveyed from the air or from a vantage point allowing clear viewing of the entire platform. Right-of-way renewal of an existing transmission line (single or multi-conductor configuration) or other vertical structure within desert tortoise habitat, and that is the only line on the landscape (not co-located with other alignments within a corridor), will require monitoring of the transmission line and/or structure for nests during annual maintenance flights and comply with annual reporting requirements.

All raven observations will be documented, including date, time, location (GPS point coordinates in UTM's using Zone 11, NAD 83), habitat, number of individuals, behavior (e.g., courtship, nesting, perching, flocking, foraging), and locations of occupied and potential nests. The location of the nest (GPS point in UTM's, position on structure) and a clear photo will be taken followed immediately by surveys for animal carcasses/remains. The carcass/remains survey will cover a 15-meter radius beginning at the edge of the disturbance footprint (e.g., tower/pole structure) where the nest is located. This area will be walked using 10-meter interval transects. If a desert tortoise carcass is found, BLM (if on BLM-controlled land) and USFWS will be notified within 24 hours by e-mail or phone. Documentation of desert tortoise remains (clear photos of remains in situ, and GPS points in UTM's) will be recorded, along with use-status of the nest (e.g., not in use - abandoned or deteriorating; active and raven attending or sitting in nest, feeding nestlings) and provided to BLM and/or USFWS at time of occurrence. All carcasses, regardless of species, shall be documented on the data form.

The nest should be monitored twice per month until it is inactive. The nest must be removed once determined it is inactive or after the current breeding season is over in accordance with MBTA and USFWS, BLM, and NDOW guidance. An inactive nest is defined by USFWS as the continuous absence of any adult, egg, or dependent young. Monitoring the nest twice per month will allow take of desert tortoises to be quantified. If a nest is found outside of the breeding season, the proponent will be

responsible for removing it. Nest removal may be completed by the proponent or by a contractor. Stick nest materials should be removed well away from the nest site to prevent reuse of materials.

Should ravens be found to habitually prey on desert tortoises or other special status species within the first 3 years following project construction, such matters will be resolved with either use of additional raven deterrents or removal of the offending ravens by the project proponent or its agent. Removal of the offending raven(s) by lethal means will require a depredation permit from the USFWS and is considered a last-resort effort. The proponent may also contract with a person, company, or agency having a current depredation permit to perform lethal removals.

Upon reviewing monitoring data from the first 3 years, subsequent monitoring will be completed during the annual operation and maintenance flight/drive surveys, preferably during the breeding season (February through August). This is a one-time monitoring session per year coinciding with the maintenance flight/drive of the energy project lines. Any nests visible during the annual maintenance flight/drive shall be documented on the data form and relayed to BLM, or BIA, as appropriate. Preventing access to anthropogenic food and water resources; nest monitoring and removal; searches for desert tortoise remains; preventing nesting, and those components of or consistent with the Plan that discourage perching, will remain in effect throughout the duration of the project until decommissioned.

6.2 Reporting

The project applicant will submit monitoring summary reports: 1) for the SPGF, at the end of each calendar year during construction, at completion of construction, and one calendar year following completion of construction; 2) for the gen-tie line monitoring, at the end of the first 3 calendar years once operation has commenced (unless extended by BLM); and 3) for the gen-tie line monitoring, at the end of every calendar year of operation after the first 3 years (to be completed during the maintenance flight/drive); and 4) at the end of every calendar year after decommissioning should structures and components remain. Annual reports are submitted to the BIA, BLM, USFWS, and NDOW as appropriate. The annual reports (standard forms created by BLM) will include:

- Start and end points (UTM coordinates) and dates of monitoring;
- Number and behavior of observed ravens within project area, including:
 - Exact raven nest and perch locations including GPS points in UTM coordinates and photos;
 - Location on the structure (e.g., crossarm, insulator) the nest or perch is located;
 - Photos of the nest;
- Number of nests that were removed in the project area;
- Recommendations for improving raven management in locations where nesting and perching was documented;
- Wildlife mortality/injury attributed to predators, including photos and GPS locations in UTM coordinates;
 - Observations of raven predation on desert tortoises (including diagnostic signs) will be reported to the designated contacts at BLM and USFWS by an e-mail or phone call within 24 hours of the observation.

6.3 ADAPTIVE MANAGEMENT

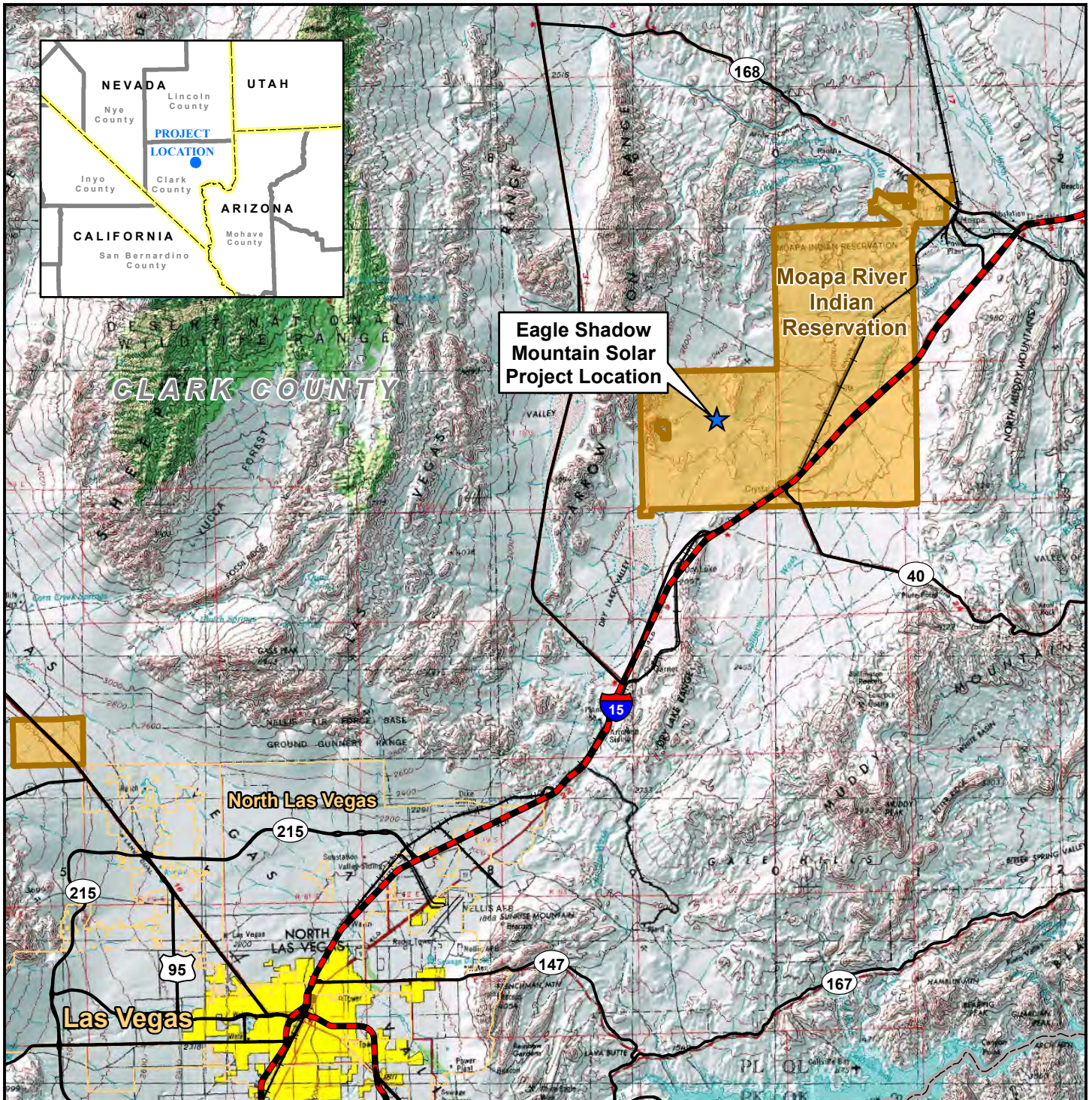
Ravens are famously adaptive, resourceful, and clever; demonstrating problem-solving abilities further necessitating the need for adaptive management. Flexibility and a willingness to adopt new or experimental methods and measures are likely to be crucial for the effectiveness of any long-term raven management plan.

For the project gen-tie line, BLM will review the results of raven AMMs and BMPs in cooperation with the project applicant, and other agencies, as necessary. Because the conservation of the desert tortoise and other special status species identified as vulnerable to raven predation is a high priority, the BLM will determine if changes to project design features are warranted (e.g., installing perch deterrents) during the first 3 years of commercial operation of the project. Adaptive management should be responsive to identified problems occurring within any reporting year. Reports received by BLM interim to annual monitoring reports suggesting that current AMMs and BMPs are ineffective at reducing raven occurrences, will result in action taken to swiftly and effectively resolve the situation.

This Plan is a living document and will be revised and updated as innovative solutions are developed to minimize impacts, agency guidance is adjusted, and/or conditions of the project warrants. Additional, project-specific AMMs may be required by BLM at any time to minimize impacts.

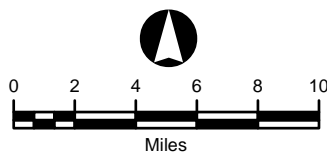
7 References

- Aiya Solar Project. 2016. FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS). Online at: https://www.aiyasolarprojecteis.com/uploads/4/1/6/8/41682917/aiya_solar_project_feis_volume_1_1-29-16_.pdf.
- Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C. and Sacramento, California.
- APLIC. 2012. Reducing Avian Collisions with Power Lines. The State of the Art in 2012. Washington, D.C. and Sacramento, CA: Edison Electric Institute and Avian Power Line Interaction Committee
- Boarman, W.I. 1992. Problems with management of a native predator on a threatened species: raven predation on desert tortoise. Proceedings of the 15th Vertebrate Pest Conference. University of California, Davis.
- Boarman, W. I. 2002. *Reducing Predation by Common Ravens on Desert Tortoises in the Mojave and Colorado Deserts*. Prepared for the United States Bureau of Land Management. United States Geological Survey Western Ecological Research Center. San Diego, California.
- Boarman, W.I. 1993. When a native predator becomes a pest: a case study. In: S. K. Majumdar, E. W. Miller, D. E. Miller, E. K. Brown, J. R. Pratt, and R. F. Schmalz (eds.), Conservation and resource management. Penn. Acad. Sci. Philadelphia, PA. pp. 186–201.
- Boarman, W. I. 2003. Managing a subsidized predator population: reducing common raven predation on desert tortoises. *Environmental Management*. 32:205-217.
- Bureau of Land Management. 2008. *Manual 6840 Special Status Species Management*. Release 6-125. December 12, 2008. 46 pp.
- Bureau of Land Management, Southern Nevada District Office, Final Common Raven Management Plan for Energy Development within the BLM Southern Nevada District, 2014
- Bureau of Land Management, Southern Nevada District Office, Final Common Raven Management Plan for Energy Development within the BLM Southern Nevada District, 2014.
- Newfields. 2018. Preliminary Desert Tortoise Presence/Absence Report for Eagle Shadow Mountain Solar Project.
- Sherman, M.W. 1993. Activity patterns and foraging ecology of nesting common ravens in the Mojave Desert, California. (M.S. Thesis, Colorado State University, Ft. Collins.) 29 pp.
- U.S. Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) Recovery Plan. U. S. Fish and Wildlife Service, Portland, OR. 73 pages plus appendices.



Legend

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



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

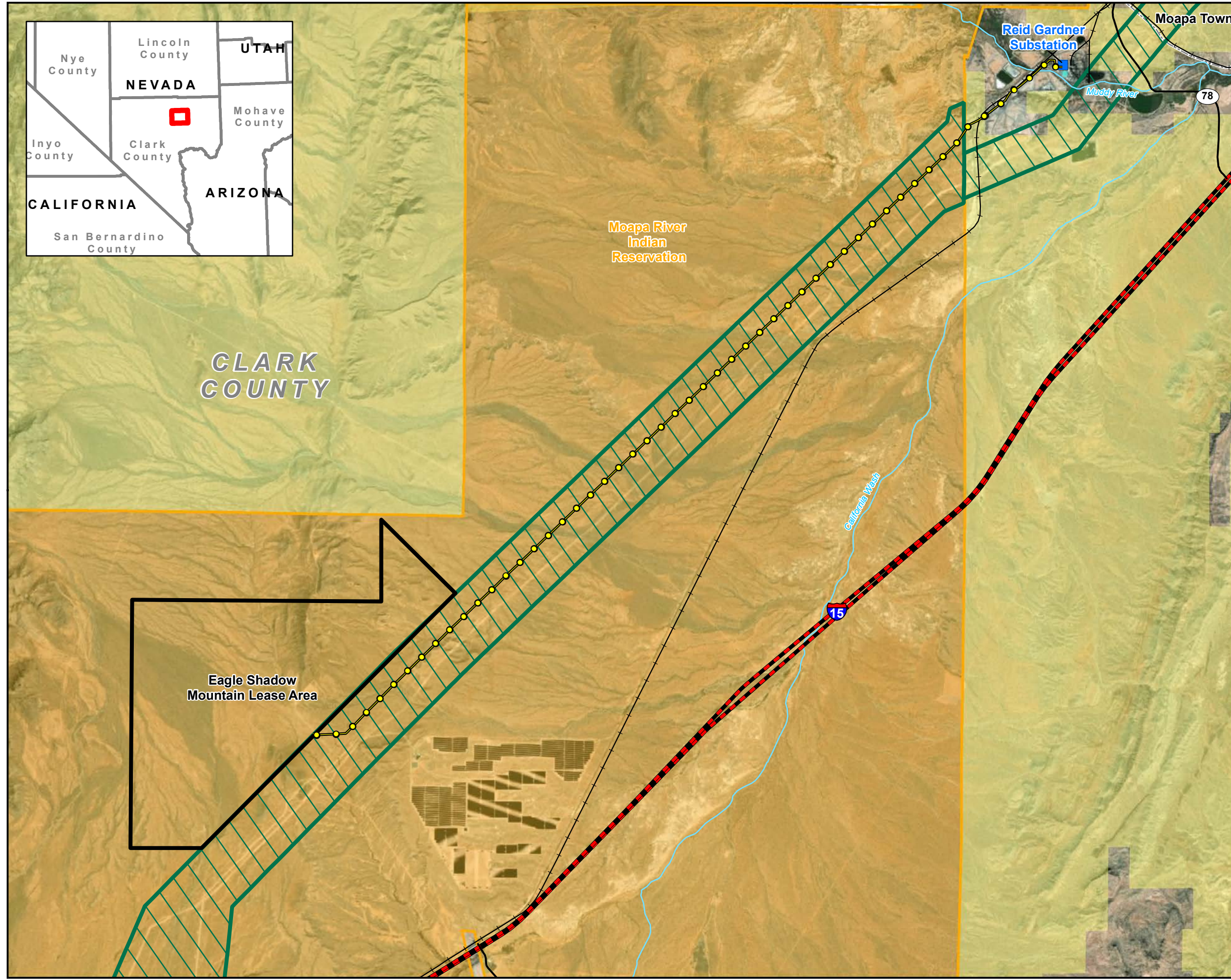
Eagle Shadow Mountain Solar Project

**FIGURE 1
 PROJECT LOCATION**

Map Extent: Clark County, Nevada

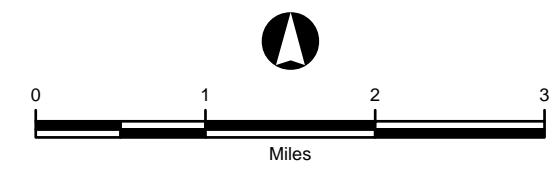
Date: 11-06-18	Author: rnc
----------------	-------------

G:\Eagle Shadow Mountain Solar Project\MXD's\Project Location 8.5x11 110618.mxd



Legend

- Project Components**
- ESM Gen-Tie - Alternative
- Eagle Shadow Mountain Solar Project Area
- 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

**Eagle Shadow Mountain
Solar Project**

**Figure 2
ESM Solar Project Components**

Map Extent: Clark County, Nevada

Date: 03-20-19	Author: mc
G:\ESM\MXD's\Project Location_032019.mxd	

APPENDIX A
RAVEN MONITORING AND REPORTING FORMS

Dead or Injured Bird Form

Project Name: _____

Case File #: _____ Biological Opinion #: _____

Date found: _____ Time found: _____

Biologists: _____

* Make sure to take photos *

* Report mortalities and injuries: <https://birdreport.fws.gov/> *

<u>BIRD #</u>	Species _____	Bird Count _____
	Sign of death or injury (circle one)	
	Collision	Electrocution
	Unknown	Other _____
	Location in UTMs _____	
	What could have prevented this? _____ (Cover transformer, install insulator cover, install perch deterrent...)	
	Weather conditions at time of death if known _____	
	Comments _____	

<u>BIRD #</u>	Species _____	Bird Count _____
	Sign of death or injury (circle one)	
	Collision	Electrocution
	Unknown	Other _____
	Location in UTMs _____	
	What could have prevented this? _____ (Cover transformer, install insulator cover, install perch deterrent...)	
	Weather conditions at time of death if known _____	
	Comments _____	

Appendix L

Biological Assessment

Biological Assessment

Eagle Shadow Mountain Solar Project



Prepared for:

Bureau of Indian Affairs Western Regional Office
2600 N. Central Avenue
Phoenix, AZ 85004-3050

June 2019

TABLE OF CONTENTS

1.0	INTRODUCTION	1-1
1.1	Project Overview	1-1
1.2	Consultation History	1-2
2.0	DESCRIPTION OF THE PROPOSED ACTION	2-1
2.1	Onsite Project Facilities	2-3
2.1.1	Solar Field	2-3
2.1.2	Energy Storage System	2-8
2.1.3	Electrical Collection System and Substation.....	2-8
2.1.4	Site Security and Fencing.....	2-8
2.1.5	Communication Systems Infrastructure	2-9
2.1.6	Operations and Maintenance Area	2-9
2.1.7	Internal Project Roads	2-9
2.1.8	Lighting	2-10
2.1.9	Water Supply	2-10
2.1.10	Wastewater Treatment	2-10
2.1.11	Waste and Hazardous Materials Management.....	2-10
2.1.12	Fire Protection	2-11
2.2	Offsite Project Facilities	2-11
2.2.1	230 kV Transmission Line (Gen-Tie).....	2-11
2.2.2	Project Access Road.....	2-12
2.3	Project Construction.....	2-12
2.3.1	Onsite Project Facilities Construction.....	2-14
2.3.2	Offsite Project Facilities Construction	2-16
2.3.3	Site Stabilization, Protection and Reclamation	2-18
2.3.4	Construction Workforce Schedule, Equipment and Materials.....	2-18
2.3.5	Construction Traffic	2-19
2.3.6	Health and Safety Program.....	2-19
2.4	Temporary Construction Facilities (to be removed following construction)	2-19
2.4.1	Onsite Temporary Project Construction Facilities	2-19
2.4.2	Offsite Temporary Project Construction Facilities.....	2-19
2.5	Operations and Maintenance	2-20
2.5.1	Onsite Project Facilities	2-20
2.5.2	Offsite Project Facilities	2-21
2.6	Decommissioning	2-21
2.7	Management Plans, Minimization Measures, and Compensatory Mitigation.....	2-21
2.7.1	Management Plans	2-21
2.7.2	Minimization Measures	2-22
2.7.3	Construction Minimization Measures	2-22
2.7.4	Operations and Maintenance Minimization Measures.....	2-27
2.7.5	Decommissioning Minimization Measures.....	2-27
2.7.6	Compensatory Mitigation.....	2-27
3.0	ACTION AREA AND EXISTING CONDITIONS.....	3-1
3.1	Action Area	3-1

3.2	Habitat and Vegetation	3-1
3.3	Wildlife	3-3
3.4	Ground Water Resources.....	3-3
4.0	DESCRIPTION OF SPECIES	4-1
4.1	Federally Listed Bird Species	4-1
4.1.1	Yellow-billed Cuckoo.....	4-1
4.1.2	Yuma (Ridgway’s) Clapper Rail	4-1
4.1.3	Southwestern Willow Flycatcher	4-2
4.2	Desert Tortoise.....	4-2
4.2.1	Distribution and Abundance in the Action Area.....	4-3
4.2.2	Factors That May Affect the Desert Tortoise in the Action Area	4-4
4.2.3	Desert Tortoise Designated Critical Habitat	4-7
4.3	Moapa Dace	4-7
4.3.1	Distribution and Life History.....	4-9
4.3.2	Threats to the Species	4-9
4.3.3	Critical Habitat	4-9
5.0	EFFECTS OF THE PROPOSED ACTION AND DETERMINATION OF EFFECTS	5-1
5.1	Federally Listed Bird Species	5-1
5.1.1	Yellow-billed Cuckoo.....	5-1
5.1.2	Yuma (Ridgway’s) Clapper Rail	5-2
5.1.3	Southwestern Willow Flycatcher	5-2
5.2	Desert Tortoise.....	5-3
5.2.1	Injury and Mortality.....	5-3
5.2.2	Relocation, Translocating and Handling	5-3
5.2.3	Loss of Occupied Habitat	5-3
5.2.4	Constriction of Movement	5-4
5.2.5	Vibration and Noise.....	5-4
5.2.6	Dust	5-5
5.2.7	Lighting.....	5-5
5.2.8	Edge Effects	5-5
5.2.9	Introduction of Weeds and Invasive Species	5-5
5.2.10	Exposure to Chemicals.....	5-6
5.2.11	Attraction of Human Subsidized Predators.....	5-6
5.2.12	Operations and Maintenance.....	5-7
5.3	Moapa Dace	5-7
5.3.1	Water Drawdowns.....	5-8
5.4	Cumulative Effects.....	5-9
6.0	REFERENCES.....	6-1

LIST OF TABLES

Table 1-1 – Listed Species Considered	1-5
Table 2-1 – Summary of Agency Lands / Jurisdiction	2-2
Table 2-2 – Temporary and Permanent Disturbance	2-3
Table 3-1. - Plant Species Observed in the Project Area.....	3-1
Table 3-2 – Vegetative Covertypes within the Project Area	3-3
Table 4-1 – Tortoise Sign Found in Project Area.....	4-4

LIST OF FIGURES

Figure 1-1 - Project Location	1-3
Figure 1-2 – Proposed Project Area	1-4
Figure 2-1 – Conceptual Site Plan	2-5
Figure 2-2 – Typical Single-Axis Tracker Array Layout	2-6
Figure 2-3 – Typical Single-Axis Tracker Cross Sectional View.....	2-7
Figure 2-4 – Typical Gen-Tie Transmission Structure	2-13
Figure 4-1 – Desert Tortoise Observations	4-5
Figure 4-2 – Desert Tortoise Designated Critical Habitat	4-8

LIST OF APPENDICES

Appendix A – USFWS Species List

1.0 INTRODUCTION

The purpose of this Biological Assessment (BA) is to review the Eagle Shadow Mountain Solar Project (ESMSP or Project) and to determine to what extent the Project would affect federally listed threatened or endangered species; species proposed for listing; and/or designated or proposed critical habitat. The Project would use land held in trust by the Bureau of Indian Affairs (BIA) for the benefit of the Moapa Band of Paiutes (Band).

The proposed Project would be located approximately 30 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1-1**), west of I-15 and east of U.S. Highway 93. The ESMSP would be located on up to 2,200 leased acres within an area of approximately 4,770 acres on the Reservation in Sections 1, 9, 10, 11, 14, 15, 16, 21 and 22 of Township 16 South, Range 64 East, Mount Diablo Base Meridian. These lands are currently vacant except for roads, pipelines, a tribal aggregate mine, and two operating water wells. These lands and facilities would be excluded from the final lease area.

The proposed 12.5-mile gen-tie line would be located in Township 16 South, Ranges 64 and 65 East and Township 15 South, Ranges 65 and 66 East. The gen-tie line would be located within an existing utility corridor, adjacent to multiple existing linear electric transmission and pipeline utilities. **Figure 1-2** shows the location of the proposed components of the Project and associated facilities. Project components would include onsite facilities, offsite facilities, and temporary facilities needed to construct the Project.

Project components on Tribal land would include the solar facility and the majority of the generation-tie transmission line (gen-tie). The remaining portion of the gen-tie and associated facilities would be on land managed by the Bureau of Land Management (BLM) and private land. As such, this BA has been prepared in coordination with both BIA and BLM for submittal to the U.S. Fish and Wildlife Service (USFWS).

1.1 Project Overview

325MK 8me LLC (“Applicant”), a subsidiary of 8minutenergy, proposes to construct, operate, maintain, and decommission the Project, consisting of up to a 300-megawatt (MW) alternating current (AC) solar photovoltaic (PV) power generating facility on approximately 2,200 acres of land on the Moapa River Indian Reservation (Reservation) in Clark County, Nevada (**Figure 1-1**). Major Project components include the following:

- Solar field
- Onsite substation
- Operation and maintenance (O&M) facilities
- 230-kilovolt (kV) gen-tie
- Short access roads
- Electric distribution and communication lines
- Temporary construction facilities including staging areas.

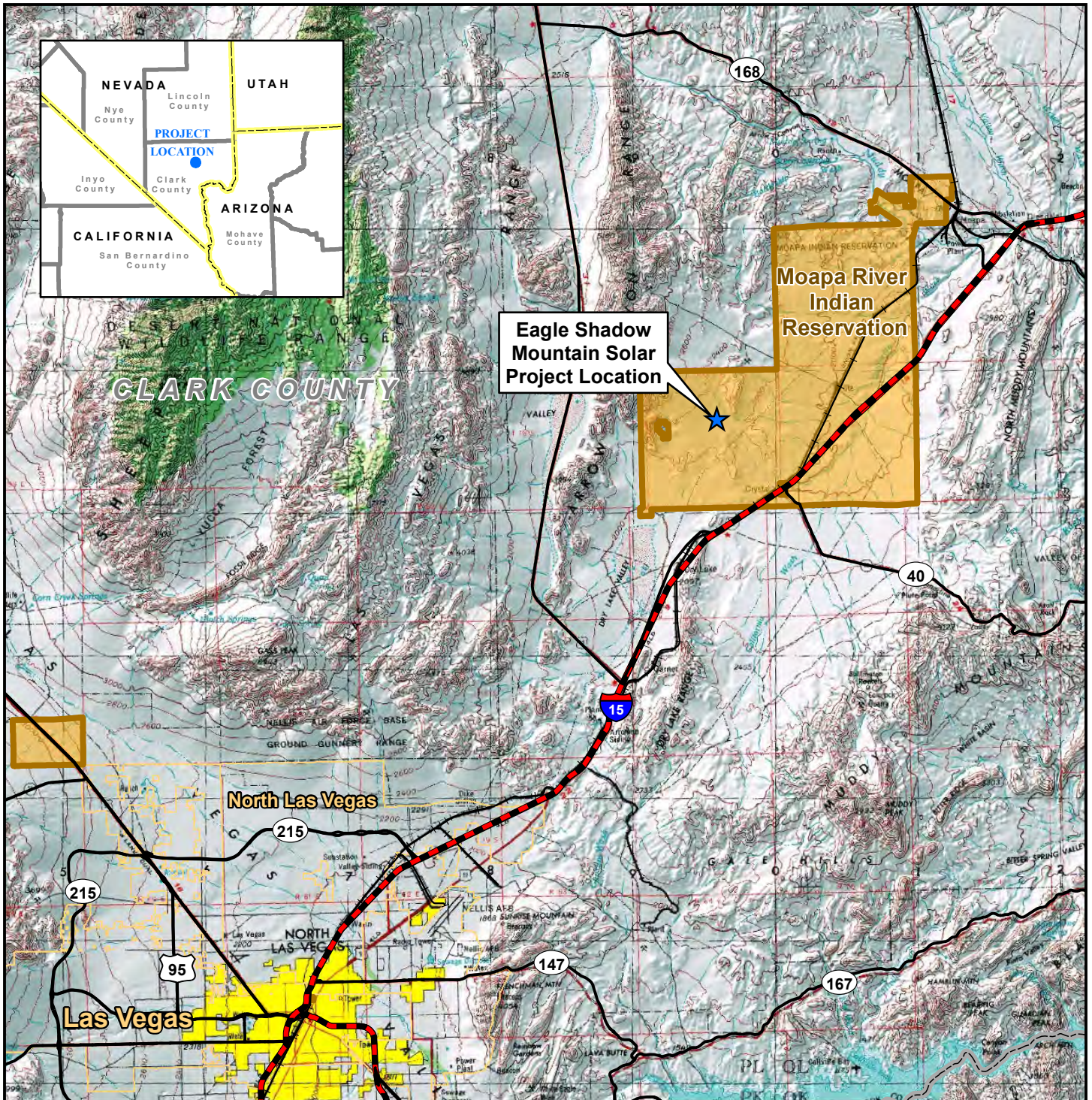
A complete Project description is presented in Chapter 2 of this BA.

Power produced by the Project would be conveyed to the Nevada Power bulk transmission system via the gen-tie, which would interconnect to the existing Reid-Gardner Substation.

1.2 Consultation History

On May 9, 2019, a list of species that may occur within the Project area was obtained from the USFWS website Information for Planning and Consultation System (IPaC) (**Appendix A**) and other species were considered due to proximity to the Project area (USFWS 2019). **Table 1-1** lists these species, their status, critical habitat (if any) and proximity of the same to the proposed Project area, and the recommended effects determination.

Additionally, the applicant met with USFWS on March 6, 2019, at the USFWS Las Vegas Field Office to discuss the Section 7 process, timing, options for tortoise relocation and potential project designs that would minimize impacts to desert tortoise. Attendees included Carla Wise (USFWS, Las Vegas Field Office), Roy Averill-Murray (USFWS Desert Tortoise Recovery Office, Reno), Chip Lewis (BIA), Tamara Dawes (BIA), Christina Varela (BIA), Jason Moretz (8Minutenergy), Luke Shillington (8Minutenergy), Randy Schroeder (EnValue), Patrick Golden (EnValue), and Patricia McCabe (Logan Simpson).

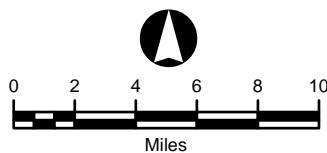


Legend

- Solar Project Location
- Interstate
- US/ State Highway
- Railroad
- Municipal Boundary

Jurisdictional Land Ownership

- Indian Reservation



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

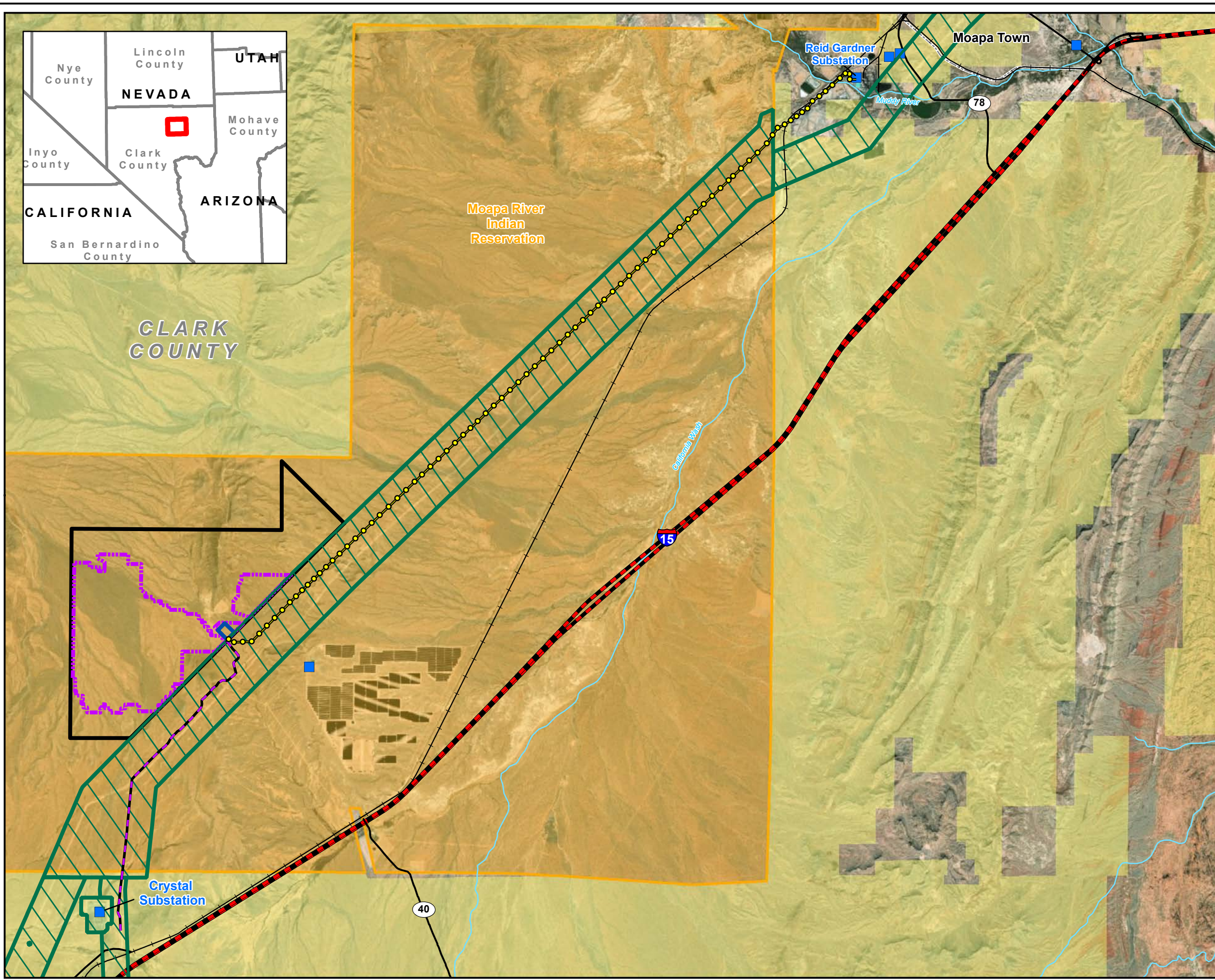
Eagle Shadow Mountain Solar Project

**FIGURE 1-1
 PROJECT LOCATION**

Map Extent: Clark County, Nevada

Date: 11-06-18	Author: rnc
----------------	-------------

G:\Eagle Shadow Mountain Solar Project\MXD's\Project Location 8.5x11 110618.mxd

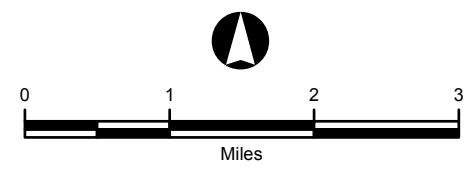


Legend

- Project Components**
- ESM Gen-Tie – Proposed
 - Solar Facility Access Road
 - Eagle Shadow Mountain Study Area
 - Eagle Shadow Mountain Solar Site
 - Eagle Shadow Mountain Substation

- 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 Land
 - Private Lands



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

**Eagle Shadow Mountain
 Solar Project**

**Figure 1-2 -
 Proposed Project Area**

Map Extent: Clark County, Nevada

Date:- 05-30-19	Author: mc
G:\ESM\MXD's\Study Area_053019.mxd	

**Table 1-1
LISTED SPECIES CONSIDERED**

Species	Status	Critical Habitat/Location	Recommended Determination of Effects
Birds			
Yellow-billed cuckoo (<i>Coccyzus americanus</i>) Population: Western U.S. Distinct Population Unit	Threatened	USFWS Proposed Critical Habitat located approximately 5 miles northwest of the gen-tie line.	<i>May affect, not likely to adversely affect</i> <i>No effect to proposed critical habitat</i>
Yuma clapper (Ridgway's) rail (<i>Rallus longirostris yumanensis</i>) Population: U.S. only	Endangered	No USFWS Designated Critical Habitat	<i>May affect, not likely to adversely affect</i>
Southwestern willow flycatcher (<i>Empidonax trailii extimus</i>)	Endangered	USFWS Designated Critical Habitat approximately 20 miles east of the Project area	<i>May affect, not likely to adversely affect</i> <i>No effect to designated critical habitat</i>
Reptiles			
Desert tortoise (<i>Gopherus agassizii</i>) Mojave population	Threatened	USFWS designated Critical Habitat approximately 10 miles west of the Project area	<i>May affect, likely to adversely affect</i> <i>No effect to designated critical habitat</i>
Fish			
Moapa dace (<i>Moapa coriacea</i>)	Endangered	No USFWS Designated Critical Habitat	<i>May affect, likely to adversely affect</i>

* Yellow-billed cuckoo and Moapa dace were not included in the USFWS official species letter but are addressed in this BA due to the proximity of the species' ranges/proposed critical habitat to the project area.

2.0 DESCRIPTION OF THE PROPOSED ACTION

This chapter provides a detailed description of the proposed Project. It describes the various components of the Project and includes discussions of the proposed construction process, O&M procedures, and decommissioning.

The solar site would be located entirely on the Reservation. Major onsite facilities include a 300MW AC solar field comprised of multiple blocks of PV solar panels mounted on single-axis tracking systems, associated inverter and transformer equipment, an energy storage system (ESS), a project substation, and O&M facilities. The offsite facilities would include an approximately 12.5-mile single- or dual-circuit 230kV gen-tie located on the Reservation, BLM-administered lands, and private lands. Most of the gen-tie would be within a Federally-designated utility corridor on the Reservation. This line would require a ROW width of 125 to 200 feet. Additional offsite facilities include an existing road that would provide access to the Project and electric distribution and communication lines. Temporary facilities that would be removed at the end of construction include laydown and construction areas and water storage tanks also located on the Reservation. **Table 2-1** summarizes the principle components of the Project and the associated agency actions.

Power produced by the Project would be conveyed to the regional transmission system via the gen-tie interconnection to NV Energy's existing 230kV Reid Gardner Substation.

In addition to the Federal agency jurisdictions mentioned above, the approximately 1.3-mile portion of the gen-tie crossing private lands would be subject to Clark County jurisdiction and would require a Special Use Permit (SUP).

The Project would include the following onsite key elements located within the 2,200-acre solar lease boundary, which are discussed further below. Onsite facilities would impact only a portion of the 2,200-acre lease area (solar site).

- Solar Field
- Energy Storage System
- Onsite Electrical Collection System and Substation
- Site Security and Fencing
- Communication Systems Infrastructure
- Operations and Maintenance Area
- Internal Project Roads
- Lighting
- Water Supply
- Wastewater Treatment
- Waste and Hazardous Materials Management
- Fire Protection

**Table 2-1
SUMMARY OF AGENCY LANDS / JURISDICTION
PROPOSED EAGLE SHADOW MOUNTAIN SOLAR PROJECT**

Agency	Project Component	Location	Agency Action	Mileage / Acreage *
BIA	Solar Field	Reservation	Lease	Up to 2,200 acres
	230 kV Line	Reservation	ROW	Up to 0.1 miles / 2.4 acres
	TOTAL BIA			2,202.4 acres
BLM	230 kV Line	Designated Utility Corridor on Tribal Lands and managed by BLM	ROW	10.8 miles / 261 acres
	230 kV Line	BLM Lands	ROW	0.3 miles / 8.1 acres
	Site Access Road	Designated Utility Corridor on Tribal Lands and managed by BLM	ROW	4.2 miles / 12.1 acres
	Site Access Road	BLM Lands	ROW	0.8 miles / 2.2 acres
	TOTAL BLM			16.1 miles / 283 acres
PRIVATE	230 kV Line	Private Lands owned by NV Energy	N/A	1.3 miles / 8.1 acres
	TOTAL Private			1.3 miles / 8.1 acres

* Acreage and mileage are approximate. Gen-tie acreage is based on a 200-foot ROW and only a portion of the ROW would be disturbed. Access road is existing – no new impacts expected by ROW issued for its use. Only a portion of the 2,200-acre potential solar site and lease area would be permanently disturbed by the final footprint of the solar project.

The Project would include the following offsite key elements located outside of the 2,200-acre solar lease boundary, which are discussed further below:

- 230kV Transmission Line (Gen-Tie) and Access/Spur Roads
- Site Access Road
- The Project would also include the following temporary key elements associated with construction that would be removed once construction is complete:
 - Contractor use areas on the solar field
 - Contractor use areas along gen-tie line

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

Table 2-2 TEMPORARY AND PERMANENT DISTURBANCE		
Project Component	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Solar Field and Ancillary Facilities		
Tracker Posts	0	5
Inverter Skids	0	2
Misc. Laydown	0	3
O&M/Parking/Laydown	0	3
Substation	0	17
Energy Storage System (BESS)	0	15
Solar Facility Access Roads	0	55
Solar Facility and Ancillary Facilities	2,086	0
Subtotal	2,086¹	100²
230kV Gen-Tie Line		
Access Road	2	5.9
Structure Work Areas	12.5	0
SAG and Tension	11.6	0
Structures	0	1.1
Subtotal	26	7
Total	2,112	107

¹ The solar field includes all facilities within its boundary including solar arrays, internal site roads, substation, O&M facility, 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 ESMSP 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 ESMSP are summarized in **Appendix C** of the EIS.

2.1 Onsite Project Facilities

2.1.1 Solar Field

The solar field would include mounted PV modules, inverters, and transformers that would be combined to form array blocks approximately 3 MW in size (block size may change based on final design). The blocks would be repeated to create up to 300 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 alternating electrical current (AC) at the inverter stations. **Figure 2-1** shows the conceptual site plan for the ESMSP solar field.

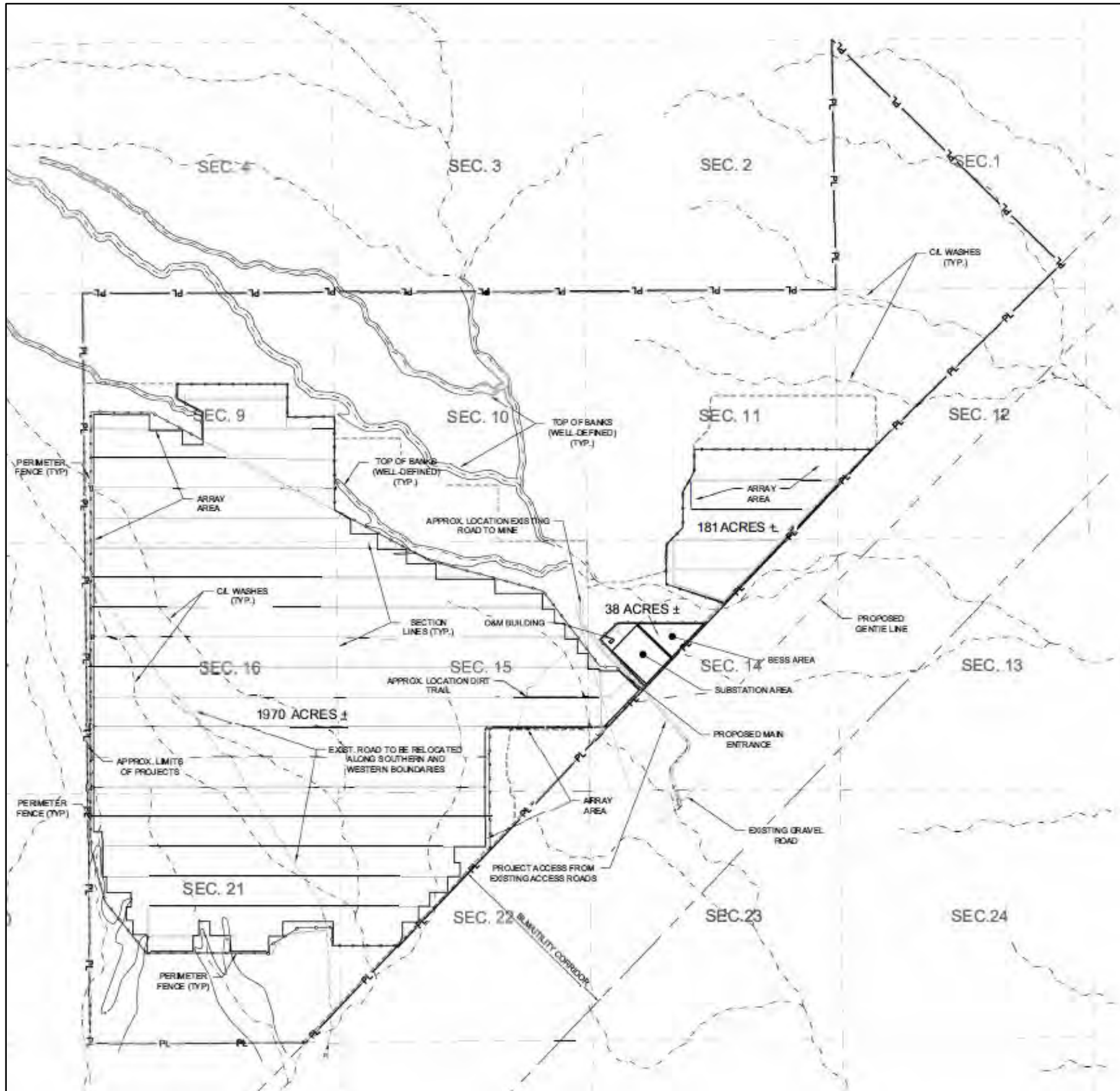
The Project would be constructed using photovoltaic panels or modules that convert sunlight directly into electricity. Panels would be installed on single-axis tracker mount systems oriented in north-south rows that would rotate to follow the sun over the course of the day.

The foundations for the mounting structures would be embedded driven steel posts or other embedded foundation design approximately 8 feet below ground, depending on the structure, soil conditions, and wind loads, and may be encased in concrete or utilize small concrete footings. Final solar panel layout and spacing would be optimized for site characteristics and the desired energy production profile.

A typical panel array layout using single-axis trackers is shown on **Figure 2-2**. 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 20 feet above the ground surface depending on the grade where the posts are installed (**Figure 2-3**). The preferred mounting configuration would use directly embedded driven posts with concrete piers or screw anchors used only if subsurface conditions do not support driven posts.

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 5 to 10 minutes during daylight conditions to move the panels in approximately one-degree increments.

Meteorological monitoring stations located at multiple locations (up to 7) 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 from the ground.



GENERAL NOTES

1. ALL DIMENSIONS SHOWN ARE APPROXIMATE AND SUBJECT TO CHANGE.
2. ALL EQUIPMENT SELECTION AND SPECIFICATIONS SUBJECT TO CHANGE WITH FINAL DESIGN.

LEGEND

<u>EXISTING</u>	<u>NEW</u>

PRELIMINARY

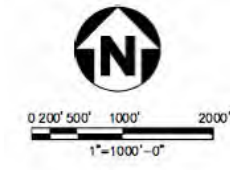


Figure 2-1
 Conceptual Site Plan
 Eagle Shadow Mountain Solar Project

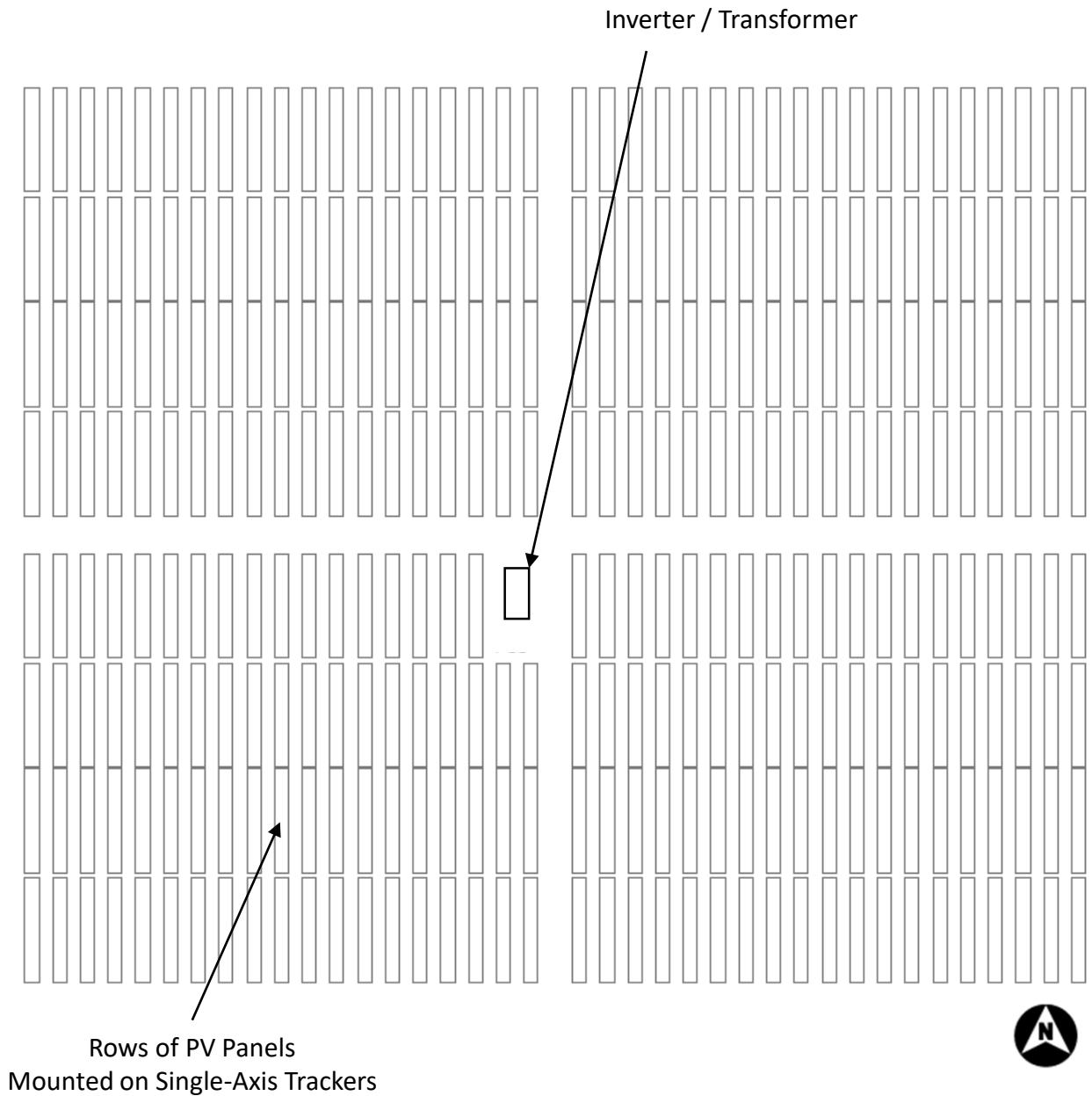


Figure 2-2
Typical Single-Axis Tracker Array Layout

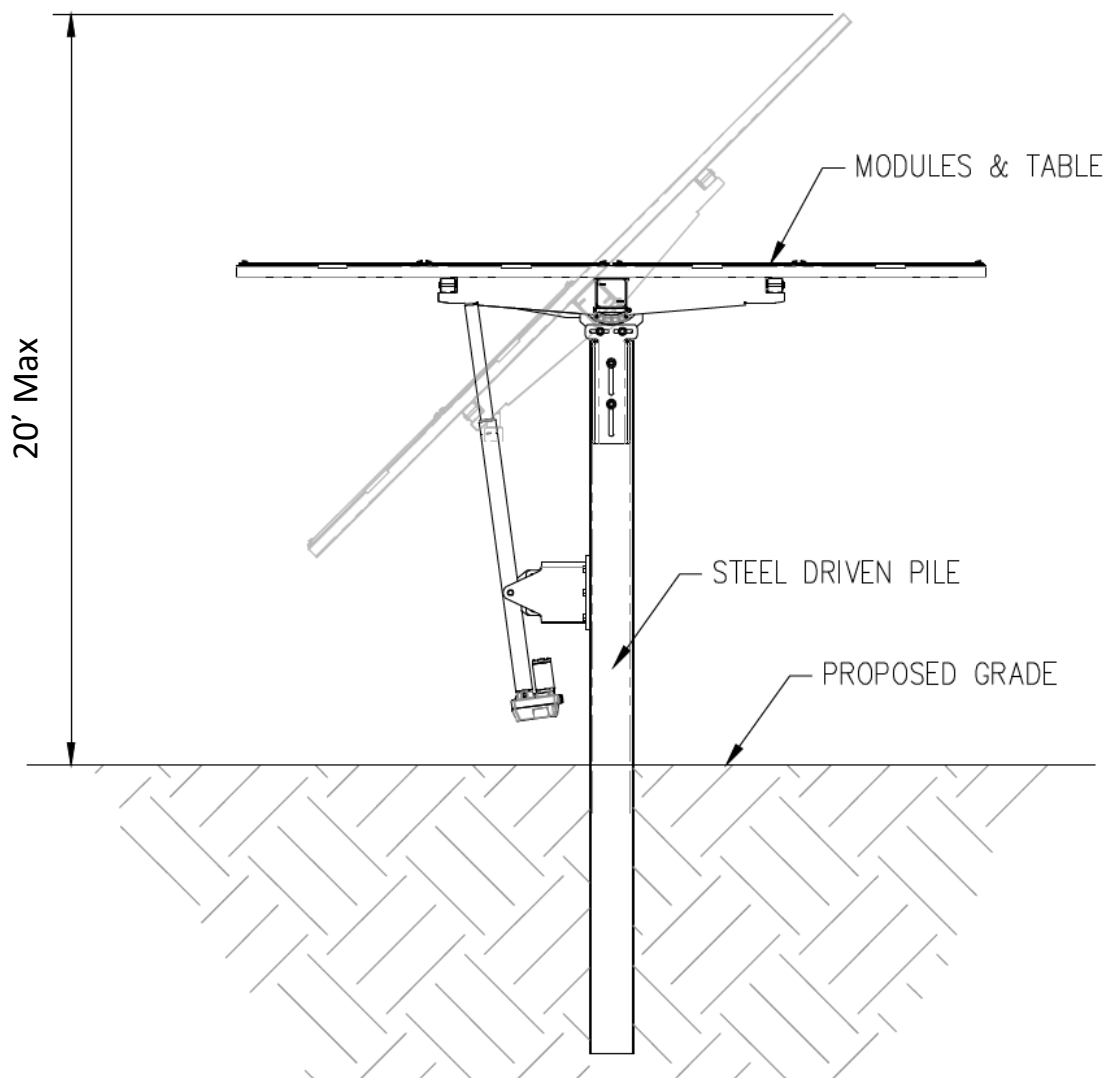


Figure 2-3
Typical Single-Axis Tracker Cross Sectional View

2.1.2 Energy Storage System

The ESMSp may include one or more ESSs, located onsite. The ESSs would consist of modular and scalable battery packs and battery control systems that conform to national safety standards. The ESS modules, which may include commercially available flow batteries, typically consist of industry-standard containers (approximately 40 feet x 8 feet x 8 feet) in pad- or post-mounted, stackable metal structures, but could also be housed in a dedicated building in compliance with applicable regulations. The maximum height of a building is not expected to exceed 25 feet. The actual dimensions and number of energy storage modules and structures would vary depending on the application, supplier, chosen configuration, and applicable building standards.

2.1.3 Electrical Collection System and Substation

PV modules convert sunlight into DC electricity. The DC electricity generated from the PV modules in each array block would be collected and delivered through underground or above ground cables to a station near the center of the array where an inverter 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 onsite 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.

The inverter units would have a rated power of up to 3 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 wood poles with post insulators and underground in trenches depending on soil characteristics. The 34.5kV alternating current (AC) collection system would convey electricity from the Inverter Stations to the onsite substation. Pole height would be up to 75 feet above grade and approximately 150-foot spacing between poles and perch deterrents would be installed to prevent perching and predation. Wood poles typically would be directly embedded to 10 percent of the pole height plus two feet. If the collector system is buried in trenches, the cabling and fiber optic lines would be buried as deep as 4 feet in trenches as wide as 10 feet depending on the number of circuits being collected.

The onsite Project substation would fully contain several components including 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 approximately 17 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 as shown on **Figure 1-2**.

2.1.4 Site Security and Fencing

The Project site would be enclosed within a chain link fence, potentially with barbed wire, measuring up to eight feet in height (from finished grade). The fence would have controlled access points, lighting, 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 onsite substation.

Temporary desert tortoise exclusion fencing would be installed immediately outside of the chain link perimeter fence during construction. The permanent perimeter fence would be installed to leave an 8 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.

2.1.5 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), 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. Support equipment (i.e., metering class current transformers and potential transformers) would also be installed to facilitate metering of all applicable energy outputs. In addition, an up to 100-foot tall lattice structure may be erected near the substation/control building to facilitate wireless communications to provide a back-up option for 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 O&M building and would connect to the communications system.

2.1.6 Operations and Maintenance Area

The Project would include an O&M building with associated facilities and on-site parking on approximately 3 acres. The O&M building would be steel framed with metal siding and roof panels up to 20 feet by 80 feet. The O&M building may include offices, repair facility/parts storage, control room, restrooms, potable and non-potable water, and a septic tank and leach field. The design and construction of this building would be consistent with Clark County building standards and approved by the Band and BIA.

Additional components of the O&M area would include a temporary construction laydown and storage area, above-ground water storage tanks, security gate, signage, flagpole, and trash containers. The O&M area would be equipped with exterior lighting as approved by the Band and BIA. The water supply for the O&M area would be provided via the Band's nearby well.

2.1.7 Internal Project Roads

Within the solar field, access ways would be built to provide vehicle access to the solar equipment (PV modules, inverters, transformers) for O&M activities. These access ways would 15 feet wide and located between the array blocks to facilitate access to array blocks and inverters. Hammerhead turnarounds would be constructed at the terminus of interior access roads to facilitate vehicle and equipment

turnarounds. 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 onsite materials.

The vegetation on the portions of the site not covered by roads, O&M facilities, and the site substation would be mowed to a height of 18-inches and drive-and-crush construction methods would be implemented; vegetation would quickly regrow 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 during operations.

2.1.8 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, in compliance with any applicable regulations, measured at the property line after dark.

2.1.9 Water Supply

The Project's construction water requirements would be met from existing water rights owned by the Moapa Band of Paiutes. The Applicant would have access to this water supply through an agreement with the Band.

Up to 200 acre-feet (AF) of water would be required over approximately 18 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 20 acre-feet per year. A small water treatment system may be installed to provide deionized water for panel washing. One or more above-ground water storage tanks may be placed on-site near the O&M building.

2.1.10 Wastewater Treatment

Wastewater generated during construction and operation would include sanitary waste. Portable toilets would be used during construction. A septic tank and drain field system could be used for collection, treatment, and disposal of sanitary waste during operations. If a septic system is not installed, portable toilets would be used during operations.

2.1.11 Waste and Hazardous Materials Management

The primary wastes generated at the Project during construction, operation, and maintenance would be nonhazardous solid and liquid wastes. Limited quantities of hazardous materials would be used and stored on site and 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, empty containers, the typical refuse generated by workers and small office operations, and other miscellaneous solid wastes. The types of wastes and their estimated quantities are discussed in Appendix D in the Draft Environmental Impact Statement (DEIS).

The Applicant has prepared an Emergency Response Plan and Spill Response Plan that address waste and hazardous materials management including BMPs related to storage, spill response, transportation, and handling of materials and wastes. These draft plans are included in Appendices E and F in the DEIS.

Waste management would emphasize the recycling of wastes where possible and would identify the specific landfills that would receive wastes that cannot be recycled.

2.1.12 Fire Protection

The Project’s fire protection water system may be supplied from the water storage tank(s) located near the O&M building 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 electric and one diesel-fueled backup firewater pump would deliver water to the fire protection water-piping network. Fire protection pump flow rates would be in accordance with applicable standards.

The electrical equipment enclosures that house the inverters, transformers, and ESS 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.

2.2 Offsite Project Facilities

2.2.1 230 kV Transmission Line (Gen-Tie)

The Project would require the construction of an approximately 12.5-mile single- or dual-circuit 230kV gen-tie for interconnection to the regional transmission grid system. The proposed gen-tie route would proceed east from the Project substation on tribal land before entering the designated BLM utility corridor for approximately 10.8 miles. While in the utility corridor a new transmission line would parallel the existing transmission lines heading northeast to the point where it would exit the Reservation. When leaving the utility corridor, the gen-tie line would enter BLM-administered lands for approximately 0.3 miles, traverse private lands for approximately 1.3 miles, and then terminate at NVE’s Reid Gardner substation. An approximate 125 to 200-foot wide ROW would be required from the land managing agencies. **Figure 1-2** shows the location of the proposed gen-tie route and the table below provides the Township, Range, and Section(s) that would be crossed by the proposed gen-tie line, by land managing agency.

Reservation (within designated utility corridor)		
Township 16 South	Range 64 East	Sections 12, 13, and 14
Township 16 South	Range 65 East	Sections 5, 6, and 7
Township 15 South	Range 65 East	Sections 12, 13, 14, 22, 23, 27, 28, 32, and 33
BLM		
Township 16 South	Range 66 East	Section 7
Private		
Township 16 South	Range 66 East	Sections 5 and 6

Information based on the Mount Diablo Base Meridian

The Applicant would construct the gen-tie from the Project substation, through the designated utility corridor to a Point of Change of Ownership (POCO) pole structure located on BLM-administered land.

From the POCO pole structure, the remaining portion of the gen-tie would be constructed by NV Energy to the Reid Gardner Substation.

The portion of the overhead 230kV line on federally-administered lands would be installed on approximately 73 support 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 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 to link the project substation to the Reid Gardner Substation. **Figure 2-4** shows the dimensions of the typical transmission structure. Most of the structures would be accessed via new spur roads constructed from existing utility access roads. Where the line does not parallel existing lines, a new road would be developed within the ROW to facilitate access to the gen-tie transmission structures. The proposed ROW would be 125 to 200 feet wide.

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, 2012).

2.2.2 Project Access Road

Main access to the ESMSP site for construction and through operations and decommissioning would be provided via existing roads. Access to this area of the Reservation 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 include the road built to provide access to the nearby existing K-Road Solar Facility and the road providing access to the existing tribal aggregate operation and water wells that would be adjacent to the ESMSP. No upgrades to these existing roads are anticipated to be necessary to provide the access needed for this Project, other than maintenance during construction and operations, as required. **Figure 1-2** shows the location of the existing road that would be used.

Additionally, one existing road used by the Band to access a potential cement mining operation currently crosses the lease area and therefore would be rerouted outside of the proposed solar facility lease boundary.

2.3 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 18 months and would include mobilization, grading and site preparation, installation of drainage and erosion control measures, PV panel/tracker assembly, solar field and gen-tie component construction. The Applicant expects that Project construction would commence in the third quarter of 2020.

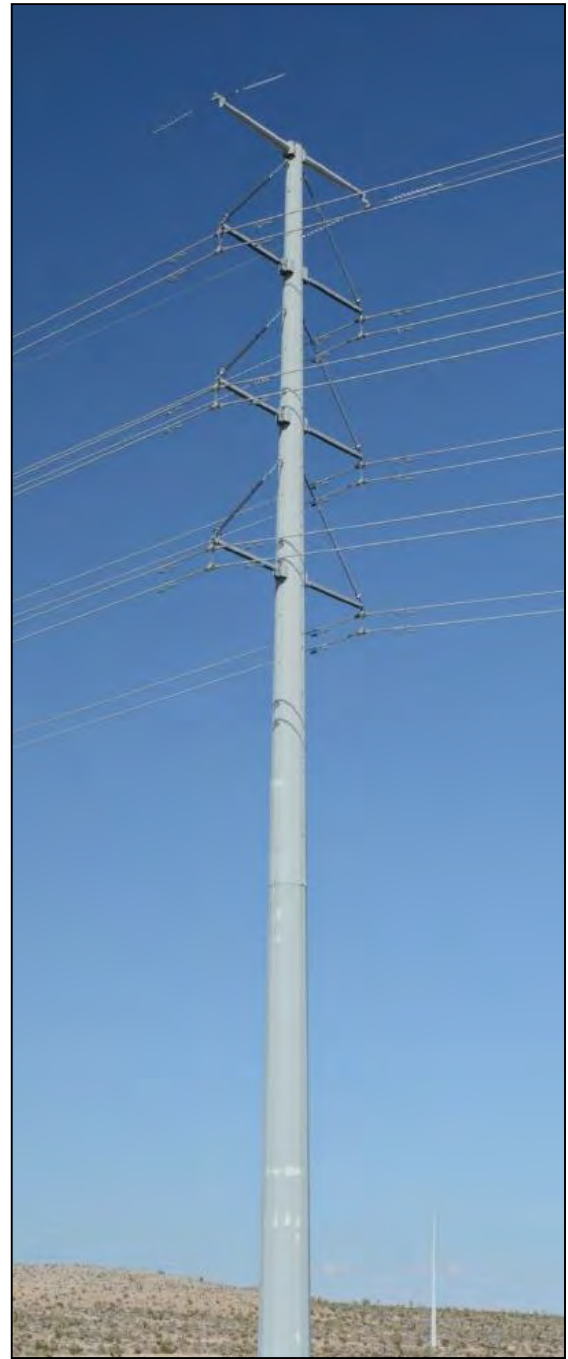
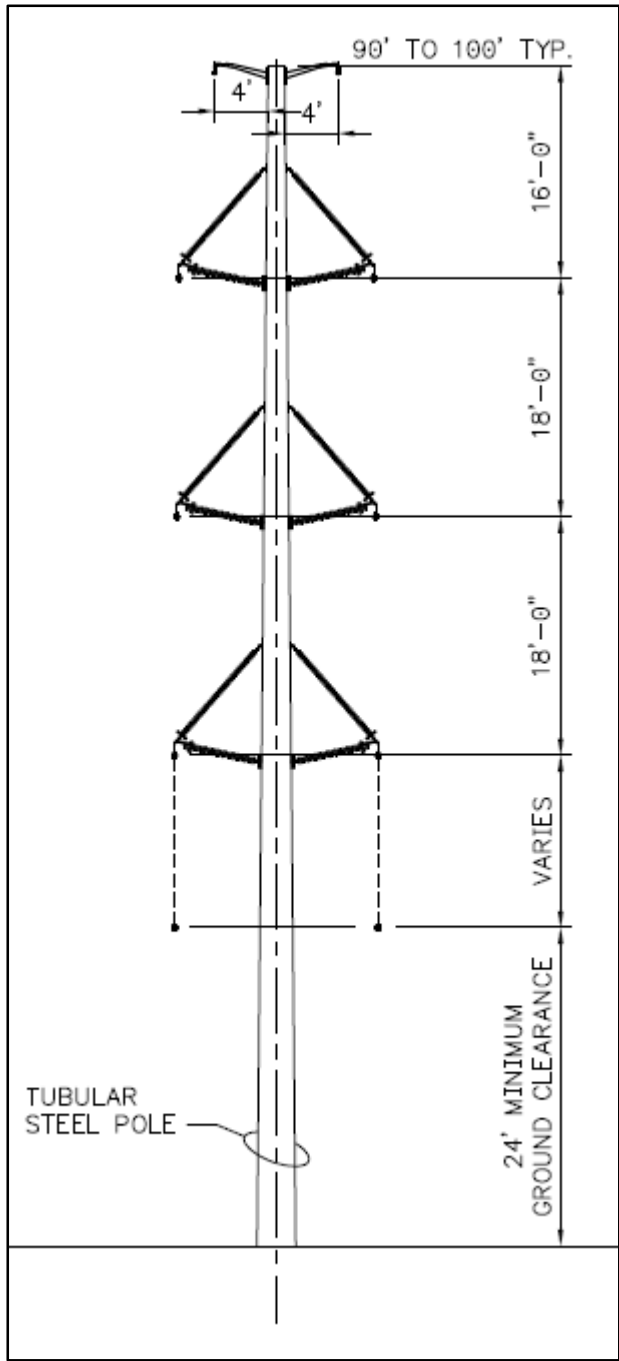


Figure 2-4
 Typical Gen-Tie Transmission Structure

2.3.1 Onsite Project Facilities Construction

The following construction components occur onsite within the solar lease property and solar field boundary.

Site Preparation - Environmental clearance surveys would be performed at the Project site prior to commencement of construction activities. During the environmental clearance phase, the boundaries of the construction area would be delineated and marked. The site then would be prepared for use by selectively removing vegetation and grading which would be minimized to the extent reasonably practicable.

Initially, a construction office and staging area and entrance and exit gates would be established at the Project's main access where the existing roads on the Reservation enter the site.

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 and 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 tortoises from moving onto the site from adjacent areas. Authorized biologists would be retained to survey for and relocate desert tortoises and perform other sensitive species surveys, removal, and mitigation.

Vegetation Removal - Vegetation would be permanently cleared from roadways, access ways, and at inverter equipment, substations, and O&M facilities. 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. Vegetation within the solar arrays would be mowed to a minimum height of 18 inches and construction equipment would be allowed to drive and crush that vegetation during construction to facilitate regrowth during operations.

Site Clearing/Grading/Excavation - The cuts and fills associated with all earthwork required on the site are planned to be balanced on-site. Within the solar field, some grading would be required for roads and access ways between the solar arrays and for electrical equipment pads. The amount of the grading would be limited where the panel support foundations are driven or drilled. A small graded pad could be required 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 building foundations. Aggregate material would be used for parking areas, substation area, and where needed for the access roads. Riprap material could be required for erosion control. This material would be sourced from the Band, as available.

PV Solar Array Assembly and Construction - The construction sequence for the solar field would follow a generally specified order sequenced by arrays. Each array would contain solar panels, an

inverter, and a step-up transformer and construction work within each array would generally proceed as follows:

- Install foundations for inverter units;
- Prepare trenches for underground cable;
- 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;
- Perform electrical terminations; and
- Inspect, test, and commission equipment.

Cable trenches would contain electrical conductors for power generation and fiber optic cables for equipment communication. Trenches would vary between 3 to 10 feet wide and 3 to 4 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.

Installation of electrical equipment and necessary infrastructure to energize the equipment would consist primarily of the following tasks:

- Equipment—Installation of all electrical equipment including inverters, transformers, circuit breakers, switches and switchgear, lighting, communication, control, and SCADA equipment.
- Cables—Installation of all cables necessary to energize the Project equipment. Cables would be routed via cable trays, above-grade conduits, below-grade conduit, and overhead structures.
- Grounding—All equipment and structures would be grounded as necessary.
- Telecommunications—Communication systems including T-1 internet cables, fiber optic, and telephone would be installed during electrical construction.

Standard transmission line construction techniques would be used to construct the 34.5 kV collector lines. Primary stages in construction would be foundation installation, tower installation, and conductor stringing. Wood 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 onsite substation would require a graded site to create a relatively flat surface approximately one percent maximum slope in any direction. The substation interior would be covered with aggregate surfacing for safe operation.

The substation systems could include heating, ventilating, and air conditioning (HVAC) systems; distribution panels; lighting; communication and control equipment; and lightning protection.

The 17-acre substation area would be excavated to a depth of approximately 10 feet and 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 transformer containment area would be lined with an impermeable membrane covered with gravel to capture any expected leaks. A pre-fabricated control house would be installed to house the electronic components required for the substation equipment.

O&M Building Construction - The O&M area would be graded and after the O&M building is constructed, the remaining area would be appropriately surfaced for parking, roads, material storage and the erection of a temporary assembly structure for use during the construction phase of the Project. Following site preparation of the O&M area, construction of the O&M building would commence. Concrete foundations would be poured to support the permanent O&M building and a modular steel building approximately 2,000-3,000 square-foot would be erected. An area adjacent to the building would be developed for parking and an aggregate base may be installed on unpaved areas within the O&M area.

A potable and non-potable water treatment system could be installed in the O&M building. Alternatively, bottled water could be used for potable water. If a potable water system is developed, above ground water tanks could be erected and connected to a service pump to provide water to the building. Active and reserve septic fields could also be established and connected to O&M buildings waste system if portable toilets aren't used during operations. Temporary construction power would be connected to the O&M building.

2.3.2 Offsite Project Facilities Construction

Gen-Tie Line Construction - Construction equipment access would be required at each transmission structure. The Project would use a combination of existing and new access roads and spur roads to get construction equipment to each structure location.

Most of the proposed gen-tie route would be sited to follow existing roads to minimize ground disturbance. Construction of the gen-tie would begin with development of access roads and spur roads where they are needed. New access roads and spur roads would typically be 12 feet wide and bladed and would be compacted to ensure stability if needed. Access roads parallel to the gen-tie alignment and spur roads would not be maintained following construction.

To access the gen-tie service road within the ROW, construction vehicles would use the existing Hidden Valley Road near the Reid Gardner substation on the northern end of the gen-tie route, the existing unnamed gravel road from I-15 Exit 80, and the proposed Project access road via North Las Vegas Boulevard for the southern end of the gen-tie route.

Where the gen-tie would parallel existing lines, the road associated with the existing line would be used and upgraded as needed and short spur roads developed to access structure locations. Spur roads could cross drainages at grade where needed.

Structure Sites - A 125-foot by 50-foot (6,250 square-foot) area would be needed around each of the approximately 73 structure sites on federally-administered land 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). The primary equipment used in setting foundations would be concrete trucks, auger rigs, pickup trucks, crane and front-end loaders. Excavated spoil material would be spread around the temporary work areas.

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. 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 4 to 7 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.

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 the 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 100 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. These areas would not be bladed. 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. 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). A detailed list of this equipment and the anticipated construction personnel is included in the POD for the gen-tie found in **Appendix H** of the DEIS.

2.3.3 Site Stabilization, Protection and Reclamation

During and following construction of both onsite and offsite 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 Band). If needed to control dust during construction, palliatives that are approved by agencies prior to use would be applied to interior access roads after they are constructed at the beginning of the construction period. Depending on the site preparation technique, organic matter could also be worked into the upper soil layers or mulched onsite and redistributed into the fill (except under equipment foundations, trenches and roadways) to aid in dust control.

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 Site Restoration Plan that would outline all measures to be implemented immediately after construction.

2.3.4 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 300 construction workers with a peak not expected to exceed 750 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 5:00 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 am) to avoid work during high ambient temperatures. Further, construction requirements would require some night-time 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 above ground 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.

Appendix I in the DEIS provides a description of the onsite equipment expected to be used for solar panel array and collection system construction, onsite substation construction, and gen-tie line construction. Actual construction equipment details and durations may vary.

2.3.5 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. All construction traffic would use I-15, Highway 93, North Las Vegas Boulevard, and existing improved roads on the Reservation to access the site. The Applicant has prepared a draft Transportation Management Plan to address Project-related traffic (Appendix J in the DEIS).

2.3.6 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 WEAP outlining safety, health and environmental requirements.

2.4 Temporary Construction Facilities (to be removed following construction)

2.4.1 Onsite Temporary Project Construction Facilities

The Project construction contractor would establish 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 itself be developed with solar arrays after it is no longer needed and development of the site progresses. Following construction, equipment would be removed from laydown areas not developed with solar arrays and would be revegetated.

The approximately 35-acre portion of the solar facility immediately east of the main access road (**Figure 1-2**) would be used for development of the project substation (approximately 17 acres), an ESS (approximately 12 acres), and an O&M building and parking area (approximately 6 acres). Although this entire 35-acre 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.

Additional temporary project construction facilities include up to ten temporary water holding tanks and temporary generators to provide power the pumps at two existing wells. These facilities would be installed in pre-disturbed areas adjacent to the existing wells and would be removed following construction.

2.4.2 Offsite Temporary Project Construction Facilities

Temporary construction areas 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.

2.5 Operations and Maintenance

2.5.1 Onsite 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 5 full time-equivalent (FTE) positions. This workforce would include administrative and management personnel, operators, and security and maintenance personnel. Typically, up to three (3) staff would work during the day shift (sunrise to sunset) and the remainder during the night shifts and weekends. Employees would be based at the O&M building.

During the first year of operation, the frequency of inspections would be higher than normal to address any identified post-construction issues. Periodic routine maintenance would include monthly, quarterly, semi-annual and annual inspections and service. Panel washing could be conducted periodically as needed to improve power generation efficiency (likely on foot and by hand). At designated intervals, approximately every 10 to 15 years, major equipment maintenance would be performed.

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 operations and maintenance would be controlled and minimized by applying water. Palliatives would only be applied at the beginning of construction, if necessary, and only on roads in areas where desert tortoise have been excluded.

Safety precautions and emergency systems would be implemented as part of the design and construction of ESMSP to ensure safe and reliable operation. Administrative controls would include classroom and hands-on training in operating and maintenance procedures, general safety items, and a planned maintenance program. These would work with the system design and monitoring features to enhance safety and reliability. The Project would also have an Emergency Response Plan (ERP). The ERP would address potential emergencies including chemical releases, fires, and injuries. All employees would be provided with communication devices, cell phones, or walkie-talkies, to provide aid in the event of an emergency.

The Applicant has prepared a draft Integrated Weed Management Plan for the Project that follows an integrated approach as required by BIA and BLM (Appendix K in the DEIS). Although mechanical control is expected and desirable for the Project, desert tortoise-safe herbicides may also be used to control noxious weeds during the less-active season, if mechanical treatments are not successful. The plan contains a list of desert tortoise-safe herbicides and would be implemented as needed during operations. Pest control may also be required, including control of rodents and insects inside of the buildings and electrical equipment enclosures.

2.5.2 Offsite 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. Gen-tie access roads would not be regularly maintained but could be graded as needed to provide access to transmission structures for maintenance activities.

Other O&M activities could include insulator washing (as needed), periodic air inspections (as needed), repair or replacement of conductor (as needed), replacement of insulators (as needed), and response to emergency situations (outages) to restore power. With the exception of emergency situations and outages, most maintenance work would take place during daylight hours.

2.6 Decommissioning

The anticipated operational life of the ESMSP would be up to 50 years after which, the Project would be decommissioned and existing facilities and equipment would be removed. Decommissioning would involve removal of the solar arrays and other facilities with some buried components (such as cabling) potentially remaining in place. Following decommissioning, the area would be reclaimed and restored according to applicable regulations at the time of decommissioning.

To ensure that the permanent closure of the facility does not have an adverse effect, the Applicant has prepared a draft Decommissioning Plan included as Appendix L in the DEIS. The final Decommissioning Plan would be developed near the time of decommissioning in coordination with the 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 applicable regulatory requirements and resource plans.

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. Work to decommission the transmission line is anticipated to be conducted within the boundaries of existing easements and rights of way.

Following decommissioning, the disturbed areas would be stabilized and would be revegetated. Native species would be used for revegetation, if appropriate, and seeding using BLM and BIA recommended seed mixes. Re-seeding would take place during appropriate months. Seed would be planted using drilling, straw mulching, or hydromulching, as appropriate.

2.7 Management Plans, Minimization Measures, and Compensatory Mitigation

2.7.1 Management Plans

The Applicant would be required to prepare the following management plans, which would be submitted to the Moapa Band of Paiutes, BIA, BLM, and USFWS (as appropriate) for approval:

- Integrated Weed Management Plan
- Raven Control Plan
- Decommissioning Plan
- Site Restoration Plan
- Dust Abatement Plan
- Spill Prevention and Emergency Response Plan
- Health and Safety Program
- Fire Management Plan
- Hazardous Materials and Waste Management Plan
- Stormwater Pollution Prevention Plan
- Site Drainage Plan
- Traffic Management Plan
- WEAP
- Bird and Bat Conservation Strategy

2.7.2 Minimization Measures

The following proposed minimization measures would be implemented as part of the Project proposed by the Applicant to avoid or reduce environmental impacts associated with the proposed action to federally protected species. Minimization will include the general conservation strategies (i.e., BMPs), as well as adhere to the specific desert tortoise minimization measures and comply with the terms and conditions of the USFWS BO issued for this Project.

2.7.3 Construction Minimization Measures

The following measures would be implemented to reduce effects on the desert tortoise and other terrestrial and avian wildlife species during construction, operation, and maintenance:

1. **Construction area flagging.** Work areas will be flagged prior to beginning construction activities and disturbance confined to the work areas. A biological monitor will escort all survey crews on site prior to construction. All survey crew vehicles will remain on existing roads and stay within the flagged areas to the maximum extent practicable. In cases where construction vehicles are required to go off existing roads, a biological monitor (on foot) will precede the vehicles.
2. **Desert tortoise fencing.** Temporary tortoise-proof fencing will be installed around the boundary of the solar facility. If permissible by the Project-issued BO, biological monitors under supervision of an authorized biologist (approved by USFWS) will be present during fence installation to relocate all tortoises in harm's way to outside the work area. Additional clearance surveys and activities will be conducted after completion of the tortoise fence to ensure that no tortoises remain fenced inside the construction boundaries.

Fence specifications will be consistent with those approved by USFWS (USFWS 2009b). Tortoise guards will be placed at all road access points where desert tortoise-proof fencing is interrupted to exclude desert tortoises from the Project footprint. Gates or tortoise exclusion guards will be installed with minimal ground clearance and shall deter ingress by desert tortoises. The temporary tortoise-proof fencing will be removed once the Project is commissioned allowing tortoises to re-occupy the site during operations.

3. **Field Contact Representative.** The BIA and Applicant will designate a Field Contact Representative (FCR) who will be responsible for overseeing compliance of the Terms and Conditions of the BO. The FCR will be onsite during all active construction activities that could result in the “take” of a desert tortoise. The FCR will have the authority to briefly halt activities that are in violation of the desert tortoise protective measures until the situation is remedied.

4. **Authorized desert tortoise biologist.** All authorized desert tortoise biologists (and monitors) are agents of BIA and USFWS and will report directly to BIA, USFWS, BLM, and the Applicant concurrently regarding all compliance issues and take of desert tortoises; this includes all draft and final reports of non-compliance or take. Authorized desert tortoise biologists, monitors, and the FCR will be responsible for ensuring compliance with all conservation measures for the Project as described in the BO. Prior to starting construction, authorized biologist(s) will submit documentation of authorization from the USFWS and approval of NDOW. Potential authorized desert tortoise biologists will submit their statement of qualifications to USFWS.

An authorized desert tortoise biologist will record each observation of a desert tortoise handled in the tortoise monitoring reports. This information will be provided directly to BIA, USFWS, and BLM.

5. **Biological monitoring.** Under supervision of an authorized biologist, biological monitors will be present at all active construction locations (not including the solar field after it has been fenced with desert tortoise fencing and clearance surveys have been completed). Desert tortoise monitors will provide oversight to ensure proper implementation of protective measures; record and report desert tortoises and tortoise sign observations in accordance with approved protocol; and report incidents of noncompliance in accordance with the BO and other relevant permits. The biological monitor(s) will survey the construction area to ensure that no tortoises are in harm’s way. If a tortoise is observed entering the construction zone, work in the immediate vicinity will cease until the tortoise moves out of the area. Tortoises found above ground during construction activities will be moved offsite by an authorized biologist following the protocols described in the Desert Tortoise Translocation Plan.

6. **Desert tortoise clearance surveys and translocation.** After installation of tortoise fencing around the perimeter of the solar facility and prior to surface-disturbing activities, biological monitors and the authorized desert tortoise biologists who supervise them will conduct a clearance survey to locate and remove all desert tortoises from harm’s way including those areas to be disturbed, using techniques that provide full coverage of construction zones (USFWS 2009b).

No surface-disturbing activities shall begin until two consecutive surveys find no live tortoises. In sectors or zones where a live tortoise is found, surveys will be repeated until the two-pass standard is met.

An authorized biologist will excavate burrows potentially containing desert tortoises located in the area to be disturbed with the goal of locating and removing all desert tortoises and desert tortoise eggs. Typical tortoise burrows have a characteristic shape with a flat bottom and arched top similar to a capital letter ‘D’ with the flat side down. Clearance will include evaluation of caliche caves and dens will also be evaluated, as tortoises are known to shelter there. Caliche is a naturally occurring hardened cemented soil composed of calcium carbonate, gravel, sand, and silt. The practice of excavating every obvious tortoise burrow will not be done as it has shown to be ineffective and inefficient in locating tortoises; instead, all obvious tortoise burrows will be scoped for presence and possible extraction. During clearance surveys, all handling of desert tortoises and their eggs and excavation of burrows shall be conducted solely by an authorized desert tortoise biologist in accordance with the most current USFWS-approved guidance (USFWS 2009b). If any active tortoise

nests are encountered, USFWS must be contacted immediately prior to removal of any tortoises or eggs from those burrows to determine the most appropriate course of action. Unoccupied burrows will remain in place to allow for tortoise use during operations. Outside construction work areas, all potential desert tortoise burrows and pallets within 50 feet of the edge of the construction work area will be flagged. If a desert tortoise occupies a burrow during the less-active season, the tortoise may be temporarily penned or will be translocated following USFWS approval, contingent upon weather conditions and health assessment results. No stakes or flagging will be placed on the berm or in the opening of a desert tortoise burrow. Desert tortoise burrows will not be marked in a manner that facilitates poaching. Avoidance flagging will be designed to be easily distinguished from access route or other flagging, and will be designed in consultation with experienced construction personnel and authorized biologists. This flagging will be removed following construction completion.

An authorized desert tortoise biologist or biological monitor will inspect areas to be backfilled immediately prior to backfilling. Burrows with the potential to be occupied by tortoises within the construction area will be searched for presence. In some cases, a fiber optic scope will be used to determine presence or absence within a deep burrow.

A translocation plan following the 2018 guidance will be approved by the USFWS prior to the start of construction (USFWS 2018). The plan identifies potentially suitable recipient locations, control site options, post-translocation densities, procedures for pre-disturbance clearance surveys and tortoise handling, as well as disease testing and post-translocation monitoring and reporting requirements. Tortoises found within 500 meters of the project boundary (fenceline) will be relocated outside of the nearest fence to a location that contains suitable habitat; tortoises found within the interior of the project site (>500 meters from a boundary fence) will be translocated to somewhere within the 4,770-acre lease area that contains suitable habitat.

BIA and the Applicant will have an authorized biologist relocate tortoises following the USFWS-approved protocol (USFWS 2009b) and according to the approved translocation plan. If the USFWS releases a revised protocol for handling desert tortoises before initiation of Project activities, the revised protocol will be implemented. The relocation/translocation effort will adhere to the following procedures as well as those stipulated in the BO Terms and Conditions:

Tortoises found within the project area will be relocated outside of the ROW to an area of suitable habitat as directed by the USFWS. Translocation will follow installation of exclusionary tortoise fence, as determined in coordination with the agencies. Translocation events will occur to specific locations outlined in the approved project-specific translocation review package (TRP) and disposition plan, based on construction and translocation timing considerations for each tortoise. The project will employ two strategies for translocating tortoises, depending on the initial capture location of each animal.

1. **Short-distance Relocations:** Tortoises found within 500 meters of the solar site fenceline or within the gen-tie construction area would be relocated to areas immediately outside of the project's temporary exclusion fencing or outside of harm's way in the vicinity of the gen-tie ROW. Following the completion of construction, the exclusion fencing would be removed; the permanent site fencing would be permeable to desert tortoises and existing vegetation on the project site is expected to be left relatively intact during construction and operation of the project. Therefore, the short-distance translocation strategy is designed to allow tortoises to freely re-occupy the site following construction.

2. Study Area Translocation: Tortoises found in the interior of the solar site fenceline (>500 meters from the exclusion fence) would be translocated to receiver sites identified within the larger 4,770-acre lease area identified for the project but not proposed for project development.

- An authorized biologist will perform health assessments and draw blood samples for each tortoise to be relocated. Blood testing will determine whether any desert tortoise suffer from upper respiratory tract disease (URTD).
- Tortoises will be temporarily tagged with combination global positioning system (GPS)/radio-transmitter tags so if the results of blood work indicate that a tortoise is infected with URTD, the tortoise can be retrieved and handled as directed by USFWS.
- When determining a release location for an individual tortoise, release site preference will be to find a like-for-like shelter resource. Every attempt will be made to find similar cover sites and habitat to that at the location of each individual on the Project site, otherwise all translocatees shall be released at the most appropriate and available unoccupied shelter sites (e.g., soil burrows, caliche caves, rock caves, etc.). Because of the impermanent nature of soil burrows and cave availability, prior to submitting the final Disposition Plan and determining exact areas of release, potential release sites will be re-investigated for existing burrows and caliche or rock caves that can be used for shelter sites. Known active/inactive tortoise burrows discovered during the surveys would be re-investigated for this purpose. If insufficient shelter sites exist in an area to be used for translocation, the Applicant shall coordinate with the agencies to determine the most appropriate course of action, such as reviewing an alternate release site, modifying/improving existing burrows and partial burrows, or artificially creating burrows per USFWS protocols, prior to translocation. The number of artificial burrows per translocated tortoise will be included in the TRP/Disposition Plan, as feasible, and may include more than one burrow per tortoise to increase translocation success (i.e. tortoises remaining within their release locations). The disposition of relocated tortoises will be evaluated and reported on following the Terms and Conditions of the BO.
- If a tortoise voids its bladder while being handled, it will be given the opportunity to rehydrate before release. Tortoises will be offered fluids by soaking in a shallow bath, or an authorized desert tortoise biologist will administer nasal-oral fluid, or injectable epicoelomic fluids. Any tortoise hydration support beyond offering water or shallow soaking would only be provided by an authorized biologist who has received advanced training in health assessments and been specifically approved by USFWS for these procedures.

7. Integrated Weed Management Plan. Prior to construction, an Integrated Weed Management Plan will be developed that includes measures designed to reduce the propagation and spread of designated noxious weeds, undesirable plants, and invasive plant species, or as determined by the cooperating or reviewing agencies (BIA, BLM, NDOW, etc.). Measures in the plan will include, but are not limited to the following:

- Areas with current weeds will be mapped. Topsoil with the presence of weeds will not be salvaged and reused elsewhere in the Project. The topsoil from such areas will be disposed of properly.
- Inspect heavy equipment for weed seeds before they enter the Project area. Require that such equipment be cleaned first to remove weed seeds before being allowed entry. Clean equipment that has been used in weed infested areas before moving it to another area.

- Any straw or hay wattles are used for erosion control must be certified weed free.
8. **WEAP.** A WEAP will be presented to all personnel onsite during construction. This program will contain information concerning the biology and distribution of the desert tortoise, desert tortoise activity patterns, and its legal status and occurrence in the proposed Project area. The program will also discuss the definition of "take" and its associated penalties, measures designed to minimize the effects of construction activities, the means by which employees limit impacts, and reporting requirements to be implemented when tortoises are encountered. Personnel will be instructed to check under vehicles before moving them as tortoises often seek shelter under parked vehicles. Personnel will also be instructed on the required procedures if a desert tortoise is encountered within the proposed Project area. WEAP training will be mandatory, as such, workers will be required to sign in and wear a sticker on their hardhat to signify that they have received the training and agree to comply.
9. **Access roads.** Construction access will be limited to the Project area and established access roads.
10. **Speed limits and signage.** Until the desert tortoise fence has been constructed, a speed limit of 15 miles per hour will be maintained during the periods of highest tortoise activity (March 1 through November 1) and a limit of 25 mph during periods of lower tortoise activity. This will reduce dust and allow for observation of tortoises in the road. Speed-limit and caution signs will be installed along access roads and service roads. After the tortoise proof fence is installed and the tortoise clearance surveys are complete, speed limits within the fenced and cleared areas will be established by the construction contractor and based on surface conditions and safety considerations and remain with limits established by USFWS in the BO.
11. **Trash and litter control.** Trash and food items will be disposed properly in predator proof containers with resealing lids. Trash will be emptied and removed from the Project site on a periodic basis as they become full. Trash removal reduces the attractiveness of the area to opportunistic predators such as ravens, coyotes, and foxes.
12. **Raptor control.** The applicant will inspect structures annually for nesting ravens and other predatory birds and report observations of nests to the USFWS and BIA. Transmission line support structures and other facility structures will be designed to discourage their use by raptors for perching or nesting (e.g., by use of anti-perching devices) in accordance with the most current APLIC guidelines (APLIC 2006, 2012). In addition to increasing desert tortoise protection, following these guidelines during transmission line construction will reduce the possibility of avian electrocution and other hazards.
13. **Overnight hazards.** No overnight hazards to desert tortoises (e.g., auger holes, trenches, pits, or other steep-sided depressions) will be left unfenced or uncovered; such hazards will be eliminated each day prior to the work crew and monitoring biologists leaving the site. All excavations will be inspected for trapped desert tortoises at the beginning, middle, and end of the workday, at a minimum, but will also be continuously monitored by a biological monitor or authorized biologist. Should a tortoise become entrapped, the authorized biologist will remove it immediately.
14. **Blasting.** If blasting is required in desert tortoise habitat, detonation will only occur after the area has been surveyed and cleared by an authorized desert tortoise biologist no more than 24 hours prior. A 200-foot radius buffer area around the blasting site will be surveyed and all desert tortoises above ground within this 200-foot buffer of the blasting site will be moved 500 feet from the blasting site, placed in unoccupied burrow, and temporarily penned to prevent tortoises that have been temporarily relocated from returning to the site. Tortoises located outside of the immediate blast zone

and that are within burrows will be left in their burrows. All burrows, regardless of occupied status, will be stuffed with newspapers, flagged, and location recorded using a global positioning system (GPS) unit. Immediately after blasting, newspaper and flagging will be removed. If a burrow or cover site has collapsed that could be occupied, it will be excavated to ensure that no tortoises have been buried and are in danger of suffocation. Tortoises removed from the blast zone will be returned to their burrow if it is intact or placed in a similar unoccupied or constructed burrow.

15. **Penning.** Tortoises may be held *in-* or *ex-situ* (e.g., if temperatures do not allow for translocation, or if tortoises do not pass the health assessment) for a maximum of 12 months. Previously constructed and approved enclosure pens are present adjacent to the Project site and would be used if any quarantine is necessary. Quarantine is not the preferred option for tortoises to be translocated and would only be used as necessary, in coordination with USFWS.

16. **Stormwater Pollution Prevention Plan.** The applicant will oversee the establishment and functionality of sediment control devices as outlined in the stormwater pollution prevention plan.

2.7.4 Operations and Maintenance Minimization Measures

The following minimization measures will be implemented during O&M of the Proposed Action to reduce effects on the desert tortoise and other species:

17. **WEAP Training.** WEAP training will be required for all O&M staff for the duration of the Project. In addition to an overview of minimization measures, the training will include specific BMPs designed to reduce effects to the desert tortoise.

18. **Biological Monitoring.** A biological monitor(s) will be present during ground-disturbing and/or off-road O&M activities outside of the fenced solar facility to ensure that no tortoises are in harm's way. Tortoises found above ground during O&M activities will be avoided or moved by an authorized biologist, if necessary. Pre-maintenance clearance surveys followed by temporary exclusionary fencing also will be required if the maintenance action requires ground or vegetation disturbance. A biological monitor will flag the boundaries of areas where activities would need to be restricted to protect tortoises and their habitat. Restricted areas will be monitored to ensure their protection during construction.

19. **Speed Limits.** Speed limits within the project area, along transmission line routes, and access roads will be restricted to less than 25 mph during O&M. Speed limits in the solar facility will be restricted to 15 mph during O&M.

2.7.5 Decommissioning Minimization Measures

The same minimization measures used for construction will be used for decommissioning and are listed in **Section 2.7.3**.

2.7.6 Compensatory Mitigation

The applicant will pay the following required compensatory mitigation requirement:

20. **Habitat Compensation.** Prior to surface disturbance activities within desert tortoise habitat, the Project proponent will pay a one-time remuneration fee (per acre of proposed disturbance). The remuneration fees will be submitted to the account that USFWS designates in the BO. The

compensation for habitat loss under Section 7 of the Endangered Species Act (ESA) is an annually adjusted rate, currently \$902/acre (subject to change annually on March 1).

21. Habitat Use Study

The Project proponent will work with the University of Nevada, Las Vegas (UNLV), U.S. Geological Survey (USGS), or other agency to design and implement a 2-3-year study to compare on-site and off-site desert vegetation and climate (e.g., annual and perennial plant growth and cover, ambient temperature) to address metrics of habitat change, including how desert tortoises use the vegetation on site for forage and cover. Results from tortoise monitoring as approved in the Project's Desert Tortoise Translocation Plan (in draft) would inform the tortoise use portion of this study.

3.0 ACTION AREA AND EXISTING CONDITIONS

3.1 Action Area

Section 7 (a)(2) of the ESA defines the “Action Area” as the areas to be affected directly or indirectly by the federal action. For this Project, the Action Areas are defined as 1) the area of direct impacts (solar site, access roads, and gen-tie ROW)(2,200 acres plus 277-acre ROW), and 2) the area of indirect impacts, or recipient areas for short- and long-distance tortoise translocations (2,570 acres). The Muddy River downstream of Muddy Spring is also part of the area of indirect impacts because the Project would use groundwater.

The Action Area is located within the Mojave Desert approximately 20 miles north of Las Vegas, Nevada, largely within the Moapa River Indian Reservation. The Mojave Desert is cooler and wetter than the Sonoran Desert to the south and warmer and drier than the high-elevation Great Basin Desert to the north (Brown 1994).

The Mojave Desert occupies portions of southeastern California, southern Nevada, southwestern Utah and northwestern Arizona. The Mojave Desert region, and the area surrounding the Action Area specifically, displays typical basin and range topography.

3.2 Habitat and Vegetation

Mojave creosotebush-white bursage is the dominant vegetation community in the Action Area. This vegetation community is dominant throughout Clark County. It is dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) with other associated species. **Table 3-1** lists all the plant species that were observed during field surveys. Also, Sahara mustard (*Brassica tournefortii*), a plant species designated by the Nevada Department of Agriculture (NDA) as a Category B weed species, is found in small isolated areas. Category B species are defined by NDA as “weeds established in scattered populations in some counties of the state; actively excluded where possible, and actively eradicated from nursery stock dealer premises; control required by the state in areas where populations are not well established or previously unknown to occur.”

Common Name	Scientific Name
Creosote bush	<i>Larrea tridentata</i>
White bursage	<i>Ambrosia dumosa</i>
Desert senna	<i>Senna armata</i>
Desert trumpet	<i>Eriogonum inflatum</i>
Big galleta	<i>Pleuraphis rigida</i>
Devil’s spineflower	<i>Chorizanthe rigida</i>
Desert globemallow	<i>Sphaeralcea ambigua</i>
Catclaw acacia	<i>Acacia greggii</i>
Rough joint fir	<i>Ephedra nevadensis</i>

Table 3-1 Plant Species Observed in the Project Area	
Common Name	Scientific Name
Compact brome	<i>Bromus madritensis</i>
Mediterranean grass	<i>Schismus barbatus</i>
Three awn	<i>Aristida purpurea</i>
Desert marigold	<i>Baileya multiradiata</i>
Wingnut cryptanth	<i>Cryptantha pterocarya</i>
Cleftleaf phacelia	<i>Phacelia crenulata</i>
Red brome	<i>Bromus tectorum</i>
Russian thistle	<i>Salsola tragus</i>
Gilia	<i>Gilia sp.</i>
Buckwheat	<i>Eriogonum sp.</i>
Threadleaf snakeweed	<i>Gutierrezia microcephala</i>
Cottontop cactus	<i>Echinocactus polycephalus</i>
Mojave yucca	<i>Yucca schidigera</i>
Golden Cholla	<i>Cylindropuntia echinocarpa</i>
Common fishhook cactus	<i>Mammillaria tetrancistra</i>
Desert barrel cactus	<i>Ferocactus cylindraceus</i>
Beavertail pricklypear	<i>Opuntia basilaris</i>
Buckhorn cholla	<i>Cylindropuntia acanthocarpa</i>
Pincushion flower	<i>Chaenactis fremontii</i>
Brownplume wirelettuce	<i>Stephanomeria pauciflora</i>
Four o'clock	<i>Mirabilis sp.</i>
Desert indianwheat	<i>Plantago ovata</i>
Desert needlegrass	<i>Achnatherum speciosum</i>
Indian ricegrass	<i>Achnatherum hymenoides</i>
Low woollygrass	<i>Erioneuron pulchella</i>
Four-winged salt brush	<i>Atriplex canescens</i>
Cheesebush	<i>Hymenoclea salsola</i>
Broom snakeweed	<i>Gutierrezia sarothrae</i>
Mormon tea	<i>Ephedra nevadensis</i>

Disturbed areas, both within and adjacent to the Action Area, are associated with multiple dirt roads and less impacted offroad vehicle trails, adjacent railroad and interstate highway (to the east) and adjacent transmission line and natural gas line corridors (to the north and west), substations and nearby residential construction. **Table 3-2** lists the acreages of the various vegetative cover types occurring within the Project area.

Project Component	Vegetation Covertypes	Acreage
Solar Site	Sonoran-Mojave Creosotebush-White Bursage	2,116.3
	North American Warm Desert Riparian Systems	1.8
	Mojave North American Warm Desert Riparian Mesquite Bosque	5.3
	Sonoran-Mojave Mixed Salt Desert Scrub	57.7
	Microphytic Playa Sparse Vegetation	0.6
	Agriculture-Cultivated Crops and Irrigated Agriculture	0.2
Proposed Gen-tie ROW	Sonoran-Mojave Creosotebush-White Bursage	288.4
	North American Warm Desert Riparian Systems	2.6
	Developed	5.1
	North American Warm Desert Badland	0.3
	Microphytic Playa Sparse Vegetation	0.6
	Introduced Riparian Vegetation	1.2
PROJECT AREA TOTAL		2,483.8

3.3 Wildlife

Species observed in the Action Area during the biological surveys included species of birds, mammals, and a variety of reptiles. Commonly observed avian species include: black-throated sparrow (*Amphispiza bilineata*), ash-throated flycatcher (*Myiarchus cinerascens*), black-tailed gnatcatcher (*Polioptila melanura*), loggerhead shrike (*Lanius ludovicianus*), common raven (*Corvus corax*), burrowing owl (*Athene cunicularia*), red tailed-hawk (*Buteo jamaicensis*) and lesser nighthawk (*Chordeiles sp.*) (Newfields 2018a, 2018b). Small mammal residents include kangaroo rats (*Dipodomys spp.*), pack rats (*Neotoma cinerea*) and white-tailed antelope squirrels (*Ammospermophilus leucurus*). Common larger mammals may include coyotes (*Canis latrans*), kit foxes (*Vulpes macrotis*), and black-tailed jackrabbits (*Lepus californicus*). Reptiles include western whiptail lizards (*Aspidoscelis tigris*), side-blotched lizards (*Uta stansburiana*), horned lizard (*Phrynosoma sp.*), desert iguana (*Dipsosaurus dorsalis*), bull snake (*Pituophis catenifer sayi*), coachwhip (*Masticophis flagellum*) and desert tortoise.

3.4 Ground Water Resources

The Proposed Action is in the Colorado River Basin Region of Nevada's Hydrographic Regions. The Colorado River Basin is one of the larger hydrographic regions in Nevada, covering 5,612 square miles

and includes 27 hydrographic areas. The Action Area is located in and around the area called Arrow Canyon Range Cell. The hydrogeology of the Arrow Canyon Range Cell is recognized as unique yet poorly understood in terms of detailed documentation. Seven groundwater management basins are superimposed on the Arrow Canyon Range field. The Arrow Canyon Range Cell is composed of a series of north-south trending structural blocks related to extensional faulting that are almost entirely composed of Paleozoic carbonate rock (K Road FEIS 2012). The Action Area is located within the California Wash hydrographic basin, which is an unconsolidated sand and gravel aquifer.

The basin is a westward-thickening section of Paleozoic carbonate rocks, in part unconformably overlain by generally fine-grained sediments of the Muddy Creek Formation (Longwell et al. 1965). The carbonate-rock terrain that constitutes the Arrow Canyon Range Cell incorporates both recharge areas and one major spring discharged area, and is bounded by generally less permeable basin or bedrock lithologies. The California Wash Basin around the Action Area is around 5,000 feet thick (K Road FEIS 2012). Regional patterns of precipitation combined with terrain elevation results in the highest mountain ranges receiving the majority of precipitation that becomes recharge. The carbonate terrain is efficient in retaining a relatively high percentage of precipitation as recharge.

Groundwater data from several Reservation monitoring and test wells in the vicinity of the Action Area indicate the static water level ranges in depth from 354 to 526 feet below the surface and the wells yielding over 1,000 gallons per minute (gpm; K Road FEIS 2012). Pump and step-drawdown testing of the carbonate aquifer yielded a range of transmissivity of 50,000 to 100,000 ft./day, hydraulic conductivity of 20 ft./day and specific yield (Sy) of 0.03 to 0.008 (BIA 2012).

4.0 DESCRIPTION OF SPECIES

Only one federally listed species under the ESA was documented within or near the Project: the desert tortoise. **Section 4.2** lists details of the survey protocol and the results. Moapa dace are endemic to the Muddy River, located approximately 10 miles north of the Project site, and the proposed gen-tie would span it. The Muddy River and associated springs would be in the area of effects for groundwater pumping associated with the Proposed Action. Other species considered for analysis are described in **Section 4.1**.

No Designated Critical Habitat for any listed plant or animal species occurs within the Action Area, though critical habitat units for the desert tortoise occur approximately 10 miles west of the Action Area on the west side of the Arrow Canyon Range.

4.1 Federally Listed Bird Species

4.1.1 Yellow-billed Cuckoo

On October 3, 2014, the yellow-billed cuckoo (*Coccyzus americanus*) was listed as threatened under the ESA (79 FR 59992; USFWS 2014). The yellow-billed cuckoo has always been rare in Nevada and while there are still small areas of suitable habitat within the state, breeding populations of the species are apparently extirpated from Nevada (Center for Biological Diversity 1998). Yellow-billed cuckoos may still utilize remnant habitats present within the state during migration.

Based on historic accounts, the species was widespread and locally common in California and Arizona, locally common in a few river reaches in New Mexico, locally common in Oregon and Washington, and locally uncommon in scattered drainages of the arid and semiarid portions of western Colorado, western Wyoming, Idaho, Nevada, and Utah. The scattered cottonwoods on the Colorado River tributaries (Virgin, Muddy, and Pahrangat) 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 5 miles northwest of the proposed gen-tie crossing and 10 miles north of the Project site. During 2018 surveys, one probable breeding territory was identified in this area, though there is no suitable habitat for the species along the Muddy River where the proposed gen-tie would cross the River.

4.1.2 Yuma (Ridgway's) Clapper Rail

The Yuma clapper rail (*Rallus longirostris yumanensis*) was listed as an endangered species on March 11, 1967 (32 FR 4001). The Recovery Plan was finalized in 1983 and portions of the Action Plan were initiated over the ensuing years. The Yuma clapper 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 clapper rail in the U.S. includes portions of Arizona, California, and Nevada. The Yuma clapper rail lives in freshwater marshes dominated by cattail (*Typha* sp.) and bulrush (*Scirpus* ssp.) with a mix of riparian tree and shrub species (*Salix exigua*, *S. gooddingii*, *Tamarix* sp., *Tessaria serica*, and *Baccharis* sp.) along the shoreline of the marsh (Eddleman 1989). No habitat for this species occurs within the Action Area. This species is known to occur along the Muddy River within the

Overton Wildlife Management Area over 15 miles downstream of the proposed gen-tie crossing. There is no suitable habitat for the species along the Muddy River where the proposed gen-tie would cross the River

4.1.3 Southwestern Willow Flycatcher

The southwestern willow flycatcher (*Empidonax traillii extimus*) was listed by the USFWS as an endangered species within its entire range on February 27, 1995 (FR 60: 10693-10715). Critical habitat for the species was originally established in 1997 (FR 62: 39129-39147) but subsequently vacated and incidental protection provided along the Virgin River and its 100-year floodplain from the Arizona/Nevada border to Halfway Wash in Nevada (FR 65: 4140-4156).

Critical habitat was again proposed on October 12, 2004 (FR 69: 60706-60736), redefined and re-instituted in 2005 (FR 70: 60886-61009; USFWS 1997), 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 (FR 70: 60886-61 009).

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 a component of nesting habitat that also influences the microclimate and density of the vegetation component. No suitable riparian or microhabitat conditions exist within the Action Area. The closest known breeding habitat for this species is located along the Muddy River, at Warm Springs Ranch, approximately 5 miles northwest of the proposed gen-tie crossing and 10 miles north of the Project site. During 2018 surveys, eight southwestern willow flycatcher territories were identified, including three confirmed pairs with nests, during the early nesting season, and one territory was confirmed during the late season, though there is no suitable habitat for the species along the Muddy River where the proposed gen-tie would cross the River.

4.2 Desert Tortoise

Desert tortoise is 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 1994). Within those six recovery units, DWMA were identified, where populations of tortoises facing similar threats would be managed with the same strategies.

The Action Area is within the Northeastern Mojave Recovery Unit, which encompasses almost 5 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. Characteristically, tortoises in this unit are active in late summer and early autumn in addition to spring, reflecting the fact that this region receives up to about 40 percent of its annual rainfall in summer and supports two distinct annual floras on which tortoises can forage (USFWS 2012). Desert tortoise also feed on cacti, perennial grasses, and herbaceous perennials. Desert tortoises may den together in caliche caves in bajadas, washes, or caves in sandstone rock outcrops (USFWS 2011).

If basic habitat requirements are met, the desert tortoise can survive and reproduce within the varied vegetation communities of the Mojave region (USFWS 1994). These requirements include sufficient suitable plants for forage and cover, suitable substrates for burrow and nest sites, and freedom from disturbance. Throughout most of the Mojave region, the desert tortoise occurs

primarily on flats and bajadas with soils ranging from sand to sandy-gravel characterized by scattered shrubs and abundant inter-shrub space for herbaceous plant growth. Desert tortoises are also found on rocky terrain and slopes.

4.2.1 Distribution and Abundance in the Action Area

Field Surveys

To assess the status of the desert tortoise in the Action Area, field surveys were conducted in September and October 2018. Team members included more than one biologist previously approved by USFWS as an Authorized Biologist on multiple prior projects. To be granted authorized status, USFWS requires that the biologist has thorough knowledge of desert tortoise behavior, natural history, and ecology, and demonstrates substantial field experience and training to successfully:

- Handle desert tortoises
- Excavate burrows to locate desert tortoise or eggs
- Relocate desert tortoises
- Reconstruct desert tortoise burrows
- Unearth and relocate desert tortoise eggs
- Locate, identify, and record all forms of desert tortoise sign; and
- Follow USFWS-approved protocols.

The survey area was located using topographical maps, aerial photographs, and GPS coordinates, and additional coordination with representatives of the Moapa Band of Paiutes. Handheld Garmin 60 GPS units were pre-loaded with the Project area boundaries and were used for orienteering during the surveys. The areas within the study area (4,770 acres) and gen-tie route (300 acres) were surveyed in accordance with current USFWS protocols (USFWS 2010).

The team of biologists surveyed using 10-meter (33-foot) wide parallel pedestrian transects. USFWS refers to this methodology as “100 percent coverage.” According to the USFWS, the objective of the field survey is to determine presence or absence of desert tortoises, estimate the number of tortoises (abundance), and assess the distribution of tortoises within the Action Area (USFWS 2010).

Observations of tortoise sign (live tortoises, carcasses, shell, bones, scutes, scat, burrows, pellets, tracks, egg shell fragments, etc.) were recorded in the field using the Fulcrum application program. Fulcrum is a mobile data collection platform for survey data. Fulcrum uses an online interface to smartphones or tablets for data collection in the field. Data are backed-up automatically to a server or “cloud” as data are collected in the field. At the end of each survey day the data are reviewed for quality control so that survey data sheets can be generated.

Field Survey Results

Data collected within the survey area were analyzed using the USFWS 2010 Protocol equation to determine the estimated number of tortoises within the Action Area. This method uses the number of tortoises observed above ground, the probability that a tortoise is above ground, the probability of detecting a tortoise if above ground, and the size of the area surveyed. The equation is illustrated below.

$$\left(\begin{array}{c} \text{Estimated number of tortoises} \\ \text{within action area} \end{array} \right) = \frac{\left(\begin{array}{c} \text{Number of tortoises} \\ \text{observed above ground} \end{array} \right)}{\left(\begin{array}{c} \text{Probability that} \\ \text{a tortoise is} \\ \text{above ground (P}_a\text{)} \end{array} \right)} \times \frac{\left(\begin{array}{c} \text{Size of action area} \\ \text{Size of area surveyed} \end{array} \right)}{\left(\begin{array}{c} \text{Probability of} \\ \text{detecting a tortoise,} \\ \text{if above ground (P}_d\text{)} \end{array} \right)}$$

Seventy-three live adult tortoises were observed within the Action Areas (44 within the proposed development area, or fenceline, and 29 within the lease area but outside of the fenceline [the area proposed for translocation efforts]). Two were observed along the proposed gen-tie. The estimated number of tortoises in the Action Area was calculated to be 145, with a 95% confidence interval of 76 to 277. The estimated number of tortoises within the solar site was calculated to be 73 (44 adults found during the survey), with a 95% confidence interval of 36 to 145 adult tortoises (**Figure 4-1**). **Table 4-1** summarizes tortoise sign found in the entire 4,770-acre lease area.

Table 4-1 TORTOISE SIGN FOUND IN PROJECT AREA						
	Class 1 (Used today)	Class 2 (Used this week)	Class 3 (Used this season)	Class 4 (Old Requires Excavation)	Class 5 (Old Collapsed)	Total
Burrow	335	451	469	70	25	1,350
Carcass	2	5	5	9	70	91
Pallet	9	35	73	2	2	121
Scat	2	38	22	13	1	76
Other (Eggs, Mating Circle, Etc.)	9					

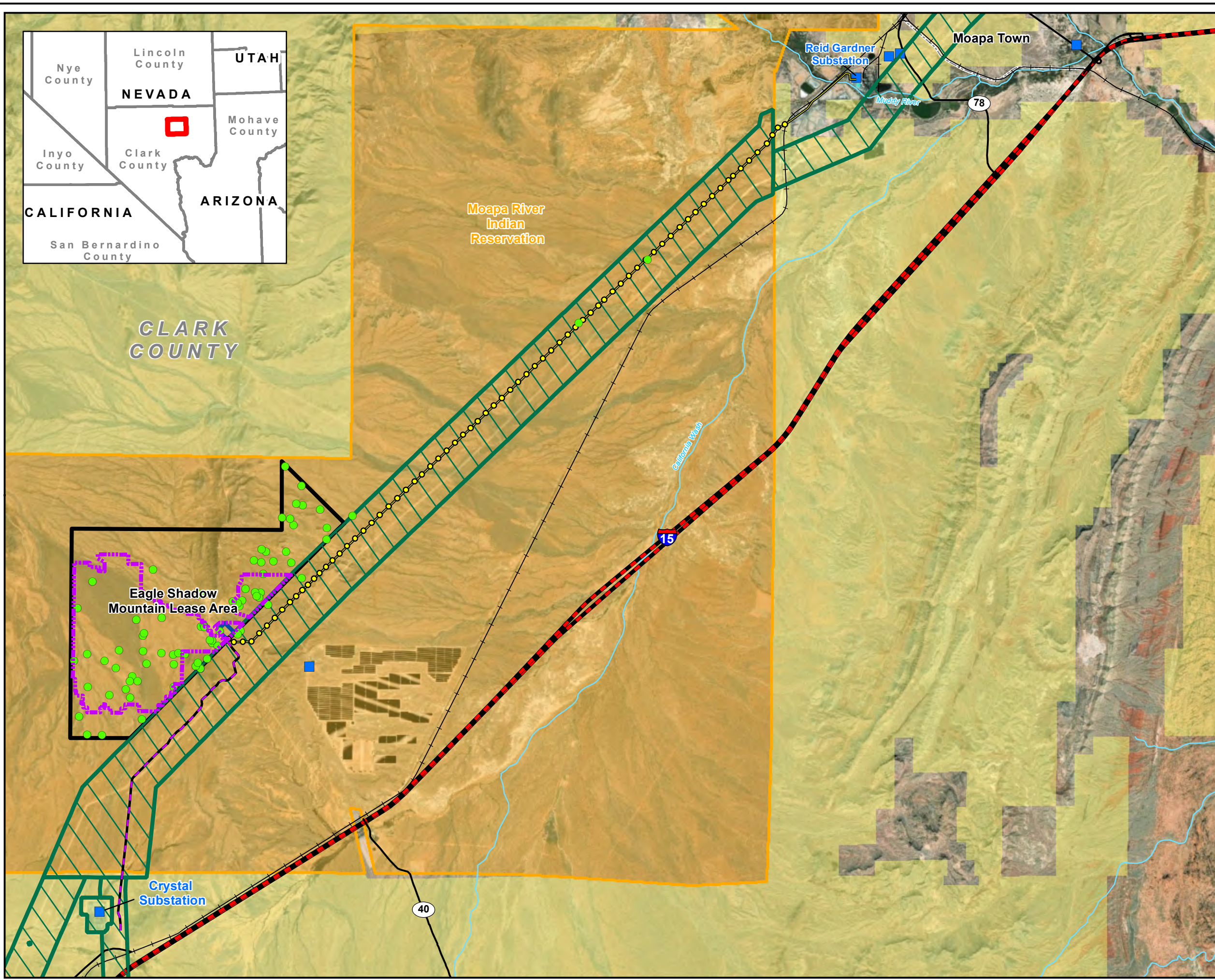
The USFWS model predicts 76 to 277 tortoises in the 4,900-acre Action Area, resulting in a calculated range of about 10 to 36 tortoises per square mile in the Action Area. The USFWS model predicts 36 to 145 tortoises in the 2,200-acre solar site, resulting in a calculated range of about 11 to 43 tortoises per square mile.

These results are generally consistent with USFWS recent findings presented in the Revised Recovery Plan for the Mojave Population of the Desert Tortoise (2011). The NE Mojave Recovery Unit was found to be the only unit that increased in abundance from 2004 through 2014 (Allison and McLuckie 2018).

4.2.2 Factors That May Affect the Desert Tortoise in the Action Area

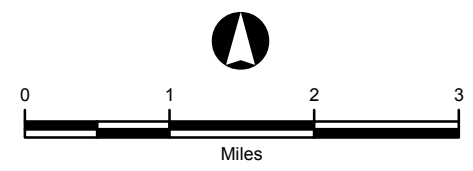
Upper Respiratory Tract Disease

Upper respiratory track disease (URTD) was discovered in 1990 and is currently a major cause of mortality in the western Mojave Desert population. Habitat degradation, poor nutrition, and drought have increased the desert tortoises' susceptibility to this disease (USFWS 1994). It is thought that URTD is transmitted between desert tortoise populations when desert tortoises are captured as pets, then subsequently released.



Legend

- Project Components**
- ESM Gen-Tie – Proposed
 - Solar Facility Access Road
 - Eagle Shadow Mountain Project Area
 - Eagle Shadow Mountain Fence Line
 - Eagle Shadow Mountain Substation
- 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 Land
 - Private Lands
- Desert Tortoise Observations**
- Live Tortoise



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

Eagle Shadow Mountain Solar Project

Figure 4-1 - Desert Tortoise Observations

Map Extent: Clark County, Nevada	
Date: 05-10-19	Author: rnc
G:\ESM\MXD's\Desert Tortoise Observations_050919.mxd	

General Anthropogenic Factors

The factors causing the decline of the desert tortoise are primarily human related. These factors include collection of desert tortoises for pets, food, and commercial trade; collision with vehicles on roads and highways; mortality from gunshots; predation; and off-road vehicle (ORV) travel cross-country or on trails. Predation by the common raven is intense on younger age classes of desert tortoise. Raven populations have shown a 15-fold increase in the Mojave Desert from 1968 to 1988 (Berry 1990). Increased food supplies from road kills, landfills, trash, garbage dumps, agricultural development and new perch and nest sites all contribute to the increased population of ravens. Berry (1990) speculated that raven predation has resulted in such high juvenile desert tortoise loss in some portions of the Mojave that recruitment of juveniles into the adult population has been halted. In the Project area, previous disturbance from OHV travel, weeds and ground disturbance from multiple linear facilities such as pipelines and transmission lines were observed.

Connectivity

Habitat connectivity is important to maintain desert tortoise access to required resources (e.g., water or burrow sites), minimize energetic expenditures to access resources, limit risk of travel-related injury or death by minimizing the need to move through risky or uninhabitable areas, maintain social behaviors and gene flow, and enable movement with a change in environmental conditions, such as climate shift (Webster et al. 2002; Lowe and Allendorf 2010). In a review of numerous definitions of habitat connectivity published in the scientific literature, Kindlmann and Burel (2008) defined habitat connectivity simply as “the ease with which individuals can move about within a landscape.” This definition encompasses both structural (based entirely on landscape configuration independent of the animal) and functional connectivity (including animal responses to landscape features). It is important to note that natural barriers—such as rivers or mountains—often can limit habitat connectivity. In addition to natural barriers, human structures including housing developments, roads, farmland, and fences have increasingly reduced habitat connectivity (Fahrig 2003). This reduced connectivity has resulted from both habitat destruction and fragmentation the division of habitat into smaller, discontinuous units.

Factors in assessing the potential effects of the Project on desert tortoise habitat connectivity include:

- Natural barriers to tortoise movement
- Anthropogenic barriers to tortoise movement
- Habitat fragmentation

Genetic connectivity can be defined as the degree to which gene flow affects evolutionary processes within populations. For gene flow to occur across an area, populations of desert tortoises need to be connected by areas of suitable habitat that support sustainable numbers of reproductive individuals. Natural barriers, such as mountain ranges and rivers, reduce genetic connectivity and are thought to have partly resulted in some broad-scale genetic differentiation among tortoise populations within the Mojave Desert (Averill-Murray et al. 2013). In the Action Area there are currently no natural barriers that would affect genetic connectivity from south to north. Tortoise movement to the east may be limited by Interstate 15 and a railroad, and by the mountains to the west. Genetic connectivity is currently maintained as tortoises can exchange

genetic material with populations in suitable habitat areas north and south of the project area. Given the existing natural and anthropogenic barriers, because most vegetation would be maintained on the Project site, and the perimeter fence would remain permeable to allow tortoises to occupy and move through the solar arrays. Project activities would be unlikely to further reduce genetic connectivity in the area.

Habitat Fragmentation

The Proposed Project is not expected to substantively contribute to habitat fragmentation because it is surrounded by large tracts of undeveloped land that support a healthy tortoise population. Additionally, the preservation of native vegetation on site and a permeable fence would allow tortoises to re-occupy the site after construction.

4.2.3 Desert Tortoise Designated Critical Habitat

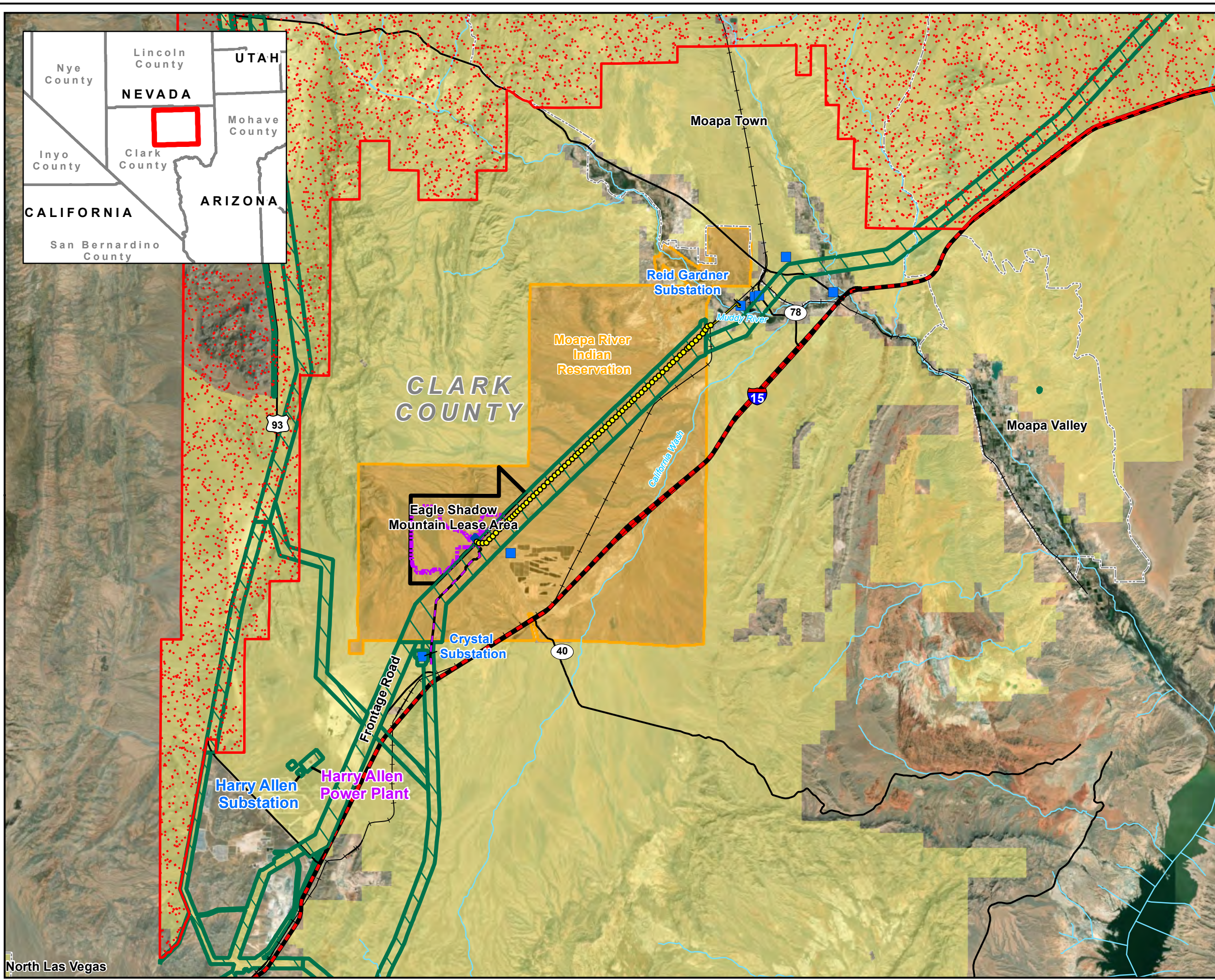
In 1990, USFWS listed the desert tortoise as threatened over 30 percent of its geographic range. In response to this listing, the *Desert Tortoise (Mojave Population) Recovery Plan* was created to aid in the preservation of the species. In this plan, six population units termed “recovery units,” were identified using available data on genetic variability, morphology, ecosystem types, and population behavior.

Within these recovery units, 14 desert wildlife management areas (DWMA) were identified as areas where tortoise populations could be managed for recovery. The guidelines used to delineate the 14 DWMA were used by USFWS to designate federally protected desert tortoise “Critical Habitat” in 1994. Of the original 22,616 to 27,407 square kilometers recommended for protection in the 14 DWMA, 26,087 square kilometers became Designated Critical Habitat (DCH). Primary constituent elements of DCH for the desert tortoise are those physical and biological attributes that are necessary for the long-term survival of the species. These elements were identified as sufficient space to support viable populations within each of the five Recovery Units and to provide for movement, dispersal, and gene flow; sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species; suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites; sufficient vegetation for shelter from temperature extremes and predators; and habitat protected from disturbance and human-caused mortality (USFWS 2011).

The Project area is not located within USFWS desert tortoise DCH (USFWS 2019). **Figure 4-2** depicts the nearest DCH, which is approximately 4 miles to the west of the proposed Project. The Project activities would not have indirect effects on the physical characteristics of designated critical habitat that are required to support the recovery of the species.

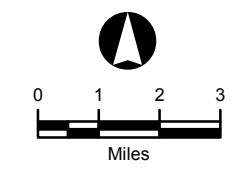
4.3 Moapa Dace

The Moapa dace was listed as an endangered species under the ESA on March 11, 1967 (32 Federal Register [FR] 4001). Since the Moapa dace represents a monotypic genus, this species was assigned a recovery priority of 1 (highest ranking) by the USFWS in 1995. The original recovery plan for this species was prepared in 1983 and subsequently revised in 1995.



Legend

- Project Components**
- ESM Gen-Tie – Proposed
 - Solar Facility Access Road
 - Eagle Shadow Mountain Project Area
 - Eagle Shadow Mountain Fence Line
 - Eagle Shadow Mountain Substation
- 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 Land
 - Private Lands
- Critical Habitat**
- Critical Habitat - Desert Tortoise



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

Eagle Shadow Mountain Solar Project

Figure 4-2 - Desert Tortoise Designated Critical Habitat

Map Extent: Clark County, Nevada

Date:- 05-10-19	Author: rnc
G:\ESM\MXD's\Desert Tortoise Observations_050919.mxd	

North Las Vegas

4.3.1 Distribution and Life History

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 in which encompasses 10 thermal spring provinces that form the Muddy River. Moapa dace likely inhabited 25 springs and approximately 16 kilometers of the upper Muddy River (Ono et al. 1983). Historically, the Muddy River was 48.4 kilometers long; however, in 1935, with the completion of the Hoover Dam, Lake Mead flooded the lower 8 kilometers of the river, rendering it unsuitable for Moapa dace. Previous surveys found adult Moapa dace occurring in low numbers in restricted portions of 3 springs and less than 2 miles of spring outflow and river in the Warm Springs area (USFWS 1983).

The Moapa dace inhabits a variety of habitats throughout its several life stages. As individuals age, they occupy habitats with increasing flow velocities such that larval dace are apparently limited to slackwater portions of the upper reaches of tributaries of the Moapa River, whereas adults can be found in the river's mainstem. The species prefers warmer temperatures (67-89.6°F); thus, cooler temperatures in the middle portion of the Moapa River mainstem may function as a barrier to downstream movements (USFWS 1996).

The species is omnivorous; stomach contents have included beetles, moths, butterflies, true flies, leaf hoppers, true bugs, caddisflies, mayflies, damselflies, dragonflies, worms, scuds, crustaceans, snails, filamentous algae, vascular plants, detritus and sand. The dace primarily forages on drift items but will also forage on the stream or spring substrate. The species 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).

4.3.2 Threats to the Species

Threats to the Moapa dace include habitat loss and alteration, introduction of non-native species, and parasites. Habitat loss and alteration has been ongoing in the Warm Springs areas for the purposes of recreational, industrial and municipal projects. Several headwater springs were completely channelized or diverted for use as swimming pools. Irrigation for agricultural purposes historically had impacts on headwater springs in the Warm Springs area, though agricultural activity in the area has declined.

Moapa dace persist within several warm springs and associated springbrooks that have been altered greatly by humans. Downstream habitats, where adult dace from different spring systems mixed historically, are now infested with exotic predatory fish. In many cases infested habitats are intentionally blocked from upstream areas by fish barriers built to prevent the spread of exotic fish. Specifically, a fish barrier (known as the refuge barrier) and a water diversion exist upstream of the Project's gen-tie crossing. The resulting fragmented population structure threatens the dace's genetic and demographic health, although barriers must be maintained until the threats of exotic fish are eliminated (USFWS 2009a).

The gen-tie crossing is located almost 2 miles (downstream) of the area selected for USFWS snorkel surveys for Moapa dace from 2005-2013, and was not surveyed because the Action Area is not considered suitable dace habitat.

4.3.3 Critical Habitat

There is no designated critical habitat for the Moapa dace.

5.0 EFFECTS OF THE PROPOSED ACTION AND DETERMINATION OF EFFECTS

This section presents the potential direct, indirect, and cumulative effects of the Proposed Action on listed species. Impacts resulting from the implementation of the Proposed Action include:

- Injury or mortality of desert tortoises from construction activities;
- Temporary stress on desert tortoises from handling during relocation efforts;
- Temporary constriction of movement corridors for desert tortoises during construction;
- Disturbance from vibrations during construction that could affect tortoises near the boundary of the construction area;
- Temporary and permanent loss of desert tortoise habitat and burrows;
- Disturbance and displacement of desert tortoises during construction of the associated access roads and proposed gen-tie;
- Potential noise and lighting effects on tortoise behavior and movement;
- Introduction of weeds and invasive species within the construction area during construction and operation;
- Exposure to chemicals (herbicides, palliatives and spills from equipment);
- Potential increased raven and other predator populations resulting from perches provided by the solar structures, transmission lines and towers, and perimeter fencing, and human introduction of trash within or near the Action Area boundary;
- Groundwater use from the same hydrographic basin that supports the Moapa dace (incremental or additive effects), yellow-billed cuckoo, Yuma clapper rail, and southwestern willow flycatcher.

5.1 Federally Listed Bird Species

5.1.1 Yellow-billed Cuckoo

There is no suitable habitat along the Muddy River at the proposed gen-tie crossing and no habitat would be removed or affected by the Proposed Action. Proposed critical habitat occurs approximately 5 miles upstream of the Project area near the Warm Springs Ranch and potential breeding was observed there in 2018. While few yellow-billed cuckoos are known to occur there, they may use the Muddy River for migration to and from breeding habitat and for dispersal, and those individuals may be at risk of colliding with the proposed gen-tie. While groundwater withdrawals may result in insignificant reductions in flow in the Muddy River, the magnitude of effects would be too small to affect yellow-billed cuckoo or cuckoo habitat (e.g., riparian vegetation)(see analysis in Section 5.3).

Determination

Due to the low number of yellow-billed cuckoos that occur near the Action Area and the lack of habitat in the Project area, the potential for direct mortality to this species is low. Potential risk would be insignificant and discountable and potential indirect effects would be negligible. The Proposed Action **may affect, but is not likely adversely affect** the yellow-billed cuckoo. No proposed or designated critical habitat is within the project vicinity along the Muddy River; therefore, the project would have *no effect* to **proposed critical habitat**.

5.1.2 Yuma (Ridgway's) Clapper Rail

There is no suitable habitat along the Muddy River at the proposed gen-tie crossing and no habitat would be removed or affected by the Proposed Action. This species is known to occur along the Muddy River within the Overton Wildlife Management Area over 15 miles downstream of the proposed gen-tie crossing. Critical habitat has not been designated for this species. While the nearest suitable habitat is over 15 miles from the Project area, rails may use the Muddy River as a migration corridor, and those individuals may be at risk of colliding with the proposed gen-tie. While groundwater withdrawals may result in insignificant reductions in flow in the Muddy River, the magnitude of effects would be too small to affect Yuma clapper rail habitat (e.g., hydrophytic vegetation)(see analysis in Section 5.3).

There have been two isolated incidents involving Yuma clapper rail near solar projects. One mortality was discovered near the solar field at a PV solar project in Riverside County, California. Field data collected in connection with that incident failed to provide evidence of any direct impact or collision with a PV module. Another Yuma clapper rail mortality was discovered at a PV solar project in Imperial County, California. There was no evidence of a collision with a PV module.

In response to these incidents, USFWS addressed the potential for solar projects to result in injury or mortality to Yuma clapper rail in an incidental take statement for a project in Imperial County, California. The USFWS recognized that interactions between Yuma clapper rail and PV facilities are improbable when such projects are distant from this species' habitat. The USFWS concurred with the BLM's finding that the project, located near the Colorado River in Riverside County, California, was "not likely to adversely affect" Yuma clapper rail. Similar to the ESM Project, that project area did not include aquatic habitat for Yuma clapper rail, was not located in a flight path that would connect aquatic features.

Determination

Due to the low number of Yuma clapper rail mortalities at PV solar facilities and the lack of habitat in the Action Area, the potential for direct mortality to this species is low. Potential risk would be insignificant and discountable and potential indirect effects would be negligible. The Proposed Action **may affect, but is not likely adversely affect** the Yuma clapper rail.

5.1.3 Southwestern Willow Flycatcher

There is no suitable habitat along the Muddy River at the proposed gen-tie crossing and no habitat would be removed or affected by the Proposed Action. There is no designated critical habitat in the Action Area. Suitable habitat occurs approximately 5 miles upstream of the Project area near the Warm Springs Ranch and potential breeding was observed there in 2018. While few southwestern willow flycatchers are known to occur there, they may use the Muddy River for migration to and from breeding habitat and for dispersal, and those individuals may be at risk of colliding with the proposed gen-tie.

While groundwater withdrawals may result in insignificant reductions in flow in the Muddy River, the magnitude of effects would be too small to affect southwestern willow flycatcher or its habitat (e.g., riparian vegetation)(see analysis in Section 5.3).

Determination

Due to the low number of southwestern willow flycatchers that occur near the Action Area and the lack of habitat in the Project area, the potential for direct mortality to this species is low. Potential risk would be insignificant and discountable and potential indirect effects would be negligible. The Proposed Action **may affect, but is not likely adversely affect** the southwestern willow flycatcher. No proposed or designated critical habitat is within the Action Area along the Muddy River; therefore, the project would have *no effect* to **designated critical habitat**.

5.2 Desert Tortoise

5.2.1 Injury and Mortality

A federal take of a species listed pursuant to the federal ESA is defined as “Take – to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct” (50 CFR 17.3). An estimated 73 adult desert tortoises (95% CI = 36 – 145; plus approximately 2 tortoises associated with the gen-tie corridor) occur within the Action Area (based on 2018 USFWS protocol calculations). Therefore, construction of the Proposed Action may result in impacts to up to 73 (95% CI = 36 to 145) adult desert tortoises through harassment, direct mortality, and impacts on desert tortoise habitat. Two desert tortoises were observed within the gen-tie survey area. No take estimates were generated along this linear feature.

Beside the initial construction, the use of the site access road as well as O&M activities inside and outside the solar site could represent a source of ongoing mortality. Biological monitors would accompany all activities along the access road and gen-tie during construction. As such, direct take of desert tortoises resulting from these activities is expected to be very low.

5.2.2 Relocation, Translocating and Handling

Temporary desert tortoise exclusion fencing would be installed prior to construction and desert tortoises would be relocated via clearance surveys before the construction phase of the project. Relocation of desert tortoises can potentially represent take via harassment and/or mortality, as there is a possibility for tortoises to be killed or injured as a result of this process. Desert tortoises would be relocated to Tribal lands within the Action Area as described in the Project’s translocation plan. It is expected that all tortoises would be captured and safely released outside the exclusion fence adjacent to the Project site. Tortoises encountered along the gen-tie would be relocated out of harm’s way in the immediate vicinity of where they were found.

5.2.3 Loss of Occupied Habitat

The Proposed Action includes the installation of temporary desert tortoise exclusion fencing around the solar facility, utilizing gates and cattle guards (with ramps) at ingress/egress locations. The permanent perimeter fence would be constructed inside of the exclusion fencing. Exclusion fencing would be removed after construction, allowing tortoises to move onto and through the site during operations.

Vegetation would be cleared along access roads, at the Project substation and O&M building, at inverters, and along cable trenches. However, most native vegetation within the solar arrays would be left in place during construction. Equipment would drive and crush vegetation, preserving the integrity of root balls and allowing it to regrow after construction. Tall shrubs would be trimmed to allow for installation of panels. Native vegetation would remain in the solar arrays during operations and would provide suitable habitat for tortoises during operations.

A total of approximately 107 acres of occupied desert tortoise habitat would be permanently disturbed and up to approximately 2,108 acres would be temporarily disturbed as a result of project implementation (**Table 2-2**).

Construction equipment would not operate beyond the fenced boundary with the exception of the access road and the gen-tie ROWs. Roads that are not designated as open by the Applicant and Tribe are not to be used by project personnel unless accompanied by a biological monitor.

5.2.4 Constriction of Movement

The Proposed Action is currently located in an area where desert tortoise movement is generally unrestricted. Topography in the area is gently sloping to rolling with no major barriers to movement. Disturbance resulting from the construction of the gen-tie line may affect tortoise movement via avoidance during construction, but generally would not restrict tortoise movement. The railroad and Interstate 15 to the east and the Arrow Canyon Range likely represent barriers to movement out of the Dry Lake Valley to the east or west. North and/or south movement within the valley is generally unrestricted.

Temporary exclusionary fencing would be installed around the perimeter of the site in order to exclude tortoises during construction. The exclusionary fencing would restrict desert tortoise movement on the site during construction, but would not preclude north-south movement through the Dry Lake Valley. During operations, tortoises would be allowed to move freely through the site. No permanent exclusionary fencing would be used on the access road or gen-tie line. These areas would experience temporary disturbance that could affect tortoise movement but would not directly restrict it.

Biological monitors would be in place along the access road during construction to minimize any impacts from vehicles. Once exclusion fencing has been installed and clearance surveys are completed, biological monitors would not be required.

5.2.5 Vibration and Noise

Equipment that would cause surface disturbance and otherwise operate during construction would be limited to what would be needed to grade dirt access roads, equipment to install solar arrays, trenching equipment for installation of cable and wiring and equipment to install the small operations building and the proposed electric substation. Areas outside of the exclusion fence may experience short-term vibrations and increased noise that could potentially disturb desert tortoises. Vibration is unlikely to be noticeable more than 40 or 50 feet beyond the source; noise would be increased at greater distances though would also be temporary and sporadic. Construction taking place near the perimeter edge of the exclusion fence is limited. Ground-disturbing activities during O&M would be substantially less than during construction of the Proposed Action, such that no adverse effects on desert tortoise from ground vibration or noise are expected to occur during O&M.

5.2.6 Dust

Construction activities and O&M vehicle traffic on the roads within the Action Area could generate dust that could affect vegetation adjacent to the Action Area in the short-term; long-term adverse effects on vegetation are not expected to occur. The buildup of dust on plant leaves could affect photosynthetic productivity and nutrient and water uptake resulting in loss of potential foraging plants for desert tortoises. It is assumed that this low-level dusting effect during construction would be minimal and most likely washed away during rainstorms. Construction BMPs would be in place to monitor and decrease dust pollution if required by use of polymeric stabilizers in the soil or with frequent watering with water trucks or other means.

5.2.7 Lighting

Temporary lighting would be used during construction at dawn and dusk at the construction offices, laydown yard and substation area. There may also be mobile lighting located at entrances during construction. Lighting would likely be used more during the wintertime to ensure safe working conditions for personnel. 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, in compliance with any applicable requirements from the Band, measured at the property line after dark. The Project's lighting system would provide O&M personnel with illumination for both normal and emergency conditions near the main entrance, O&M building and the Project substation. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be downward facing and shielded to focus illumination on the desired areas only. Therefore, light trespass on surrounding properties would be minimal. If lighting at individual solar panels or other equipment is needed for night maintenance, portable lighting would be used. Project lighting is not expected to have a more than negligible effect on desert tortoises near and adjacent to the Proposed Action

5.2.8 Edge Effects

The edge effect is the effect of the juxtaposition or placing side by side of contrasting environments on an ecosystem. This term is commonly used in conjunction with the boundary between natural habitats and disturbed or developed land. The Proposed Action includes placement of a temporary exclusionary perimeter fence during construction. Other than impacted burrows or desert tortoises that need to be relocated during fence construction we assume that there would be no permanent or long-term edge effects as a result of the Proposed Action. The fence may create roosting sites for ravens or birds of prey; these effects would be mitigated through the preparation and implementation of a Raven Control Plan.

5.2.9 Introduction of Weeds and Invasive Species

Introduction of weeds and invasive species would be controlled using an integrated weed management plan and would prevent or minimize the spread/colonization of weeds onsite and off-site. Invasive species could be introduced to the area via transport by construction vehicles and equipment. The ground would be disturbed during construction providing increased opportunity for weed establishment, though much less than if the site were to be graded. The integrated weed management plan (Appendix G of the DEIS) would identify management and operational practice to avoid the introduction or spread of existing invasive species within the Action Area. The goal of this plan would be to minimize potential effects from weeds and invasive species within the Action Area and adjacent

lands, as well as to avoid adverse effects on desert tortoise foraging habitat off-site. Implementation of this plan would result in no adverse effects on desert tortoises from weeds or invasive species within the Action Area or on adjacent lands.

5.2.10 Exposure to Chemicals

The primary wastes generated at the Project during construction, operation, and maintenance would be nonhazardous solid and liquid wastes. Limited quantities of hazardous materials would be used and stored on the solar site. The ESS, if included, could include 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 small office operations, and other miscellaneous solid wastes. The types of wastes and their estimated quantities will be discussed in a hazardous materials plan that will be developed for the Project.

The Applicant has prepared an Emergency Response Plan and a Spill Response Plan that address waste and hazardous materials management including BMPs related to storage, spill response, transportation, and handling of materials and wastes. These draft plans are included in Appendices E and F of the DEIS. Waste management would emphasize the recycling of wastes where possible and would identify the specific landfills that would receive wastes that cannot be recycled.

Mechanical treatment of weeds is the preferred method for the Project; however, herbicides may be used if necessary. Herbicide use would follow those approved in BLM's Programmatic EIS (PEIS) for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Managed Lands in 17 Western States (BLM 2016). The applicant would implement a Site Restoration Plan and an Integrated Weed Management Plan that specifies procedures for managing vegetation and minimizing the spread of non-native and noxious weeds, including integrated pest management and use of herbicides. Standard Operating Procedures (SOPs) would be incorporated into the Integrated Weed Management Plan (Appendix G of the DEIS) and implemented. The herbicides that may be used in mowed areas, based on those allowed on BLM lands, include aminopyralid, clopyralid, imazapyr, imazapic, glyphosate, metasulfuron methyl, and rimsulfuron. Herbicides that are believed to have deleterious effects on reptiles, such as 2,4-D, would not be allowed. Any herbicide use would be used during the less active tortoise season.

Water is the preferred method for reducing dust for the Project; however, palliatives may be used in permanent disturbance areas at the beginning of construction where tortoises have been excluded. Approved palliatives for use in desert tortoise habitat include Road Bond 1000, Soil Cement (for roads and heavy traffic areas), Formulated Soil Binder (FSB) 1000 (for non-traffic areas on finer soils) and Plas-Tex (For non-traffic areas on sandier/rockier soils). Since palliatives would only be used in areas where tortoises have been excluded, they should not come into contact with these substances.

5.2.11 Attraction of Human Subsidized Predators

Avian predators and scavengers such as the common raven (*Corvus corax*) and canids benefit from a myriad of resource subsidies provided by human activities as a result of substantial development within the desert as compared to undeveloped desert landscapes (Boarman et al. 1996). These subsidies can include food (e.g. garbage), water (e.g. detention ponds), nesting substrates (e.g. transmission lines and

fencing), and safety from inclement weather or predators (e.g. buildings). Ravens and other predators may be attracted to elevated structures associated with the Proposed Action such as the perimeter fencing, gen-tie line poles, collector line poles and the O&M building. There is a potential for increased sources of food, trash or water both during construction and operation of the Project, particularly at facilities where people concentrate; however, a Raven Control Plan (RCP)(Appendix K of the DEIS) was developed and would be approved prior to the initiation of construction activities. It addresses trash and litter control. These would reduce or eliminate potential raven (or other avian predators) related impacts to desert tortoises.

5.2.12 Operations and Maintenance

Because the solar site would be enclosed with permeable fencing and most vegetation would be maintained on site during operations, it is likely that tortoises would pass through the solar site and reoccupy it to some extent, though the extent to which tortoise would reoccupy the site is unknown at this time. The presence of desert tortoises on the solar site may result in take (injuries or death). Tortoises may be injured or killed during routine maintenance of facilities inside and outside of the fenced solar site caused by truck traffic along the gen-tie line and/or associated access roads and maintenance vehicles on the solar site. Mitigation measures, such as biological monitors for ground disturbing activities, speed limits, and WEAP, would help to minimize impacts to desert tortoise during these routine maintenance activities (Refer to Section 2.7.4).

Determination

Implementation of the Proposed Action “**may affect, and is likely to adversely affect**” the desert tortoise in the Action Area. This determination is based on the following considerations:

- Construction-related impacts on the desert tortoise could include direct mortality or injury as a result of being crushed by vehicles and disturbance of soil. During pedestrian surveys of the Action Area, desert tortoise sign (e.g., scat, tracks, burrows, shell fragments) as well as live tortoises were observed. In addition to the direct and indirect effects of construction on the tortoise, temporary and permanent disturbance to desert tortoise habitat would occur.
- Capturing, handling, and relocating desert tortoises out of the solar site may result in harassment and possibly injury or death (Blythe et al. 2003). To minimize this effect, tortoises would be handled in accordance with USFWS handling protocols (Minimization Measures 4, 5, and 6).
- O&M activities along the gen-tie, access roads, and within the solar site could include direct mortality or injury as a result of being crushed by vehicles. Desert tortoises are expected to re-inhabit the solar site during operations, the extent of which is unknown at this time. Minimization measures (**Section 2.7.4**) would be implemented to minimize this risk.

5.3 Moapa Dace

The Moapa dace is only known to occur in the Muddy River and several associated headwater springs in the Warm Springs area. Those springs represent the primary water source for the Muddy River to which the Moapa dace is endemic. The Proposed Action would include water withdrawal from the EC-1 well of up to 200 acre-feet (AF) during the 18-month construction period and up to 20 acre-feet per year (afy)

for panel washing and domestic use during the O&M period. Groundwater withdrawals represent the only potential effect to Moapa dace from the Proposed Action.

5.3.1 Water Drawdowns

The entire flow of the Muddy River is derived from the discharge from the regional carbonate aquifer, except during infrequent precipitation events that increase River flows for up to a few days. Consumptive uses include 1) natural evapotranspiration, 2) surface-water diversions, and 3) groundwater diversions.

On July 14, 2005, a Memorandum of Agreement (MOA) was signed by the Southern Nevada Water Authority (SNWA), Meadow Valley Wash Water District (MVWWD), Coyote Springs Investments (CSI), Band and the USFWS regarding the withdrawal of 16,100 afy from the regional carbonate aquifer in Coyote Spring Valley and California Wash Basins that included conservation measures for the Moapa dace. The MOA outlined specific conservation actions that each party would complete in order to minimize potential impacts to the Moapa dace should water levels decline in the Muddy River system as a result of the cumulative withdrawal of 16,100 aft of groundwater from the two basins. On January 20, 2006, the USFWS concluded intra-service consultation and issued a programmatic biological opinion (PBO) entitled the *Intra-Service Programmatic Biological Opinion for the Proposed Muddy River Memorandum of Agreement Regarding the Groundwater Withdrawal of 16,100 Acre-Feet per Year from the Regional Carbonate Aquifer in Coyote Spring Valley and California Wash Basins, and Establish Conservation Measures for the Moapa Dace, Clark County, Nevada* (PBO).

The PBO indicated that the adverse effects associated with the withdrawal of 16,100 afy of groundwater would not result in “jeopardy” for the Moapa dace. Current monitoring data indicate that no instream flow trigger points have been reached.

The Moapa dace would not be directly affected by the construction or O&M of the proposed action. However, groundwater withdrawals associated with the proposed action would indirectly affect the Moapa dace. The effects of these groundwater withdrawals were previously analyzed in the 2006 PBO which evaluated the cumulative effects associated with the withdrawal of up to 16,100 afy from the carbonate aquifer in Coyote Spring Valley and California Wash basins. The Tribe is one of several parties that would withdraw water under this analysis. Up to 2,500 afy of Tribal withdrawals were included for the Tribe out of the total 16,100 analyzed in the 2006 PBO; the 200 AF (construction) and 20 afy (operations) of withdrawals proposed by the Project would be included in the previously permitted 2,500 afy. The K-road Project has already been built and is permitted to use up to 20 afy during operations; the Moapa Solar Energy Center not been built but is permitted to use 100 AF during construction and up to 30 afy during operations; and the Aiya Solar Project has not been built but would use approximately 100 AF during construction. Water would be supplied by a local water utility during operations for Aiya. Total water use from the Muddy River system for all four projects would be up to 300 AF during construction (which would not likely occur at the same time) and up to 70 afy during operations, well under the allotted 2,500 afy for the Tribe. The use of the 200 AF and 20 afy would contribute to ongoing adverse effects to Moapa dace as was analyzed in the 2006 PBO to which this document tiers.

Determination

Groundwater pumping associated with the Proposed Action “**may affect, and is likely to adversely affect**” Moapa dace because the withdrawal of water (200 AF during construction and 20 afy during operations) could contribute to ongoing adverse effects as analyzed in the 2006 PBO.

5.4 Cumulative Effects

Cumulative effects are those effects from future private, state, or Tribal activities that are likely to occur within the Action Area. Future federal actions are excluded as these are subject to Section 7 consultation under the ESA (50 CFR 402.02). The Band has no future projects planned for the area surrounding the Action Area that would not involve the BIA as the lead agency; therefore, the cumulative effects analysis is not warranted. The Arrow Canyon Solar Project (200 MW PV project) and the Southern Bighorn Solar and Storage Center (300 MW and 135 MW storage system) have recently been proposed and would be located on the Reservation. Additionally, the BLM is currently completing NEPA for the Gemini Solar and Battery Storage Project (690 MW and 380 MW storage system) which is located on BLM land southeast of the Reservation.

6.0 REFERENCES

- Allison, L. and A. McLuckie. 2018. Population Trends in Mojave Desert Tortoises (*Gopherus agassizii*). *Herpetological Conservation and Biology*. 13(2): 433-452. Published August 31, 2018.
- Averill-Murray RC, Darst CR, Strout N, Wong M. 2013. Conserving population linkages for the Mojave Desert Tortoise (*Gopherus agassizii*). *Herpetological Conservation and Biology* 8(1):1-15.
- Avian Power Line Interaction Committee (APLIC). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012 [Internet]. Washington, D.C. and Sacramento (CA): Edison Electric Institute, Avian Power Line Interaction Committee, the California Energy Commission.
- APLIC. 2006. Suggested practices for avian protection on power lines: the state of the art in 2006 [Internet]. Washington, D.C. and Sacramento (CA): Edison Electric Institute, Avian Power Line Interaction Committee, the California Energy Commission; [accessed May 1, 2019]. [http://www.aplic.org/uploads/files/2643/SuggestedPractices2006\(LR-2\).pdf](http://www.aplic.org/uploads/files/2643/SuggestedPractices2006(LR-2).pdf).
- Berry KH. 1990 (as amended). The status of the desert tortoise in California in 1989. U.S. Bureau of Land Management, Riverside, California; amended to include data from 1990, 1991, and 1992.
- Bureau of Land Management (BLM). 2017. Programmatic EIS for Vegetation Treatments Using Aminopyralid Fluroxypyr and Rimulfuron on BLM Lands in 17 Western States.
- Bureau of Indian Affairs (BIA). 2016. Final Environmental Impact Statement – Aiya Solar Project. February 2016.
- BIA Western Region Office. Phoenix, AZ. 362 pages.
- BIA. 2012. Final Environmental Impact Statement – K-Road Solar Project.
- BIA Western Region Office. Phoenix, AZ.
- Boarman WI, Sazaki M. 1996. Highway mortality in desert tortoises and small vertebrates: Success of barrier fences and culverts. *Proceedings of Transportation Related Wildlife Mortality Seminar; 1996 Apr 30-May 2; Tallahassee, FL. Tallahassee (FL): Florida Department of Transportation, Environmental Management Office. p. 169-173.*
- Blythe AK, Swann DE, Steidl RJ, and Stitt EW. 2003. Movement patterns of translocated desert tortoises.
- In: Duncan, DK, Stewart, G, Tuegel M, Egan TB, Pond D, editors. *Proceedings of the 2003 Symposium of the Desert Tortoise Council; 2003 Feb 21-23; Las Vegas, NV. Madison (WI): Omnipress. p. 81.*
- Eddleman, WR. 1989. Biology of the Yuma clapper rail in the southwestern U.S. and northwestern Mexico. Final Report to Bureau of Reclamation, Yuma Projects Office and Fish and Wildlife

- Service, Region 2. Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming. 127 p.
- Fahrig L. 2003. Effects of habitat fragmentation on biodiversity. *Annual Review of Ecology and Systematics*. 34:487-515.
- Hogan C. 2014. Habitat fragmentation [Internet]. [accessed 2014 September 19]. <http://www.eoearth.org/view/article/153225>.
- Kindlmann P, Burel F. 2008. Connectivity measures: a review. *Landscape Ecology*. 23:879-890.
- Longwell, C. R., E. H. Pampeyan, B. Bowyer, and R. J. Roberts. 1965. Geology and mineral deposits of Clark County, Nevada. *Nevada Bureau of Mines Bulletin* 62: 1-208.
- Lowe WH, Allendorf FW. 2010. What can genetics tell us about population connectivity? *Molecular Ecology*. 19(15):3038-3051.
- [NDOW] Nevada Department of Wildlife. 2007. Gila monster status, identification and reporting protocol for observations. Las Vegas (NV): NDOW Southern Region.
- Newfields. 2018a. Eagle Shadow Mountain Solar Biological Reconnaissance Report. 8 pages.
- Newfields. 2018b. Preliminary Desert Tortoise Presence/Absence Report for Eagle Shadow Mountain Solar Project. 5 pages.
- Ono RD, Williams JD, Wagner A. 1983. *Vanishing fishes of North America*. Washington, D.C.: Stone Wall Press. 157 p.
- Southern Nevada Water Authority (SNWA 2019). Southwestern Willow Flycatcher and Yellow-billed Cuckoo Surveys at the Warm Springs Natural Area, Clark County, Nevada 2018. January 2019. 18 pages.
- Todd, RL. 1986. Black rail, little black rail, black crane, farallon rail (*Laterallus jamaicensis*). In Sanderson GC, editor. *Management of migratory shore and upland game birds in North America*. Washington, D.C.: International Association of Fish and Wildlife Agencies. p.71-83.
- U.S. Fish and Wildlife Service (USFWS). 1990. Determination of Threatened Status for the Mojave Desert Population of the Desert Tortoise. *Federal Register* 55(63) 12178-12191.
- USFWS. 1983. Moapa dace recovery plan. Portland (OR): USFWS Region 1.
- USFWS. 1994. Determination of Critical Habitat for the Mojave Population of Desert Tortoise. *Federal Register* 59(26) 5820-5866.
- USFWS. 1996. Description and assessment of operations, maintenance, and sensitive species of the Lower Colorado River. Prepared by the U.S. Bureau of Reclamation, Lower Colorado Region for the USFWS and Lower Colorado River Multi-Species Conservation Program.

- USFWS. 1997. Final determination of critical habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*). Federal Register 62(140):39129-39147.
- USFWS. 2009a. Spotlight species action plan: Moapa dace 2010-2014. Sacramento (CA): USFWS Region 8.
- USFWS. 2009b. Desert tortoise (Mojave population) field manual: (*Gopherus agassizii*). Sacramento (CA): USFWS Region 8.
- USFWS. 2010. Preparing for any action that may occur within the range of the Mojave desert tortoise (*Gopherus agassizii*). Ventura (CA): USFWS.
- USFWS. 2011. Revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). Sacramento (CA): USFWS Region 8.
- USFWS. 2012. Status of the species and its critical habitat-Rangewide: February 9, 2012 [Internet].
- USFWS; https://www.fws.gov/nevada/desert_tortoise/documents/misc/status-desert-tortoise.pdf. [accessed May 1, 2019].
- USFWS. 2013. Designation of critical habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*); Final Rule. Federal Register 78(2): 334-534.
- USFWS. 2018. Translocation of Mojave Desert Tortoises from Project Sites: Plan Development Guidelines. U.S. Fish and Wildlife Service, Las Vegas, Nevada. Revised February 2018.
- USFWS. 2019. IPaC – Information, Planning, and Conservation System [Internet]. Washington, D.C.: USFWS, U.S. Geological Survey; [Accessed May 7, 2019]. <http://ecos.fws.gov/ipac/>.
- USFWS. 2014. Western yellow-billed cuckoo. Portland (OR): Oregon Fish and Wildlife Office; [accessed 2014 Nov 14]. <http://www.fws.gov/oregonfwo/Species/Data/YellowBilledCuckoo/>.
- Webster MS, Marra PP, Haig SM, Bensch S, Holmes RT. 2002. Links between worlds: unraveling migratory connectivity. Trends in Ecology and Evolution. 17(2):76-83.

Appendix A.

USFWS Species List



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Southern Nevada Fish And Wildlife Office
4701 N. Torrey Pines Drive
Las Vegas, NV 89130-2301
Phone: (702) 515-5230 Fax: (702) 515-5231

In Reply Refer To:
Consultation Code: 08ENVS00-2019-SLI-0100
Event Code: 08ENVS00-2019-E-00176
Project Name: Eagle Shadow Mountain Solar

May 07, 2019

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
 - Migratory Birds
 - Wetlands
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Southern Nevada Fish And Wildlife Office

4701 N. Torrey Pines Drive

Las Vegas, NV 89130-2301

(702) 515-5230

Project Summary

Consultation Code: 08ENVS00-2019-SLI-0100

Event Code: 08ENVS00-2019-E-00176

Project Name: Eagle Shadow Mountain Solar

Project Type: POWER GENERATION

Project Description: Located 30-miles north of Las Vegas. 2,200 acre solar site with a 12.5 mile transmission line. This IPaC will support BIA's consultation with the USFWS.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/36.58779573393167N114.72443004106725W>



Counties: Clark, NV

Endangered Species Act Species

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Southwestern Willow Flycatcher <i>Empidonax traillii extimus</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6749	Endangered
Yuma Clapper Rail <i>Rallus longirostris yumanensis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3505	Endangered

Reptiles

NAME	STATUS
Desert Tortoise <i>Gopherus agassizii</i> Population: Wherever found, except AZ south and east of Colorado R., and Mexico There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4481	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bendire's Thrasher <i>Toxostoma bendirei</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9435	Breeds Mar 15 to Jul 31
Burrowing Owl <i>Athene cunicularia</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9737	Breeds Mar 15 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

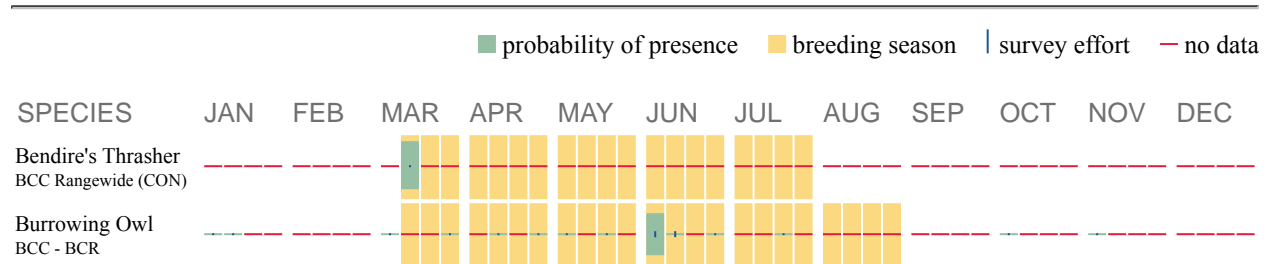
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as

occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC

species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location?”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER POND

- [PUBF](#)

RIVERINE

- [R4SBC](#)
 - [R5UBH](#)
-

Appendix M

Cultural Resources Consultation



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008



IN REPLY REFER TO:
Environmental Quality Services
MS620-EQS

OCT 17 2018

Ms. Rebecca L. Palmer
State Historic Preservation Officer
Nevada State Historic Preservation Office
901 South Stewart Street, Suite 5004
Carson City, Nevada 89701-5248

Dear Ms. Palmer:

This letter and the enclosures constitute initiation of the process prescribed by Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and codified at 36 CFR 800. As Lead Agency Official at 36 CFR 800.2(a)(2), the Bureau of Indian Affairs (BIA) has determined that the proposed project constitutes a federal undertaking: **approval of a lease and rights-of-way for the Eagle Shadow Mountain Solar Project and associated infrastructure, Clark County, Nevada (Project No. 2018-126)**. The undertaking can be characterized as construction of a 300 megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,300 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

Pursuant to 36 CFR 800.3, we wish to initiate the consultation process for the undertaking with the Nevada State Historic Preservation Office (SHPO). We are writing to request your views and consult regarding the following prescribed steps:

Involving the public pursuant to 36 CFR 800.3(e): We plan to continue to involve the public while developing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA). As part of the NEPA review process, we will employ BIA, BLM, and Tribal notification procedures for addressing our responsibilities as defined at 36 CFR 800.2(d).

Identifying other consulting parties pursuant to 36 CFR 800.3(f): Besides your office, the consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians as identified at 36 CFR 800.3(d), 325 MK 8ME, LLC (project proponent), BLM Las Vegas Field Office, and National Park Service (NPS). Pursuant to 36 CFR 800.2(c)(2)(ii), we presently are approaching Tribes in the region that may attach religious and cultural significance to historic properties that may be affected by the undertaking. Pursuant to 36 CFR 800.2(c)(5), we also are approaching the Old Spanish Trail Association.

Determining the Area of Potential Effects (APE) pursuant to 36 CFR 800.4(a)(1): We presently consider the APE to include the parcel of approximately 2,500 contiguous acres for the solar energy center lease and all associated facilities, alternative transmission routes, and associated access roads. We propose the indirect APE for the undertaking to extend from the solar field lease area a radius of five miles or the visual horizon, whichever is closer. The indirect APE for the transmission Gen-Tie line will be one mile from the center line. Please see the enclosed map showing the direct and indirect APEs for the project.

Any additional efforts that may be necessary to identify historic properties in the APE pursuant to 36 CFR 800.4(b): As we follow subsequent steps in the consultation process, we will submit an archeological survey report for your review that covers the proposed lease area, transmission line alignment(s), and any other associated facilities. We anticipate a viewshed analysis will be used to identify areas in the indirect APE from which the undertaking may be visible.

We look forward to your views on these steps and additional efforts we may employ to satisfy our responsibilities as prescribed by the NHPA. If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256 or by email at Garry.Cantley@bia.gov.

Sincerely,



Regional Director

Enclosures

cc: Superintendent, Southern Paiute Agency (w/enc)
Attn: Environmental Coordinator
Chairman, Moapa Business Council (w/enc)
Chairperson, Moapa Cultural Committee (w/enc)
Field Manager, Las Vegas Field Office, BLM (w/enc)
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Region, NPS (w/enc)
Manager, Siting & Permitting, 8minutenergy (w/enc)
Regional Realty Officer, WRO (w/enc)



NEVADA
**STATE HISTORIC
PRESERVATION OFFICE**

Department of Conservation and Natural Resources

**Brian Sandoval, Governor
Bradley Crowell, Director
Rebecca L. Palmer, Administrator, SHPO**

November 20, 2018

Bryan Bowker
Western Regional Office Director
Bureau of Indian Affairs
2600 North Central Avenue
Phoenix, AZ 85004-3008

Re: Lease and Rights-Of-Way for the Eagle Shadow Mountain Solar Project and Associated Infrastructure, Clark County, Nevada (Project No. 2018-126)
Environmental Quality Services MS620-EQS / SHPO Undertaking #2019-5682

Dear Mr. Bowker:

The Nevada State Historic Preservation Office (SHPO) has reviewed the subject documents received in hard copy on October 23, 2018 and via email on November 20, 2018 in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

Project Description

The SHPO understands this undertaking to be the Bureau of Indian Affairs' (BIA) approval of a lease and rights-of-way for the construction of a 300 megawatt solar photovoltaic electrical generation facility with associated infrastructure and access on the Moapa River Indian Reservation.

Area of Potential Effect (APE)

The BIA has determined that the direct effects as a result of this undertaking will be contained within a 2,500-acre area. Furthermore, the BIA has determined that indirect and cumulative effects as a result of this undertaking will be contained within a 5-mile radius of the solar field's direct APE or to the visual horizon, whichever is closer. The indirect APE is defined as a 1-mile radius from the centerline of the transmission line extending from the solar field. Since the BLM did a visual analysis of the Gemini solar field's visibility during their CRINA process, it may be helpful for the public if the BIA also does a viewshed analysis to further refine the indirect APE for this undertaking.

The SHPO **concurs** with the BIA's determination that this APE accounts for all potential direct, indirect, and cumulative effects that may result from this undertaking in keeping with 36 CFR §800.4(a)(1) and 36 CFR §800.16(d).

Identification Effort for Historic Properties

The SHPO notes that the proposed identification effort for archaeological properties within the direct APE is adequate for this undertaking. However, it is unclear what efforts the BIA is taking to identify other historic properties (e.g., architectural or traditional cultural properties) that could be within the indirect APE. If BIA is seeking SHPO review and comment on the proposed identification effort for the indirect APE, please submit additional information to our office.

901 S. Stewart Street, Suite 5004 ✦ Carson City, Nevada 89701 ✦ Phone: 775.684.3448 Fax: 775.684.3442

www.shpo.nv.gov

Native American Consultation

The SHPO notes that consultation with the affected Native American tribes has been identified per 36 CFR §800.2(c)(2)(i)(B). If this consultation results in the identification of properties of religious and/or cultural significance that could be affected by the undertaking, the SHPO looks forward to consulting with the BIA on the National Register eligibility and possible effects of the undertaking per 36 CFR §800.4(c) and 36 CFR §800.4(d). In order to maintain a complete and accurate record of consultation, please forward a brief narrative summary of the results of this consultation to our office so this may be added to the administrative record for this undertaking.

Consulting Parties and Public Consultation

The SHPO notes that consultation with the public and representatives of organizations that have a demonstrated interest in historic properties have been identified for consultation on this undertaking by the BIA in keeping with 36 CFR Part §800.2(c)(5). If this consultation results in the identification of historic properties that could be affected by the undertaking, the SHPO looks forward to consulting with the BIA concerning the National Register eligibility and possible effects of the undertaking. In order to maintain a complete and accurate record of consultation, please forward a brief narrative summary of the results of this consultation to our office so this may be added to the administrative record for this undertaking.

Should you have any questions concerning this correspondence, please contact Jessica Axsom at (775)684-3445 or by email at jaxsom@shpo.nv.gov or SHPO staff architectural historian Kristen Brown at (775) 684-3439 or by email at knbrown@shpo.nv.gov.

Sincerely,



Robin K. Reed
Deputy State Historic Preservation Officer

cc via email: Garry J. Cantley, BIA



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008



IN REPLY REFER TO:
Environmental Quality Services
MS620-EQS

DEC -7 2018

Ms. Rebecca L. Palmer
State Historic Preservation Officer
Nevada State Historic Preservation Office
901 South Stewart Street, Suite 5004
Carson City, Nevada 89701-5248

Dear Ms. Palmer:

The Bureau of Indian Affairs (BIA) is in receipt of your letter dated November 20, 2018, in response to our initiation of the consultation process for the proposed undertaking, **approval of a lease and rights-of-way for the Eagle Shadow Mountain Solar Project and associated infrastructure, Clark County, Nevada (Project No. 2018-126; SHPO Undertaking #3019-5682)**. We are writing to submit additional information in reply to your comment about our proposed efforts to identify historic properties in the indirect area of potential effect (APE).

We plan to conduct a Class I overview of the indirect APE as defined in our previous correspondence. The overview will include a review of historic maps and aerial photographs, including the General Land Office (GLO) Historical Index and Plat Maps, to identify possible cultural resources that have not been recorded and/or previously evaluated for eligibility for the National Register of Historic Places (National Register). If historic resource locations are confirmed via cross-referencing with modern aerials, we will plan to visit the location with the intent of recording and evaluating the site's eligibility. Previously recorded sites within the indirect APE will be addressed with a site revisit and evaluation using the following proposed conditions:

- Unevaluated rock shelters (with cultural material recorded on site form) that are visible from and face toward the project area;
- Unevaluated petroglyphs that are visible from the project area;
- Unevaluated linear sites without architecture, e.g., roads, railroads, etc.;
- Unevaluated structures;
- The resource is potentially eligible under some criteria other than that listed at 36 CFR 60.4(d); those that fall under this criterion will not be visited or evaluated;
- If the site has been previously evaluated, we will tend to accept that evaluation, keeping in mind that the passage of time, changing perceptions of significance, or incomplete evaluation may require us to review each case.

In regard to identifying any traditional cultural properties (TCP), besides the Moapa Band of Paiute Indians, we have approached eight Tribes in the region that may attach religious and cultural significance to historic properties that may be affected by the undertaking. We shall ensure that consultation with any Tribe that advises us of such will continue throughout the life of the project to identify, evaluate, document, and mitigate possible impacts to TCPs.

We look forward to your views on our proposed efforts to identify historic properties in the indirect APE, as well as any additional efforts we may employ to satisfy our responsibilities as prescribed by the National Historic Preservation Act.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256 or by email at Garry.Cantley@bia.gov.

Sincerely,



Regional Director

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Region, NPS
Manager, Siting & Permitting, 8minutenergy
Regional Realty Officer, WRO



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008



IN REPLY REFER TO:

Environmental Quality Services
MS620-EQS

OCT 24 2018

Honorable Timothy L. Nuvangyaoma
Chairman, Hopi Tribal Council
P.O. Box 123
Kykotsmovi, Arizona 86039

Dear Chairman Nuvangyaoma:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Hopi Tribe about the proposed project: **approval of a lease and rights-of-way for the Eagle Shadow Mountain Solar Project and associated infrastructure, Clark County, Nevada (Project No. 2018-126)**. The undertaking can be characterized as construction of a 300 megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,300 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, 325 MK 8ME, LLC (project proponent), BLM Las Vegas Field Office, and the National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE).

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advice on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the Hopi Tribe attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256 or by email at Garry.Cantley@bia.gov.

Sincerely,

Sgd) Bryan L. Bowker

Regional Director

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Superintendent, Hopi Agency
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Region, NPS
Manager, Siting & Permitting, 8minutenergy
Director, Cultural Preservation Office, Hopi Tribe (w/enc)



Timothy L. Nuvangyaoma
CHAIRMAN

Clark W. Tenakhongva
VICE-CHAIRMAN

November 5, 2018

Regional Director
Attention: Gary J. Cantley, Archaeologist
Bureau of Indian Affairs, Western Regional Office
2600 North Central Avenue
Phoenix, Arizona 85004-3008

Re: Eagle Shadow Mountain Solar Project

Dear Regional Director,

Thank you for your correspondence dated October 24, 2018, regarding the Bureau of Indian Affairs wishing to consult on the approval of a lease and rights-of-way for the Eagle Shadow Mountain Solar Project and associated infrastructure in Clark County, Nevada. The Hopi Tribe claims cultural affiliation to earlier identifiable cultural groups in the Southwest, including the Virgin Anasazi cultural group in southern Nevada. The Hopi Cultural Preservation Office supports the identification and avoidance of our ancestral sites, and we consider the prehistoric archaeological sites of our ancestors to be "footprints" and Traditional Cultural Properties. Therefore, we appreciate the Bureau of Indian Affairs' continuing solicitation of our input and your efforts to address our concerns.

The Hopi Cultural Preservation Office requests consultation on any proposal in southern Nevada that has the potential to effect prehistoric Ancestral Pueblo sites. We understand the undertaking is characterized as a 300 megawatt solar photovoltaic electricity generating facility on 2300 acres of the Moapa River Paiute Reservation, and Bureau of Land Management right-of-way for an associated transmission line and access road. We also understand a cultural resources survey will be conducted.

Therefore, to enable us to determine if this proposal may affect cultural resources significant to the Hopi Tribe, we request continuing consultation on this proposal including being provided with a copy of the cultural resources survey report for review and comment. If you have any questions or need additional information, please contact Terry Morgart at the Hopi Cultural Preservation Office at 928-734-3619 or tmorgart@hopi.nsn.us. Thank you again for your consideration.

Respectfully,

Stewart B. Koyiyumptewa, Program Manager
Hopi Cultural Preservation Office

xc: Nevada State Historic Preservation Office





United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008



IN REPLY REFER TO:
Environmental Quality Services
MS620-EQS

OCT 24 2018

Honorable Charles F. Wood
Chairman, Chemehuevi Tribal Council
P.O. Box 1976
Havasu Lake, California 92363

Dear Chairman Wood:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Chemehuevi Indian Tribe (CIT) about the proposed project: **approval of a lease and rights-of-way for the Eagle Shadow Mountain Solar Project and associated infrastructure, Clark County, Nevada (Project No. 2018-126)**. The undertaking can be characterized as construction of a 300 megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,300 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, 325 MK 8ME, LLC (project proponent), BLM Las Vegas Field Office, and the National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE).

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advice on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the Chemehuevi Indian Tribe attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256 or by email at Garry.Cantley@bia.gov.

Sincerely,

Sgd) Bryan L. Bowker

Regional Director

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Superintendent, Colorado River Agency (w/enc)
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Region, NPS
Manager, Siting & Permitting, 8minutenergy
Director of Cultural Resources, CIT (w/enc)



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008



IN REPLY REFER TO:

Environmental Quality Services
MS620-EQS

OCT 24 2018

Honorable Dennis Patch
Chairman, Colorado River Tribal Council
26600 Mohave Road
Parker, Arizona 85344-7737

Dear Chairman Patch:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Colorado River Indian Tribes (CRIT) about the proposed project: **approval of a lease and rights-of-way for the Eagle Shadow Mountain Solar Project and associated infrastructure, Clark County, Nevada (Project No. 2018-126)**. The undertaking can be characterized as construction of a 300 megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,300 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, 325 MK 8ME, LLC (project proponent), BLM Las Vegas Field Office, and the National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE).

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advice on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the CRIT attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256 or by email at Garry.Cantley@bia.gov.

Sincerely,

(Sgd) Bryan L. Bowker

Regional Director

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Superintendent, Colorado River Agency
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Region, NPS
Manager, Siting & Permitting, 8minutenergy
Tribal Historic Preservation Officer, CRIT (w/enc)



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008



IN REPLY REFER TO:

Environmental Quality Services
MS620-EQS

OCT 24 2018

Honorable Timothy Williams
Chairman, Fort Mojave Tribal Council
500 Merriman Avenue
Needles, California 92363

Dear Chairman Williams:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Fort Mojave Indian Tribe (FMIT) about the proposed project: **approval of a lease and rights-of-way for the Eagle Shadow Mountain Solar Project and associated infrastructure, Clark County, Nevada (Project No. 2018-126)**. The undertaking can be characterized as construction of a 300 megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,300 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, 325 MK 8ME, LLC (project proponent), BLM Las Vegas Field Office, and the National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE).

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advice on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the FMIT attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256 or by email at Garry.Cantley@bia.gov.

Sincerely,

(Sgd) Bryan L. Bowker

Regional Director

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Superintendent, Colorado River Agency
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Region, NPS
Manager, Siting & Permitting, 8minutenergy
Director, Aha Makav Cultural Society, FMIT (w/enc)



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008



IN REPLY REFER TO:

Environmental Quality Services
MS620-EQS

OCT 24 2018

Honorable Dr. Damon R. Clarke
Chairman, Hualapai Tribal Council
P.O. Box 179
Peach Springs, Arizona 86434

Dear Chairman Clarke:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Hualapai Indian Tribe about the proposed project: **approval of a lease and rights-of-way for the Eagle Shadow Mountain Solar Project and associated infrastructure, Clark County, Nevada (Project No. 2018-126)**. The undertaking can be characterized as construction of a 300 megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,300 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, 325 MK 8ME, LLC (project proponent), BLM Las Vegas Field Office, and the National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE).

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advice on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the Hualapai Indian Tribe attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256 or by email at Garry.Cantley@bia.gov.

Sincerely,

(Sgd) Bryan L. Bowker

Regional Director

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Superintendent, Truxton Canon Agency
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Region, NPS
Manager, Siting & Permitting, 8minutenergy
Tribal Historic Preservation Officer, Hualapai Indian Tribe (w/enc)



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008



IN REPLY REFER TO:

Environmental Quality Services
MS620-EQS

OCT 24 2018

Honorable Ona Segundo
Chairwoman, Kaibab Paiute Tribal Council
HC 65 Box 2
Fredonia, Arizona 86022

Dear Chairwoman Segundo:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Kaibab Band of Paiute Indians (Kaibab Band) about the proposed project: **approval of a lease and rights-of-way for the Eagle Shadow Mountain Solar Project and associated infrastructure, Clark County, Nevada (Project No. 2018-126)**. The undertaking can be characterized as construction of a 300 megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,300 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, 325 MK 8ME, LLC (project proponent), BLM Las Vegas Field Office, and the National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE).

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advice on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the Kaibab Band attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256 or by email at Garry.Cantley@bia.gov.

Sincerely,

(Sgd) Bryan L. Bowker

Regional Director

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Region, NPS
Manager, Siting & Permitting, 8minutenergy
Cultural Resources Director, Kaibab Band (w/enc)



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008



IN REPLY REFER TO:

Environmental Quality Services
MS620-EQS

OCT 24 2018

Honorable Bennie Tso
Chairman, Las Vegas Paiute Tribe
One Paiute Drive
Las Vegas, Nevada 89106

Dear Chairman Tso:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Las Vegas Paiute Tribe (LVPT) about the proposed project: **approval of a lease and rights-of-way for the Eagle Shadow Mountain Solar Project and associated infrastructure, Clark County, Nevada (Project No. 2018-126)**. The undertaking can be characterized as construction of a 300 megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,300 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, 325 MK 8ME, LLC (project proponent), BLM Las Vegas Field Office, and the National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE).

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advice on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the LVPT attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256 or by email at Garry.Cantley@bia.gov.

Sincerely,

(Sgd) Bryan L. Bowker

Regional Director

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Region, NPS
Manager, Siting & Permitting, 8minutenergy
Manager, Environmental Programs, LVPT (w/enc)



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008



IN REPLY REFER TO:

Environmental Quality Services
MS620-EQS

OCT 24 2018

Honorable Tamra Borchardt-Slayton
Chairwoman, Paiute Indian Tribe of Utah Tribal Council
440 North Paiute Drive
Cedar City, Utah 84720-2613

Dear Chairwoman Borchardt-Slayton:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Paiute Indian Tribe of Utah (PITU) about the proposed project: **approval of a lease and rights-of-way for the Eagle Shadow Mountain Solar Project and associated infrastructure, Clark County, Nevada (Project No. 2018-126)**. The undertaking can be characterized as construction of a 300 megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,300 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, 325 MK 8ME, LLC (project proponent), BLM Las Vegas Field Office, and the National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE).

Following provisions of the NHPA, we are seeking counsel with your office regarding the proposed undertaking to identify any concerns about historic properties; advice on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the PITU attaches religious and cultural significance to any historic properties in the APE.

We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256 or by email at Garry.Cantley@bia.gov.

Sincerely,

(Sgd) Bryan L. Bowker

Regional Director

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Region, NPS
Manager, Siting & Permitting, 8minutenergy
Cultural Resource Director, PITU (w/enc)



United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
WESTERN REGIONAL OFFICE
2600 North Central Avenue
Phoenix, Arizona 85004-3008



IN REPLY REFER TO:
Environmental Quality Services
MS620-EQS

OCT 24 2018

Mr. Dennis Ditmanson
Association Manager
Old Spanish Trail Association
P.O. Box 909
Las Vegas, New Mexico 87701

Dear Mr. Ditmanson:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), the Western Regional Office of the Bureau of Indian Affairs (BIA) wishes to consult with the Old Spanish Trail Association (OSTA) about the proposed project: **approval of a lease and rights-of-way for the Eagle Shadow Mountain Solar Project and associated infrastructure, Clark County, Nevada (Project No. 2018-126)**. The undertaking can be characterized as construction of a 300 megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,300 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking will require right-of-way approval by the Bureau of Land Management (BLM) for an associated transmission line and access road.

The BIA is serving as Lead Federal Agency as described at 36 CFR 800.2(a)(2) for the project. Consulting parties identified to date for this undertaking include the Moapa Band of Paiute Indians, Nevada State Historic Preservation Office, 325 MK 8ME, LLC (project proponent), BLM Las Vegas Field Office, and the National Park Service (NPS). A cultural resource inventory report will be prepared for the proposed area of potential effects (APE). We anticipate a viewshed analysis will be used to identify areas in the indirect area of potential effect from which the undertaking may be visible. We are enclosing a map of the direct and indirect effects areas.

Following provisions of the NHPA, we are seeking counsel with the OSTA regarding the proposed undertaking to identify any concerns about historic properties; advice on our identification efforts and evaluation of historic properties; articulate views on the undertaking's effects; and participate in the resolution of any adverse effects. We specifically are asking to be advised if the OSTA has any concerns about the effects of

the project on the Old Spanish Trail Corridor and any related trail segments. We look forward to your views on this project and other efforts we may employ to satisfy our responsibilities as prescribed by the NHPA.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750 extension 1256 or by email at Garry.Cantley@bia.gov.

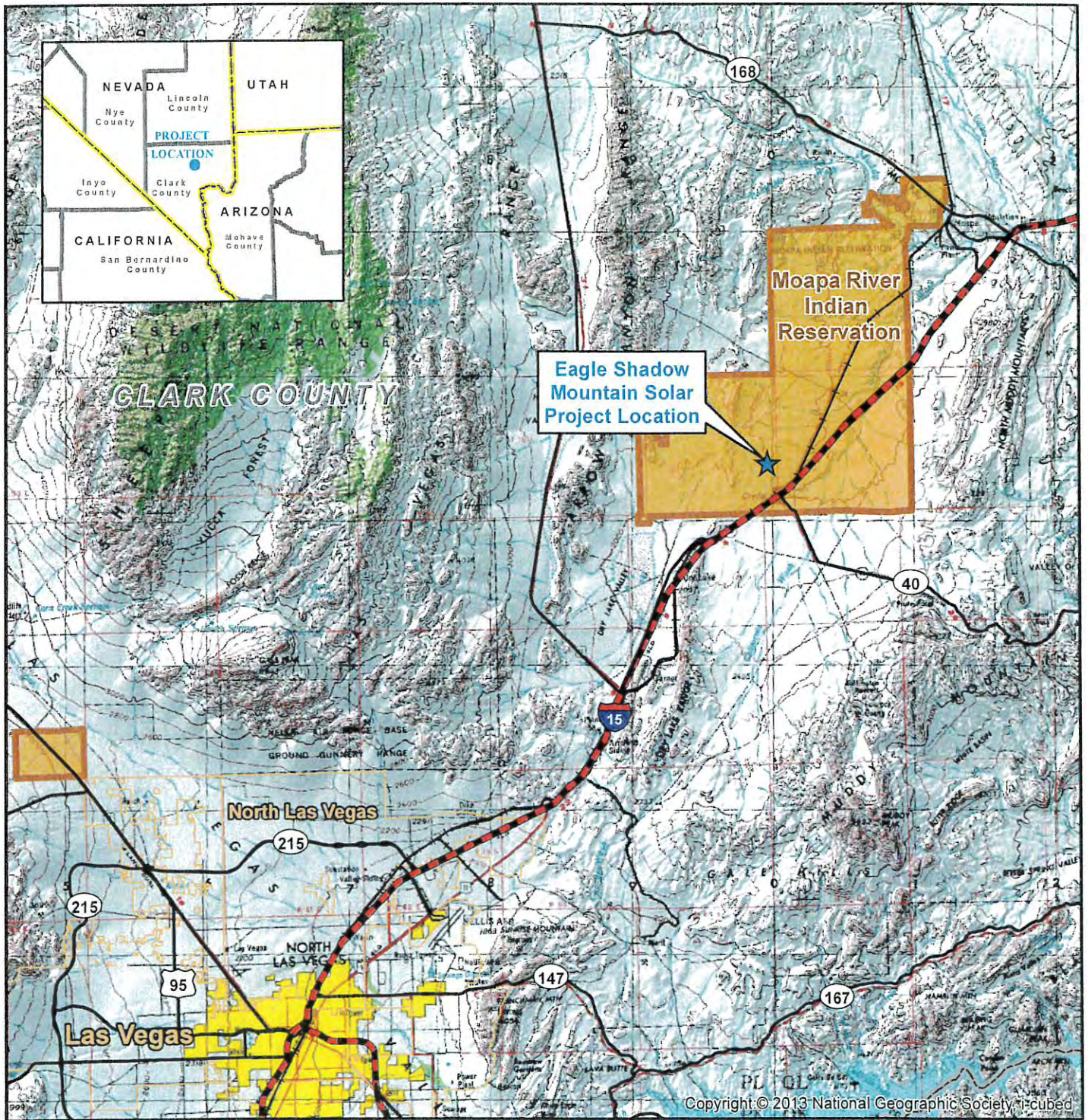
Sincerely,



Regional Director

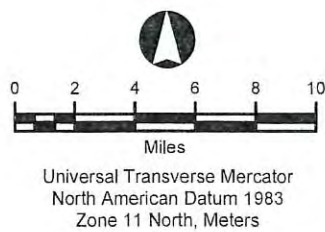
Enclosures

- cc: Superintendent, Southern Paiute Agency
- Attn: Environmental Coordinator
- Chairman, Moapa Business Council
- Chairperson, Moapa Cultural Committee
- Field Manager, Las Vegas Field Office, BLM
- Cultural Resource Specialist, Nat'l Trails System-Intermtn. Region, NPS
- Manager, Siting & Permitting, 8minutenergy
- Nevada Director, Board of Directors, OSTA (w/enc)
- President, Nevada Chapter, OSTA(w/enc)
- President, Board of Directors OSTA(w/enc)



Legend

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



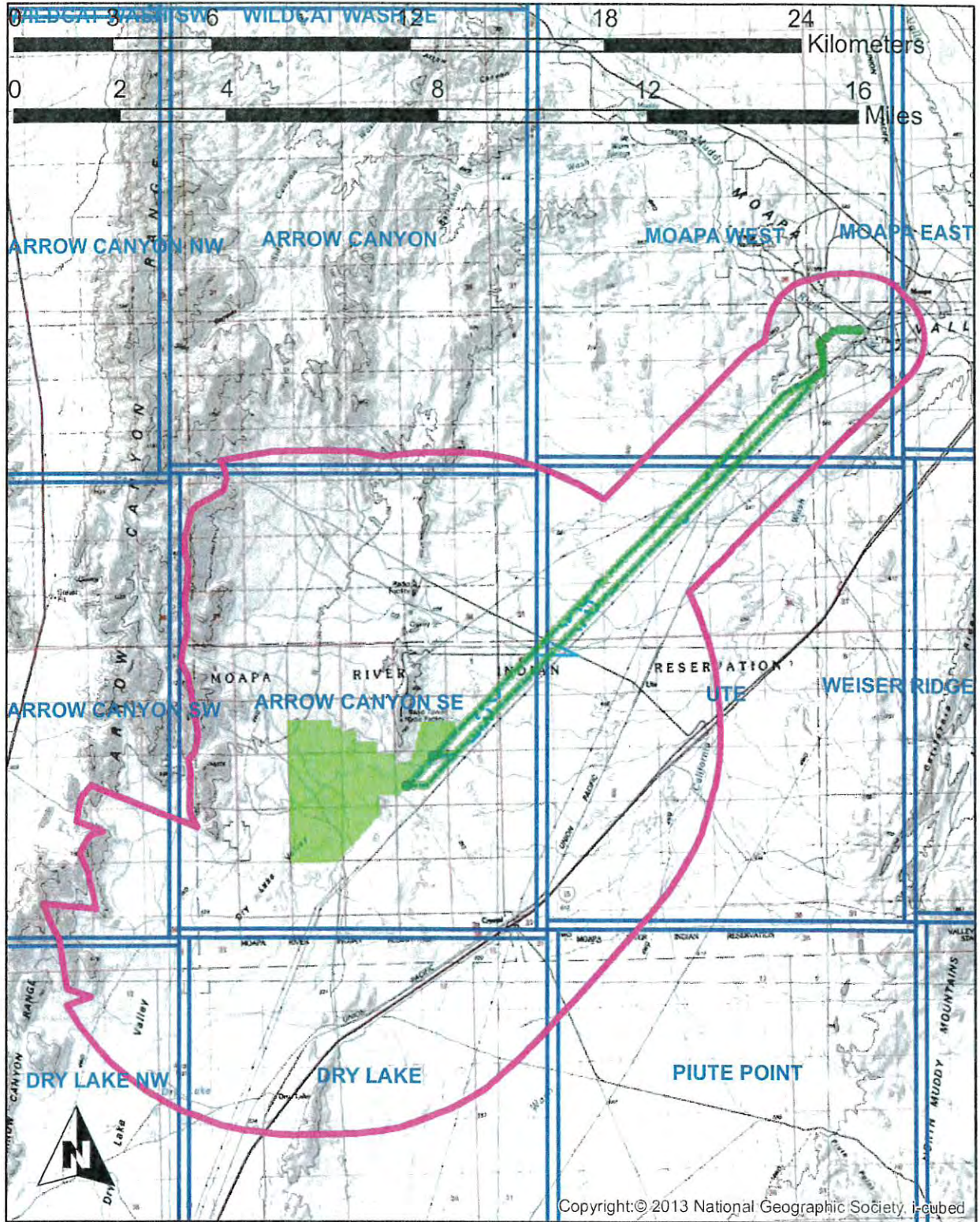
Eagle Shadow Mountain Solar Project

**FIGURE 1-1
PROJECT LOCATION**

Map Extent: Clark County, Nevada

Date: 08-13-18	Author: rnc
----------------	-------------

G:\Eagle Shadow Mountain Solar Project\MXD's\Project Location 8.5x11 081318.mxd



Eagle Shadow Mountain Solar Overview
 Cultural Resource Project Area and Indirect APE
 Preliminary Pole Locations Shown
 200 Foot Wide Gen-Tie Corridor
 September 5, 2018
 Knight & Leavitt Associates, Inc.
 Map by A. J. Thompson

- Solar Field and Gen-Ties Indirect APE
- Eagle Shadow Mtn Solar Field and Gen-Tie
- Access Roads

Appendix N

List of Acronyms

Acronyms Used in the EIS

AC	Alternating Current
ACC	Air-cooled Condenser
ACEC	Areas of Critical Environmental Concern
ac-ft	acre-feet
ADEIS	Administrative Draft Environmental Impact Statement
ADT	Annual Average Daily Traffic
AFY	acre-feet per year
ANL	Argonne National Laboratory
APE	Area of Potential Effect
ASME	American Society of Mechanical Engineers
APP	Avian Protection Plan
BACT	Best Available Control Technology
Band	Moapa Band of Paiute Indians
BBCS	Bird and Bat Conservation Strategy
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
Blvd.	Boulevard
BMPs	Best Management Practices
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 e	CO ₂ Equivalent
CPV	Concentrating Photovoltaic
CSI	Coyote Springs Investment
CSP	Concentrating Solar Power
CT	Census Tract
CWA	Clean Water Act
DAQEM	Department of Air Quality and Environmental Management
DEIS	Draft Environmental Impact Statement
DEMs	Digital Elevation Models
DOT	Department of Transportation
DWMA	Desert Wildlife Management Area
EIS	Environmental Impact Statement

EPA	Environmental Protection Agency
EPC	Engineering, Procurement and Construction
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
ESMSP	Eagle Shadow Mountain Solar Project
ESS	Energy Storage System
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FLPMA	Federal Land Policy Management Act
FTE	Full-time Equivalent
GHG	Greenhouse Gas
GIS	Geographic Information System
gpm	gallons per minute
GPS	Global Positioning System
HA	Hydrographic Area
HMA	Herd Management Area
hp	horsepower
I-15	Interstate 15
IBC	International Building Code
IECC	International Energy Conservation Code
IPCC	Intergovernmental Panel on Climate Change
IPP	Intermountain Power Project
ITA	Indian Trust Assets
IWAC	Invasive Weed Awareness Coalition
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
MVWD	Meadow Valley Water District

MW	megawatt
MWac	megawatts of alternating current
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NAD	North American Datum
NCCAC	Nevada Climate Change Advisory Committee
NDEP	Nevada Department of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NNHP	Nevada Natural Heritage Program
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
OEM	original equipment manufacturer
OHV	off highway vehicle
OSHA	Occupational Safety and Health Administration
Pb	lead
PBO	Programmatic Biological Opinion
PCEs	primary constituent elements
PCS	Plant Control System
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
psi	pound(s) per square inch
PV	photovoltaic
PVC	polyvinyl chloride
RCRA	Resource Conservation Recovery Act
Reservation	Moapa River Indian Reservation
RO	reverse osmosis
ROD	Record of Decision
ROW	right(s)-of-way
RPS	Renewable Portfolio Standard
SCADA	Supervisory Control and Data Acquisition
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
SWIP	Southwest Intertie Project
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
TSDf	Treatment, Storage and Disposal Facility
µm	micrometer
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
URTD	Upper Respiratory Tract Disease
U.S.	United States
USACE	United States Army Corps of Engineers
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
USTs	Underground Storage Tanks

UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WEAP	Worker Environmental Awareness Program
WSA	Wilderness Study Areas
°C	degrees Centigrade
°F	degrees Fahrenheit

Appendix 0

References

References

325MK 8me. 2019. Eagle Shadow Mountain Gen-Tie Project Plan of Development. May 2019. 46 pages.

Argonne National Laboratory (ANL) and National Renewable Energy Laboratory (NREL). 2015. A Review of Avian Monitoring and Mitigation Information at Existing Utility-Scale Solar Facilities. U.S. Department of Energy, SunShot Initiative and Office of Energy Efficiency & Renewable Energy. http://www.evs.anl.gov/downloads/ANL-EVS_15-2.pdf.

Avian Power Line Interaction Committee (APLIC). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC. Washington, D.C.

_____. 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C., and Sacramento, California.

Bureau of Indian Affairs (BIA). 2012. Final Environmental Impact Statement K Road Moapa Solar Facility. March 2012. http://www.blm.gov/nv/st/en/fo/lvfo/blm_programs/energy/k-road_moapa_solar.html.

_____. 2014a. Final Environmental Impact Statement for the Moapa Solar Energy Center. February 2014. <https://www.moapasolarenergycentereis.com/documents.html>.

_____. 2014b. Bureau of Indian Affairs Western Region Integrated Noxious Weed Management Plan and Programmatic Environmental Assessment for Weed Control on Indian Lands. <https://www.bia.gov/sites/bia.gov/files/uploads/bia/idc1-026854.pdf> . Accessed April 2019.

_____. 2016. Final Environmental Impact Statement for the Aiya Solar Project. February 2016. <https://www.aiyasolarprojecteis.com>.

Chu, Miyoko, and Glenn Walsberg. 1999. Phainopepla (*Phainopepla nitens*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online.

Clark County. 2019. Multiple Species Habitat Conservation Plan (MSHCP). <http://www.clarkcountynv.gov/airquality/dcp/Documents/permit%20amend/Covered%20Species.pdf>. Accessed April 2019.

Council on Environmental Quality (CEQ). 1997a. Considering Cumulative Effects Under the National Environmental Policy Act. January 1997.

_____. 1997b. Environmental Justice, Guidance Under the National Environmental Policy Act. December 10, 1997.

_____. 2010. Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions. February 18, 2010.

- _____. 2014. Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts, December 18, 2014.
<https://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance>.
- Eddleman, W. R. 1989. *Biology of the Yuma Clapper Rail in the Southwestern United States and Northwestern Mexico*. Report prepared for the U.S. Bureau of Reclamation. Yuma, Arizona.
- Federal Aviation Administration (FAA). 2019. Airport Forms, Airport Master Record Program.
<https://www.faa.gov/airports/resources/forms/?sect=airportmaster>. Accessed February 2019.
- Federal Emergency Management Agency (FEMA). 2019 and 2002. FEMA Flood Map Service Center.
<https://msc.fema.gov/portal/search?AddressQuery=moapa%20NV#searchresultsanchor>.
Accessed April 2019.
- Hamilton, M. E., and S. R. Kokos. 2011. Clark County Rare Plant Habitat Modeling. Prepared for the Bureau of Land Management Las Vegas Field Office.
<http://www.clarkcountynv.gov/airquality/dcp/Documents/Library/other%20reports/collab/BLM%20CC%20Rare%20Plant%20Habitat%20Modeling%20Report%20Jul2011.pdf>. Accessed April 2019.
- Hamilton, M. E. 2019. *Eriogonum corymbosum* Habitat Model. EPG, Inc.
<https://www.arcgis.com/home/item.html?id=81bfdde6ec84415ab2abf666789e9bba#overview>.
Accessed April 2019.
- Heritage Environmental Consultants (Heritage). 2019. Eagle Shadow Mountain Solar Project Noxious Weed Survey. April 2019. 15 pages.
- Interagency Wild and Scenic Rivers Council. 2019. River Mileage Classifications for Components of the National Wild and Scenic Rivers System. 29 pages. <https://www.rivers.gov/documents/rivers-table.pdf>. Accessed April 2019.
- Invasive Weed Awareness Coalition (IWAC). 2006. Research Aims to Save Desert Tortoise Habitat from Non-native Grasses and Wildfire.
<http://www.wssa.net/Weeds/Invasive/SuccessStories/NV%20Research%20aims%20to%20save%20desert%20tortoise%20habitat%20from%20nonnative%20grasses%20and%20wildfire.pdf>.
- Jennings, J. D. 1978. Prehistory of Utah and the Eastern Great Basin. University of Utah Anthropological Papers No. 98, University of Utah Press, Salt Lake City.
- Jennings, W. B. 1997. Habitat Use and Food Preferences of the Desert Tortoise, *Gopherus agassizii*, in the Western Mojave Desert and Impacts of Off-Road Vehicles. Proceedings: Conservation, Restoration, and Management of Tortoises and turtles; An International Conference, pp. 42–45.
- LaGory et al. 2016. A preliminary assessment of avian mortality at utility-scale solar energy facilities in the United States. <https://www.sciencedirect.com/science/article/pii/S0960148116301422>.
Accessed April 2019.
- Latch E. K., W. I. Boarman, A. Walde, and R. C. Fleischer. 2011. Fine-Scale Analysis Reveals Cryptic Landscape Genetic Structure in Desert Tortoises. PLoS ONE 6(11): e27794.
<https://doi.org/10.1371/journal.pone.0027794>. Accessed April 2019.

- Longcore, T., et al. 2013. "Avian Mortality at Communication Towers in the United States and Canada: Which Species, How Many, and Where?" *Biological Conservation* 158(February):410–419.
- Meaney, C. A., M. Reed-Eckert, and G. P. Beauvais. 2006. Kit Fox (*Vulpes macrotis*): A technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. <http://www.fs.fed.us/r2/projects/scp/assessments/kitfox.pdf>. Accessed March 2019.
- Mifflin, M. D. 1968. *Delineation of Ground-Water Flow Systems in Nevada*. Technical Report Series H-W Hydrology and Water Resources Publication No. 4. Center for Water Resources Research. Desert Research Institute, University of Nevada System, Reno.
- Mifflin and Associates. 2001. Hydrogeologic and Groundwater Modeling Analyses for the Moapa Paiute Energy Center. A Calpine Company Project in Cooperation with the Moapa Band of Paiute Indians. Moapa Indian Reservation, Clark County, Nevada.
- _____. 2013. Hydrogeologic Assessment and Groundwater Modeling Analyses for the Moapa Solar Energy Center. MSEC Final EIS Appendix.
- Moapa Paiutes. 2019. The Moapa Band of Paiutes History of the Moapa Paiutes People. <http://www.moapabandofpaiutes.com/tribal-history>. Accessed February 10, 2019.
- The Multiagency Avian-Solar Collaborative Working Group. 2016. Avian-Solar Science Coordination Plan. http://blmsolar.anl.gov/program/avian-solar/docs/Final_Avian-Solar_Science_Coordination_Plan.pdf. Accessed April 2019.
- NatureServe. 2009a. Species Explorer. http://explorer.natureserve.org/servlet/NatureServe?sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=103738&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=101963&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=101963&selectedIndexes=105855&selectedIndexes=103739&selectedIndexes=100883&selectedIndexes=103738&selectedIndexes=103483&selectedIndexes=104858&selectedIndexes=103922. Accessed April 2019.
- _____. 2009b. Species Explorer. http://explorer.natureserve.org/servlet/NatureServe?sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=100925&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=100925&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=100925. Accessed April 2019.
- Nevada Division of Water (NDW). 2019. Nevada Hydrology Data. http://webgis.water.nv.gov/Html5Viewer/Index.html?configBase=http://webgis.water.nv.gov/Geocortex/Essentials/REST/sites/Hydrology/viewers/NV_Hydrology/virtualdirectory/Resources/Config/Default. Accessed April 2019.
- Nevada Division of Environmental Protection (NDEP). 2014. Nevada 2014 Water Quality Integrated Report with EPA Overlisting. Assessment Period October 1, 2006 through September 30, 2011. https://ndep.nv.gov/uploads/water-wqm-docs/IR2014_Report.pdf. Accessed April 2019.

- Nevada Department of Wildlife (NDOW). 2012. Gila Monster Status, Identification and Reporting Protocol for Observations. http://www.ndow.org/uploadedFiles/ndoworg/Content/public_documents/Nevada_Wildlife/Gila%20Monster%20Status,%20Identification%20and%20Reporting%20Protocol%20for%20Observations.pdf. Accessed April 2019.
- _____. 2019. Burrowing Owl. http://www.ndow.org/Species/Birds/Burrowing_Owl/. Accessed April 2019.
- Nevada Natural Heritage Program (NNHP). 2001 Nevada rare plant atlas. <http://heritage.nv.gov/atlas>. Accessed April 2019.
- _____. 2016. Plant and Animal At-Risk Tracking List. Department of Conservation and Natural Resources. http://heritage.nv.gov/sites/default/files/other_docs/track.pdf. Accessed April 2019.
- Newfields. 2018a. Eagle Shadow Mountain Solar Biological Reconnaissance Report. 8 pages.
- _____. 2018b. Preliminary Desert Tortoise Presence/Absence Report for Eagle Shadow Mountain Solar Project. 5 pages.
- _____. 2019. Preliminary Jurisdictional Determination Report. Eagle Shadow Mountain Solar Farm. January 2019. 196 pages.
- Peterson, E. B. 2008. A Synthesis of Vegetation Maps for Nevada (Initiating a 'Living' Vegetation Map). Documentation and geospatial data, Nevada Natural Heritage Program, Carson City, Nevada.
- Southern Nevada Water Authority (SNWA). 2015. Water Resource Plan. http://water.nv.gov/hearings/past/Spring%20-%20Cave%20-%20Dry%20Lake%20and%20Delamar%20Valleys%202017/Exhibits/SNWA/SNWA_Exh_477_SNWA%20Water%20Resources%20Plan%202015.pdf. Accessed April 2019.
- _____. 2019. Southwestern Willow Flycatcher and Yellow-billed Cuckoo Surveys at the Warm Springs Natural Area, Clark County, Nevada 2018. January 2019. 18 pages.
- Spangenberg, E. K. 1995. Plants Eaten by Juvenile Desert Tortoises in the Central Mojave Desert. Paper presented at the National Biological Service Desert Tortoise Symposium, 1995. <http://www.tortoise-tracks.org/wptortoisetacks/about-the-deserttortoise/plants-eaten-by-the-juvenile>.
- Stewart, J. H., and Carlson, J. E. 1978. Geologic Map of Nevada: U.S. Geological Survey and Nevada Bureau of Mines and Geology. <http://mrdata.usgs.gov/geology/state/state.php?state=NV>. Accessed April 2019.
- Tilley, D. 2012. Plant Guide for Las Vegas buckwheat (*Eriogonum corymbosum* var. *nilesii*). USDA-Natural Resources Conservation Service, Aberdeen, ID Plant Materials Center. 83210-0296. https://plants.usda.gov/plantguide/pdf/pg_ercon.pdf. Accessed April 2019.
- Todd, R. L. 1986. A Saltwater Marsh Hen in Arizona: A History of the Yuma Clapper Rail (*Rallus longirostris yumanensis*). Phoenix, Arizona: Report prepared for the Arizona Game and Fish Department.

- University of Las Vegas, Center for Business and Economic Research. 2019. Las Vegas/Clark County Economic Data. <http://cber.unlv.edu/CCEconData.html>. Accessed February 10, 2019.
- U.S. Bureau of Land Management (BLM). 1998. Proposed Las Vegas Resource Management Plan and Final Environmental Impact Statement. Las Vegas Field Office. May 1998. https://eplanning.blm.gov/epl-front-office/projects/lup/78155/128953/156905/1998_LV_RMP_Volume_1.pdf.
- Bureau of Land Management (BLM). 2007. Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement.
- _____. 2016. Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States.
- U.S. Census Bureau. 2017. American Community Survey 5-yr estimates 2013–2017. <https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes/2017/5-year.html>. Accessed February 10, 2019.
- U.S. Department of Agriculture (USDA). 2012. Forest Service. Index of Species Information. <http://www.fs.fed.us/database/feis/plants/shrub/yucsch/all.html>.
- U.S. Fish and Wildlife (USFWS). 1995. Recovery Plan for the Rare Aquatic Species of the Muddy River Ecosystem. Portland, Oregon. 60 pp.
- _____. 1997. Final determination of critical habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*). Federal Register 62(140):39129-39147.
- _____. 2002. Final Recovery Plan Southwestern Willow Flycatcher (*Empidonax traillii extimus*). https://ecos.fws.gov/docs/recovery_plans/2002/020830c.pdf.
- _____. 2005. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*). <https://www.govinfo.gov/content/pkg/FR-2005-10-19/pdf/05-20144.pdf#page=2>.
- _____. 2007. Nevada Fish and Wildlife Office. Protecting Burrowing Owls at Construction Sites in Nevada's Mojave Desert Region. Las Vegas, Nevada.
- _____. 2009. Preparing for any action that may occur within the range of the Mojave desert tortoise. (*Gopherus agassizii*). Region 8, Sacramento, California. 15 pages.
- _____. 2011a. Species Data List. Gila Monster. <https://www.fws.gov/mountain-prairie/es/gilaMonster.php>. Accessed April 2019.
- _____. 2011b. Revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, California. 222 pages.
- _____. 2013a. Designation of critical habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*); Final Rule. Federal Register 78(2):334–534.

- _____. 2013b. Health Assessment Procedures for the Mojave Desert Tortoise (*Gopherus agassizii*): A Handbook Pertinent to Translocation. https://www.fws.gov/nevada/desert_tortoise/documents/reports/2013/assess/May2013-Desert-tortoise-health-eval-handbook.pdf.
- _____. 2014. Determination of Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*). Federal Register 79(192):59992–60038.
- _____. 2016. Nevada's Protected Species by County. https://www.fws.gov/nevada/protected_species/species_by_county.html. Accessed April 2019.
- _____. 2018. Preparing for Any Action that May Occur Within the Range of The Mojave Desert Tortoise (*Gopherus agassizii*). https://www.fws.gov/nevada/desert_tortoise/documents/manuals/Mojave%20Desert%20Tortoise_Pre-project%20Survey%20Protocol_2018.pdf. Accessed April 2019.
- _____. 2019. Environmental Conservation Online System: Information, Planning and Conservation System (IPAC). Species list for the Eagle Shadow Mountain Solar Project. February, 2019.
- U.S. Geological Survey (USGS) National Gap Analysis Program. 2005. Southwest Regional GAP Analysis Project—Land Cover Descriptions. RS/GIS Laboratory, College of Natural Resources, Utah State University.
- _____. 2019. Groundwater and Streamflow Information Program. Online at https://www.usgs.gov/water-resources/groundwater-and-streamflow-information/groundwater-monitoring?qt-science_support_page_related_con=0#qt-science_support_page_related_con. Accessed April 2019.
- U.S National Park Service (NPS). 2010. Inventory, Research and Monitoring of Evaluation and Watch List Plants. Lake Mead National Recreation Area. <http://www.clarkcountynv.gov/airquality/dcp/Documents/Library/dcp%20reports/2010/Eval%20and%20Watch%20Lists%20Plant%20Inventory%20and%20Research%20NPS-536%20Final%20Report%20June%202010.pdf>. Accessed April 2019.
- Westwood. 2018. Preliminary Hydrology Report. Eagle Shadow Mountain Solar, Clark County, Nevada. June 2018. 26 pages.

Appendix P

Biological Opinion



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Nevada Fish and Wildlife Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130

IN REPLY REFER TO:
08ENVS00-2019-F-0132
and 08ENVS00-2019-I-0133
and 1-5-05-FW-536, Tier 8

November 12, 2019

Memorandum

To: Western Regional Director
Bureau of Indian Affairs,
Phoenix, Arizona

From: Field Supervisor
Southern Nevada Fish and Wildlife Office
Las Vegas, Nevada

Subject: Biological Opinion for the Eagle Shadow Mountain Solar Project
Moapa River Indian Reservation, Clark County, Nevada

This transmits the U.S. Fish and Wildlife Service's (Service) biological opinion in response to your memorandum received June 19, 2019, requesting formal consultation for the Eagle Shadow Mountain Solar Project in Clark County, Nevada. This biological opinion addresses potential effects to the federally threatened Mojave desert tortoise (*Gopherus agassizii*) and Moapa dace (*Moapa coriacea*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act; 16 U.S.C. 1531 et seq.) and 50 CFR § 402 of our interagency regulations governing section 7 of the Act. No Mojave desert tortoise critical habitat occurs in the proposed project area, thus none will be affected.

This consultation (project-level biological opinion) is tiered to the Programmatic Biological Opinion (File No. 1-5-05-FW-536, Tier 8) for the Muddy River Memorandum of Agreement to address adverse effects to the Moapa dace (*Moapa coriacea*), a fish listed as endangered under the Act, that may result from groundwater withdrawal required for all phases of project activities. The proposed project involves construction, operation, maintenance, and decommissioning of a photovoltaic power plant and associated infrastructure and facilities on Moapa River Indian Reservation lands with anticipated adverse effects to the desert tortoise. No critical habitat has been designated for the Moapa dace, thus none will be affected.

The BIA also requests concurrence from the Service through informal consultation that the proposed project *may affect, but is not likely to adversely affect* the endangered Yuma clapper

rail (*Rallus obsoletus yumanensis*), endangered southwestern willow flycatcher (*Empidonax traillii extimus*), or threatened yellow-billed cuckoo (*Coccyzus americanus*). No critical habitat for these species is present in the proposed project area, thus none will be affected.

This biological opinion and concurrence are based on information provided in your memorandum; the biological assessment; the programmatic biological opinion (File No. 1-5-05-FW-536); correspondence between the Service, BIA, the Moapa Band of Paiutes, the applicant, and the consultants; desert tortoise translocation plan; interagency section 7 consultation regulations in 50 CFR Part 402; scientific publications, articles, and reports; and our files. A complete project file of this consultation is available in the Service's Southern Nevada Fish and Wildlife Office in Las Vegas.

Biological Opinion for The Eagle Shadow Mountain Solar Project

File Nos. 08ENVS00-2019-F-0132
and 08ENVS00-2019-I-0133

Issued to:

Bureau of Indian Affairs
Western Regional Office
2600 N. Central Ave
4th Floor Mailroom
Phoenix, Arizona

by:

U.S. Fish and Wildlife Service
Southern Nevada Fish and Wildlife Office
4701 North Torrey Pine Drive
Las Vegas, Nevada

November 12, 2019

TABLE OF CONTENTS

TABLE OF CONTENTS 2

INFORMAL CONSULTATION (FILE NO. 08ENVS00-2019-I-0133) 4

BIOLOGICAL OPINION (FILE NO. 08ENVS00-2019-F-0132) 5

CONSULTATION HISTORY 5

DESCRIPTION OF THE PROPOSED ACTION 6

 Definition of the Action Area 6

 Proposed Action 10

 Onsite Project Components 11

 Offsite Project Components 19

 Project Construction 21

 Onsite Construction 22

 Offsite Construction 26

 Desert Tortoise Translocation 28

 Operation and Maintenance 30

 Decommissioning 31

 Management Plans 32

 Proposed Minimization Measures 32

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION 40

 Jeopardy Determination 40

STATUS OF THE SPECIES- RANGEWIDE 41

 Desert Tortoise 41

 Moapa Dace 59

ENVIRONMENTAL BASELINE 71

 Action Area 72

 Status of the Desert Tortoise in the Action Area 73

 Factors Affecting the Desert Tortoise in the Action Area 82

 Status of the Moapa Dace in the Action Area 93

 Factors Affecting the Moapa Dace in the Action Area 93

EFFECTS OF THE PROPOSED ACTION 95

 Desert Tortoise Direct Effects 95

 Desert Tortoise Indirect Effects 110

 Effects of Habitat Compensation 117

 Desert Tortoise Conclusions 117

 Moapa Dace Effects 120

 Moapa Dace Conclusions 122

CUMULATIVE EFFECTS 124

CONCLUSION	125
Desert Tortoise Jeopardy Conclusion	125
Moapa Dace Jeopardy Conclusion.....	126
INCIDENTAL TAKE STATEMENT	126
AMOUNT AND EXTENT OF TAKE.....	127
Desert Tortoise.....	127
Moapa Dace	132
EFFECT OF TAKE	133
REASONABLE AND PRUDENT MEASURES (RPMS) WITH TERMS AND CONDITIONS	133
REPORTING REQUIREMENTS.....	133
DISPOSITION OF DEAD OR INJURED SPECIMENS	134
CONSERVATION RECOMMENDATIONS	135
REINITIATION NOTICE.....	135
LITERATURE CITED	137
DESERT TORTOISE.....	137
MOAPA DACE.....	150
APPENDIX. DESERT TORTOISE TRANSLOCATION PLAN	153

INFORMAL CONSULTATION (FILE NO. 08ENVS00-2019-I-0133)

The proposed project *may affect, but is not likely to adversely affect* the endangered Yuma clapper rail (*Rallus obsoletus yumanensis*), threatened yellow-billed cuckoo (*Coccyzus americanus*), or endangered southwestern willow flycatcher (*Empidonax traillii extimus*). Direct effects to the listed birds include injury or mortality to individual birds from contact with project vehicles, solar panels, fencing, buildings, towers, and transmission lines. Birds may also be affected by lighting and noise.

Suitable habitat for Yuma clapper rail, yellow-billed cuckoo, and southwestern willow flycatcher does not occur within or near the action area for the proposed project; however, there are documented records of all three species in suitable habitat within 15 to 20 miles of the project. These listed birds occur in areas such as Ash Meadows National Wildlife Refuge, Overton Wildlife Management Area, Las Vegas Wash, Warm Springs Natural Area, and Pahrangat National Wildlife Refuge. We do not have information and cannot predict the paths dispersing and migrating individuals may take, and there is no evidence to indicate that dispersal of these species would occur within the action area. Two mortalities of Yuma clapper rails and one yellow-billed cuckoo at solar facilities in California have been documented, although the circumstances and causes of death have not been confirmed.

The low number of known recorded mortalities, the lack of habitat within the action area, and the long distance from any known occurrence suggests low potential for direct mortality to listed birds related to the Project. Based on the best available science, the potential direct and indirect effects posed by the Project to the three listed bird species are expected to be negligible.

The applicant will prepare a Bird and Bat Conservation Strategy to include an analysis of effects with measures to avoid or minimize effects to birds. It will include nest monitoring during the active nesting season for migratory birds during construction as well as an adaptive management component. The adaptive management component would apply during construction and operations and would be implemented in coordination with the Service, BIA, and the Applicant if problems related to migratory birds are identified.

In consideration of the above, we concur with BIA's determination that the proposed project *may affect, but is not likely to adversely affect* the Yuma clapper rail, yellow-billed cuckoo, or southwestern willow flycatcher.

BIOLOGICAL OPINION (FILE NO. 08ENVS00-2019-F-0132)

CONSULTATION HISTORY

On January 20, 2006, the Fish and Wildlife Service (Service) concluded intra-Service consultation and issued a programmatic biological opinion (PBO) (File No. 1-5-05-FW-536) for execution of the *Proposed Muddy River Memorandum of Agreement (MOA) Regarding the Groundwater Withdrawal of 16,100 acre-feet per year (afy) from the Regional Carbonate Aquifer in the Coyote Spring Valley and California Wash Basins and Establishment of Conservation Measures for the Moapa Dace, Clark County, Nevada*. As the sole Federal signatory to the MOA, the Service would carry out actions and commitments in the MOA that may adversely affect the federally listed endangered Moapa dace (*Moapa coriacea*). The Service anticipated that all future Federal actions and formal consultations that involve withdrawal of groundwater under the MOA be tiered to the PBO; therefore, this consultation is tiered to the 2006 PBO.

March 5, 2019 - The Service did a site visit with the Moapa Band of Paiutes (Band), Bureau of Indian Affairs (BIA), 8 Minute Energy (Applicant), and cooperating agencies to discuss the proposed Eagle Shadow Mountain Solar project.

March 6, 2019 - The Service met with BIA, the Band, the Applicant, and the environmental consultant to discuss the Section 7 process, timing, options for Mojave desert tortoise (*Gopherus agassizii*) translocation, and potential project designs that would minimize impacts to desert tortoise.

June 4, 2019 – The Service, BIA, 8 Minute Energy, and environmental consultants had discussions and resolved questions regarding information needed for the biological assessment (BA).

June 11, 2019 - The Service received BIA's BA and request to initiate formal consultation for the Eagle Shadow Mountain Solar Project to address potential adverse effects to the desert tortoise.

June 14, 2019 - The Service provided comments on the BA to BIA.

June 24, 2019 – The Service, BIA, 8 Minute Energy, and environmental consultants discussed and clarified the BA comments that the Service provided. The Service e-mailed all parties information regarding palliatives, herbicides, western yellow-billed cuckoo, and additional literature.

June 28, 2019 - The Service received the final draft of the BA from BIA. Comments from the Service were addressed, and the consultation package was considered complete. The Service also received BIA's request for concurrence through informal consultation that the proposed action

may affect, but is not likely to adversely affect the endangered Yuma clapper rail (*Rallus obsoletus yumanensis*), endangered southwestern willow flycatcher (*Empidonax traillii extimus*), or threatened yellow-billed cuckoo (*Coccyzus americanus*). The request for formal and informal consultation was initiated.

August 19, 2019 - The BIA provided the draft desert tortoise translocation plan to the Service for review.

September 6, 2019 - The Service provided BIA comments on the first draft of the translocation plan.

September 9, 2019 - The Service provided a draft biological opinion to the BIA.

September 26, 2019 - The Service, BIA, and environmental consultants had a call to discuss Service comments to the translocation plan.

September 26, 2019 - The Service received comments on the draft biological opinion from the BIA.

September 30, 2019 - The Service addressed the BIA comments on the draft biological opinion.

October 15, 2019 - The BIA provided an updated desert tortoise translocation plan to the Service for review.

October 22, 2019 - The Service provided final comments on the translocation plan.

October 30, 2019 - The BIA provided the final desert tortoise translocation plan to the Service.

November 5, 2019 - The BIA provided updated acres of disturbance (temporary and permanent) for the gen-tie line and access road on BLM land.

DESCRIPTION OF THE PROPOSED ACTION

Definition of the Action Area

The Applicant has entered into an agreement with the Band to lease their land to construct a photovoltaic (PV) solar generating station on 2,200 acres of land in Clark County, Nevada. The proposed Eagle Shadow Mountain Solar Project (Project) would be located within the Mojave Desert approximately 30 miles northeast of Las Vegas, Nevada, west of I-15, and east of U.S. Highway 93. It would be located on up to 2,200 acres within an area of approximately 4,070 acres on the Moapa River Indian Reservation (Reservation) in Sections 1, 9, 10, 11, 14, 15, 16, 21 and 22 of Township 16 South, Range 64 East, Mount Diablo Base Meridian (Figure 1).

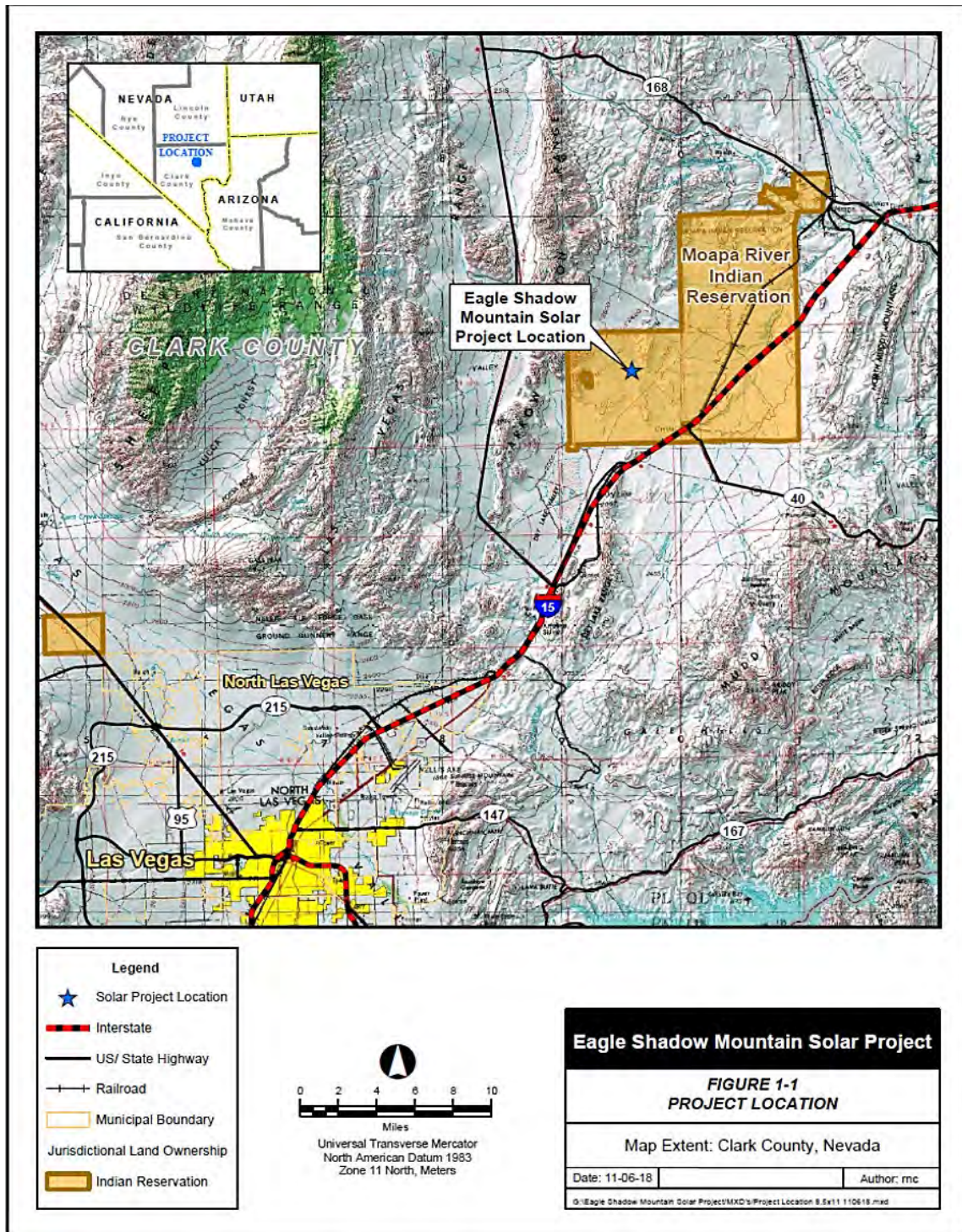


Figure 1. Project location.

The proposed 12.5-mile gen-tie line would be located in Township 16 South, Ranges 64 and 65 East and Township 15 South, Ranges 65 and 66 East. The gen-tie line would be located within

an existing utility corridor, adjacent to multiple existing linear electric transmission and pipeline utilities (Figure 2). Project components would include onsite facilities, offsite facilities, and temporary facilities needed to construct the Project. Project components on Reservation land would include the solar facility and the majority of the generation-tie transmission line (gen-tie). The remaining portion of the gen-tie and associated facilities would be on land managed by the Bureau of Land Management (BLM) and private land.

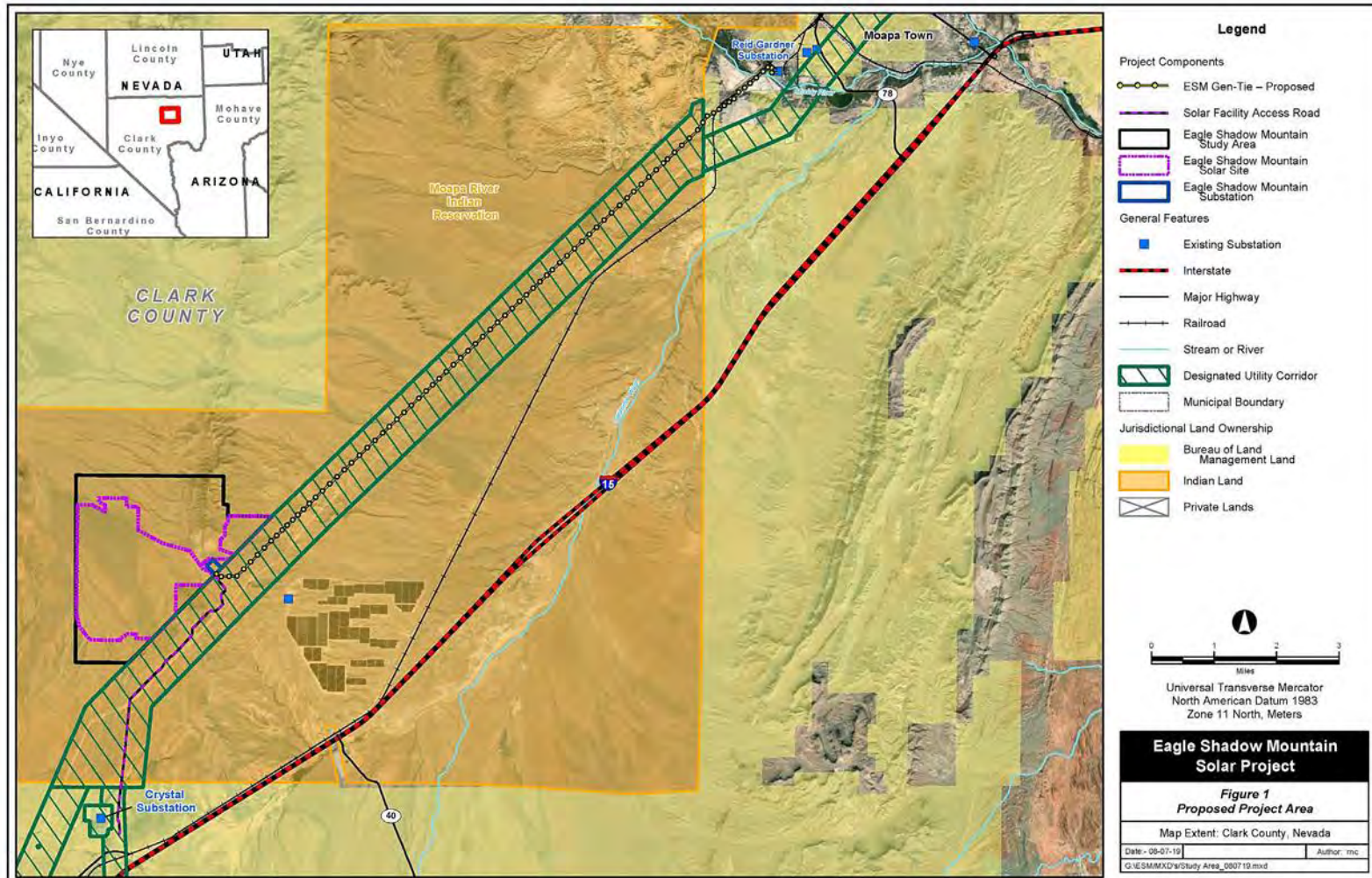


Figure 2. Solar and gen-tie project areas.

Proposed Action

The Project would include the construction, operation and maintenance (O&M), and decommissioning of a solar facility located entirely on the Reservation. Onsite facilities include a 300-megawatt (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, an energy storage system (ESS), a project substation, and O&M facilities. The offsite facilities would include an approximately 12.5 mile single- or dual-circuit 230kV gen-tie line located on the Reservation, BLM-administered lands, and private lands. Most of the gen-tie line would be within a federally designated utility corridor on the Reservation. This line would require a 285-acre ROW up to 200 feet wide. Additional offsite facilities would include an existing road that would provide access to the Project and electric distribution and communication lines. Temporary facilities removed at the end of construction would include laydown and construction areas and water storage tanks. Table 1 summarizes the principle components of the Project and the associated agency actions.

Table 1. Summary of Agency lands and jurisdiction.

Agency	Project Component	Location	Agency Action	Mileage / Acreage *
BIA	Solar Field	Reservation	Lease	Up to 2,200 acres
	230 kV Line	Reservation	ROW	Up to 0.1 miles / 2.4 acres
	TOTAL BIA			2,202.4 acres
BLM	230 kV Line	Designated Utility Corridor on Reservation Lands and managed by BLM	ROW	10.8 miles / 261 acres
	230 kV Line	BLM Lands	ROW	0.3 miles / 8.1 acres
	Site Access Road	Designated Utility Corridor on Reservation Lands and managed by BLM	ROW	4.2 miles / 12.1 acres
	Site Access Road	BLM Lands	ROW	0.8 miles / 2.2 acres
	TOTAL BLM			16.1 miles / 283.4 acres
PRIVATE	230 kV Line	Private Lands owned by NV Energy	N/A	1.3 miles / 8.1 acres
	TOTAL Private			1.3 miles / 8.1 acres

* Acreage and mileage are approximate. Gen-tie acreage is based on a 200-foot ROW and only a portion of the ROW would be disturbed. Access road is existing – no new impacts expected by ROW issued for its use. Acres for new access roads are within the 230 kV Line acres of disturbance. Only a portion of the 2,200-acre potential solar field and lease area would be permanently disturbed by the final footprint of the solar project.

Power produced by the Project would be conveyed to the regional transmission system via the gen-tie interconnection to NV Energy’s existing 230kV Reid Gardner Substation.

In addition to the federal agency jurisdictions mentioned above, the approximately 1.3-mile portion of the gen-tie line crossing private lands would be subject to Clark County jurisdiction and would require a Special Use Permit.

The total acreage of disturbance associated with the Project would include 2,165 acres of temporary disturbance and 120 acres of permanent disturbance (Table 2).

Table 2. Project temporary and permanent disturbance.

Project Component	Temporary Disturbance (acres)	Permanent Disturbance (acres)
<u>Solar Field and Ancillary Facilities</u>		
Tracker Posts	0	5
Inverter Skids	0	2
Misc. Laydown	0	3
O&M/Parking/Laydown	0	3
Substation	0	17
Energy Storage System (BESS)	0	15
Solar Facility Access Roads	0	55
Solar Facility and Ancillary Facilities	2,086	0
Subtotal	2,086	100¹
<u>230kV Gen-Tie Line</u>		
Access Road	16.2	8.3
Structure Work Areas	22.4	0
SAG and Tension	40.2	0
Structures	0	11.7
Subtotal	80	20
Total	2,165	120

¹ Permanent acres would be graded and free of vegetation for the duration of operations while temporary acres would not be graded with vegetation left in place.

Onsite Project Components

The Project would include the following onsite key elements located within the 2,200-acre solar lease boundary:

- Solar Field
- Energy Storage System
- Onsite Electrical Collection System and Substation
- Site Security and Fencing
- Communication Systems Infrastructure
- Operations and Maintenance Area
- Internal Project Roads

- Lighting
- Water Supply
- Wastewater Treatment and Waste and Hazardous Materials Management
- Fire Protection

Solar Field

The solar field would include mounted PV modules, inverters, and transformers that would be combined to form array blocks of 3 MW. The blocks would be repeated to create up to 300 MW of alternating electrical current (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 3 shows the conceptual site plan for the solar field.

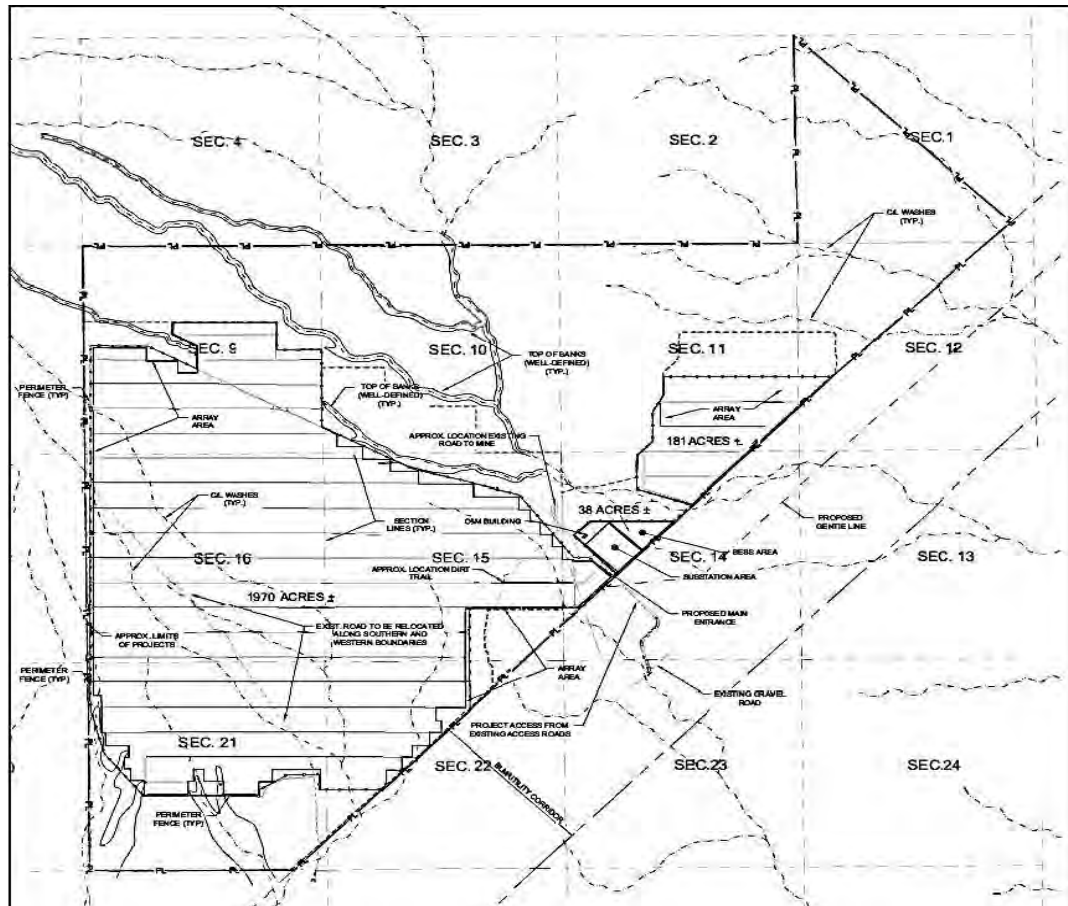


Figure 3. Conceptual site plan.

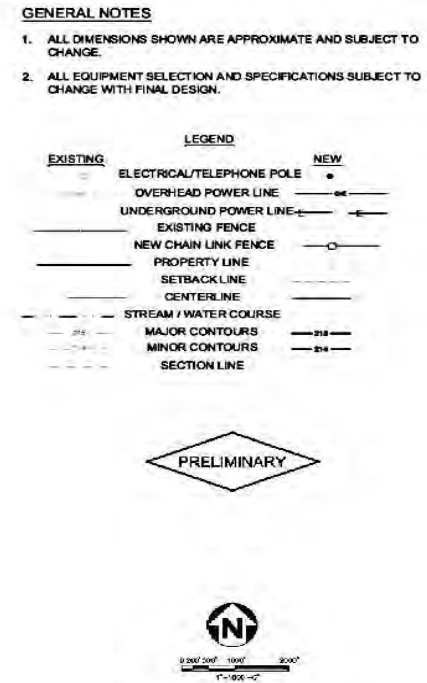


Figure 2-2
 Conceptual Site Plan
 Eagle Shadow Mountain Solar Project

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 driven steel posts embedded approximately eight feet below ground, depending on the structure, soil conditions, and wind loads, and they may be encased in concrete or utilize small concrete footings. Final solar panel layout and spacing would be optimized for site characteristics and the desired energy production profile.

A typical panel array layout using single-axis trackers is shown in Figure 4. 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 20 feet above the ground surface depending on the grade where the posts are installed (Figure 5). The preferred mounting configuration would use directly embedded driven posts with concrete piers (or screw anchors if subsurface conditions do not support driven posts).

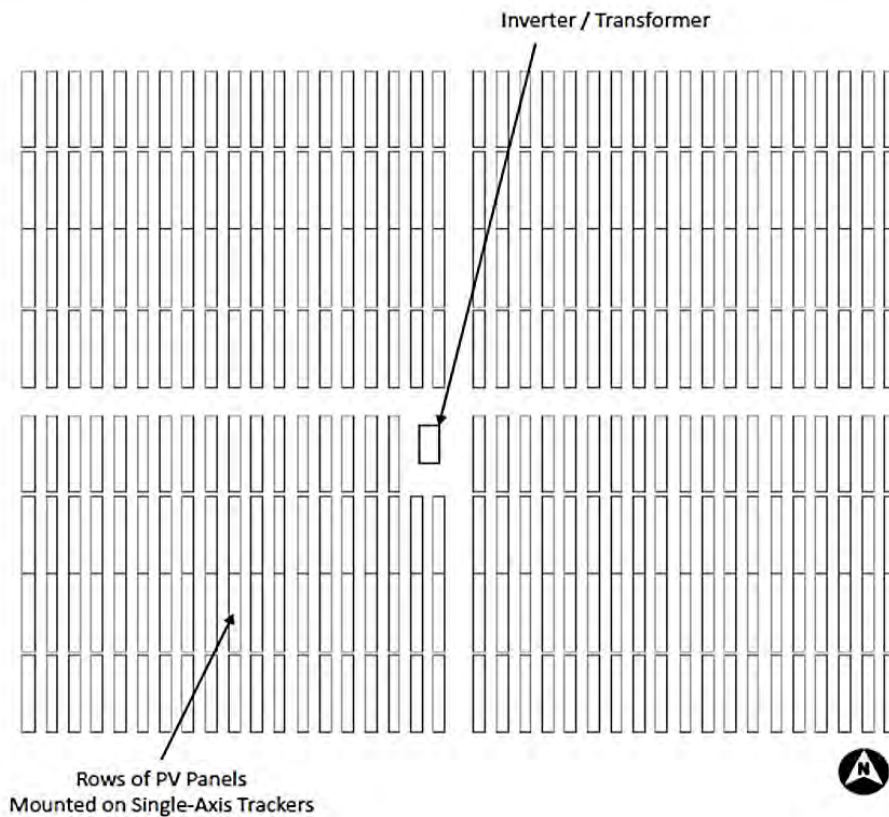


Figure 4. Single-axis tracker array layout.

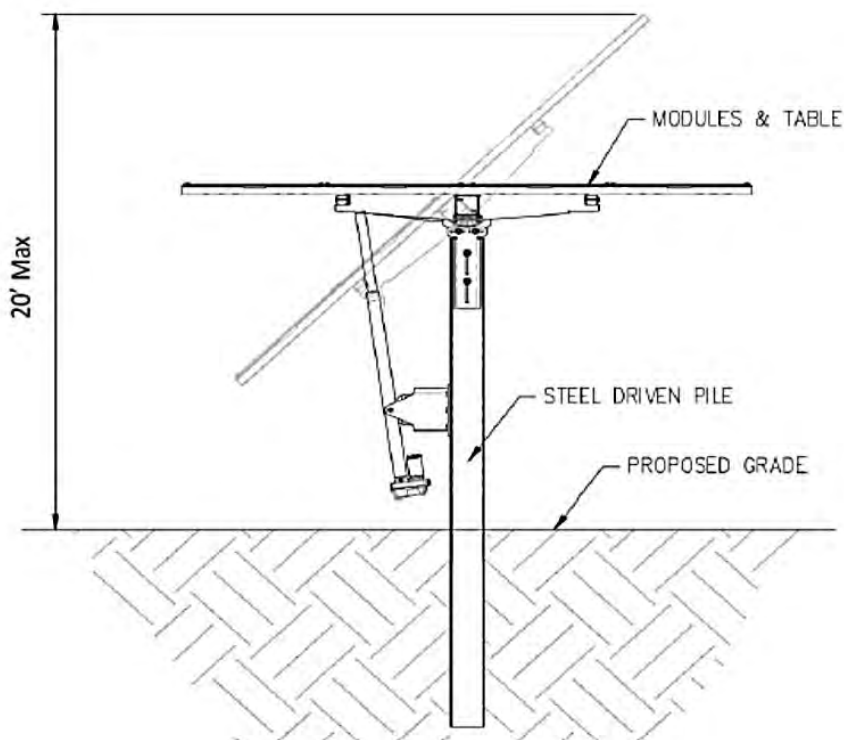


Figure 5. Single-axis tracker cross sectional view.

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 ten minutes during daylight conditions to move the panels in approximately one-degree increments.

Meteorological monitoring stations located at up to seven locations within the solar array would monitor wind speed and communicate with the tracker units. This would allow 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.

Energy Storage System (ESS)

The Project may include one or more ESSs onsite. The ESSs would consist of modular and scalable battery packs and battery control systems. The ESS modules, which may include commercially available flow batteries, typically consist of industry-standard containers (approximately 40 feet x 8 feet x 8 feet) in pad- or post-mounted, stackable metal structures but

could also be housed in a dedicated building. The maximum height of a building is not expected to exceed 25 feet. The actual dimensions and number of energy storage modules and structures would vary depending on the application, supplier, chosen configuration, and applicable building standards.

Onsite Electrical Collection System and Substation

PV modules convert sunlight into DC electricity. The DC electricity generated from the PV modules in each array block would be collected and delivered through underground or aboveground cables to a station near the center of the array where an inverter converts the DC electricity to AC electricity, and a medium-voltage transformer steps up the voltage to 34.5 kV. This converted AC electricity would be delivered to the onsite substation via the 34.5 kV AC collection system. At the substation, the electricity would be stepped up to 230 kV for delivery to the transmission grid.

The inverter units would have up to three 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 units 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 a combination of overhead single- or double-circuit lines, and fiber optic communication lines, on wooden poles with post insulators and also underground in trenches depending on soil characteristics. The 34.5kV AC collection system would convey electricity from the inverter stations to the onsite substation. Pole height would be up to 75 feet above grade and approximately 150-foot spacing between poles, and perch deterrents would be installed to prevent perching and predation. Wooden poles typically would be directly embedded to ten percent of the pole height plus two feet. If the collector system is buried in trenches, the cabling and fiber optic lines would be buried as deep as four feet in trenches and as wide as ten feet depending on the number of circuits being collected.

The onsite 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 approximately 17 acres and be secured by a chain-link fence. The proposed location of the Project substation would be near the main site entrance.

Site Security and Fencing

The Project site would be enclosed with a chain link fence, potentially with barbed wire, measuring up to eight feet from finished grade. The fence would have controlled access points, lighting, and possibly security alarms, security camera systems with remote monitoring, and security guard vehicle patrols to deter trespassing or unauthorized activities. Additional fencing would also be installed around the onsite substation.

Temporary desert tortoise exclusion fencing would be installed immediately outside of the chain

link perimeter fence during construction. The permanent perimeter fence would leave an 8-inch opening at the bottom of the fence to allow desert tortoises to move across and through the site when the temporary tortoise fence is removed following construction. Substation fencing would include desert tortoise exclusion fencing to prevent tortoises from entering the substation.

Communication Systems Infrastructure

Telecommunications systems would be installed at the substation. This would consist of a remote terminal unit, a communications line (i.e., T-1 line), 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. 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. Support equipment (i.e., metering class current transformers and potential transformers) would also be installed to facilitate metering of energy outputs. An up to 100-foot tall lattice structure may be erected near the substation or control building to facilitate wireless communications to provide a back-up option for 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 O&M building and would connect to the communications system.

Operations and Maintenance Area

The Project would include an O&M building with facilities and onsite parking on approximately three acres. The O&M building would be up to 20 feet by 80 feet with steel framing, metal siding, and roof panels. The O&M building may include offices, repair facility and parts storage, control room, restrooms, potable and non-potable water, and a septic tank and leach field.

Additional components of the O&M area would include a temporary construction laydown and storage area, aboveground water storage tanks, security gate, signage, flagpole, trash containers, and exterior lighting. The water supply for the O&M area would be provided via the Band's nearby well.

Internal Project Roads

Within the solar field, internal roads would be built to provide vehicle access to the solar equipment (PV modules, inverters, transformers) for O&M activities. These roads would be 15 feet wide and located between the array blocks to facilitate access to array blocks and inverters. Hammerhead turnarounds would be constructed at the terminus of interior access roads to facilitate vehicle and equipment turnarounds. The soil surface of all interior roads would be bladed. In addition to grading, interior roads that lead to inverter stations would be compacted using onsite materials.

The vegetation on the portions of the site not covered by roads, O&M facilities, and the site substation would be mowed to a minimum height of 18 inches, and drive-and-crush construction methods would be implemented; vegetation would regrow following construction. Vegetation would be maintained to a height needed for movement of the solar panels, site maintenance, and fire-risk management using mechanical and chemical controls during operations.

Lighting

Minimal lighting would be used onsite and would be directed inward and downward. Site lighting could include motion sensor lights for security purposes. Lighting used onsite would be of the lowest intensity foot-candle level.

Water Use and Supply

The Project's construction water requirements would be met from existing water rights owned by the Moapa Band of Paiutes. The Applicant would have access to this water supply through an agreement with the Band.

Up to 200 acre-feet (AF) of water would be required over approximately 18 months for construction-related activities, including dust control. During O&M, water demand for panel washing and O&M domestic use is not expected to exceed 20 afy. A small water treatment system may be installed to provide deionized water for panel washing. One or more aboveground water storage tanks may be placed onsite near the O&M building.

Wastewater Treatment and Waste and Hazardous Materials Management

Wastewater generated during construction and operation would include sanitary waste. Portable toilets would be used during construction. A septic tank and drain field system would be used for collection, treatment, and disposal of sanitary waste during operations. If a septic system is not installed, portable toilets would be used during operations.

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 onsite, with the primary hazardous materials onsite during construction being 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, empty containers, typical refuse generated by workers and small office operations, and other miscellaneous solid wastes.

The Applicant would prepare an Emergency Response Plan and Spill Response Plan that addresses waste and hazardous materials management including Best Management Practices (BMPs) related to storage, spill response, transportation, and handling of materials and wastes. Waste management would emphasize the recycling of wastes 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) located near the O&M building, which would have the appropriate fire department connections to facilitate use for fire suppression purposes. During construction, one electric and one diesel-fueled backup firewater pump would deliver water to the fire protection water-piping network.

The electrical equipment enclosures that house the inverters, transformers, and ESS would be metal structures. Any fire that could occur would be contained within the structures designed to meet 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 O&M.

Offsite Project Components

The Project would include the following offsite elements located outside of the 2,200-acre solar lease boundary:

- 230 kV Transmission Line (Gen-Tie)
- Site Access and Spur Roads

230 kV Transmission Line (Gen-Tie)

The Project would require the construction of an approximately 12.5-mile single- or dual-circuit 230kV gen-tie for interconnection to the regional transmission grid system. The proposed gen-tie would proceed east from the Project substation on Reservation land before entering the designated BLM utility corridor for approximately 10.8 miles. In the utility corridor, a new transmission line would parallel the existing transmission lines heading northeast to where it would exit the Reservation. When leaving the utility corridor, the gen-tie line would enter BLM-administered lands for approximately 0.3 miles, traverse private lands for approximately 1.3 miles, and then terminate at the Reid Gardner substation. A ROW up to 200 feet wide and approximately 285 acres would be required.

The Applicant would construct the gen-tie from the Project substation through the designated utility corridor to a Point of Change of Ownership (POCO) pole structure located on BLM-administered land. From the POCO pole structure, 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 approximately 73 support structures spaced 700 to 900 feet apart depending on the topographic, hydrologic, and geologic conditions of the underlying lands. The structures would be up to 150 feet above grade with minimum ground clearance of 25 feet. In addition, one of the shield wires on the gen-tie line would include a fiber optic communications cable to link the project substation to the Reid Gardner Substation. Figure 6 shows the dimensions of the typical

transmission structure. Most of the structures would be accessed via new spur roads constructed from existing utility access roads. Where the line does not parallel existing lines, a new road would be developed within the ROW to facilitate access to the gen-tie transmission structures.

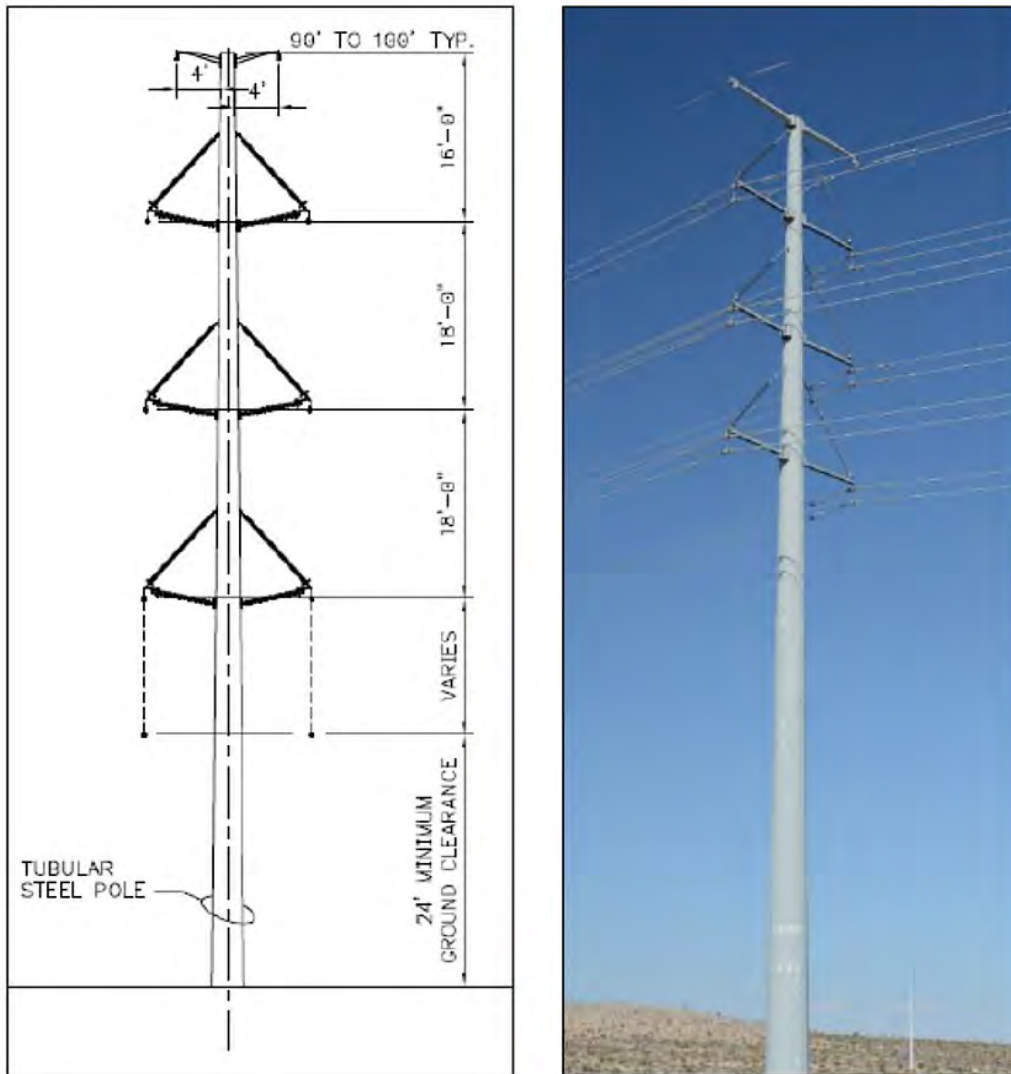


Figure 6. Typical Gen-Tie Transmission Line.

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.

Project Access Road

Main access to the Project site for construction, O&M, and decommissioning would be provided via existing roads. Access to this area of the Reservation 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 include the road built to provide access to the nearby existing K Road Solar Facility and the road providing access to the existing aggregate operation and water wells adjacent to the Project. No upgrades to these existing roads are anticipated to be necessary to provide access needed for this Project other than maintenance during construction and operations.

One existing road, used by the Band to access a potential cement mining operation, currently crosses the lease area and would be rerouted outside of the proposed solar facility lease boundary.

Project Construction

Prior to any activity on the site, 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 18 months and would include mobilization, grading and site preparation, installation of drainage and erosion control measures, PV panel/tracker assembly, and solar field and gen-tie component construction. The Applicant expects that Project construction would commence in the third quarter of 2020.

Site Stabilization, Protection and Reclamation

During and following construction of both onsite and offsite 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 Band). If needed to control dust during construction, palliatives that are approved by agencies prior to use would be applied to interior access roads after they are constructed at the beginning of the construction period. Depending on the site preparation technique, organic matter could also be worked into the upper soil layers or mulched onsite and redistributed into the fill (except under equipment foundations, trenches and roadways) to aid in dust control.

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 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 average 300 construction workers and not exceed 750 workers at any given time. Most construction staff and workers would commute daily to the

jobsite from 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 and 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 5:00 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 am) to avoid work during high ambient temperatures. Further, construction requirements would require some nighttime activity for installation, service or electrical connection, or 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 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 with management and construction employees. All construction traffic would use I-15, Highway 93, North Las Vegas Boulevard, and existing improved roads on the Reservation to access the site. The Applicant has prepared a draft Transportation Management Plan to address Project-related traffic.

Health and Safety Program

The Applicant would require all employees and contractors to 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. All site personnel would be required to go through a new hire orientation and follow the WEAP outlining safety, health, and environmental requirements.

Onsite Construction

The following construction components would occur onsite within the solar lease property and solar field boundary.

Site Preparation

Environmental clearance surveys would be performed at the Project site prior to commencement

of construction activities. During environmental clearance, the boundaries of the construction area would be delineated and marked. The site would then be prepared by selectively removing vegetation as necessary. Grading would be minimized to the extent practicable.

A construction office, staging area, and entrance and exit gates would be established at the Project's main access where the existing roads on the Reservation enter the site.

Surveying/Staking

Prior to construction, the limits of construction disturbance areas would be delineated by surveying and staking. Where necessary, the construction areas and sensitive areas to be avoided would be flagged with appropriate buffers, and 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 desert tortoise during appropriate timeframes. Approved temporary tortoise fencing would be installed around the perimeter of the construction areas to prevent tortoises from moving onto the site from adjacent areas. Authorized biologists would survey for and relocate desert tortoises according to the approved translocation plan.

Vegetation Removal

Vegetation would be permanently cleared from roadways, access ways, and at inverter equipment, substations, and O&M facilities. 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. Vegetation within the solar arrays would be mowed to a minimum height of 18 inches, and construction equipment would be allowed to drive and crush that vegetation during construction to facilitate regrowth during operations.

Site Clearing/Grading/Excavation

The cuts and fills associated with all earthwork required on the site are planned to be balanced onsite. Within the solar field, some grading would be required for roads and access ways between the solar arrays and for electrical equipment pads. The amount of grading would be limited to where the panel support foundations are driven or drilled. A small graded pad could be required 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 building foundations. Aggregate material would be used for parking areas, substation area, and where needed for the access roads. Riprap material could be required for erosion control. This material

would be sourced from the Band as available.

PV Solar Array Assembly and Construction

The construction sequence for the solar field would follow a generally specified order sequenced by arrays. Each array would contain solar panels, an inverter, and a step-up transformer, and construction work within each array would generally proceed as follows:

- install foundations for inverter units;
- prepare trenches for underground cable;
- 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;
- perform electrical terminations; and
- inspect, test, and commission equipment.

Cable trenches would contain electrical conductors for power generation and fiber optic cables for equipment communication. Trenches would vary between three to ten 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. Trucks would be used to transport the PV modules to the solar field. Final solar field assembly would require small cranes, tractors, and forklifts.

Installation of electrical equipment and necessary infrastructure to energize the equipment would consist primarily of the following tasks:

- Installation of all electrical equipment including inverters, transformers, circuit breakers, switches and switchgear, lighting, and communication, control, and SCADA equipment.
- Installation of all cables necessary to energize the Project equipment. Cables would be routed via cable trays, above-grade conduits, below-grade conduit, and overhead structures.
- All equipment and structures would be grounded.
- Communication systems including T-1 internet cables, fiber optic, and telephone would be installed during electrical construction.

Standard transmission line construction techniques would be used to construct the 34.5 kV collector lines. Primary stages in construction would be 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 in the solar field and would require a relatively flat graded surface approximately one percent maximum slope in any direction. The substation interior would be covered with aggregate surfacing for safe operation.

The substation systems could include heating, ventilating, and air-conditioning systems; distribution panels; lighting; communication and control equipment; and lightning protection.

The 17-acre substation area would be excavated to a depth of approximately 10 feet, a copper grounding grid 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 an aggregate rock base.

Installation of the transformers, breakers, buswork, and metal dead-end structures would follow. A transformer containment area would be lined with an impermeable membrane covered with gravel to capture any expected leaks. A pre-fabricated control house would be installed to house the electronic components required for the substation equipment.

Operation and Maintenance Facilities

The O&M area would be graded and after the O&M building is constructed, the remaining area would be appropriately surfaced for parking, roads, material storage, and the erection of a temporary assembly structure for use during the construction phase of the Project. Following site preparation of the O&M area, construction of the O&M building would commence. Concrete foundations would be poured to support the permanent O&M building, and a 2,000-3,000 square-foot modular steel building would be erected. An area adjacent to the building would be developed for parking, and an aggregate base may be installed on unpaved areas within the O&M area.

A potable and non-potable water treatment system could be installed in the O&M building or bottled water could be used for potable water. If a potable water system is developed, aboveground water tanks would be erected and connected to a service pump to provide water to the building. Active and reserve septic fields would also be established and connected to the O&M building's waste system if portable toilets are not used during operations. Temporary construction power would be connected to the O&M building.

Onsite Temporary Construction Facilities

The Project construction contractor would establish 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 solar arrays after it is no longer needed as development of the site progresses. Following construction, equipment would be removed from laydown areas not developed with solar arrays and revegetated.

The approximately 35-acre portion of the solar facility immediately east of the main access road would be developed for the project substation (approximately 17 acres), an ESS (approximately 12 acres), and an O&M building and parking area (approximately 6 acres). Although this entire 35-acre 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 material delivery and storage. Following construction, these facilities would be removed.

Additional temporary project construction facilities include up to ten temporary water holding tanks and temporary generators to provide power to the pumps at two existing wells. These facilities would be installed in previously disturbed areas adjacent to the existing wells and would be removed following construction.

Offsite Construction

Gen-Tie Line Construction

Construction equipment access would be required at each transmission structure. Most of the proposed gen-tie route would be sited to follow existing roads to minimize ground disturbance. New access and spur roads would be developed as needed and would typically be 12 feet wide, bladed, and compacted to ensure stability. Access roads parallel to the gen-tie alignment and spur roads would not be maintained following construction.

To access the gen-tie service road within the ROW, construction vehicles would use the existing Hidden Valley Road near the Reid Gardner substation on the northern end of the gen-tie route, the existing unnamed gravel road from I-15 Exit 80, and the proposed Project access road via North Las Vegas Boulevard for the southern end of the gen-tie route.

Where the gen-tie would parallel existing lines, the road associated with the existing line would be used and upgraded as needed and short spur roads developed to access structure locations. Spur roads could cross drainages at grade.

Structure Sites

A 125-foot by 50-foot (6,250 square-foot) area would be needed around each of the approximately 73 structure sites on federally administered land 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. The poles would be set within an augured hole (for tangent structures) or on a concrete pier foundation (dead-end structures). The primary equipment used in setting foundations would be concrete trucks, auger rigs, pickup trucks, cranes, and front-end loaders. Excavated spoil material would be spread around the temporary work areas.

Foundation Installation

The steel poles used for the gen-tie would be supported by steel-reinforced pier concrete foundations where needed for the conditions at each structure site. 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 4 to 7 feet in diameter and 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.

Structure Installation

Structures would be staged in designated laydown and stringing areas or delivered and unloaded adjacent to their final locations. Poles would be delivered on a flatbed trailer and lifted into place using a crane. For the direct-imbedded (tangent) poles, the open space between the poles and walls of the auger holes would be backfilled with concrete or soil.

Conductor Stringing

After the structures are erected, the conductors and static wires would be strung between them and attached. Pulling and tensioning sites are the locations where equipment would be located to pull the conductors and wires into place. Multiple pulling and tensioning sites would be required for installing the conductors on the transmission structures, and these sites would be approximately 100 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. These areas would not be bladed. 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. 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).

Offsite Temporary Construction Facilities

Temporary construction areas 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 and conductor installation.

Desert Tortoise Translocation

Presence/absence surveys for desert tortoise were conducted in the action area in the fall of 2018. A translocation plan that details all activities associated with clearance and translocation is in the Appendix. Below is a brief summary of the process.

Beginning in fall of 2019 and continuing in spring of 2020, surveys would be completed to collect health assessment information on the existing tortoise population. All tortoises would receive health assessments according to the guidelines in the *Health Assessment Procedures for the Mojave Desert Tortoise (Gopherus agassizii): A Handbook Pertinent to Translocation* (Service 2019b).

Also in 2020, the Translocation Review Package (TRP) would be prepared for the first translocation event, including proposed disposition, health assessment data, and enzyme-linked immunosorbent assay (ELISA) results for the pathogens *Mycoplasma agassizii* and *M. testudineum*, and quantitative polymerase chain-reaction (qPCR) results for *Mycoplasma agassizii*, *M. testudineum*, and testudinid herpesvirus 2. Addenda for unknown adults located during clearance efforts including health assessment data and photographs would be submitted to BLM, BIA, and the Service's Desert Tortoise Recovery Office for approval.

Radio transmitters would be affixed to a subset of tortoises over approximately 100 grams in weight, so that the animals could be easily relocated for future translocation. Juvenile tortoises, regardless of weight, would be translocated or returned based on where they were found. Juveniles found less than 500 m from the fenceline would be translocated, and juveniles found more than 500 m from the fenceline would be held in temporary pens and returned to the location they were found after construction. All tortoises would be translocated in accordance with the Desert Tortoise Translocation Plan. Only authorized biologists and biological monitors would conduct these activities.

Translocation Procedures Summary

The desert tortoise translocation procedures are described in detail in the Appendix. The steps for

translocation are summarized as

1. Identify release locations within recipient area.
2. Approve Translocation Review Package
3. Passively exclude desert tortoises during fence construction (section 5.3 of the Translocation Plan).
4. Perform health assessments.
5. Review Final Translocation Review Package; translocate known tortoises.
6. Perform clearance surveys to locate all tortoises within solar field.
7. Complete subsequent Translocation Review Package addenda and release remaining tortoises.

Tortoises within 500 m of the development area borders inside mowed areas of the Project site generally would be translocated a short distance to a location outside the border, within approximately 500 m of their capture site. The release area would be within a 1,870-acre recipient area. Tortoises located within the interior of the solar site, greater than approximately 500 m from the fenceline, would be penned and returned to the solar site, or translocated to another suitable area determined on a cases-by-case basis through consultation with the Service, following construction (these tortoises would be kept in temporary holding pens during construction activities). For purposes of this translocation plan, tortoises moved less than 500 m will be “translocated” and tortoises greater than 500 m from the solar site fenceline will be penned and “returned” to the recipient area or back within the solar site after construction.

Per the Service’s translocation guidance, “Data from recent translocations indicate that desert tortoises moved up to 500 m from their capture location are expected to settle within 1.5 km of their release point; most tortoises (>97.5%) moved >500 m are expected to settle within 6.5 km of their release point.” Accordingly, the translocation recipient area immediately outside the Project includes the release band (500 m wide) plus all suitable tortoise habitat within 1.5 km. The relocation recipient area includes the translocation release area, plus all suitable tortoise habitat within 6.5 km.

The number of tortoises to be translocated cannot be exactly known until clearance surveys are completed. Hence, the number of translocatees and their translocation destinations are based on the number of adult tortoises found and their locations during the surveys. The total number of adult tortoises estimated to be moved based on surveys is 79.

The translocation plan prepared by the BIA, Service, and Applicant’s consultants includes procedures and activities to ensure that translocated tortoises survive and establish in the recipient area while minimizing impacts to resident tortoises. The health of all tortoises to be translocated and a sample of resident tortoises have been or would be assessed by trained and well-qualified biologists. Release locations would be identified in the disposition plan in

consideration of current distribution and health status of resident tortoises.

Monitoring of Translocated Desert Tortoises

BIA would ensure that translocated desert tortoises would be monitored in accordance with this biological opinion, the translocation plan, and the long-term monitoring plan (LTMP). Newly translocated tortoises display increased activity, often moving extreme distances in erratic directions; neither distance nor direction can be accurately predicted.

While movements for tortoises translocated immediately outside the site are expected to be much less than the indirectly translocated or returned tortoises, tortoises with transmitters affixed at release sites would be tracked within 24 hours of release, once daily for the first two weeks, weekly during the tortoise active season, twice per month during the less active winter season, and then according to the LTMP schedule. Tortoises actively returned to mowed areas following construction would be tracked similarly at release and then according to the LTMP. Tortoises allowed to reintroduce passively would also be tracked per the LTMP. Recipient and control tortoises would be identically tracked to compare movements and behaviors.

Operation and Maintenance

The O&M requirements for a PV solar generation facility include regular monitoring, periodic inspections, and needed maintenance. Operation of the Project is expected to require a workforce of up to five full time-equivalent positions. This workforce would include administrative and management personnel, operators, and security and maintenance personnel. Typically, up to three staff would work during the day shift and the remainder during the night shifts and weekends. Employees would be based at the O&M building.

During the first year of operation, the frequency of inspections would be higher to address any identified post-construction issues. Periodic routine maintenance would include monthly, quarterly, semi-annual, and annual inspections and service. Panel washing could be conducted periodically to improve power generation efficiency (likely on foot and by hand). At designated intervals, approximately every 10 to 15 years, major equipment maintenance would be performed. This would require the use of vehicles and equipment including crane trucks, forklifts, and manlifts. Pick-up trucks would be in daily use on the site, but no heavy equipment would be used during normal plant operation.

Dust during O&M would be controlled and minimized by applying water. Palliatives would only be applied at the beginning of construction, if necessary, and only on roads in areas where desert tortoise have been excluded.

Safety precautions and emergency systems would be implemented as part of the design and construction of the Project to ensure safe and reliable operation. Administrative controls would include classroom and hands-on training in O&M procedures, general safety items, and a planned maintenance program. These would work with the system design and monitoring features to enhance safety and reliability. The Project would also have an Emergency Response

Plan (ERP). The ERP would address potential emergencies including chemical releases, fires, and injuries. All employees would be provided with communication devices, cell phones, or walkie-talkies to provide aid in the event of an emergency.

The Applicant has prepared an Integrated Weed Management Plan for the Project that follows an integrated approach as required by BIA. Although mechanical control is expected and desirable for the Project, herbicides may also be used to control noxious weeds during the tortoise less-active season if mechanical treatments are not successful. The plan contains a list of herbicides (the same herbicides approved for use within tortoise habitat on BLM lands) and would be implemented as needed during operations. Pest control may also be required, including control of rodents and insects inside of the buildings and electrical equipment enclosures.

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. Gen-tie access roads would not be regularly maintained but could be graded as needed to provide access to transmission structures for maintenance activities.

Other O&M activities could include insulator washing, periodic air inspections, repair or replacement of conductors, replacement of insulators, and response to emergency situations (outages) to restore power. With the exception of emergencies and outages, most maintenance work would take place during daylight hours. Desert tortoises would be captured and moved out of harm's way as needed.

Decommissioning

The anticipated operational life of the Project would be up to 50 years. The Project would then be decommissioned and existing facilities and equipment removed. Decommissioning would involve removal of the solar arrays and other facilities with some buried components (such as cabling) potentially remaining in place. Following decommissioning, the area would be reclaimed and restored according to applicable regulations at the time of decommissioning.

To ensure that the permanent closure of the facility does not have an adverse effect, the Applicant would prepare a draft Decommissioning Plan. The final Decommissioning Plan would be developed near the time of decommissioning in coordination with the 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 applicable regulatory requirements and resource plans.

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. Work to decommission the transmission line is anticipated to

be conducted within the boundaries of existing easements and rights of way.

This biological opinion includes decommissioning activities that may affect desert tortoise. This includes capturing and moving tortoises out of harm's way. When these activities occur over 50 years from today, laws regarding desert tortoise may have changed. The Decommissioning Plan would address how desert tortoises would be moved according to the most recent guidance. As needed, this biological opinion may be reinitiated to incorporate such changes.

Following decommissioning, the disturbed areas would be stabilized and revegetated. Native species would be used for revegetation, using BLM and BIA recommended seed mixes. Re-seeding would take place during appropriate months. Seed would be planted using drilling, straw mulching, or hydromulching as appropriate.

Management Plans

The Applicant would be required to prepare the following management plans, which would be submitted to the Band, BIA, BLM, and the Service (as appropriate) for approval:

- Integrated Weed Management Plan
- Raven Management Plan
- Decommissioning Plan
- Site Restoration Plan
- Dust Abatement Plan
- Spill Prevention and Emergency Response Plan
- Health and Safety Program
- Fire Management Plan
- Hazardous Materials and Waste Management Plan
- Stormwater Pollution Prevention Plan
- Site Drainage Plan
- Traffic Management Plan
- WEAP
- Bird and Bat Conservation Strategy

Proposed Minimization Measures

The following proposed minimization measures and BMPs will be implemented as part of the Project proposed by the Applicant to avoid or reduce environmental impacts associated with the proposed action to the Mojave desert tortoise.

Construction Minimization Measures

The following measures will be implemented to reduce effects on the desert tortoise during construction, operation, and maintenance:

1. **Construction area flagging.** Work areas will be flagged prior to beginning construction activities, and disturbance will be confined to the work areas. A biological monitor will escort all survey crews onsite prior to construction. All survey crew vehicles will remain on existing roads and stay within the flagged areas to the maximum extent practicable. In cases where construction vehicles are required to go off existing roads, a biological monitor (on foot) will precede the vehicles.
2. **Desert tortoise fencing.** Temporary tortoise-proof fencing will be installed around the boundary of the solar facility. Biological monitors under supervision of an authorized biologist (approved by the Service) will be present during fence installation to move all tortoises in harm's way to outside the work area. Additional clearance surveys and activities will be conducted after completion of the tortoise fence to ensure that no tortoises remain inside the fenced construction boundaries.

Fence specifications will be consistent with those approved by the Service (Service 2009b). Tortoise guards will be placed at all road access points where tortoise-proof fencing is interrupted to exclude desert tortoises from the Project footprint. Gates or tortoise exclusion guards will be installed with minimal ground clearance and shall deter ingress by desert tortoises. The temporary tortoise-proof fencing will be removed once the Project is commissioned, allowing tortoises to re-occupy the site during operations.

During the tortoise active seasons, all new fences will be checked twice a day for the first two weeks after construction or the first two weeks after tortoises become active if fence construction occurs in the winter, including once each day immediately before temperatures reach lethal thresholds. After the first two weeks, all tortoise exclusion fencing will be inspected monthly during construction, quarterly for the life of the Project, and immediately following all major rainfall events. Any damage to the fence will be repaired within two days of observing the damage.

3. **Field Contact Representative.** The BIA and Applicant will designate a Field Contact Representative (FCR) who will be responsible for overseeing compliance of the minimization measures of the biological opinion. The FCR will be onsite during all active construction activities that could result in "take" of a desert tortoise. The FCR will have the authority to halt activities that are in violation of the desert tortoise protective measures until the situation is remedied.
4. **Authorized desert tortoise biologist.** All authorized desert tortoise biologists (and monitors) are agents of BIA and the Service and will report directly to BIA, the Service, BLM, and the Applicant concurrently regarding all compliance issues and take of desert tortoises; this includes all draft and final reports of non-compliance or take. Authorized desert tortoise biologists, monitors, and the FCR will be responsible for ensuring compliance with all conservation measures for the Project as described in the biological opinion. Prior to starting construction, authorized biologist(s) will submit documentation of authorization from the Service and approval from NDOW. Potential authorized desert tortoise biologists will submit their statement of qualifications to Service.

An authorized desert tortoise biologist will record each observation of a desert tortoise handled in the tortoise monitoring reports. This information will be provided directly to BIA, the Service, and BLM.

Potential authorized desert tortoise biologists must submit their statement of qualifications to the Service's Southern Nevada Fish and Wildlife Office in Las Vegas for approval, allowing a minimum of 30 days for Service response. The statement form is available in Chapter 3 of the Desert Tortoise Field Manual on the internet at:

https://www.fws.gov/nevada/desert_tortoise/dt/dt_manuals_forms.html

Authorized desert tortoise biologist requests in southern Nevada should be e-mailed to: ADTB_request@fws.gov

5. **Biological monitoring.** Under supervision of an authorized biologist, biological monitors will be present at all active construction locations (not including inside the solar field after it has been fenced with desert tortoise fencing and clearance surveys have been completed). Desert tortoise monitors will provide oversight to ensure proper implementation of protective measures, record and report desert tortoises and tortoise sign observations in accordance with approved protocol, and report incidents of noncompliance in accordance with the biological opinion and other relevant permits. The biological monitor(s) will survey the construction area to ensure that no tortoises are in harm's way. If a tortoise is observed entering the construction zone, work in the immediate vicinity will cease until the tortoise moves out of the area. Tortoises found aboveground during construction activities will be moved offsite by an authorized biologist following the protocols described in the Desert Tortoise Translocation Plan.
6. **Desert tortoise clearance surveys and translocation.** After installation of tortoise fencing around the perimeter of the solar facility and prior to surface-disturbing activities, biological monitors and the authorized desert tortoise biologists who supervise them will conduct a clearance survey to locate and remove all desert tortoises from harm's way including those areas to be disturbed, using techniques that provide full coverage of construction zones (Service 2009b).

No surface-disturbing activities shall begin until two consecutive surveys find no live tortoises. In sectors or zones where a live tortoise is found, surveys will be repeated until the two-pass standard is met.

An authorized biologist will excavate burrows potentially containing desert tortoises located in the area to be disturbed with the goal of locating and removing all desert tortoises and desert tortoise eggs. Typical tortoise burrows have a characteristic shape with a flat bottom and arched top similar to a capital letter 'D' with the flat side down. Clearance will include evaluation of caliche caves and dens, as tortoises are known to shelter there. Caliche is a naturally occurring hardened cemented soil composed of calcium carbonate, gravel, sand, and silt. The practice of excavating every obvious tortoise burrow will not be done as it has

shown to be ineffective and inefficient in locating tortoises; instead, all obvious tortoise burrows will be scoped for presence and possible extraction. During clearance surveys, all handling of desert tortoises and their eggs and excavation of burrows shall be conducted solely by an authorized desert tortoise biologist in accordance with the most current Service-approved guidance (Service 2009b). If any active tortoise nests are encountered, the Service must be contacted immediately prior to removal of any tortoises or eggs from those burrows to determine the most appropriate course of action. Unoccupied burrows will remain in place to allow for tortoise use during operations. Outside construction work areas, all potential desert tortoise burrows and pallets within 50 feet of the edge of the construction work area will be flagged. If a desert tortoise occupies a burrow during the less-active season, the tortoise may be temporarily penned or will be translocated following Service approval, contingent upon weather conditions and health assessment results. No stakes or flagging will be placed on the berm or in the opening of a desert tortoise burrow. Desert tortoise burrows will not be marked in a manner that facilitates poaching. Avoidance flagging will be designed to be easily distinguished from access route or other flagging, and will be designed in consultation with experienced construction personnel and authorized biologists. This flagging will be removed following construction completion.

An authorized desert tortoise biologist or biological monitor will inspect areas to be backfilled immediately prior to backfilling. Burrows with the potential to be occupied by tortoises within the construction area will be searched for presence. In some cases, a fiber optic scope will be used to determine presence or absence within a deep burrow.

A translocation plan following the 2018 guidance will be approved by the Service prior to the start of construction (Service 2018b). The plan identifies potentially suitable recipient locations, control site options, post-translocation densities, procedures for pre-disturbance clearance surveys and tortoise handling, as well as disease testing and post-translocation monitoring and reporting requirements. Tortoises found within 500 meters (m) of the project boundary (fenceline) will be translocated outside of the nearest fence to a location that contains suitable habitat; tortoises found within the interior of the project site (>500 m from a boundary fence) will be penned during construction and returned within the solar site after construction (or translocated to somewhere within the Study Area Recipient Site if needed).

BIA and the Applicant will have an authorized biologist translocate and return tortoises following the Service-approved protocol (Service 2009b) and according to the approved translocation plan. If the Service releases a revised protocol for handling desert tortoises before initiation of Project activities, the revised protocol will be implemented.

Tortoises found within the project area will be translocated to an area of suitable habitat as directed by the Service. Translocation will follow installation of exclusionary tortoise fence, as determined in coordination with the agencies. Translocation events will occur to specific locations outlined in the approved project-specific translocation review package (TRP) and disposition plan, based on construction and translocation timing considerations for each tortoise. The project will employ two strategies for moving tortoises, depending on the initial capture location of each animal:

a. Short-distance translocation: Tortoises found within approximately 500 m of the solar site fenceline will be translocated to areas immediately outside of the project's temporary exclusion fencing. All translocated tortoises will have health assessments, have blood samples drawn, and be marked. Following the completion of construction, the exclusion fencing will be removed, the permanent site fencing will be permeable to desert tortoises, and the existing vegetation on the project site is expected to be crushed or trimmed to facilitate construction and operation of the project. Therefore, the translocation strategy is designed to allow tortoises to freely move through, and potentially re-occupy, the site following construction.

b. Indirect translocation or return to project site: Tortoises found in the interior of the solar site fenceline (approximately >500 m from the exclusion fence) will be held in temporary holding pens for the duration of construction and returned to the solar site interior, or translocated to another suitable area determined on a case-by-case basis through consultation with the Service, following construction. The following actions will occur:

- An authorized biologist will perform health assessments and draw blood samples for each tortoise returned. Blood testing will determine whether any desert tortoise suffers from upper respiratory tract disease (URTD).
- Tortoises will be temporarily tagged with combination global positioning system (GPS)/radio-transmitter tags, so if the results of blood work indicate that a tortoise is infected with URTD, the tortoise can be retrieved and handled as directed by the Service.
- When determining a release location for an individual tortoise, release site preference will be to find a like-for-like shelter resource. Every attempt will be made to find similar cover sites and habitat to that at the location of each individual found within the solar site, otherwise all translocatees shall be released at the most appropriate and available unoccupied shelter sites (e.g., soil burrows, caliche caves, rock caves, etc.) or under the shade of a shrub. Because of the impermanent nature of soil burrows and cave availability, prior to submitting the final Disposition Plan and determining exact areas of release, potential release sites will be re-investigated for existing burrows and caliche or rock caves that can be used for shelter sites. Known active and inactive tortoise burrows discovered during the surveys will be re-investigated for this purpose. If insufficient shelter sites exist in an area to be used for relocation, the Applicant shall coordinate with the agencies to determine the most appropriate course of action, such as reviewing an alternate release site, modifying/improving existing burrows and partial burrows, or artificially creating burrows per Service protocols prior to relocation. The number of artificial burrows per returned tortoise will be included in the TRP/Disposition Plan, as feasible, and may include more than one burrow per tortoise to increase relocation success (i.e. tortoises remaining within their release locations). The disposition of returned

tortoises will be evaluated and reported on following the reporting requirements of the biological opinion.

- If a tortoise voids its bladder while being handled, it will be given the opportunity to rehydrate before release. Tortoises will be offered fluids by soaking in a shallow bath or an authorized desert tortoise biologist will administer nasal-oral fluid or injectable epicoelomic fluids. Any tortoise hydration support beyond offering water or shallow soaking will only be provided by an authorized biologist who has received advanced training in health assessments and been specifically approved by the Service for these procedures.
7. **Integrated Weed Management Plan.** Prior to construction, an Integrated Weed Management Plan will be developed that includes measures designed to reduce the propagation and spread of designated noxious weeds, undesirable plants, and invasive plant species, or as determined by the cooperating or reviewing agencies (BIA, BLM, NDOW, etc.). Measures in the plan will include but are not limited to the following:
- Areas with current weeds will be mapped. Topsoil with the presence of weeds will not be salvaged and reused elsewhere in the Project. The topsoil from such areas will be disposed of properly.
 - Inspect heavy equipment for weed seeds before they enter the Project area. Require that such equipment be cleaned first to remove weed seeds before being allowed entry. Clean equipment that has been used in weed infested areas before moving it to another area.
 - Any straw or hay wattles are used for erosion control must be certified weed free.
8. **WEAP.** A WEAP will be presented to all personnel onsite during construction. This program will contain information concerning the biology and distribution of the desert tortoise, desert tortoise activity patterns, and its legal status and occurrence in the proposed Project area. The program will also discuss the definition of "take" and its associated penalties, measures designed to minimize the effects of construction activities, the means by which employees limit impacts, and reporting requirements to be implemented when tortoises are encountered. Personnel will be instructed to check under vehicles before moving them as tortoises often seek shelter under parked vehicles. Personnel will also be instructed on the required procedures if a desert tortoise is encountered within the proposed Project area. WEAP training will be mandatory, as such, workers will be required to sign in and wear a sticker on their hardhat to signify that they have received the training and agree to comply.
9. **Access roads.** Construction access will be limited to the Project area and established access roads.
10. **Speed limits and signage.** Until the desert tortoise fence has been constructed, a speed limit of 15 miles per hour will be maintained during the periods of highest tortoise activity (March 1 through November 1) and a limit of 25 mph during periods of lower tortoise activity. This will reduce dust and allow for observation of tortoises in the road. Speed limit and caution signs will be installed along access roads and service roads. After the tortoise-proof fence is

installed and the tortoise clearance surveys are complete, speed limits within the fenced and cleared areas will be established by the construction contractor based on surface conditions and safety considerations and remain with limits established by the Service in the biological opinion.

11. **Trash and litter control.** Trash and food items will be disposed properly in predator proof containers with resealing lids. Trash will be emptied and removed from the Project site on a periodic basis as they become full. Trash removal reduces the attractiveness of the area to opportunistic predators such as ravens, coyotes, and foxes.
12. **Raptor control.** The applicant will inspect structures annually for nesting ravens and other predatory birds and report observations of nests to the Service and BIA as stated in the Raven Management Plan. Transmission line support structures and other facility structures will be designed to discourage their use by raptors for perching or nesting (e.g., by use of anti-perching devices) in accordance with the most current APLIC guidelines. In addition to increasing desert tortoise protection, following these guidelines during transmission line construction will reduce the possibility of avian electrocution and other hazards.
13. **Overnight hazards.** No overnight hazards to desert tortoises (e.g., auger holes, trenches, pits, or other steep-sided depressions) will be left unfenced or uncovered; such hazards will be eliminated each day prior to the work crew and monitoring biologists leaving the site. All excavations will be inspected for trapped desert tortoises at the beginning, middle, and end of the workday, at a minimum, but will also be continuously monitored by a biological monitor or authorized biologist. Should a tortoise become entrapped, the authorized biologist will remove it immediately.

When outside of the fenced areas of the Project site, Project personnel will not move construction pipes greater than 3 inches in diameter if they are stored less than 8 inches above the ground until they have inspected the pipes to determine the presence or absence of desert tortoises. As an alternative, the Applicant may cap all such structures before storing them outside of the fenced area.

14. **Blasting.** If blasting is required in desert tortoise habitat, detonation will only occur after the area has been surveyed and cleared by an authorized desert tortoise biologist no more than 24 hours prior. A minimum 200-foot buffered area around the blasting site will be surveyed. A larger area will be surveyed depending on the anticipated size of the explosion as determined by the authorized desert tortoise biologist. All desert tortoises above ground within the surveyed area will be moved 500 feet from the blasting site to a shaded location or placed in an unoccupied burrow. Desert tortoises that are moved will be monitored or penned to prevent returning to the buffered survey area. Tortoises located outside of the immediate blast zone and that are within burrows will be left in their burrows. All potential desert tortoise burrows, regardless of occupied status, will be stuffed with newspapers, flagged, and location recorded using a global positioning system (GPS) unit. Immediately after blasting, newspaper and flagging will be removed. If a burrow or cover site has collapsed that could be occupied, it will be excavated to ensure that no tortoises have been buried and are in

danger of suffocation. Tortoises removed from the blast zone will be returned to their burrow if it is intact or placed in a similar unoccupied or constructed burrow.

15. **Penning.** Tortoises may be held *in-* or *ex-situ* (e.g., if temperatures do not allow for translocation or if tortoises do not pass the health assessment) for a maximum of 12 months. Previously constructed and approved enclosure pens are present adjacent to the Project site and will be used if any quarantine is necessary. Quarantine is not the preferred option for tortoises to be translocated and will only be used as necessary in coordination with the Service. This penning is not the same as the temporary penning described in the blasting measure.
16. **Stormwater Pollution Prevention Plan.** The applicant will oversee the establishment and functionality of sediment control devices as outlined in the stormwater pollution prevention plan.
17. **Tortoise Encounters during Construction.** If a tortoise is injured as a direct or indirect result of Project construction activities, it shall be immediately transported to a veterinarian or wildlife rehabilitation facility and reported within 24 hours or the next workday to the Service. Any Project construction-related activity that may endanger a desert tortoise shall cease in the immediate vicinity of a desert tortoise if encountered on the Project site. Project construction activities may resume after an Authorized Biologist removes the desert tortoise from danger or after the desert tortoise has moved to a safe area.

Operations and Maintenance Minimization Measures

The following minimization measures will be implemented during O&M of the Proposed Action to reduce effects on the desert tortoise and other species:

18. **WEAP Training.** WEAP training will be required for all O&M staff for the duration of the Project. In addition to an overview of minimization measures, the training will include specific BMPs designed to reduce effects to the desert tortoise. All Project personnel will check under vehicles or equipment before moving them. If Project personnel encounter a desert tortoise, they will avoid the tortoise. The desert tortoise will be allowed to move a safe distance away prior to moving the vehicle.
19. **Biological Monitoring.** A biological monitor(s) will be present during ground-disturbing and/or off-road O&M activities outside of the fenced solar facility to ensure that no tortoises are in harm's way. Tortoises found aboveground during O&M activities will be avoided or moved by an authorized biologist if necessary. Pre-maintenance clearance surveys followed by temporary exclusionary fencing also will be required if the maintenance action requires ground or vegetation disturbance. A biological monitor will flag the boundaries of areas where activities will need to be restricted to protect tortoises and their habitat. Restricted areas will be monitored to ensure their protection during construction.

20. **Speed Limits.** Speed limits within the project area, along transmission line routes, and access roads will be restricted to less than 25 mph during O&M. Speed limits in the solar facility will be restricted to 15 mph during O&M.
21. **Trash and Litter Control and other Predator Deterrents.** Trash and food items will be disposed properly in predator proof containers with resealing lids. Trash will be emptied and removed from the Project site on a periodic basis as they become full. Trash removal reduces the attractiveness of the area to opportunistic predators such as ravens, coyotes, and foxes. To reduce attractants for birds, open containers that may collect rainwater will be removed or stored in a secure or covered location.

Decommissioning Minimization Measures

The same minimization measures used for construction will be used for decommissioning.

Compensatory Mitigation

The applicant will pay the following required compensatory mitigation:

22. **Habitat Compensation.** Prior to surface disturbance activities within desert tortoise habitat, the Project proponent sets aside, at minimum, an amount equivalent to a one-time remuneration fee (per acre of proposed disturbance). The compensation for habitat loss under Section 7 of the Endangered Species Act (ESA) is an annually adjusted rate, currently \$902/acre (subject to change annually on March 1). Fees are based on the current \$902/acre fee for all permanently disturbed acres. For all project acres that will be temporarily disturbed and leave vegetation in place, fees are assessed at 50% of the current rate.

For this Project, in lieu of assessed fees, the Project proponent will fund a desert tortoise habitat use study, monitoring, and other activities (during construction and continuing into operations) as required in this biological opinion and specifically outlined in the proposed action and in the approved Translocation Plan.

23. **Habitat Use Study.** The Project proponent will work with the University of Nevada, Las Vegas (UNLV), U.S. Geological Survey (USGS), or other agency to design and implement a 2-3-year study to compare onsite and off-site desert vegetation and climate (e.g., annual and perennial plant growth and cover, ambient temperature) to address metrics of habitat change, including how desert tortoises use the vegetation onsite for forage and cover. Results from tortoise monitoring as approved in the Project's desert tortoise translocation plan will also inform the tortoise use portion of this study.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

Jeopardy Determination

Section 7(a)(2) of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531

et seq.) requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed Federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the Status of the Species, which describes the rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities that are reasonably certain to occur in the action area on the species.

Updates to the regulations governing interagency consultation (50 CFR part 402) were effective on October 28, 2019 [84 FR 44976]. This consultation was pending at that time, and we are applying the updated regulations to the consultation. As the preamble to the final rule adopting the regulations noted, “[t]his final rule does not lower or raise the bar on section 7 consultations, and it does not alter what is required or analyzed during a consultation. Instead, it improves clarity and consistency, streamlines consultations, and codifies existing practice.” We have reviewed the information and analyses relied upon to complete this biological opinion in light of the updated regulations and conclude the opinion is fully consistent with the updated regulations.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the species, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the species in the wild by reducing the reproduction, numbers, and distribution of that species.

STATUS OF THE SPECIES- RANGEWIDE

Desert Tortoise

Listing History

The Service listed the Mojave population of desert tortoise (all tortoises north and west of the Colorado River in Arizona, Utah, Nevada, and California) as threatened on April 2, 1990 [55 Federal Register (FR) 12178]. The Service issued an initial recovery plan (Service 1994) and a revised recovery plan (Service 2011a) for the desert tortoise. A five-year review was completed in 2010 (Service 2010a).

Species Biology and Life History (verbatim from Service 2010a. All references are in the 2010 document)

“The desert tortoise is a large, herbivorous reptile that reaches 20 to 38 centimeters (8 to 15 inches) in carapace (upper shell) length and 10 to 15 centimeters (4 to 6 inches) in shell height. Hatchlings emerge from eggs at about 5 centimeters (2 inches) in length. Adults have a domed carapace and relatively flat, unhinged plastrons (lower shell). Their shells are greenish-tan to dark brown in color with tan scute (horny plate on the shell) centers. Adult desert tortoises weigh 3.6 to 6.8 kilograms (8 to 15 pounds). The forelimbs have heavy, claw-like scales and are flattened for digging. Hind limbs are more elephantine (Ernst et al. 1994).

Desert tortoises are well adapted to living in a highly variable and often harsh desert environment. They spend much of their lives in burrows, even during their seasons of activity. In late winter or early spring, they emerge from overwintering burrows and typically remain active through fall. Activity does decrease in summer, but tortoises often emerge after summer rain storms to drink (Henen et al. 1998). Mating occurs both during spring and fall (Black 1976; Rostal et al. 1994). During activity periods, desert tortoises eat a wide variety of herbaceous vegetation, particularly grasses and the flowers of annual plants (Berry 1974; Luckenbach 1982; Esque 1994). During periods of inactivity, they reduce their metabolism and water loss and consume very little food. Adult desert tortoises lose water at such a slow rate that they can survive for more than a year without access to free water of any kind and can apparently tolerate large imbalances in their water and energy budgets (Nagy and Medica 1986; Peterson 1996a,b; Henen et al. 1998).

In drought years, the availability of surface water following rains may be crucial for desert tortoise survival (Nagy and Medica 1986). During these unfavorable periods, desert tortoises decrease surface activity and remain mostly inactive or dormant underground (Duda et al. 1999), which reduces water loss and minimizes energy expenditures (Nagy and Medica 1986). Duda et al. (1999) showed that home range size, number of different burrows used, average distances traveled per day, and levels of surface activity were significantly reduced during drought years.

The size of desert tortoise home ranges varies with respect to location and year (Berry 1986a) and also serves as an indicator of resource availability and opportunity for reproduction and social interactions (O'Connor et al. 1994). Females have long-term home ranges that may be as little or less than half that of the average male, which can range to 200 or more acres (Burge 1977; Berry 1986a; Duda et al. 1999; Harless et al. 2009). Core areas used within tortoises' larger home ranges depend on the number of burrows used within those areas (Harless et al. 2009). Over its lifetime, each desert tortoise may use more than 3.9 km² (1.5 mi²) of habitat and may make periodic forays of more than 11 kilometers (7 miles) at a time (Berry 1986a).

Tortoises are long-lived and grow slowly, requiring 13 to 20 years to reach sexual maturity, and have low reproductive rates during a long period of reproductive potential (Turner et al. 1984; Bury 1987; Germano 1994). Growth rates are greater in wet years with higher annual plant production (e.g., desert tortoises grew an average of 12.3 millimeters [0.5 inch] in an El Niño year compared to 1.8 millimeters [0.07 inches] in a drought year in Rock Valley, Nevada;

Medica et al. 1975). The number of eggs as well as the number of clutches that a female desert tortoise can produce in a season is dependent on a variety of factors including environment, habitat, availability of forage and drinking water, and physiological condition (Turner et al. 1986, 1987; Henen 1997; McLuckie and Fridell 2002). The success rate of clutches has proven difficult to measure, but predation, while highly variable (Bjurlin and Bissonette 2004), appears to play an important role in clutch failure (Germano 1994).”

Recovery Plan

The Service issued an initial recovery plan (Service 1994) and a revised recovery plan (Service 2011a) for the desert tortoise. The 1994 recovery plan recommended that a scientifically credible monitoring plan be developed to determine that the population exhibit a statistically significant upward trend or remain stationary for at least 25 years and that enough habitat would be protected within a recovery unit or the habitat and populations be managed intensively enough to ensure long-term viability. Because both minimum population densities and minimum population numbers need to be considered to ensure recovery, the Service further recommended that reserves be at least 1,000 square miles. Smaller reserves that provide high-quality, secure habitat for 10,000 to 20,000 adult desert tortoises should provide comfortable persistence probabilities for the species well into the future when populations are well above minimum viable density (e.g., 30 or more adults per square mile) and population growth rates (λ) can be maintained (see page C54 of Service 1994). Conversely, populations with densities below approximately 10 adults per square mile (3.9 per square kilometer) are in danger of extinction (see page 32 of Service 1994).

“Adult” desert tortoise connotes reproductive maturity. Desert tortoises may become reproductive at various sizes. The Service based its 2010 survey protocol on the methodology used in rangewide sampling but erred in citing 160 millimeters as the size below which surveyors’ ability to detect desert tortoises decreases. In rangewide sampling, the Service uses 180 millimeters as its cut-off length for counting desert tortoises, at least in part because the Styrofoam models used for training are 180 millimeters in length. The Service changed the survey protocol to use 180 millimeters in the revised version. We have used the term “adult” to indicate reproductive status and those animals larger than 180 millimeters to conform to the Service’s protocols for rangewide sampling and pre-project surveys.

The revised recovery plan for the desert tortoise (Service 2011a) lists three objectives and associated criteria to achieve delisting. The first objective is to maintain self-sustaining populations of desert tortoises within each recovery unit into the future; the criterion is that the rates of population change for desert tortoises are increasing (i.e., $\lambda > 1$) over at least 25 years (i.e., a single generation), as measured by extensive, rangewide monitoring across conservation areas within each recovery unit and by direct monitoring and estimation of vital rates (recruitment, survival) from demographic study areas within each recovery unit.

The second objective addresses the distribution of desert tortoises. The goal is to maintain well-distributed populations of desert tortoises throughout each recovery unit; the criterion is that the distribution of desert tortoises throughout each conservation area increase over at least 25 years.

The final objective is to ensure that habitat within each recovery unit is protected and managed to support long-term viability of desert tortoise populations. The criterion is that the quantity of desert tortoise habitat within each conservation area be maintained with no net loss until population viability is ensured.

The revised recovery plan (Service 2011a) also recommends connecting blocks of desert tortoise habitat, such as critical habitat units and other important areas to maintain gene flow between populations. Linkages defined using least-cost path analysis (Averill-Murray et al. 2013) illustrate a minimum connection of habitat for desert tortoises between blocks of habitat and represent priority areas for conservation of population connectivity. Figure 7 illustrates that, across the range, desert tortoises in areas under the highest level of conservation and management remain subject to numerous threats, stresses, and mortality sources.

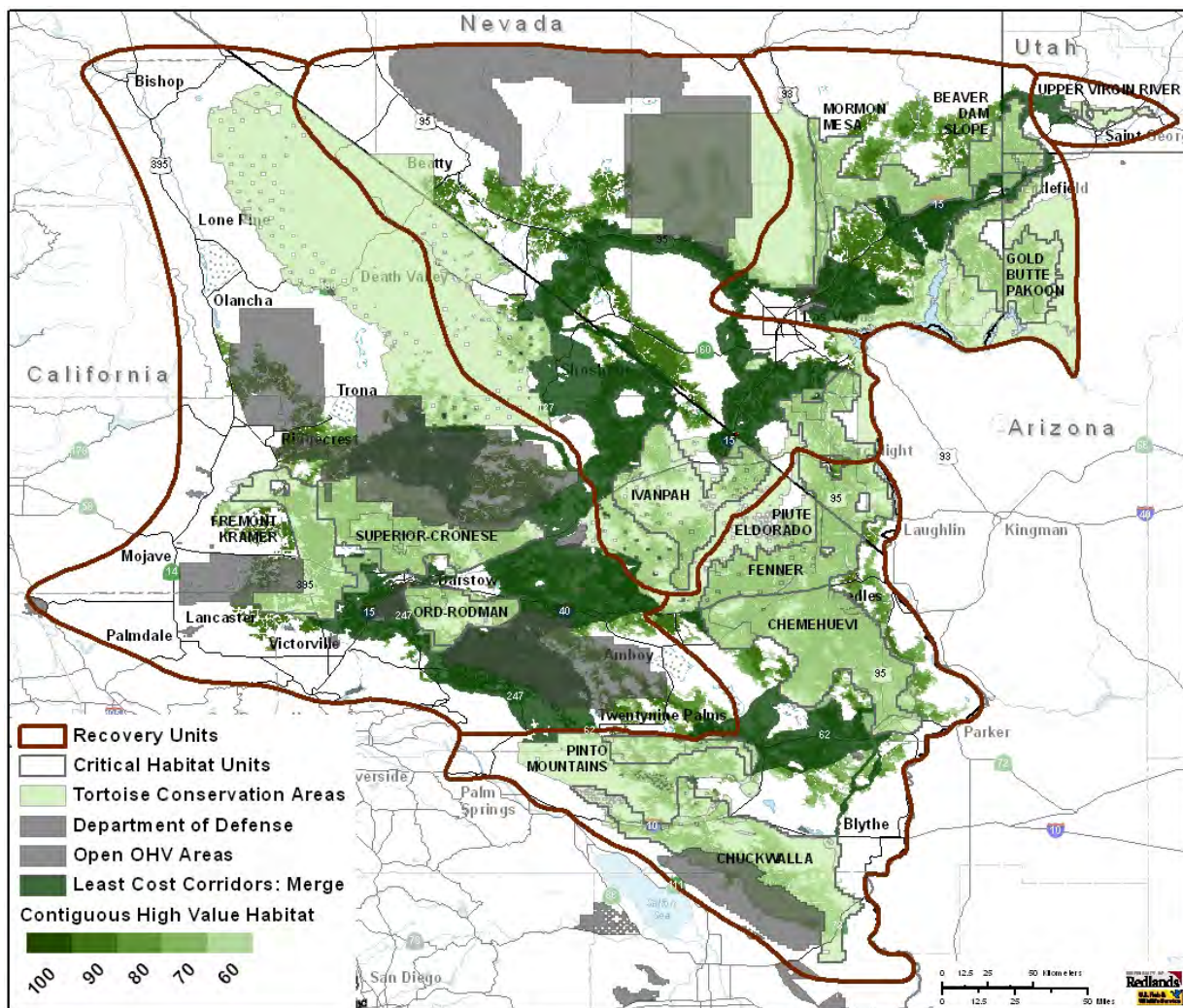


Figure 7. Recovery units, critical habitat units, conservation areas, and contiguous high value habitat.

Threats

The threats described in the listing rule and both recovery plans (Service 1994, 2011a) continue to affect the species. The most apparent threats to the desert tortoise are those that result in mortality and permanent habitat loss across large areas, such as urbanization and large-scale renewable energy projects and those that fragment and degrade habitats, such as proliferation of roads and highways, off-highway vehicle (OHV) activity, wildfire, and habitat invasion by non-native invasive plant species.

We remain unable to quantify how threats affect desert tortoise populations. The assessment of the original recovery plan emphasized the need for a better understanding of the implications of multiple, simultaneous threats facing desert tortoise populations and of the relative contribution of multiple threats on demographic factors (i.e., birth rate, survivorship, fecundity, and death rate; Tracy et al. 2004).

To better understand the relationship of threats to populations of desert tortoises and the most effective manner to implement recovery actions, the Desert Tortoise Recovery Office developed a spatial decision support system that models the interrelationships of threats to desert tortoises and how those threats affect population change. The spatial decision support system describes the numerous threats that desert tortoises face, explains how these threats interact to affect individual animals and habitat, and how these effects in turn bring about changes in populations. For example, we have long known that the construction of a transmission line can result in the death of desert tortoises and loss of habitat. We have also known that common ravens, known predators of desert tortoises, use transmission line pylons for nesting, roosting, and perching and that the access routes associated with transmission lines provide a vector for the introduction and spread of invasive weeds and facilitate increased human access into an area. Increased human access can accelerate illegal collection and release of desert tortoises and their deliberate maiming and killing, as well as facilitate the spread of other threats associated with human presence, such as vehicle use, garbage and dumping, and invasive plants (Service 2011a). Changes in the abundance of native plants, because of invasive weeds, can compromise the physiological health of desert tortoises, making them more vulnerable to drought, disease, and predation. The spatial decision support system allows us to map threats across the range of the desert tortoise and model the intensity of stresses that these multiple and combined threats place on desert tortoise populations.

The following map (Figure 8) depicts the 12 critical habitat units of the desert tortoise, linkages between conservation areas for the desert tortoise and the aggregate stress that multiple, synergistic threats place on desert tortoise populations, as modeled by the spatial decision support system. Conservation areas include designated critical habitat and other lands managed for the long-term conservation of the desert tortoise (e.g., the Desert Tortoise Natural Area, Joshua Tree National Park, and the Desert National Wildlife Refuge).

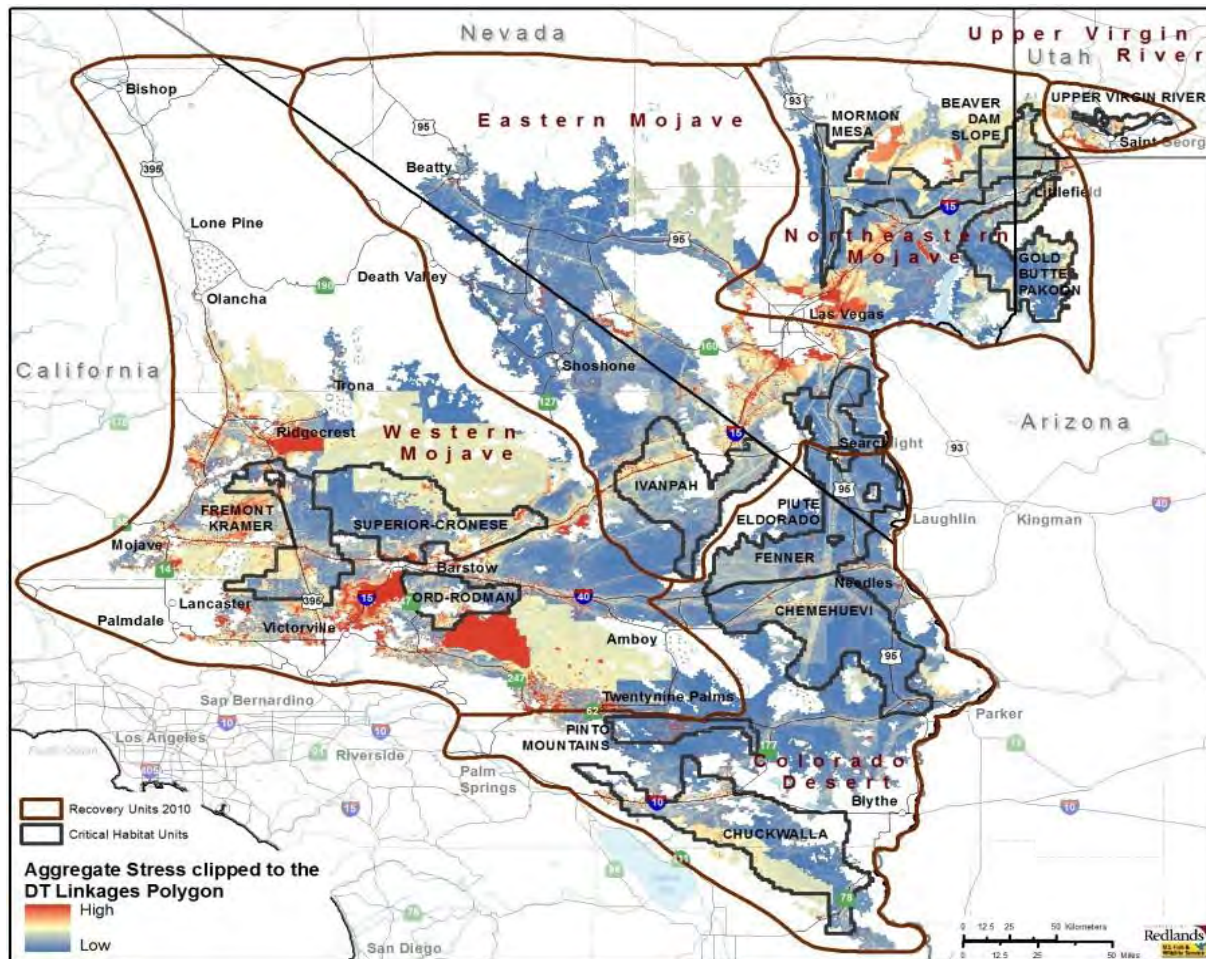


Figure 8. Critical habitat units, recovery units, and linkages.

Five-Year Review

Section 4(c)(2) of the Endangered Species Act requires the Service to conduct a status review of each listed species once every 5 years. The purpose of a 5-year review is to evaluate whether the species' status has changed since it was listed (or since the most recent 5-year review); these reviews, at the time of their completion, provide the most up-to-date information on the rangewide status of the species. For this reason, we are appending the 5-year review of the status of the desert tortoise (Service 2010a) to this biological opinion and are incorporating it by reference to provide most of the information needed for this section of the biological opinion. The following paragraphs provide a summary of the relevant information in the 5-year review.

In the 5-year review, the Service discusses the status of the desert tortoise as a single distinct population segment and provides information on the Federal Register notices that resulted in its listing and the designation of critical habitat. The Service also describes the desert tortoise's ecology, life history, spatial distribution, abundance, habitats, and the threats that led to its listing (i.e., the five-factor analysis required by section 4(a)(1) of the Endangered Species Act). In the 5-year review, the Service concluded by recommending that the status of the desert tortoise as a

threatened species be maintained.

With regard to the status of the desert tortoise as a distinct population segment, the Service concluded in the 5-year review that the recovery units recognized in the original and revised recovery plans (Service 1994 and 2011a, respectively) do not qualify as distinct population segments under the Service's distinct population segment policy (61 FR 4722; February 7, 1996). We reached this conclusion because individuals of the listed taxon occupy habitat that is relatively continuously distributed, exhibit genetic differentiation that is consistent with isolation-by-distance in a continuous-distribution model of gene flow, and likely vary in behavioral and physiological characteristics across the area they occupy as a result of the transitional nature of, or environmental gradations between, the described subdivisions of the Mojave and Colorado deserts.

The Service summarizes information in the 5-year review with regard to the desert tortoise's ecology and life history. Of key importance to assessing threats to the species and to developing and implementing a strategy for recovery is that desert tortoises are long lived, require up to 20 years to reach sexual maturity, and have low reproductive rates during a long period of reproductive potential. The number of eggs that a female desert tortoise can produce in a season is dependent on a variety of factors including environment, habitat, availability of forage and drinking water, and physiological condition. Predation seems to play an important role in clutch failure. Predation and environmental factors also affect the survival of hatchlings. The Service notes in the 5-year review that the combination of the desert tortoise's late breeding age and a low reproductive rate challenges our ability to recover the species.

The 5-year review also notes that desert tortoises increase their reproduction in high rainfall years; more rain provides desert tortoises with more high quality food (i.e., plants that are higher in water and protein), which, in turn, allows them to lay more eggs. Conversely, the physiological stress associated with foraging on food plants with insufficient water and nitrogen may leave desert tortoises vulnerable to disease, and the reproductive rate of diseased desert tortoises is likely lower than that of healthy animals. Young desert tortoises also rely upon high-quality, low-fiber plants (e.g., native annual plants) with nutrient levels not found in the invasive weeds that have increased in abundance across its range (Oftedal et al. 2002; Tracy et al. 2004). Compromised nutrition of young desert tortoises likely represents an effective reduction in reproduction by reducing the number of animals that reaches adulthood. Consequently, although we do not have quantitative data that show a direct relationship, the abundance of weedy species within the range of the desert tortoise has the potential to affect the reproduction of desert tortoises and recruitment into the adult population in a negative manner.

The vast majority of threats to the desert tortoise or its habitat are associated with human land uses. Using captive neonate and yearling desert tortoises, Drake et al. (2015) found that individuals "eating native forbs had better body condition and immune functions, grew more, and had higher survival rates (>95%) than (desert) tortoises consuming any other diet"; health and body condition declined in individuals fed only grasses (native or non-native). Current information indicates that invasive species likely affect a large portion of the desert tortoise's range. Furthermore, high densities of weedy species increase the likelihood of wildfires;

wildfires, in turn, destroy native species and further the spread of invasive weeds.

Drake et al. (2015) “compared movement patterns, home-range size, behavior, microhabitat use, reproduction, and survival for adult desert tortoises located in, and adjacent to, burned habitat” in Nevada. They noted that the fires killed many desert tortoises but found that, in the first five years post-fire, individuals moved deeper into burned habitat on a seasonal basis and foraged more frequently in burned areas (corresponding with greater production of annual plants and herbaceous perennials in these areas). Production of annual plants upon which desert tortoises feed was 10 times greater in burned versus unburned areas but was dominated by non-native species (e.g., red brome [*Bromus rubens*]) that frequently have lower digestibility than native vegetation. During years six and seven, the movements of desert tortoises into burned areas contracted with a decline in the live cover of a perennial forage plant that rapidly colonizes burned areas. Drake et al. (2015) did not find any differences in health or survivorship for desert tortoises occupying either habitat (burned or unburned) during this study or in reproduction during the seventh year after the fire.

Various human activities have introduced numerous species of non-native invasive plants into the California desert. Routes that humans use to travel through the desert (paved and unpaved roads, railroads, motorcycle trails, etc.) serve as pathways for new species to enter habitat of the desert tortoise and for species that currently occur there to spread. Other disturbances of the desert substrate also provide invasive species with entry points into the desert. Figure 9 depicts the potential for these species to invade habitat of the desert tortoise. The reproductive capacity of the desert tortoise may be compromised to some degree by the abundance and distribution of invasive weeds across its range; the continued increase in human access across the desert likely continues to facilitate the spread of weeds and further affect the reproductive capacity of the species.

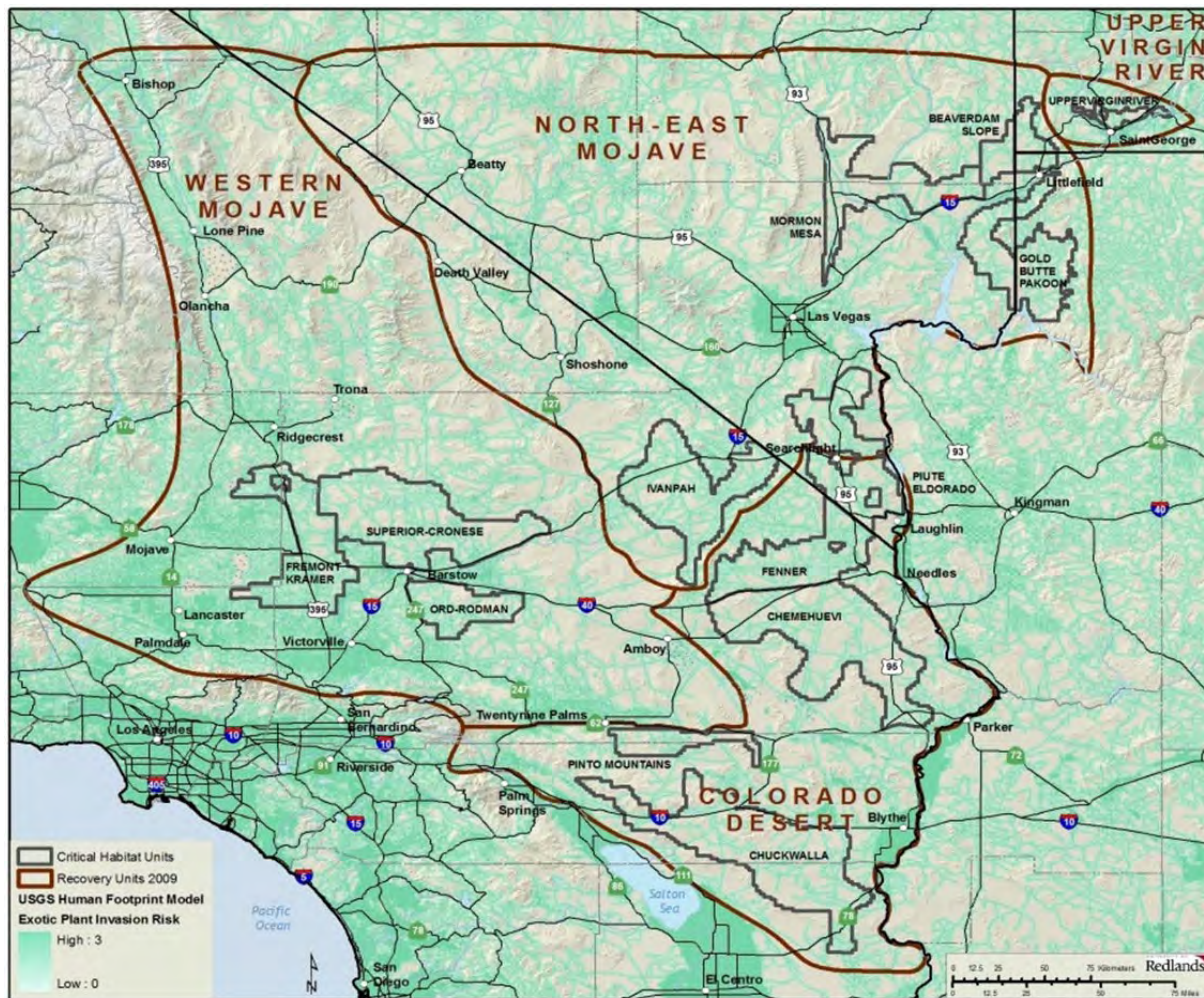


Figure 9. Potential for exotic plant invasion in desert tortoise habitat.

Since the completion of the 5-year review, the Service has issued several biological opinions that affect large areas of desert tortoise habitat because of numerous proposals to develop renewable energy within its range. These biological opinions concluded that proposed solar plants were not likely to jeopardize the continued existence of the desert tortoise primarily because they were located outside of critical habitat and desert wildlife management areas that contain most of the land base required for the recovery of the species. The proposed actions also included numerous measures intended to protect desert tortoise during the construction of the projects, such as translocation of affected individuals. In aggregate, these projects would result in an overall loss of approximately 48,041 acres of habitat of the desert tortoise. We also predicted that the project areas supported up to 4,363 desert tortoises; we concluded that most of these individuals were small desert tortoises, that most adults would likely be translocated from project sites, and that most mortalities would be small desert tortoises (< 180 mm) that were not detected during clearance surveys. To date, 660 desert tortoises have been observed during construction of solar projects (Table 3); most of these individuals were translocated from work areas, although some desert tortoises have been killed. The mitigation required by the BLM and California Energy Commission (the agencies permitting some of these facilities) resulted in the acquisition of

private land and funding for the implementation of various actions that are intended to promote the recovery of the desert tortoise. These mitigation measures are consistent with recommendations in the recovery plans for the desert tortoise; many of the measures have been derived directly from the recovery plans and the Service supports their implementation. We expect that, based on the best available scientific information, they will result in conservation benefits to the desert tortoise; however, it is difficult to assess how desert tortoise populations will respond because of the long generation time of the species. Table 3 summarizes information regarding the solar projects that have undergone formal consultation with regard to the desert tortoise.

Table 3. Solar projects for which the Service has issued biological opinions or incidental take permits. References are in Literature Cited.

Project and Recovery Unit	Acres of Desert Tortoise Habitat	Desert Tortoises Estimated¹	Desert Tortoises Observed²	Citations³
Eastern Mojave				
Ivanpah Solar Electric Generating System	3,582	1,136	175 ⁷	Service 2011b, Davis 2014
Stateline	1,685	947	55	Service 2013a, Ironwood 2014
Silver State North – NV	685	14 ⁶	7	Service 2010b, NewFields 2011
Silver State South – NV	2,427 ⁴	1,020 ⁴	152	Service 2013a, Cota 2014
Amargosa Farm Road – NV	4,350	4 ⁶	-	Service 2010f
Nevada Solar One - NV	400	5	5	Burroughs 2012, 2014
Copper Mountain North - NV	1,504	10 ⁵	3 ⁵	Service 2011c, 2013b; NewFields 2014
Copper Mountain - NV	380	5	5	Burroughs 2012, 2014
Townsite - NV	905	4 ⁸	- ⁵	Service 2014a
Techren Boulder City - NV	2,291	15 ⁹	- ⁵	Service 2012a
Valley Electric Association - NV	80	4	4 ¹⁰	Service 2015a
Western Mojave				
Mojave Solar, Abengoa Harper Lake	Primarily in abandoned agricultural fields	4 ⁶	-	Service 2011d
Chevron Lucerne Valley	516	10	-	Service 2010c
Cinco	500	53	2	Service 2015b, Daitch 2015
Soda Mountain	1,726	78	-	Service 2015c

Project and Recovery Unit	Acres of Desert Tortoise Habitat	Desert Tortoises Estimated¹	Desert Tortoises Observed²	Citations³
Northeastern Mojave				
Res Americas Moapa Solar Energy Center - NV	951	95	-	Service 2014b
Moapa K Road Solar	2,141	186	177	Service 2012b, Cardno, Inc 2018
Playa Solar	1,538	258	77	Service 2015d, Ironwood Consulting 2016
Invenergy Harry Allen Solar	594	242	-	Service 2015d
NV Energy Dry Lake Solar Energy Center	751	45	-	Service 2015d
NV Energy Dry Lake Solar Energy Center at Harry Allen	55	15	-	Service 2015d
Aiya Solar	672	91	-	Service 2015e
Mountainview	146	5	5	Wise 2018
Colorado				
Genesis	1,774	8	0	Service 2010d, Fraser 2014a
Blythe	6,958	30	0	Service 2010e, Fraser 2014b
Desert Sunlight	4,004	56	7	Service 2011e, Fraser 2014a
McCoy	4,533	15	0	Service 2013c, Fraser 2014b
Desert Harvest	1,300	5	-	Service 2013d
Rice	1,368	18	1	Service 2011f, Fraser 2014a
Total	47,816	4,363	660	

¹The numbers in this column are not necessarily comparable because the methodologies for estimating the numbers of desert tortoises occasionally vary between projects. When available, we included an estimate of the numbers of small desert tortoises.

²This column reflects the numbers of desert tortoises observed within project areas. It includes translocated animals and those that were killed by project activities. Project activities may result in the deaths of more desert tortoises than are found. Dashes represent projects for which we have no information at this point; some projects have not broken ground at the time of this biological opinion.

³The first citation in this column is for both the acreage and the estimate of the number of desert tortoises. The second is for the number of desert tortoises observed during construction of the project; where only one citation is present, construction has not begun or data are unavailable at this time.

⁴These numbers include Southern California Edison's Primm Substation and its ancillary facilities.

⁵These projects occurred under the Clark County Multi-species Habitat Conservation Plan; the provisions of the habitat conservation plan do not require the removal of desert tortoises. We estimate that all six projects combined will affect fewer than 50 desert tortoises.

⁶These estimates do not include smaller desert tortoises.

⁷In the table attached to the electronic mail, the number of desert tortoises translocated from the project site is

represented by the total number of translocated animals minus the number of animals born in the holding pens.

⁸The estimate of the number of desert tortoises is from the portion of the project on BLM land (20.39 acres). The remaining lands are covered by the Clark County Multi-species Habitat Conservation Plan; see footnote 5.

⁹The estimate of the number of desert tortoises is from both BLM (104 acres) and private (2,200 acres) land. The remaining lands are covered by the Clark County Multi-species Habitat Conservation Plan; see footnote 5.

¹⁰Of the 80-acre project site, 76.4 acres were left intact (there was crushing and mowing of vegetation but no blading) with openings along the bottom of the fence for tortoise. After project completion, four tortoises were released back into the solar facility on September 25, 2017. One adult has left and re-entered the facility twice and the one juvenile has remained within the facility.

In August 2016, the Service (2016a) issued a biological opinion to the BLM for a land use plan amendment under the Desert Renewable Energy Conservation Plan. The land use plan amendment addressed all aspects of the BLM's management of the California Desert Conservation Area; however, the Service and BLM agreed that only those aspects related to the construction, operation, maintenance, and decommissioning of renewable energy facilities were likely to adversely affect the desert tortoise. The land use plan amendment resulted in the designation of approximately 388,000 acres of development focus areas where the BLM would apply a streamlined review process to applications for projects that generate renewable energy; the BLM estimated that approximately 11,290 acres of modeled desert tortoise habitat within the development focus areas would eventually be developed for renewable energy. The BLM also adopted numerous conservation and management actions as part of the land use plan amendment to further reduce the adverse effects of renewable energy development on the desert tortoise.

The land use plan amendment also increased the amount of land that the BLM manages for conservation in California (e.g., areas of critical environmental concern, National Conservation Lands, etc.) from 6,118,135 to 8,689,669 acres (BLM 2015); not all of the areas subject to increased protection are within desert tortoise habitat. The BLM will also manage lands outside of development focus areas according to numerous conservation and management actions; these conservation and management actions are more protective of desert tortoises than direction contained in the previous land use plan. The Service (2016a) concluded that the land use plan amendment was not likely to jeopardize the continued existence of the desert tortoise and would benefit its recovery.

In addition to the biological opinions issued for solar development within the range of the desert tortoise, the Service (2012c) also issued a biological opinion to the Department of the Army (Army) for the use of additional training lands at Fort Irwin. As part of this proposed action, the Army translocated approximately 650 adult desert tortoises from 18,197 acres of the southern area of Fort Irwin, which had been off-limits to training, to lands south of the base that are managed by the BLM and the Army. The Army would also use an additional 48,629 acres that lie east of the former boundaries of Fort Irwin; much of this parcel is either too mountainous or too rocky and low in elevation to support numerous desert tortoises.

The Service also issued a biological opinion to the Department of the Navy (Navy) that considered the effects of the expansion of the Marine Corps Air Ground Combat Center at Twentynine Palms (Service 2017a). We concluded that the Navy's proposed action, the use of approximately 167,982 acres of public and private land for training, was not likely to jeopardize the continued existence of the desert tortoise. Most of the expansion area lies within the Johnson

Valley Off-highway Vehicle Management Area. As part of this proposed action, the Navy translocated 997 adult desert tortoises from the expansion area to four recipient sites to the north and east of the expansion area (Henen 2019). The Lucerne-Ord and Siberia sites are entirely within BLM-managed lands, and the Rodman-Sunshine Peak North and Cleghorn sites overlap BLM-managed lands and lands managed by the Navy. The Lucerne-Ord site lies within the Ord-Rodman desert tortoise critical habitat unit. The tortoises that were translocated by the Navy from the Johnson Valley Off-highway Vehicle Management Area were moved into populations that were below the Service's established minimum viable density, to attempt to augment these populations and make them more viable in the long-term.

The incremental effect of the larger actions (i.e., solar development, the expansions of Fort Irwin and the Marine Corps Air Ground Combat Center) on the desert tortoise is unlikely to be positive, despite the numerous conservation measures that have been (or will be) implemented as part of the actions. The acquisition of private lands as mitigation for most of these actions increases the level of protection afforded these lands; however, these acquisitions do not create new habitat and Federal, State, and privately managed lands remain subject to most of the threats and stresses we discussed previously in this section. Although land managers have been implementing measures to manage these threats and we expect, based on the best available scientific information, that such measures provide conservation benefits to the desert tortoise, we have been unable, to date, to determine whether the expected benefits of the measures have yet been realized, at least in part because of the low reproductive capacity of the desert tortoise. Therefore, the conversion of habitat into areas that are unsuitable for this species continues the trend of constricting the desert tortoise into a smaller portion of its range.

As the Service notes in the 5-year review (Service 2010a), "(t)he threats identified in the original listing rule continue to affect the (desert tortoise) today, with invasive species, wildfire, and renewable energy development coming to the forefront as important factors in habitat loss and conversion. The vast majority of threats to the desert tortoise or its habitat are associated with human land uses."

Another factor affecting the existence of the desert tortoise is climate change, which is likely to affect the prospects for the long-term conservation of the desert tortoise. For example, predictions for climate change within the range of the desert tortoise suggest more frequent and/or prolonged droughts with an increase of the annual mean temperature by 3.5 to 4.0 degrees Celsius. The greatest increases will likely occur in summer (June-July-August mean increase of as much as 5 degrees Celsius [Christensen et al. 2007]). Precipitation will likely decrease by 5 to 15 percent annually in the region; with winter precipitation decreasing by up to 20 percent and summer precipitation increasing by up to 5 percent. Because germination of the desert tortoise's food plants is highly dependent on cool-season rains, the forage base could be reduced due to increasing temperatures and decreasing precipitation in winter. Although drought occurs routinely in the Mojave Desert, extended periods of drought have the potential to affect desert tortoises and their habitats through physiological effects to individuals (i.e., stress) and limited forage availability. To place the consequences of long-term drought in perspective, Longshore et al. (2003) demonstrated that even short-term drought could result in elevated levels of mortality of desert tortoises. Therefore, long-term drought is likely to have even greater effects,

particularly given that the current fragmented nature of desert tortoise habitat (e.g., urban and agricultural development, highways, freeways, military training areas, etc.) will make recolonization of extirpated areas difficult, if not impossible.

Core Criteria for the Jeopardy Determination

When determining whether a proposed action is likely to jeopardize the continued existence of a species, we are required to consider whether the action would “reasonably be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR 402.02). Although the Service does not explicitly address these metrics in the 5-year review, we have used the information in that document and more recent information to summarize the status of the desert tortoise with respect to its reproduction, numbers, and distribution.

Reproduction

In the 5-year review, the Service notes that desert tortoises increase their reproduction in high rainfall years; more rain provides desert tortoises with more high quality food (i.e., plants that are higher in water and protein), which, in turn, allows them to lay more eggs. Conversely, the physiological stress associated with foraging on food plants with insufficient water and nitrogen may leave desert tortoises vulnerable to disease (Ofstedal 2002 in Service 2010a), and the reproductive rate of diseased desert tortoises is likely lower than that of healthy animals. Young desert tortoises also rely upon high-quality, low-fiber plants (e.g., native annual plants) with nutrient levels not found in the invasive weeds that have increased in abundance across its range (Ofstedal et al. 2002; Tracy et al. 2004). Compromised nutrition of young desert tortoises likely represents an effective reduction in reproduction by reducing the number of animals that reaches adulthood; see previous information from Drake et al. (2015). Consequently, although we do not have quantitative data that show a direct relationship, the abundance of weedy species within the range of the desert tortoise has the potential to affect the reproduction of desert tortoises and recruitment into the adult population in a negative manner.

Various human activities have introduced numerous species of non-native invasive plants into the California desert. Routes that humans use to travel through the desert (paved and unpaved roads, railroads, motorcycle trails, etc.) serve as pathways for new species to enter habitat of the desert tortoise and for species that currently occur there to spread. Other disturbances of the desert substrate also provide invasive species with entry points into the desert. The reproductive capacity of the desert tortoise may be compromised to some degree by the abundance and distribution of invasive weeds across its range; the continued increase in human access across the desert likely continues to facilitate the spread of weeds and further affect the reproductive capacity of the species.

Numbers

In the 5-year review, the Service discusses various means by which researchers have attempted

to determine the abundance of desert tortoises and the strengths and weaknesses of those methods. Due to differences in area covered and especially to the non-representative nature of earlier sample sites, data gathered by the Service’s current rangewide monitoring program cannot be reliably compared to information gathered through other means at this time.

Data from small-scale study plots (e.g., one square mile) established as early as 1976 and surveyed primarily through the mid-1990s indicate that localized population declines occurred at many sites across the desert tortoise’s range, especially in the western Mojave Desert; spatial analyses of more widespread surveys also found evidence of relatively high mortality in some parts of the range (Tracy et al. 2004). Although population densities from the local study plots cannot be extrapolated to provide an estimate of the number of desert tortoises on a rangewide basis, historical densities in some parts of the desert exceeded 100 adults per mi² (38 per km²; Tracy et al. 2004). The Service (2010a) concluded that “appreciable declines at the local level in many areas, which coupled with other survey results, suggest that declines may have occurred more broadly.”

The rangewide monitoring that the Service initiated in 2001 is the first comprehensive attempt to determine the densities of desert tortoises in conservation areas across their range. The Desert Tortoise Recovery Office (Allison and McLuckie 2018) used annual density estimates obtained from this sampling effort to evaluate rangewide trends in the density of desert tortoises over time. (All references to the density of desert tortoises are averages. Some areas support higher densities and some lower; desert tortoises are not distributed in uniform densities across large areas.) This analysis indicates that densities in the Northeastern Mojave Recovery Unit have increased since 2004, with the increase apparently resulting from increased survival of adults and sub-adults moving into the adult size class. The analysis also indicates that the populations in the other four recovery units are declining; Table 4 depicts the estimated abundance of desert tortoises within the recovery units and the change in abundance. Surveys did not include the steepest slopes in these desert tortoise conservation areas; however, the model developed by Nussear et al. (2009) generally rates steep slopes as less likely to support desert tortoises.

Table 4. Tortoise estimates within recovery units and change in abundance (Allison and McLuckie 2018).

Recovery Unit	Modeled Habitat (km²)	2004 Abundance	2014 Abundance	Change in Abundance
Western Mojave	23,139	131,540	64,871	-66,668
Colorado Desert	18,024	103,675	66,097	-37,578
Northeastern Mojave	10,664	12,610	46,701	+34,091
Eastern Mojave	16,061	75,342	24,664	-50,679
Upper Virgin River	613	13,226	10,010	-3,216
Total	68,501	336,393	212,343	-124,050

In the previous summary of the results of rangewide sampling (Service 2015f), we extrapolated the densities obtained within conservation areas (e.g., desert wildlife management area, Desert Tortoise Research Natural Area, Joshua Tree National Park) to all modeled habitat of the desert tortoise. This extrapolation may have exaggerated the number of desert tortoises because we

applied the values for areas where densities are generally highest (i.e., the conservation areas) to areas where desert tortoises exist in very low densities (e.g., the Antelope Valley). We are also aware of a few areas where the density of desert tortoises outside of conservation areas is higher than inside.

To examine the status of desert tortoise populations over time, we compared the densities of desert tortoises in the Western Mojave Recovery Unit between 2004 and 2014 (see Service 2015f). In 2004, desert tortoise conservation areas surveyed in the Western Mojave Recovery Unit supported an average density of approximately 5.7 adults per km² (14.8 per mi²). In contrast, surveys in the same areas in 2014 indicated that densities had decreased to 2.8 adults per km² (7.3 per mi²). This decline in densities is consistent with decreases in density of populations in all recovery units over the same time period, with the exception of the Northeastern Mojave Recovery Unit. In fact, historical survey data from numerous plots in the Western Mojave Recovery Unit during the late 1970s and early 1980s suggest that adult desert tortoise densities ranged from 50 to 150 per mi² (19 to 58 per km²; Tracy et al. 2004).

To further assess the status of the desert tortoise, the Desert Tortoise Recovery Office (Service 2015f) used multi-year trends from the best-fitting model describing loge-transformed density of adult animals per square kilometer. In 2014, 3 of the 5 recovery units supported densities below 3.9 adult animals per km² [Western Mojave (2.8), Eastern Mojave (1.5), and Colorado Desert (3.7); see table 10 in Service 2015f], which is the minimum density recommended to avoid extinction in the 1994 recovery plan. The Northeastern Mojave Recovery Unit supported 4.4 adult desert tortoises per km² and the Upper Virgin River Recovery Unit, which is by far the smallest recovery unit, supported 15.3 adults per km².

Allison (2014) evaluated changes in size distribution of desert tortoises since 2001. In the Western Mojave and Colorado Desert recovery units, the relative number of juveniles to adults indicates that juvenile numbers are declining faster than adults. In the Eastern Mojave, the number of juvenile desert tortoises is also declining, but not as rapidly as the number of adults. In the Upper Virgin River Recovery Unit, trends in juvenile numbers are similar to those of adults; in the Northeastern Mojave Recovery Unit, the number of juveniles is increasing, but not as rapidly as are adult numbers in that recovery unit. Juvenile numbers, like adult densities, are responding in a directional way, with increasing, stable, or decreasing trends, depending on the recovery unit where they are found.

In this context, we consider “juvenile” desert tortoises to be animals smaller than 180 millimeters in length. The Service does not include juveniles detected during rangewide sampling in density estimations because they are more difficult to detect and surveyors frequently do not observe them during sampling. However, this systematic rangewide sampling provides us with an opportunity to compare the proportion of juveniles to adults observed between years.

Distribution

Prior to 1994, desert tortoises were extirpated from large areas within their distributional limits by urban and agricultural development (e.g., the cities of Barstow and Lancaster, California; Las

Vegas, Nevada; and St. George, Utah; etc.; agricultural areas south of Edwards Air Force Base and east of Barstow), military training (e.g., Fort Irwin, Leach Lake Gunnery Range), and off-road vehicle use (e.g., portions of off-road management areas managed by the BLM and unauthorized use in areas such as east of California City, California).

Urban development around Las Vegas has likely been the largest contributor to habitat loss throughout the range since 1994, but there are other large areas of habitat loss. Desert tortoises have essentially been removed from the 18,197-acre southern expansion area at Fort Irwin (Service 2012c). The development of large solar facilities has also reduced the amount of habitat available to desert tortoises. No solar facilities have been developed within desert tortoise conservation areas, such as desert wildlife management areas, although such projects have occurred in areas that the Service considers important linkages between conservation areas (e.g., Silver State South Project in Nevada).

In recognition of the absence of specific and recent information on the location of habitable areas within the Mojave Desert, especially at the outer edges, Nussear et al. (2009) developed a quantitative, spatial habitat model for the desert tortoise north and west of the Colorado River (Figure 10). The model incorporates environmental variables such as precipitation, geology, vegetation, and slope and is based on occurrence data of desert tortoises from sources spanning more than 80 years, including data from the 2001 to 2008 rangewide monitoring surveys. The model predicts the relative potential for desert tortoises to be present in any given location, given the combination of habitat variables at that location in relation to areas of known occupancy throughout the range; calculations of the amount of desert tortoise habitat in the 5-year review (Service 2010a); and the use of a threshold of 0.5 or greater predicted value for potential desert tortoise habitat in this biological opinion. The model does not account for anthropogenic effects to habitat and represents the potential for occupancy by desert tortoises absent these effects.

Figure 10 and Table 5 depict acreages of habitat (as modeled by Nussear et al. 2009, using only areas with a probability of occupancy by desert tortoises greater than 0.5 as potential habitat) within the recovery units of the desert tortoise and of impervious surfaces as of 2006 (Fry et al. 2011); calculations are by Darst (2014). Impervious surfaces include paved and developed areas and other disturbed areas that have zero probability of supporting desert tortoises. All units are in acres.

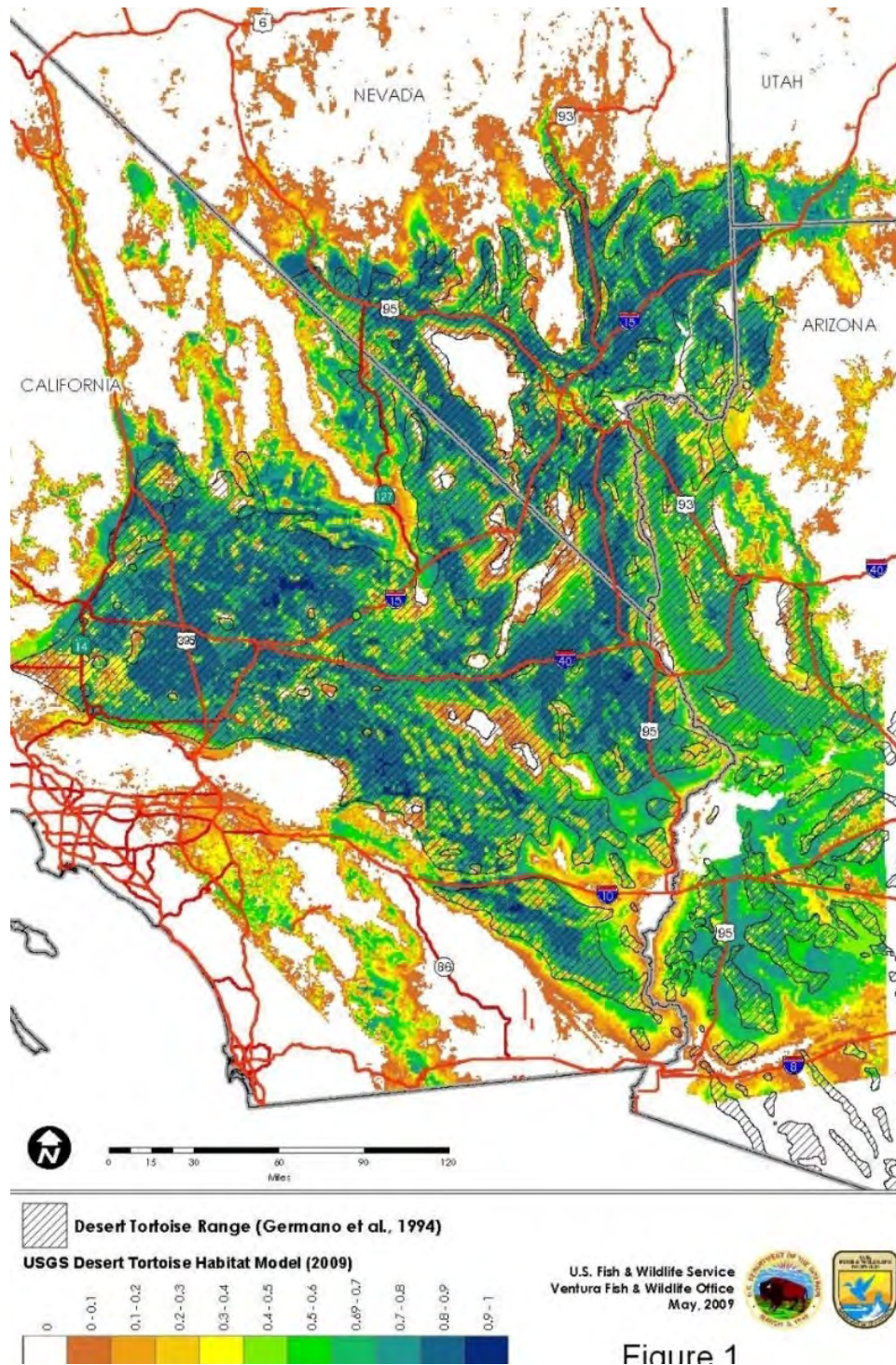


Figure 10. Modeled tortoise habitat within recovery units.

Table 5. Acres of desert tortoise habitat within recovery units.

Recovery Units	Modeled Habitat	Impervious Surfaces (percentage)	Remaining Modeled Habitat
Western Mojave	7,585,312	1,989,843 (26)	5,595,469
Colorado Desert	4,950,225	510,862 (10)	4,439,363
Northeastern Mojave	3,012,293	386,182 (13)	2,626,111
Eastern Mojave	4,763,123	825,274 (17)	3,937,849
Upper Virgin River	231,460	84,404 (36)	147,056
Total	20,542,413	3,796,565 (18)	16,745,848

The Service (2010a) concluded in its 5-year review that the distribution of the desert tortoise has not changed substantially since the publication of the original recovery plan in 1994 in terms of the overall extent of its range. Since 2010, we again conclude that the species' distribution has not changed substantially in terms of the overall extent of its range, although desert tortoises have been removed from several thousand acres because of solar development, military activities, and other project development.

Moapa Dace

Listing History

The Moapa dace was federally listed as endangered under the Endangered Species Preservation Act of 1966 on March 11, 1967 (32 FR 4001), and has been protected under the Act since its inception in 1973. Critical habitat has not been designated for the Moapa dace.

Species Biology and Life History

The Moapa dace was first collected in 1938 and was described by Hubbs and Miller (1948). Key identification characteristics are a black spot at the base of the tail and small, embedded scales that create a smooth leathery appearance. Coloration is olive-yellow above with indistinct blotches on the sides and a white belly. A diffuse, golden-brown stripe is also present. Maximum size is approximately 4.7 inches in fork length. The oldest known specimen on record is over four years old (Scoppettone et al. 1992). Visual observations of Moapa dace have revealed that they are omnivores, feeding primarily on drift items, but adults forage from the substrate as well. Larval dace feed on plankton in the upper water column, in areas with little or no current, and juveniles feed at mid-water (Service 1996).

The Moapa dace is a member of the North American minnow family, *Cyprinidae*. The genus *Moapa* is regarded as being most closely related to the dace genera *Rhinichthys* (speckled dace) and *Agosia* (longfin dace) (Coburn and Cavender 1992). These three dace genera, along with the genera *Gila* (chub), *Lepidomeda* (spinedace), *Meda* (spikedace), and *Plagopterus* (woundfin), developed from a single ancestral type (monophyletic) and are only associated with the Colorado River Basin (Service 1996).

The Moapa dace typically occur in waters ranging from 78.8 to 89.6 °F (Hubbs and Miller 1948); however, one individual was collected in water temperatures of 67.1 °F (Ono et al. 1983). Although Rinne and Minckley (1991) rarely found the species below 86° F, Deacon and Bradley (1972) indicated that the species reaches its greatest abundance at warmer temperatures between 82.4 and 86.0° F.

Reproduction occurs year-round and is confined to the upper, spring-fed tributaries where the water temperatures vary from 84.2 to 89.9 °F and dissolved oxygen concentrations vary between 4.1 and 6.2 parts per million (Scoppettone et al. 1992). Juveniles occur almost exclusively in the spring-fed tributaries, whereas adults occur in the mainstem of the Muddy River (Scoppettone et al. 1992). Adults show the greatest tolerance to cooler water temperatures, which appears to be 78.8 °F (Scoppettone 1993). Given the species temperature tolerances and cooling pattern of the river (in a downstream direction), its range appears to be restricted to the warmer waters of the upper springs and tributaries of the Warm Springs area (Deacon and Bradley 1972, Cross 1976, Scoppettone et al. 1992).

Moapa dace larvae have been observed year-round, indicating year-round reproduction; however, peak spawning activity likely occurs in the spring, with lesser activity in autumn, probably linked to food availability (Scoppettone et al. 1992). Sexual maturity occurs at one year of age, at approximately a 1.6- to 1.8-inch fork length (Hubbs and Miller 1948; Scoppettone et al. 1987, 1992). Fecundity is related to fish size; egg counts range from 60 eggs in a 1.77-inch fork length dace to 772 eggs in a 3.5-inch fork length dace (Scoppettone et al. 1992).

Although Moapa dace have never been observed spawning, Scoppettone et al. (1992) observed recently emerged larvae within 492 ft of the warm water spring discharge, over sandy silt bottoms in temperatures ranging from 86 to 89.6°F, and dissolved oxygen levels of 3.8 to 7.3 ppm. Sexually mature Moapa dace must migrate upstream from the Muddy River into thermal tributaries to spawn successfully (Scoppettone et al. 1987). Several depressions in the sand were similar to “redds” described by Minckley and Barber (1971) for longfin dace (*Agosia chrysogaster*). Depth and velocity at the suspected redds were representative of the outflow channel and similar to other suspected spawning areas in the Warm Springs (Scoppettone et al. 1992). Redds were in sandy-silt substrate at depths of 5.9 to 7.5 inches, water velocities near the nesting redds ranged from 0.12 to 0.24 feet per second (fps), and mean water column velocities from 0.5 to 0.6 fps (Scoppettone et al. 1992).

The duration of egg incubation is unknown, but is likely relatively short due to the high water temperatures (Service 1996). Emigration of young-of-the-year Moapa dace from the Refuge Stream is believed to peak in May (Scoppettone et al. 1987), and dispersal is likely similar in other tributaries with comparable water temperatures. Mortality rates for Moapa dace have been estimated to be 68 percent of the first year (juveniles) and 65 percent in the second year (adults) (Scoppettone et al. 1987).

The Moapa dace is thermophilic and endemic to the headwaters of the Warm Springs area in Clark County, Nevada. Moapa dace surveys have been conducted throughout the upper Muddy River system. The 2007 survey data indicate that there were approximately 1,172 fish in the

population that occurred throughout 5.6 mi of habitat in the upper Muddy River system. Approximately 97 percent of the total population occurred within one major tributary that included 1.78 mi of spring complexes that emanate from the Pedersen, Plummer, and Apar spring complexes on the Moapa Valley National Wildlife Refuge (NWR) and their tributaries (upstream of the gabion barrier). The highest densities of Moapa dace occurred on the Plummer and Pedersen units within the Moapa Valley NWR.

The Warm Springs Natural Area and the Moapa Valley NWR encompass about 20 springs that form the headwaters of the Muddy River. The springs and their outflows onto the Warm Springs Natural Area are home to the majority of the Moapa dace population. BLM land surrounds the distribution of the species (Figure 11).

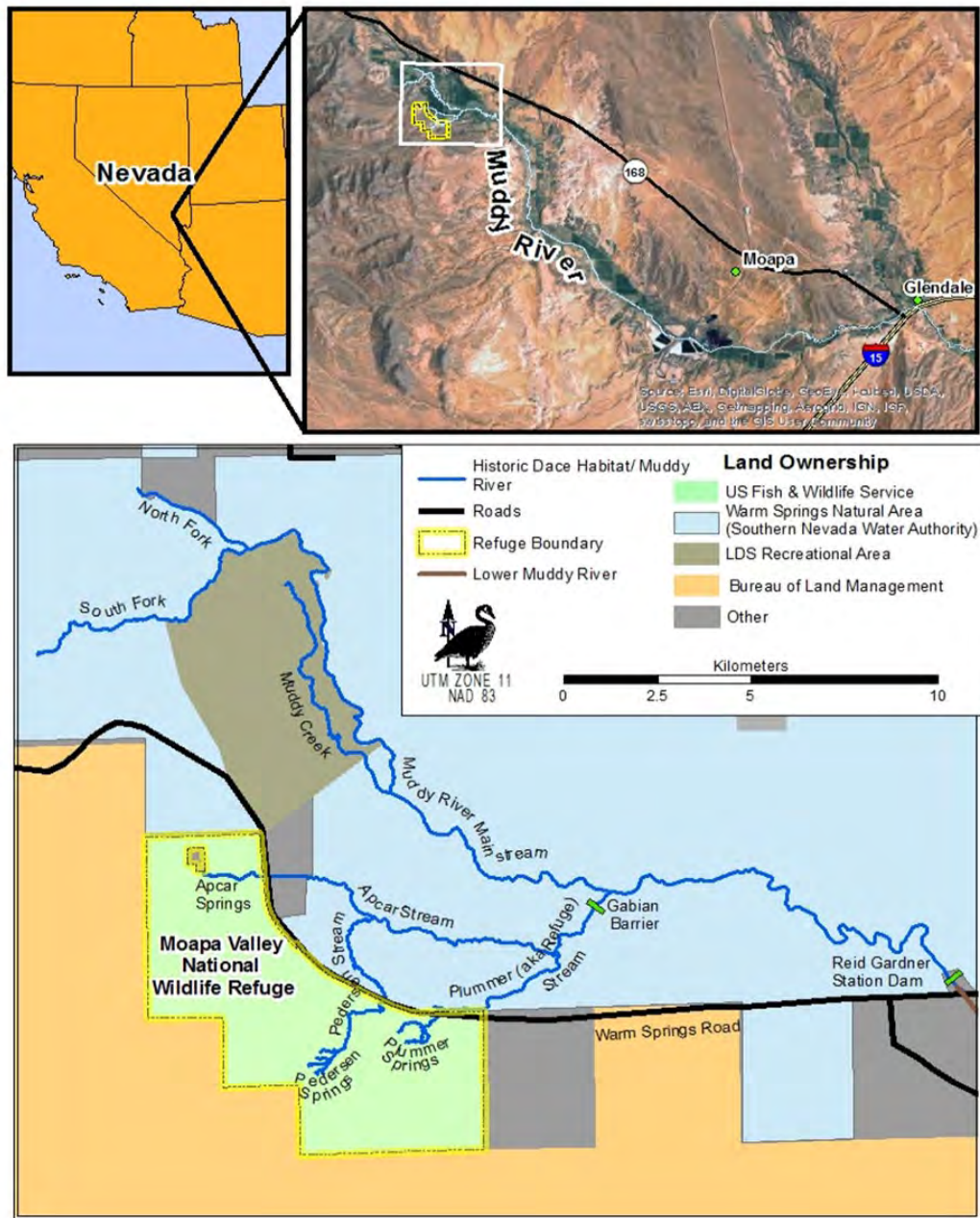


Figure 11. General and specific locations where Moapa dace occur.

In February 2006, the Secretary of the Interior approved funding through the Southern Nevada Public Lands Management Act for Southern Nevada Water Authority (SNWA) to purchase land historically known as the Warm Springs Ranch, located in the Moapa Valley. In September 2007, SNWA purchased 1,179 ac of private property that encompasses several springs in the Muddy River headwaters area, including the former Warm Springs Ranch. The property includes 3.8 miles of the mainstream Muddy River. The Warm Springs Natural Area is managed as a nature preserve for protection of Moapa dace and restoration and management of the areas as an ecological reserve.

Recovery Plan

In 1983, the Service prepared a recovery plan for Moapa dace, which was updated in 1996, and identified various tasks to guide recovery (Service 1996). The Service assigned the Moapa dace the highest recovery priority because it is the only species within the genus *Moapa*; the high degree of threat to its continued existence; and the high potential for its recovery (Service 1996). A final recovery plan was approved by the Service in 1996 (Service 1996).

Moapa dace will be considered for reclassification from endangered to threatened when (1) existing instream flows and historical habitat in three of the five occupied spring systems (Apcar, Baldwin, Cardy Lamb, Muddy Spring, Refuge) and the upper Muddy River have been protected through conservation agreements, easements, or fee title acquisitions; (2) 4,500 adult Moapa dace are present among the five spring systems and the upper Muddy River; and (3) the Moapa dace population is comprised of three or more age classes and reproduction and recruitment are documented from three spring systems.

Moapa dace will be considered for delisting provided that all reclassification criteria have been met and when (1) 6,000 adult Moapa dace are present among the five spring systems and the upper Muddy River for 5 consecutive years; (2) 75 percent of the historical habitat in the five spring systems and the upper Muddy River provides Moapa dace spawning, nursery, cover, and/or foraging habitat; and (3) non-native fishes and parasites no longer adversely affect the long-term survival of Moapa dace. These recovery criteria are preliminary and may be revised on the basis of new information (including research specified as recovery tasks).

Actions Needed:

1. Protect instream flows and historical habitat within the upper Muddy River and tributary spring systems
2. Conduct restoration/management activities
3. Monitor Moapa dace population
4. Research population health
5. Provide public information and education

Threats

Non-native fishes are a threat to the Moapa dace. It is believed that the first non-native, mosquitofish (*Gambusia affinis*) became established in the Muddy River by 1938 (Hubbs and Miller 1948). A decline in the abundance of Moapa dace was first noted in the 1960s, shortly after the introduction of non-native shortfin mollies (*Poecilia mexicana*) (Deacon and Bradley 1972, Cross 1976). The concurrent decline in the abundance of Moapa dace was likely related in part to interactions between these two species. Habitat use by mollies is similar to that of larval and juvenile Moapa dace (Deacon and Bradley 1972, Scopettone et al. 1987), and laboratory experiments have demonstrated that shortfin mollies are predators of fish larvae (Scopettone 1993). Together, these species have introduced fish parasites into the ecosystem, including tapeworms (*Bothriocephalus acheilognathi*), nematodes (*Contracaecum* spp.), and anchor worms (*Lernaea* spp.), which have negatively impacted native fishes of the Muddy River, including Moapa dace (Wilson et al. 1966, Heckman 1988).

The blue tilapia is the only non-native fish to become established in the Warm Springs Area since the introduction of the shortfin molly (Scoppettone et al. 1998). With the exception of waters on the Moapa Valley NWR, Apcar, and Refuge streams, tilapia occur in the Warm Springs' tributaries and have had devastating effects on Moapa dace and other native fish populations. The Moapa dace population has declined dramatically since the invasion of tilapia. The tilapia is detrimental to native fish species in a number of ways. Shortly after the invasion of tilapia into the Warm Springs Area, most of the aquatic vegetation disappeared. This vegetation provided habitat for invertebrates that Moapa dace rely upon as a food resource. Analysis of tilapia stomach contents revealed the presence of Moapa dace and Moapa White River springfish, indicating that tilapia further degrade native fish populations through predation. Additionally, tilapia significantly altered the streambed through the creation of nesting areas.

The introduction and establishment of tilapia and other non-native fishes have been a major factor in the deterioration of the Muddy River as habitat for native fishes (Deacon and Bradley 1972). Currently, the springs and streams on the Moapa Valley NWR and Apcar and Refuge streams are the only Muddy River tributaries free of non-native, blue tilapia. Therefore, invasion of tilapia, first detected in the Warm Springs Area in 1997, has relegated Moapa dace to habitats without the tilapia. The occurrence of tilapia is likely the primary cause for reductions in Moapa dace populations in the South Fork, North Fork, and Muddy River tributaries (Scoppettone et al. 1998). Deacon and Bradley (1972) stated "The marked decrease in abundance of native fishes that follows establishment of a non-native species could conceivably carry a native species to the point of extinction." In 2006, BLM finished construction of a fish barrier on the Muddy River near the Warm Springs Road bridge to prevent further immigration of tilapia and other non-native fish into the upper Muddy River. With this barrier in place, non-native eradication treatments can be conducted to remove non-native fish from the upper reaches of the river.

The Muddy River is a unique system because its headwaters emanate from warm-water springs, including the Warm Springs Area. The water does not get warmer as it travels downstream like most riverine systems but rather cools as it travels downstream. While the species has always had a natural thermal barrier due to the warm spring water cooling as it travels downstream, the tail of the temperature threshold can fluctuate due to reduced flows in the system. Thermal losses can occur as a result of decreasing flows from warm water springs, water diversion structures, and/or surface sheet flow (water that flows freely out of stream banks across the land). With the potential loss of these warmer waters contributing to the overall decrease in thermal load in the system, the Muddy River cools more rapidly, thus decreasing the distribution potential for the species. Since the Moapa dace is a thermally restricted species, water temperatures that drop below the preference range would not provide sufficient habitat for spawning, foraging, or shelter.

When it was described by Eakin (1964), the Muddy River at the Moapa gage had an average annual discharge of 46.5 cubic feet per second (cfs) and temperatures ranging from 87.8 to 89.6 °F at its sources. Flows have declined over the last 40 years to about 35 cfs due to a combination of surface water diversions and groundwater pumping. Although the flow in the headwaters is nearly constant seasonally, flow in the mainstem of the Muddy River varies with precipitation events, seasonal water diversions, groundwater recharge, vegetation transpiration, evaporation, and irrigation return flows.

Physical alteration of Moapa dace habitats in the Warm Springs Area, initially for irrigation purposes, began even before the species was discovered in 1938 (Scrugham 1920). These habitats have since been developed for recreational, industrial, and municipal uses. Spring orifices and outflow streams have been dug out, lined with concrete and/or gravel, mechanically and/or chemically treated to eliminate aquatic vegetation, and chlorinated to create private and public swimming pools. Several springs are capped and piped directly from the sources for municipal use, desiccating associated outflow streams. Chlorination and agricultural activities in the Warm Springs have decreased in recent years, but some spring outflow to streams continue to flow through culverts and/or dirt and cement irrigation ditches. Historically, irrigation return flows and runoff from pastureland and alfalfa fields carried significant quantities of sediment in the upper Muddy River.

The upper Muddy River has also been subjected to various physical perturbations. In 1944, the Bureau of Reclamation constructed a 10-foot-high Cipoletti weir gaging station at the Warm Springs Road Bridge. The USGS took ownership of the gage in 1948 and continues to measure flows at this gaging station. This concrete dam impounds approximately 150 ft of riverine habitat. Although the structure serves as a barrier to fish migration upstream during normal flows, it also hinders movement of Moapa dace from accessing the upstream spawning tributaries or escaping turbid river conditions. The structure also cools the river water as it cascades over the structure to a temperature below that preferred by Moapa dace (Deacon and Bradley 1972).

Another threat to the Moapa dace is fire. In June of 1994, a flash fire swept through the upper Refuge Stream that either killed or displaced individual Moapa dace that were occupying affected stream reaches. Surveys conducted post-fire in 1994, indicated that only 34 Moapa dace survived on the Moapa Valley NWR (Scoppettone et al. 1998), and subsequent surveys indicated an overall decline in the total population of Moapa dace. Given the restricted range of the species, and the associated mortality from the fire, it is apparent that the species is vulnerable to catastrophic events.

Since the PBO was issued in 2006, a major wildfire occurred on July 1, 2010, affecting the Moapa dace. According to population survey data, up to 60 percent of the existing Moapa dace occurred within the action area at the time the fire started. Post-fire survey data indicate that most dace within the affected area quickly moved to safer areas in response to the fire. Although the number of dace that were lost during the fire is unknown, the Service estimates that less than 50 individuals were lost during the event and in the immediate aftermath.

Between 1933 and 1950, Moapa dace were abundant in the Muddy River and were estimated to inhabit as many as 25 individual springs and up to 10 miles of stream habitat (Ono et al. 1983). La Rivers (1962) considered the species “common” until at least 1950. However, by 1983, the species only occurred in springs and 2 miles of spring outflows (Ono et al. 1983). The species appears to have declined since 1938, when Hubbs and Miller (1948) considered the species “rather common” in all warm water habitats in the headwaters of the Moapa River (Muddy River), including spring pools, small creeks, and the mainstem.

During 1984-87, the Service’s Seattle National Fisheries Research Center, now part of the

USGS-Biological Resources Division (BRD), extensively surveyed Moapa dace habitats and estimated the adult Moapa dace population to be between 2,600 and 2,800 individuals (Scoppettone et al. 1992). These areas were re-surveyed by USGS-BRD in August 1994, when approximately 3,841 Moapa dace were recorded (Scoppettone et al. 1996). There was a substantial reduction in the number of individuals counted in 1997, with less than 1,600 adult Moapa dace observed, which was believed to be a result of the introduction of non-native fishes (Scoppettone et al. 1998). In January 2001, 934 Moapa dace were recorded by a consortium of agencies, including the NDOW, USGS-BRD, SNWA, and the Service. In February 2002 and 2003, annual surveys enumerated approximately 1,085 and 907 individuals, respectively. The 2005 survey data indicate that there are approximately 1,300 fish in the population that occur throughout 5.6 miles of habitat in the upper Muddy River system.

In 2008, the number of Moapa dace declined approximately 60 percent, from 1,172 fish in 2007 to 459 in 2008. Most of this decline is due to large changes in the numbers of dace in the Pederson, Plummer, and Ash Meadows NWR Stream areas, which supported more than 92 percent of the population in 2007. The cause of the population decline is currently unknown, although beavers have recently changed stream characteristics in the Ash Meadows NWR Stream and vegetation management occurred along the Pederson Unit.

On July 17, 2008, the Service issued a biological opinion (84320-2008-F-0417) to the U.S. Army Corps of Engineers for their proposed issuance of a permit to SNWA for habitat restoration, establishment, and enhancement activities in the Lower Pederson Stream of the Warm Springs Natural Area. The permit allowed SNWA to restore part of the lower Pederson channel to a pre-modified alignment and construct an artificial channel connecting the stream to the channel. Incidental take of all Moapa dace in the project area occurred during the course of activities, which is estimated to be approximately 100 fish. An additional 20 Moapa dace could have been injured or killed during the course of salvage activities. An unknown number of Moapa dace eggs or larvae may have been harmed during the course of activities due to desiccation of approximately 3,229 mi of sheet flow.

Habitat restoration projects have also been implemented in the Pederson and Plummer units of the Moapa Valley NWR, restoring the streams to a more natural state. Moapa dace counts from February 2008 through February 2012 ranged from 462 to 697 fish. Count data for August 2011 (713 fish) and August 2012 (1,181 fish) indicate an increasing population trend. Surveys in August 2015 counted 2,182 Moapa dace, 1,635 in August 2016, and 1,533 in August 2017 in all reaches by direct count method (Muddy River Biological Advisory Committee 2017).

Restored areas continued to show increasing or stable numbers of Moapa dace (upper Apcar, lower Pederson, Goodchild [Little] Spring). The largest concentration of Moapa dace continued to be on the upper Plummer springbrooks on the Moapa Valley NWR, which supported about 29 percent of all Moapa dace observed in August 2011. An unusual concentration of Moapa dace observed in the upper Plummer springbrook about a month after the July 2010 wildfire was not observed in 2011. The number of Moapa dace observed in 2011 is similar to all other estimates observed in the area over the past decade. Moapa Valley NWR continued to support about 53 percent of the Moapa dace observed in August 2011. Recent small-scale habitat improvements in

the lower Apcar area may have begun a resurgence of Moapa dace in the area. Moapa dace continued to be absent from most of the areas previously occupied by tilapia (reaches 11-16) with the exception of a single Moapa dace that was observed in Muddy Creek (reach 14). Tilapia appeared to be absent from most of the tilapia-infested area (reaches 10-15) due to chemical eradication efforts in late 2010 and early 2011. Seventeen tilapia of different sizes were found in reach 16 (South Fork) both above (n=15) and below (n=2) the gabion barrier. All reaches that have been free of tilapia for many years supported dace in August 2012. Efforts to control and monitor tilapia are currently underway.

Memorandum of Agreement

On July 14, 2005, a Memorandum of Agreement (MOA) was signed by SNWA, Meadow Valley Water District (MVWD), Coyote Springs Investment (CSI), the Band, and the Service, regarding groundwater withdrawal of 16,100 acre feet per year (afy) from the regional carbonate aquifer in Coyote Spring Valley and California Wash Basins that included conservation measures for the Moapa dace. The MOA outlined specific conservation actions that each party would complete in order to minimize potential impacts to the Moapa dace should water levels decline in the Muddy River system as a result of the cumulative withdrawal of 16,100 afy of groundwater from two basins within the regional carbonate aquifer system. The MOA includes the following conservation measures:

1. Provide funding toward restoration of Moapa dace habitat on the Apcar Unit of the Moapa Valley NWR;
2. Develop a Recovery Implementation Program, which will be used to effectuate the goals of the MOA by implementing measures necessary to accomplish the protection and promote the recovery of the Moapa dace, as well as, outline the development of regional water facilities and include additional parties as appropriate. The Recovery Program will be developed for the purposes of continuing to identify the key conservation actions that, when implemented, would continue to contribute to off-set any pumping impacts that may result from groundwater pumping;
3. Assist in developing an ecological model to investigate the effects of habitat change on the ecology of the Moapa dace;
4. Construct fish barriers in order to prevent additional non-native fishes from migrating into Moapa dace habitat;
5. Eradicate non-native fish such as tilapia from the historic range of Moapa dace;
6. Restore habitat necessary for the Moapa dace, and take other steps to protect and recover the dace;
7. Provide the use of the Band's greenhouse to cultivate native plants for restoration actions in the Muddy River area;
8. Provide access to Reservation lands for the construction and maintenance of at least one fish barrier;
9. Dedicate the existing Jones Spring water right (MVWD) with a flow rate of 1.0 cfs towards establishing and maintaining in-stream flows in the Apcar tributary system that empties into the Muddy River;
10. Dedicate 460 afy of Coyote Springs Investment (CSI) appropriated water rights to the

survival and recovery of the Moapa dace, in perpetuity through a conservation easement to the Nevada State Engineer;

11. Establish a Hydrologic Review Team to develop and coordinate regional monitoring efforts of the groundwater pumping proposed under the MOA. Team members discuss and perform analyses of groundwater pumping effects and natural climatic variation on the Muddy River and Muddy Springs; and
12. Develop the Muddy River Recovery Implementation Program to provide a comprehensive program for water resource management in the Coyote Spring Valley, Warm Springs, and Muddy River areas, while working toward recovery of the Moapa dace.

In addition to the conservation measures, minimum in-stream flow levels were also established in the MOA that trigger various conservation actions should those predetermined levels be reached. The flow levels will be measured at the Warm Springs West Flume located on the Moapa Valley NWR. These automatic actions are identified in the MOA and are summarized below:

1. Should the water flows reach 3.2 cfs, the signatories will meet to discuss the issue and compare/evaluate hydrology data;
2. Should the water flows reach 3.0 cfs, during the pendency of the pump test, the Arrow Canyon well will shut down and SNW A will provide the MVWD with the sufficient water quantity necessary to meet their municipal demands. In addition, SNW A and CSI will take necessary actions to geographically redistribute groundwater pumping in Coyote Springs Valley if flows levels continue to decline;
3. Should the water flows reach 3.0 cfs or less but greater than 2.9 cfs, SNWA and CSI will restrict groundwater pumping from MX-5 and RW-2 wells, and CSI Well #1 (Permit 70430) and CSI Well #2 (Permit 70429) and CSI's pumping from other wells in Coyote Spring Valley, in combination, to 8,050 afy;
4. Should the water flows reach 2.9 cfs or less but greater than 2.8 cfs, SNWA and CSI will restrict groundwater pumping from MX-5 and RW-2 wells, and CSI Well #1 (Permit 70430) and CSI Well #2 (Permit 70429) and CSI's pumping from other wells in Coyote Spring Valley, in combination, to 6,000 afy, and the Tribe will restrict their pumping (under permit number 54075) in the California Wash basin to 2,000 afy;
5. Should the water flows reach 2.8 cfs or less but greater than 2.7 cfs, SNWA and CSI will restrict groundwater pumping from MX-5 and RW-2 wells, and CSI Well #1 (Permit 70430) and CSI Well #2 (Permit 70429) and CSI's pumping from other wells in Coyote Spring Valley, in combination, to 4,000 afy, and the Tribe will restrict their pumping (under permit number 54075) in the California Wash basin to 1,700 afy;
6. Should the water flows reach 2.7 cfs or less, SNW A and CSI will restrict groundwater pumping from MX-5 and RW-2 wells, and CSI Well #1 (Permit 70430) and CSI Well #2 (Permit 70429) and CSI's pumping from other wells in Coyote Spring Valley, in combination, to 724 afy, and the

Tribe will restrict their pumping (under permit number 54075) in the California Wash basin to 1,250 afy.

On January 30, 2006, the Service issued a non-jeopardy intra-Service PBO for the Proposed Muddy River MOA (Service 2006; 1-5-05-FW-536). The Service estimated the incidental take of Moapa dace at the programmatic level for the cumulative actions of parties to the MOA to be a 22 percent loss in riffle habitat and 16 percent loss in pool habitat. Should flows at the Warm Springs West gage decline to a flow below 2.78 cfs, the amount of incidental take for any project-specific action under the MOA would be exceeded for the Moapa dace.

Seven projects have been proposed under the PBO, six of which have moved forward and have been tiered to the PBO: (1) Tier 1- issuance of a Section 404 permit under the Clean Water Act of 1972, as amended, for the CSI residential development project; (2) Tier 2- a ROW to SNWA to construct a water conveyance pipeline, (3) Tier 3- construction of a water pipeline from an existing well on the Moapa River Indian Reservation to the Moapa Valley of Fire Travel Plaza requiring 7 afy of groundwater; (4) Tier 5- a lease approved by the BIA for construction and operation of the K Road Moapa Solar Project on the Moapa River Indian Reservation, (5) Tier 6- a lease approved by the BIA for construction and operation of the Res Americas Moapa Solar Energy Project on the Moapa River Indian Reservation, and (6) Tier 7- a lease approved by BLM for construction and operation of the Playa Solar Project within BLM's Solar Energy Zone. Tier 4 was the proposed cement plant, which was withdrawn without a biological opinion being issued. Tiers 1, 2, 5, and 6 are major projects and are discussed in detail below.

- **Tier 1:** CSI proposes to withdraw their 4,600 afy of state-appropriated water from two well locations in Coyote Spring Valley in order to help meet the water demands of its proposed residential community. Monitoring of surface flows and groundwater levels is required by the State Engineer as a condition of CSI's groundwater permits in Coyote Spring Valley. This monitoring will provide necessary information to assess long-term impacts to the aquifer and down-gradient flows (Resource Concepts Incorporated 2005). Currently, SNWA monitors eight carbonate wells in the Coyote Spring Valley hydrographic basin on a continuous basis and one carbonate well and four alluvial wells on a monthly basis.
- **Tier 2:** This consultation involves a BLM ROW for SNWA to construct a pipeline to convey groundwater withdrawals from potentially three carbonate wells located in the Coyote Spring Valley. SNWA participates in a regional carbonate aquifer system study ordered by the Nevada State Engineer (Order 1169) to evaluate how groundwater withdrawals in the Coyote Spring Valley will impact the carbonate aquifer system and adjacent Muddy River ecosystem. The Order requires pumping at least 8,150 afy, from the Coyote Spring Valley for two consecutive years. In order to meet the requirements of the Order, SNWA is pumping 9,000 afy of groundwater from the regional carbonate system. Any unused water will empty into the Reed Bowman Reservoir. Should the reservoir reach full capacity, flows will continue into the lower Muddy River. Upon completion of the study, the pipeline system would convey permitted water rights to beneficial uses. Should the results of the study indicate that water rights in the Coyote Spring Valley are fully allocated then SNWA would use the proposed pipeline to transfer their permitted water rights from other areas outside of

Coyote Spring Valley. The project would also provide a means to convey 724 afy of SNWA's permitted Coyote Spring groundwater rights to MVWD. This would facilitate the dedication by MVWD of its existing 1.0 cfs Jones Spring water right for the purpose of providing in-stream flows that will be beneficial to the Moapa dace.

- **Tier 5:** The Band and K Road propose to construct, maintain, and operate a 350 MW solar project on the Moapa River Indian Reservation. The proposed project would require approximately 380 acre feet (AF) of groundwater during the proposed 5-year construction phase (72 afy for 5 years) and up to 40 afy for operation and maintenance after construction. The Band is allotted 2,500 afy as stated in the PBO.

The Service reviewed the updated monitoring information including instream flow criteria established in the MOA. The minimum instream flow criteria measured at the Warm Springs West Flume determine thresholds that would trigger certain conservation actions including reductions in groundwater pumping. The first instream flow to trigger an automatic groundwater reduction is 3.0 cfs. According to monitoring data, the current instream flow at the Warm Springs West Flume is 3.5 cfs. The 3.5 cfs is a reduction of 0.1 cfs from before pumping was initiated. Therefore, based on the monitoring information provided, we have not reached any instream flow trigger points analyzed in the biological opinion. If instream flows reach 3.2 cfs at the Warm Springs West Flume, the signatories to the MOA will meet to discuss, compare, and evaluate the hydrology data.

As predicted in the PBO, higher elevation springs (e.g., Pederson and Pederson East Springs) would be impacted first. Flows in these two springs have been reduced by 35 to 40 percent. This reduction in flow has occurred despite withdrawal of groundwater below allowable levels. In addition, groundwater withdrawals have not been consistent since the testing period started on November 15, 2010. The variance between modeled and actual results will be evaluated further as pumping tests continue. The reduction in flows at these two springs could affect Moapa Dace, which was not anticipated fully through the modeling efforts used in the PBO.

- **Tier 6:** The Band and Moapa Solar LLC propose to construct, maintain, and operate a 200 MW solar project on the Moapa River Indian Reservation. The proposed project would require approximately 100 AF of groundwater during the proposed 2-year construction phase (50 afy for 2 years) and up to 30 afy for operation and maintenance after construction. Consultation was reinitiated on October 21, 2014, for the project because of changes in the locations of several project features, including the gen-tie line and access road located on BLM land, and the water pipeline located on Reservation lands. Additionally, the BIA proposed to increase the amount of water used for the project to 375 afy during the expected 2-year construction of the project. The Band is allotted 2,500 afy as stated in the PBO.
- **Tier 7:** The BLM proposes to construct, maintain, and operate a 200 MW PV solar project on 1,521 acres of BLM lands within the Dry Lake Solar Energy Zone (SEZ) and 3.67 acres of private land. Other facilities include access roads, a 230-kV gen-tie line, a distribution power line, a fiber-optic communications cable, a well, and a pipeline. The project would

require up to 1,350 AF of water for construction and operations and would be obtained from the Garnet Valley groundwater basin as part of the Southern Nevada Water Authority's (SNWA) 9,000 afy allocation.

The Service reviewed the updated monitoring information including instream flow criteria established in the MOA. The minimum instream flow criteria measured at the Warm Springs West Flume determine thresholds that would trigger certain conservation actions including reductions in groundwater pumping. The first instream flow to trigger an automatic groundwater reduction is 3.0 cfs. According to monitoring data, the current instream flow at the Warm Springs West Flume is 3.5 cfs. The 3.5 cfs is a reduction of 0.1 cfs from before pumping was initiated. Therefore, based on the monitoring information provided, we have not reached any instream flow trigger points analyzed in the biological opinion. If instream flows reach 3.2 cfs at the Warm Springs West Flume, the signatories to the MOA will meet to discuss, compare, and evaluate the hydrology data.

As predicted in the PBO, higher elevation springs (e.g., Pederson and Pederson East Springs) would be impacted first. Flows in these two springs have been reduced by 35 to 40 percent. This reduction in flow has occurred despite withdrawal of groundwater below allowable levels. In addition, groundwater withdrawals have not been consistent since the testing period started on November 15, 2010. The variance between modeled and actual results will be evaluated further as pumping tests continue. The reduction in flows at these two springs could affect Moapa Dace which was not anticipated fully through the modeling efforts used in the PBO.

Core Criteria for the Jeopardy Determination

When determining whether a proposed action is likely to jeopardize the continued existence of a species, we are required to consider whether the action would “reasonably be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR 402.02). A five-year review has not yet been completed but is scheduled to be done in 2021.

ENVIRONMENTAL BASELINE

Environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

Action Area

The implementing regulations for section 7(a)(2) of the Act define the “action area” as all areas to be affected directly or indirectly by the Federal action, including interrelated and interdependent actions, and not merely the immediate area involved in the action (50 CFR § 402.02). While the definition of the action area includes mention of direct and indirect effects, the updated Endangered Species Act regulations (84 FR 44976) combine these into “all effects.” Even though we discuss separate categories of effects, this biological opinion complies with the new regulations. Subsequent analyses of the environmental baseline, effects of the action, cumulative effects, and levels of incidental take are based upon the action area as determined by the Service. Regulations implementing the Act define the environmental baseline as the past and present effects of all Federal, State, or private actions and other human activities in the action area (50 CFR § 402.02). Also included in the environmental baseline are the anticipated effects of all proposed Federal projects in the action area that have undergone section 7 consultation, and the effects of state and private actions that are contemporaneous with the consultation in progress.

The action area for the Project includes the areas affected directly or indirectly by the federal action. The action areas for desert tortoise are defined as (1) the area of direct impacts (solar field, access roads, and gen-tie ROW; 2,200 acres plus 285-acre ROW), (2) the area of indirect impacts: short-distance and long-distance translocation tortoise recipient areas (1,870 acres), and (3) the areas of tortoise connectivity between the Arrow Canyon Mountain Range to the west and the Muddy Mountain Range to the east.

In addition, the action area includes a 0.8 km (0.5-mile) wide buffer along each side of linear project areas, the proposed desert tortoise translocation areas, all contiguous desert tortoise habitat within 1.5 km (0.9 miles) of the short-distance translocation areas receiving desert tortoises from less than 500 m, and all contiguous desert tortoise habitat within 6.5 km (4.0 miles) of long-distance translocation areas receiving desert tortoises from greater than 500 m away. We included the 0.5-mile buffer to address adverse effects to desert tortoises whose home ranges overlap the proposed solar facility and linear project areas; the buffer is based on the assumption that the home range of a male desert tortoise is approximately 0.77 mi² (Duda et al. 1999, Harless et al. 2009). We included habitat within 0.93 and 4.0 miles of the translocation areas to address the area in which desert tortoises may disperse following translocation. For situations where desert tortoises are moved less than 500 m, the buffer is based on the maximum straight-line distance that a male desert tortoise traveled in the first year following translocation (Walde et al. 2008). For situations where desert tortoises are translocated more than 500 m, the buffer is based on the upper limits of the 95 percent confidence interval for the maximum straight-line distance that male and female desert tortoises were observed to disperse during the first year after release (Nussear 2004, Field et al. 2007).

The action area for the Moapa dace is defined as the entire range of the Moapa dace and the hydrogeomorphic basins which have hydrologic connectivity to the Muddy River ecosystem. Although the Lower White River Flow System is hydrogeologically connected, only the basins that include the area of the proposed groundwater development and location of the Moapa dace

and its habitat are included in the action area. These basins include the Coyote Spring Valley (Basin 210), Muddy River Springs Area (Basin 219), and California Wash (Basin 218).

Status of the Desert Tortoise in the Action Area

Recovery Unit

The action area occurs within the Northeastern Mojave recovery unit as described in the revised desert tortoise recovery plan (Service 2011a). This recovery unit is similar to the 1994 designation, extending into extreme southwestern Utah and northwestern Arizona, but excluding portions south of Las Vegas. The east end of the unit extends south from the Beaver Dam Mountains, across the north end of the Virgin Mountains, down to the Colorado River. From the Colorado River at Las Vegas Bay, the southern boundary extends west generally along Las Vegas Wash through the city of Las Vegas to the Spring Mountains. From here, the western boundary extends north up the Sheep Mountains.

Recent DNA microsatellite data indicate that this unit is genetically similar to the Upper Virgin River Recovery Unit, but the Northeastern Mojave Recovery Unit does contain distinct microsatellite differences compared to the remainder of the range (Hagerty and Tracy 2010). The Sheep Mountains down to the Spring Mountains act as a near barrier for the western portion of this unit. Some variation may occur to the south and west from the Mormon Mesa, but genetic breaks appear to be ambiguous relative to at least semi-permeable topographic barriers to gene flow, such as the Muddy Mountains. An allozyme cluster at one locus from populations in the Mormon Mesa critical habitat unit overlaps another cluster identified from populations in Piute Valley in the Eastern Mojave Recovery Unit (Britten et al. 1997). A distinct shell phenotype also occurs in the Beaver Dam Slope region, but these tortoises are not genetically isolated from adjacent populations within the same recovery unit (Service 2011a).

Desert tortoises in this recovery unit are generally found in creosote bush scrub communities of flats, valley bottoms, alluvial fans, and bajadas, but they occasionally use other habitats such as rocky slopes and blackbrush scrub. Desert tortoises are often active in late summer and early fall, in addition to spring, reflecting the fact that this region receives up to about 40 percent of its annual rainfall in summer and supports two distinct annual floras on which tortoises can feed. Average daily winter temperatures usually fluctuate above freezing, and summer temperatures are typically a few degrees cooler than in the western Mojave and Colorado deserts. Two or more desert tortoises often den together in caliche caves in bajadas and washes or caves in sandstone rock outcrops, and they typically eat summer and winter annuals, cacti, and perennial grasses.

This recovery unit includes the Beaver Dam Slope, Gold Butte-Pakoon, and Mormon Mesa critical habitat units (CHUs). It also includes Lake Mead National Recreation Area south to Las Vegas Bay, Grand Canyon-Parashant National Monument on the Arizona Strip, and the eastern edge of Desert National Wildlife Refuge.

Habitat

Sonoran-Mojave creosotebush-white bursage is the dominant vegetation community in the action area. This community is dominated by creosote (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). Approximately 2,400 acres of this community type exists within the proposed solar field and gen-tie line ROW (over 98%). Sahara mustard (*Brassica tournefortii*), a plant species designated by the Nevada Department of Agriculture (NDA) as a Category B weed species, is found in small isolated areas.

Population Monitoring Data in the Action Area

In 1999, the Desert Tortoise Management Oversight Group endorsed the use of line distance sampling as the most appropriate method for estimating rangewide desert tortoise density. Fifteen monitoring strata were established that approximate the boundaries of the CHUs. Desert tortoise population monitoring began rangewide in 2001. Long-term monitoring of desert tortoise population growth and distribution, habitat quality and quantity, and the presence and intensity of threats to the desert tortoise are recovery actions identified in the revised recovery plan (Service 2011a).

Desert tortoise density estimates are generated separately for each monitoring stratum and then weighted by stratum area to arrive at average density in the monitored area of each recovery unit. When the annual estimates are imprecise, it should not be expected that there will be a close match from one year to the next. Over a period of many years, however, any underlying trend in the number of tortoises should be obvious.

Service (2016b, 2018a) desert tortoise monitoring data included the five strata in the action area, Beaver Dam Slope, Coyote Spring Valley, Gold Butte-Pakoon Clark, Mormon Mesa, and Piute-Eldorado. The monitoring strata approximate the CHUs and desert tortoise Areas of Critical Environmental Concern (ACECs) and represent the 1994 delineation of recovery units, which would not include the Colorado Desert Recovery Unit. The most recent results for each stratum are provided in Table 6. For additional or updated information on desert tortoise population monitoring, visit the Desert Tortoise Recovery Office website at:
https://www.fws.gov/nevada/desert_tortoise/dtro/dtro_monitor.html

Table 6. Desert tortoise density estimates for strata in the action area (Service 2016b, 2018a).

Recovery Unit	Stratum	Area Sampled (mi²/km²)	Number Transects	Total Transect Length (mi/km)	No. Tortoises Observed	Density Estimate (mi²/km²)
NE Mojave	Beaver Dam Slope	320/828	33	227/365	3	3.4/1.3
	Coyote Springs Valley*	396/1,025	54	368/593	26	10.9/4.2
	Gold Butte-Pakoon	763/1,977	72	439/706	8	4.9/1.9
	Mormon Mesa*	374/968	42	285/458	7	5.5/2.1

*Data is from Service 2016b. The remaining data is from Service 2018a.

Desert Tortoises in the Action Area

To assess the status of the desert tortoise in the action area, field surveys were conducted in September and October 2018. The solar field (2,200 acres), the recipient area (1,870 acres), and gen-tie route (285 acres) were surveyed in accordance with current Service protocols (Service 2017b). The area was surveyed using 10-meter (33-foot) wide parallel pedestrian transects. According to the Service, the objective of the field survey is to determine presence or absence of desert tortoises, estimate the number of tortoises (abundance), and assess the distribution of tortoises within the action area.

Forty five adult tortoises were observed within the proposed solar field development area, ten within the recipient area, and six along the gen-tie route (Figure 12).

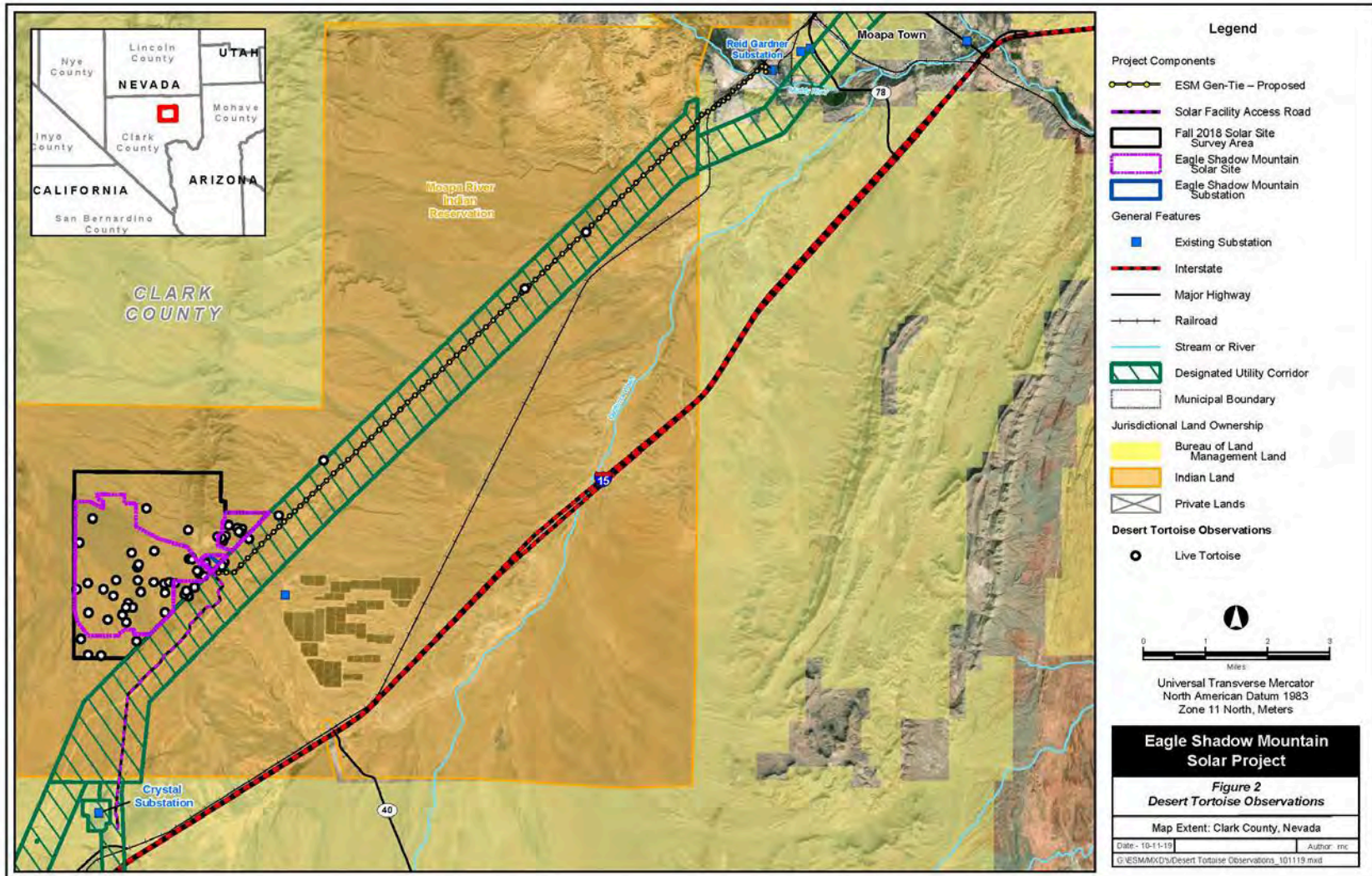


Figure 12. Desert tortoise live observations

To estimate the number of tortoises that live within the Project survey area, the formula (equation in Figure 13) divides the number of adult tortoises observed during the survey by the product of the probability that a tortoise is aboveground during the survey (P_a), and the probability that a surveyor would see the tortoise if it is aboveground (the searcher efficiency, P_d). P_a is relative to the previous winter’s rainfall recorded between October and March by the Western Regional Climate Center.

$$\left(\begin{array}{c} \text{Estimated number of tortoises} \\ \text{within action area} \end{array} \right) = \frac{\left(\begin{array}{c} \text{Number of tortoises} \\ \text{observed above ground} \end{array} \right)}{\left(\begin{array}{c} \text{Probability that} \\ \text{a tortoise is} \\ \text{above ground (} P_a \text{)} \end{array} \right) \left(\begin{array}{c} \text{Probability of} \\ \text{detecting a tortoise,} \\ \text{if above ground (} P_d \text{)} \end{array} \right)} \left(\begin{array}{c} \text{Size of action area} \\ \text{Size of area surveyed} \end{array} \right)$$

Figure 13. Equation used for tortoise estimates

The estimated number of tortoises within the 2,200-acre solar field was calculated to be 79, with a 95% confidence interval of 36 to 176 adult tortoises.

Previous solar projects have found more tortoises during clearance surveys than were originally estimated. Because tortoises are mobile, there may be more within the action area than were originally estimated based on tortoise survey data. The K Road solar project found 13.6 percent more tortoises during clearance surveys than estimated, and the Silver State South solar project found 23.6 percent more tortoises than estimated in their biological opinion. Because such higher percentages have been found compared to the estimated numbers, we allow for a 25 percent buffer for additional tortoises to be captured and moved. Adding 25 percent to the estimated 79 tortoises puts the total estimate of tortoises within the solar field at 99.

Turner et al. (1987) developed a life table for female desert tortoises based on studies conducted at Goffs, California in 1983. They estimated that 13.2 percent of the desert tortoises in that population were larger than 180 millimeters in length. To estimate the number of all desert tortoises within the solar facility, we used the methodology and calculations in Table 7.

Table 7. Number of tortoises estimated to occur within the solar field

Tortoise Calculation	Tortoise Estimate
Estimated number (point estimate) of desert tortoises larger than 180 mm (95% confidence interval)	79 (36-176)
Project limit for translocation of adults (point estimate + 25 %)	99 (45-220)
Percentage of desert tortoises in size classes larger than 180 millimeters (from Turner et al. 1987, table 32)	13.2
The total number of desert tortoises; calculated by 99/0.132	750 (341-1,667)
The number of juvenile desert tortoises; calculated by 750 – 99	651 (242-1,568)

Two caveats apply to this estimate. The table in Turner et al. (1987) is based only on females, and we assume that the size classes also apply to males. The demography of the population at the solar facility may be different from Goffs at the time of the work conducted by Turner et al., but

we do not have complete information on the demography of the population at the solar facility. Although the estimate of the number of desert tortoises on the project site is based on the best available information, the overall number of animals may be different.

Besides the tortoises within the solar field, there were also six tortoises observed during surveys along the gen-tie line route. We cannot get a density estimate for a linear project using the equation in Figure 13, so we use the 6 tortoises observed as the estimate for adults along the gen-tie line and estimate 39 juveniles based on the equations in Table 7. This puts the estimated total adults for the entire project (solar field and gen-tie line) at 105 and estimated juveniles at 690.

In addition, we expect the project area to support desert tortoise eggs if cleared during the desert tortoise nesting period, approximately May and June (Turner et al. 1984; Wallis et al. 1999). Estimating the number of tortoise eggs is extremely difficult given that the eggs are buried beneath the soil surface. Applying any assumptions has an unknown and high level of uncertainty. Therefore, we cannot calculate a precise estimate for the number of eggs that may be impacted by the proposed project.

Habitat and Population Connectivity

Quantifying the degree to which a landscape promotes or hinders movements among patches of habitat for a given species, hereafter referred to as “habitat connectivity” (Fischer and Lindenmayer 2007), has become increasingly important relative to desert tortoise recovery. As we evaluate utility-scale solar development and other land uses within the range of the species, it is essential that habitat linkages between and among populations are conserved. For gene flow to occur across the range, populations of desert tortoises need to be connected by areas of occupied habitat that support sustainable numbers of reproductive individuals. Recent research provides evidence that genetic differentiation within the Mojave population is consistent with isolation by distance in a continuous-distribution model of gene flow. Populations at the farthest extremes of the distribution are therefore the most differentiated, and a gradient of genetic differentiation occurs between those populations across the range of the species (Britten et al. 1997, Edwards et al. 2004a, Murphy et al. 2007, Hagerty and Tracy 2010). Genetic analyses also suggest that levels of gene flow among subpopulations of desert tortoises likely were high, corresponding to high levels of habitat connectivity (Murphy et al. 2007, Hagerty 2008).

Demographic connectivity describes a pattern of habitat or vegetation that is connected with other areas of similar habitat or vegetation. It refers to the degree to which population growth and vital rates are affected by dispersal (BLM and DOE 2012). The concept of demographic connectivity differs subtly from genetic connectivity as it refers to a more geographic concept of how habitat, vegetation, and dispersal (immigration and emigration) affect survival of a species through birth and growth rates. Demographic connectivity would assume a greater geographic connectedness of habitat and vegetation than genetic connectivity, but both rely on suitable habitat that can be occupied by desert tortoises. The Mojave population historically represents a series of continuous, overlapping home ranges within suitable habitats whose boundaries between divergent units may be validated by ecological or major topographic features, such as steep mountainous terrain or, even more significantly, the Colorado River (Germano et al. 1994,

Nussear et al. 2009).

Individual desert tortoises can make long-distance movements through restricted habitats, which may contribute to gene flow (Berry 1986, Edwards et al. 2004b), though we do not know the extent to which individuals utilize narrow corridors of relatively intact habitat. The underpinning of the continuous-distribution model of gene flow described above, and the evidence from desert tortoise population genetic studies and distribution, is that individual desert tortoises breed with their neighbors, those desert tortoises breed with other neighbors, and so on. The movements that maintain the genetic diversity across populations occur over generations and not necessarily during the life span of a single desert tortoise. Therefore, for gene flow to happen reliably, populations need to be connected across the range by occupied areas of habitat linkages that support sustainable numbers of desert tortoises.

To define the area required to maintain resident populations within the linkages, we considered desert tortoise home range size and the magnitude of edge effects. The size of desert tortoise home ranges varies with respect to location and year (Berry 1986) and may serve as an indicator of resource availability and opportunity for reproduction and social interactions (O'Connor et al. 1994). Females have long-term home ranges that may be as little as or less than half that of the average male, which can range to 200 acres (Burge 1977, Berry 1986, Duda et al. 1999, Harless et al. 2009). Core areas used within the lifetime home range of desert tortoises depend on the number of burrows used within those areas (Harless et al. 2009). Over its lifetime, a desert tortoise may use more than 1.5 mi² of habitat and may make periodic forays of more than 7 miles at a time (Berry 1986). We therefore assess the viability of the linkages based on the ability of those linkages to maintain the lifetime home range of a desert tortoise or the ability of home ranges of this size to connect to one another absent any barriers. Because we expect lifetime home ranges to expand and contract over time, we can consider whether the linkage could remain viable in a year where decreased resource availability results in a smaller population of individuals that respond by expanding their home ranges.

In assessing lifetime home ranges, the Service (1994) assumed a circular configuration of this area when using it in the population viability assessment. We based this assumption on the fidelity that desert tortoises exhibit towards an overwintering burrow year after year. Consequently, the overwintering burrow serves as an anchor point from which the lifetime utilization area radiates out. Using a circular lifetime home range of 1.5 mi² for a desert tortoise, we estimate that a linkage would need to be at least 1.4 miles wide to accommodate the width of a single home range. Although these figures provide a means for characterizing the potential minimum width of a linkage, we do not know the exact area or land configuration required to support a sustainable population of resident desert tortoises within any particular linkage, which would be dependent upon several factors.

Based on the best available information, occupancy likely depends on many site-specific factors, including (1) desert tortoise densities in the vicinity (i.e., lower density sites require larger areas to reliably support sustainable numbers of desert tortoises), (2) length-to-width ratio of the linkage (i.e., longer linkages may need to be wider to preserve the dynamic home ranges and interactions required for gene flow), and (3) potential edge effects and integrity of the ecosystem

within and adjacent to the linkage. Another consideration is the extent to which slope and ruggedness of the terrain allow desert tortoise occupancy or passage. In addition, maintaining connectivity of desert tortoise habitats and populations should reflect results from the landscape genetic analyses of Hagerty (2008) and Hagerty et al. (2011). These analyses showed that desert tortoise gene flow generally occurred historically in a diffuse pattern across the landscape unless otherwise constrained to more narrow, concentrated pathways created by topographic barriers (e.g., around the Spring Mountains in western Nevada). As a result, it is evolutionarily imperative that conservation is focused on maintaining a series of redundant linkages between core populations and critical habitats.

The desert tortoise population in the action area is likely connected to other tortoises in Dry Lake Valley to the north and northwest (e.g., Moapa River Indian Reservation land) by contiguous tortoise occupation or suitable habitat and minimal barriers. Desert tortoises need to have overlapping home ranges and at least semi-permeable barriers for tortoises to be assumed to be connected across the landscape.

Connectivity likely extends into Valley of Fire State Park and through the North Muddy Mountains to the east and through the Gale Hills and into Rainbow Gardens ACEC to the south. The Muddy Mountains and Lake Mead form impermeable barriers to the southeast. The Project area may have limited connectivity to the Mormon Mesa CHU and the associated Critical Habitat area. The Dry Lake Range west of the action area and I-15 and the railroad east of the action area are all barriers. I-15 is fenced with tortoise exclusion fencing but has culverts, which allow for some restricted movement. Other impermeable barriers (i.e., the Muddy River) far north and northwest would preclude connection to the north.

Desert Tortoise Translocation Areas

Desert tortoise translocation areas include areas where displaced tortoises will be released; area(s) that are established as recipient areas (areas where most tortoises establish following release), maximum dispersal area (the area that encompasses the maximum distances tortoises are anticipated to move following translocation and release), and a control area where resident tortoises are monitored to compare with translocated tortoises. The release area for translocated tortoises (and possibly some indirectly translocated tortoises) is 1,870 acres. The area immediately adjacent to the solar site that will receive tortoises and their dispersal is called the Study Area Recipient Site and is 7,112 acres. Figure 14 shows the release zone for tortoises being returned or translocated.

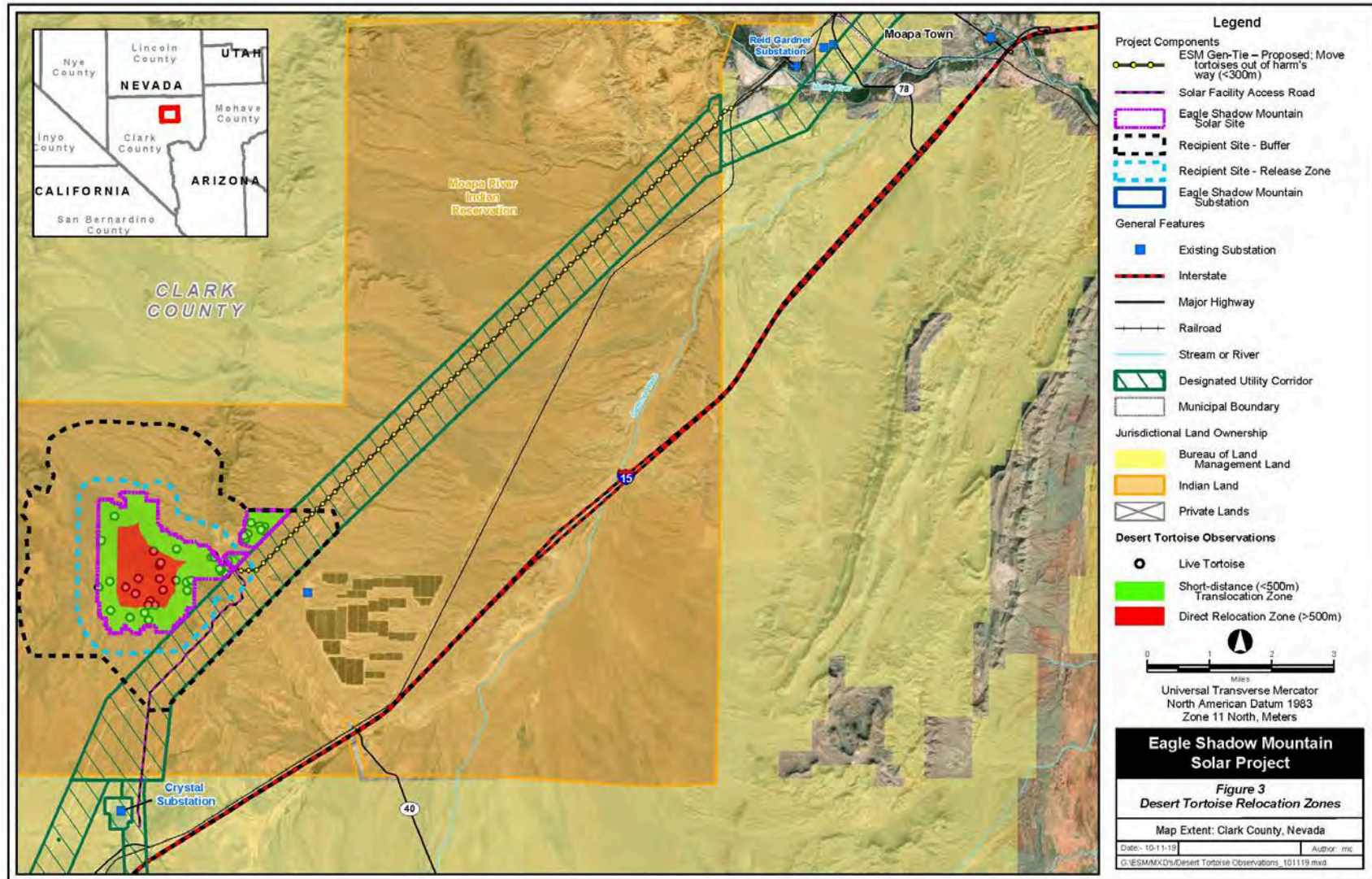


Figure 14. Study Area Recipient Site (tortoise release zone and buffer)

Vegetation in the recipient areas exhibits the same topographic, hydrologic, and vegetative characters as the solar field. It is largely dominated by creosote bush – white bursage desert scrub. This community is typically dominated by creosote bush shrubs and white bursage 0.5-1.5 m tall, widely spaced, and usually with bare ground between. Other common species in this community typically include boxthorn (*Lycium* sp.), hop sage (*Grayia spinosa*), desert trumpet flower (*Eriogonum inflatum*), and Arabian schismus (*Schismus arabicus*).

Once data are collected on the tortoises affected by the project, the Applicant will prepare a desert tortoise disposition plan for each tortoise to the Service (see Appendix H in Service 2018b). The plan must be completed within the spring or fall season in which translocation occurs. Based on the health status of those tortoises, the Service will approve or make recommendations on the disposition of the tortoises to be translocated.

Based on the number of tortoises found within the solar field area, it is estimated that 79 tortoises will need to be translocated or captured and moved for the Project to be built. An additional 25 percent was added to that number to account for more tortoises that may move into the area than were found during surveys, making the total estimate 99.

The Service guidance includes establishing a control area to be used in the translocation program to monitor natural effects on resident populations relative to translocated tortoises and tortoises that are resident in the recipient area. The control area should be similar in habitat type and quality, desert tortoise population size and structure, and disease status to the recipient areas (Service 2018b). There is an existing control site in the Coyote Springs ACEC, which has sufficient data to compare survivorship and other metrics.

The health of translocated tortoises and resident tortoises at the recipient area will be assessed and a radio transmitter attached to each tortoise (Service 2018b). The translocation process includes gathering data on sex, age, and health conditions of resident tortoises. This information will be used in conjunction with the same information collected from desert tortoises in the project area during clearance surveys to develop desert tortoise disposition plans and determine placement of translocated tortoises.

Factors Affecting the Desert Tortoise in the Action Area

BLM Programmatic Biological Opinions (PBOs) for Projects in the Action Area

Several PBOs have been issued to the BLM that include land in the action area. The first one was issued on November 25, 1997 (1-5-97-F-251; Service 1997), for implementation of various land management programs within the Las Vegas District planning area excluding desert tortoise critical habitat, ACECs, and the Las Vegas Valley. Activities proposed that may affect the desert tortoise in the action area include issuance of ROWs, Recreation and Public Purposes Act leases, mineral material sales and leases, and mining plans of operation. The programmatic consultation was limited to activities that could affect up to 240 acres per project and a cumulative total of 10,000 acres, excluding land exchanges and sales. Only land disposals by sale or exchange in Clark County, but outside the Las Vegas Valley, were covered under the consultation up to a

total of 14,637 acres.

On June 18, 1998, the Service issued a PBO (1-5-98-F-053; Service 1998) to BLM for implementation of various land management programs within desert tortoise habitat and the Las Vegas planning area, including desert tortoise critical habitat and ACECs. Activities that were proposed that may have affected the desert tortoise in the action area included recreation, designation of utility corridors and mineral material extraction areas, and designation of the desert tortoise ACECs.

On June 17, 2010, the BLM submitted a programmatic biological assessment to the Service to request consultation for program-level and project level actions that may affect and are likely to adversely affect 19 threatened and endangered species, including the desert tortoise and Moapa dace, of which 13 have designated critical habitat within the action area for the consultation. On January 2, 2013, the Service issued a non-jeopardy PBO to the BLM based on review of these activities (84320-2010-F-0365; Service 2013e). While the BLM's 1998 resource management plan remains in effect, the 2013 PBO replaces the Service's 1998 document. The PBO has been reinitiated six times to include additional acres and activity changes. The PBO is currently undergoing reinitiation, and the new PBO will replace the 2013 document.

Other Biological Opinions for Projects in the Action Area

Federal Highway Administration PBO

On September 27, 2010, the Service issued a PBO (84320-2010-F-0285; Service 2010g) to the Federal Highway Administration (FHWA) for funding road and highway projects and use of mineral material sites for these projects over a 10-year period. The Nevada Department of Transportation is the primary non-Federal proponent of projects and activities under the PBO. The FHWA and the Service anticipate that up to 4,468 acres of non-critical and 1,170 acres of critical desert tortoise habitat may be disturbed as a result of programmatic activities. This PBO is currently undergoing reinitiation.

Harry Allen Power Plant

On December 3, 1993, the service issued a biological opinion (1-5-93-F-381) to the BLM for proposed ROW amendments to include activities associated with the existing Harry Allen Power Plant. The amended ROWs authorized construction of an access road, overhead power lines, an administrative building, a maintenance building, water treatment facilities, a storm runoff pond, fuel oil tanks, and evaporation ponds. Further, the amended proposal was to include gas turbines in place of the previously proposed coal-slurry and an area approximately 1,300 feet wide and 11,000 feet long for future transmission lines. The project resulted in 523 acres of habitat disturbance. The Service exempted incidental take of 40 tortoises captured and moved from harm's way and 2 tortoises killed or injured. Because two tortoises were killed by project-related activities, BLM requested reinitiation of consultation on April 17, 2006. The Service completed reinitiation on December 20, 2006, and increased incidental take (mortality) to a total of four.

Kern River Gas Transmission (KRG T) Project

Two parallel natural gas pipelines operated by Kern River traverse west of the I-15 and east of the proposed Project. The pipeline projects required a license from the Federal Energy Regulatory Commission (FERC), ROWs from BLM, and permit from the Army Corps of Engineers. The biological opinion for the first KRG T pipeline was issued to FERC on December 21, 1990 (1-5-87-F-36R; Service 1990). The Service concluded that 45 desert tortoises may be killed or injured; 424 desert tortoises captured and moved; and 93 desert tortoise nests destroyed. As of June 24, 1991, approximately 23 deaths and 253 captures of desert tortoise were recorded by Kern River along the pipeline ROW. Problems associated with vehicular traffic on the ROW and access roads may have contributed to the mortalities in combination with high desert tortoise activity levels that were not anticipated. Consequently, on June 24, 1991, FERC requested reinitiation of formal consultation for the project based on a high incidence of desert tortoise mortality and captures on the pipeline project, which exceeded those limits established in the incidental take statement. The Service responded by letter dated June 28, 1991, and under reinitiation of consultation, imposed additional minimization measures, and increased the capture limits for desert tortoise from 294 to an unlimited number and increased injury and mortality limits from 25 to 35.

On July 9, 2002, the Service issued a biological opinion (1-5-02-F-476; Service 2002) to FERC for construction, operation, and maintenance of the second KRG T pipeline, adjacent to the first pipeline. The second pipeline project approximates the previous pipelines constructed under the 1990-1991 biological opinions. The pipeline ROW crosses approximately 318.8 miles of desert tortoise habitat, of which about 102.9 miles traverse desert tortoise critical habitat. Pipeline construction resulted in disturbance of 4,182 acres of desert tortoise habitat including 1,333 acres of desert tortoise critical habitat. Approximately 50 feet of the construction ROW overlapped the previously disturbed land that was affected by construction of the first KRG T pipeline. During construction of the second KRG T pipeline project, over 840 desert tortoises were encountered and one was killed as a direct result of project activities, which includes one desert tortoise in Utah and approximately 380 tortoises in Nevada. One tortoise was killed on June 8, 2011, as a result of maintenance operations. Consequently, BLM and the Service agreed that the requirement for reinitiation of consultation had been triggered for O&M activities due to a desert tortoise mortality and additional effects to the desert tortoise due to a large-scale translocation project in the pipeline action area. On September 28, 2011, the Service issued a biological opinion to BLM for O&M of the KRG T pipelines (84320-2011-F-0337; Service 2011g).

Sampling and Geotechnical Investigation for Proposed Cement Plant

In 2005, Ash Grove Cement Company, in cooperation with the Band, proposed to conduct preliminary studies in support of a proposed cement plant and limestone quarry on the Reservation. On August 24, 2005, the Service issued a biological opinion (1-5-05-F-497) to the BIA for their approval of the cement project. The project would locate suitable materials to develop the cement plant. The proposed project involved 23.7 acres of disturbance within a 298-acre area.

Surveys of Siting Area 1 occurred March 24 through 31, 2005. Desert tortoise sign observed during the survey included 63 burrows, 11 carcasses, 26 scats, and 12 live tortoises. In addition to the 63 typical desert tortoise burrows that were excavated in soil, there were numerous areas where outcroppings of cap rock with caliche caves and other naturally occurring cavities are present. The abundance of these naturally occurring caves would increase the number of useable tortoise dens from 63 to between 100 and 120.

Desert tortoise surveys and tortoise removal from haul and construction road areas began in March 2006, but the cement plant project did not move forward and did not get built.

UNEV Pipeline

On November 13, 2009, the Service issued a biological opinion to the BLM for ROW grants to construct, operate, and maintain the UNEV petroleum pipeline (6-UT-09-F-023; Service 2009b). The UNEV gas pipeline project aligns with the previous KRG T pipeline ROWs. On April 8, 2011, a desert tortoise was killed after being buried under a spoil pile. A second tortoise was crushed by a project vehicle and killed on May 9, 2011. A third tortoise died on June 29, 2011, when it fell into an open project trench, exceeding the incidental take exempted in the biological opinion. Consultation was reinitiated, and the Service issued a second biological opinion on July 1, 2011, exempting three additional desert tortoise mortalities or injuries (five in total). On July 18, 2011, BLM reported a fourth desert tortoise mortality when a project vehicle ran over and crushed a juvenile tortoise in the road. On August 20, 2011, UNEV reported the fifth tortoise mortality, a crushed desert tortoise on their ROW. The mortality report concluded that the mortality was caused by an unauthorized private vehicle that illegally accessed the ROW.

On August 31, 2011, BLM requested a second reinitiation of consultation in response to the additional desert tortoise mortalities. On September 29, 2011, the Service issued a biological opinion for the UNEV pipeline project. The Service exempted incidental take of 12 desert tortoises through injury or mortality, including the 5 previously killed and 237 desert tortoises captured and moved from harm's way.

On March 21, 2012, the BLM submitted a memorandum to the Service describing a newly discovered Sahara mustard (*Brassica tournefortii*) infestation in the ROW of the UNEV pipeline; a plan to treat the infestation; minimization measures to protect the desert tortoise during the treatment; and a post-application monitoring plan. The infestation occurred approximately from Meadow Valley Wash in Clark County (milepost 371) to the Beaver Dam Slope (milepost 325) at the Nevada and Utah state line. This situation constituted emergency consultation; thus, consultation was reinitiated for the third time and resulted in the Service issuing a biological opinion for this emergency consultation on July 19, 2012.

Coyote Springs Investment (CSI)

On March 2, 2006, the Service issued a biological opinion (1-5-05-FW-536 Tier 1; Service 2006) to the Army Corps of Engineers for the CSI residential development project in Coyote Spring Valley, Clark County, Nevada. The entire project area comprises approximately 13,100 acres, of

which 6,881 acres are planned for residential and commercial development and 6,219 acres are planned as a natural reserve that will ultimately be named the Coyote Springs Resource Management Area. The development will impact approximately 4.75 acres of the 61.26 acres of delineated Waters of the U.S. within the project area, thus necessitating compliance with section 404 of the Clean Water Act.

Incidental take for desert tortoise will be covered under the Clark County Multiple Species Habitat Conservation Plan (1-5-00-FW-575). Moapa dace is not included as a covered species in Clark County's MSHCP, and thus, incidental take for the dace is not authorized through Clark County's section 10(a)(1)(B) permit. Additionally, activities associated with surface and groundwater withdrawal are outside of the scope of the MSHCP and the 10(a)(1)(B) incidental take permit for the MSHCP. For the CSI biological opinion, the Moapa dace effects analysis is based off of and tiered to the January 30, 2006, *Intra-Service Programmatic Biological Opinion for the Proposed Muddy River Memorandum of Agreement Regarding the Groundwater Withdrawal of 16, 100 Acre-Feet per Year from the Regional Carbonate Aquifer in Coyote Spring Valley and California Wash Basins and Establish Conservation Measures for the Moapa Dace, Clark County, Nevada*. This intra-Service biological opinion took a programmatic (landscape-level) approach to evaluating potential effects to the endangered Moapa dace from groundwater pumping by multiple parties in the Coyote Spring Valley and California Wash hydrographic basins, considered in light of conservation measures proposed in the Muddy River Memorandum of Agreement (MOA). Included in this evaluation was the pumping of CSI's State-appropriated water right of 4,600 afy from Coyote Spring Valley to serve the proposed CSI residential development.

The Service anticipates that all desert tortoises that occur on the 6,881 acres of desert tortoise habitat in the project area (approximately 645 adult tortoises) will be taken through capture or injury and mortality as a result of the proposed action. The project will result in the permanent loss of 6,881 acres. The Service's biological opinion for the Clark County MSHCP stated that covered activities may result in the loss of up to 145,000 acres of Mojave desert scrub habitat (4 percent of total desert tortoise habitat within Clark County) and take of all desert tortoises therein.

CSI has constructed the golf course on the property and plans for additional development. The CSI property is generally bounded on the south by SR 168, on the north by the Clark-Lincoln county line, on the east by Pahrnagat Wash, and on the west by US 93. As partial mitigation, CSI will pay \$750,000 to fund research and conservation measures for the desert tortoise in the Mormon Mesa CHU.

Calpine Corporation Natural Gas-Fired Power Plant

On December 20, 2001, the Service issued a biological opinion (1-5-01-F-463; Service 2001) to the BIA for their proposed approval of a lease of Reservation land to Calpine Corporation for construction, operation, and maintenance of a natural gas-fired power plant. The lease would involve approximately 65 acres for the proposed 760 MW baseload natural gas-fired combined cycle power plant. An additional 33 acres of Reservation land may be used as borrow sites for

construction activities, which would require BIA approval. Peaking capacity of the plant may reach 1,100 MW. The project would be constructed, operated, and maintained under a long-term lease (25 years with a 20-year option) with Calpine Corporation for Reservation land and water use.

The project would include 500 kV electrical transmission lines and access roads on Reservation and BLM lands. The U.S. Environmental Protection Agency proposed to issue an authority to construct permit to Calpine Corporation under the Prevention of Significant Deterioration program at 40 CFR 52.21. The U.S. Army Corps of Engineers proposed to permit Calpine Corporation under section 404 of the Clean Water Act. BIA was the lead Federal agency for the consultation. No construction occurred, and this project has not moved forward.

K Road Moapa Solar Energy Project

In 2012, the Service issued a biological opinion (84320-2011-F-0430; Service 2012b) to the BIA for the K Road Moapa solar energy project under the intra-Service PBO for the Proposed Muddy River MOA (1-5-05-FW-536, Tier 5). The project involved the Band leasing land to a private applicant for the construction of a PV solar generating station 30 miles northeast of Las Vegas in Clark County. The BIA approvals included the lease of Reservation land and grant of easement for ROW for the access road, 12-kV transmission line, and water pipeline. The BLM issued ROW grants for an up to 500-kV transmission line and improvement of an existing access road. The BLM ROW occurs within an existing utility corridor, of which 5.0 miles is located on the Reservation and 0.5 miles on BLM land just south of the Reservation boundary. The project area is located on approximately 2,241 acres of land within the Reservation and 12 acres on BLM land within the utility corridor. All components, with the exception of power transmission lines, access roads, firebreak, and water pipeline, will be developed within the fenced 2,000-ac solar facility. Power and water transmission lines include an approximate 5.5-mile electric transmission line corridor (200 feet wide), an approximate 1-mile water pipeline corridor (25 feet wide), and an approximate 3-mile 12-kV transmission line (25 feet wide) to the Moapa Travel Plaza. The project also includes creating a 6,000-ac Conservation Area to receive displaced tortoises and two additional evaluation areas for short-term use (i.e., five years or less) associated with translocation of the tortoises.

Desert tortoise pre-project surveys estimated that 25 to 103 adult and sub-adult desert tortoises and 20 to 83 hatchling and juvenile tortoises would occur in the 2,000-acre K Road solar facility boundary; thus, the biological opinion identified a threshold of 103 adult and subadult and 83 hatchling and juvenile desert tortoises could be taken by capture within this area of the project. On April 13, 2013, the BIA reinitiated consultation for the project because 98 of the 103 subadult and adult desert tortoises had been captured in the solar facility boundary, and the final capture number was anticipated to exceed the identified 103 threshold. Based on the information in the reinitiation request, the Service revised the incidental take threshold and identified that no more than 120 adult and subadult tortoises would be captured and translocated from the solar facility boundary (84320-2011-F-0430.R001). As was reported on June 1, 2018, final project incidental take resulted in the capture of 117 adults and subadults and 60 hatchlings and juveniles.

Res Americas Moapa Solar Energy Center

In January of 2014, the Service issued a biological opinion (84320-2013-F-0301; Service 2014b) to the BIA for the Res Americas Moapa Solar Energy Center project under the intra-Service PBO for the Proposed Muddy River MOA (1-5-05-FW-536, Tier 6). The project involved the Band leasing land to a private applicant for the construction of a 200 MW PV solar generating station 30 miles northeast of Las Vegas in Clark County. The BIA approvals included the lease of Reservation land and grant of easement for ROW for the access road, two gen-tie transmission lines, and water pipeline. The BLM issued ROW grants for 230-kV and 500-kV transmission lines and an access road. The project area is located on approximately 885.4 acres of land within the Reservation and 66.1 acres on BLM land (total of 951.5 acres). All components, with the exception of power transmission lines, access roads, and water pipeline, will be developed within the fenced solar facility.

Desert tortoise pre-project surveys documented five adult and sub-adult desert tortoises and one hatchling and juvenile tortoise within the solar field, pipeline ROW, transmission lines corridors, and access road. The biological opinion identified a threshold of 29 adult and subadult and 66 juvenile desert tortoises could be taken by capture within this area of the project. Incidental take for mortality or injury was identified as 3 for adults and subadults and 6 for juveniles over the lifetime of the project.

On October 21, 2014, the BIA reinitiated consultation for the project (84320-2015-F-0016) because of changes in the locations of several project features, including the gen-tie line and access road located on BLM land and the water pipeline located on tribal lands. Additionally, the BIA proposed to increase the amount of water used for the project from 75 afy to 375 afy during the expected 2-year construction of the project. The incidental take threshold for desert tortoise did not change. This solar project has not yet been built. Future plans include expanding this project into surrounding Reservation and BLM lands for a new solar facility called Arrow Canyon Solar. On July 30, 2019, the Service issued concurrence (08ENVS00-2019-I-0144; Service 2019a) for effects to Mojave desert tortoise to the BIA for Arrow Canyon Solar geotechnical activities.

Playa Solar Project

On May 1, 2015, the Service issued a biological opinion (84320-2015-F-0139; Service 2015d) to the BLM for the Playa Solar Project tiered to the intra-Service PBO for the Proposed Muddy River MOA (1-5-05-FW-536, Tier 7). The project involves the construction, O&M, and decommissioning of a 200 MW PV solar project on 1,521 acres of BLM lands within the Dry Lake Solar Energy Zone (SEZ) and 3.67 acres of private land. Other facilities include access roads, a 230-kV gen-tie line, a distribution power line, a fiber-optic communications cable, a well, and a pipeline. The project would require up to 1,350 AF of water for construction and operations.

Desert tortoise pre-project surveys documented 18 adult and sub-adult desert tortoises on 2,150 acres. The biological opinion identified a threshold of 34 adult and subadult and 224 juvenile

desert tortoises could be taken by capture. Incidental take for mortality or injury was identified as three for adults and subadults during construction and no more than two adults per year or six over the lifetime of the project.

On March 16, 2016, the Service reinitiated consultation (84320-2015-F-0139.R001) and included amendments to the project because of changes in several project features: issuing two ROW grants to establish a Playa 1 (625 acres) and Playa 2 (959 acres), adding a temporary aboveground waterline from the well site on Moapa River Indian Reservation land to the Playa Solar construction site, increasing disturbance from 1,521 acres to 1,538 acres, and expanding the translocation site by 2,867 acres. The groundwater required for the projects was reduced from 1,350 to 675 AF. New site access from US Highway 93 was also requested.

The incidental take threshold for desert tortoise injury and mortality increased from 34 to 44 adult tortoises for construction. Incidental take for O&M was split between Playa 1 and Playa 2. Playa 1 injury and mortality take was identified as no more than one adult tortoise per year or two adults over the lifetime of the project, and Playa 2 take was identified as no more than one adult tortoise per year or three adults over the lifetime of the project.

On April 27, 2016, the Service amended the reinitiation of consultation for the project (84320-2015-F-0139.R001.AMD1) due to the expansion of the translocation recipient area to 2,867 acres. The amendment modified and replaced the language in the reinitiation to specify and confirm health assessments of resident tortoises in the expansion area. The Service estimated that 60 adult tortoises may occur in the expanded area based on the estimate of 13.5 tortoises per mi².

The Playa Solar Project has been constructed and a final project report was submitted on October 15, 2016. There were 77 tortoises translocated (42 adults and 35 juveniles). Two mortalities were documented outside of the project area and were not project related.

NV Energy Dry Lake Solar Energy Center

On May 1, 2015, the Service issued a biological opinion (84320-2015-F-0161; Service 2015d) to the BLM for the NV Energy Dry Lake Solar Energy Center Project. The project involves the construction, O&M, and decommissioning of a 130 MW PV solar project on 751 acres of BLM lands within the SEZ. Other facilities include an access road and gen-tie line pads, construction areas, and pull sites.

Desert tortoise pre-project surveys documented four adult and sub-adult desert tortoises on 945 acres and the 55 acres for the Dry Lake Solar Energy Center at Harry Allen Project. The biological opinion identified a threshold of six adult and subadult and 39 hatchling and juvenile desert tortoises could be taken by capture within this area of the project. Incidental take for mortality or injury was identified as no more than one adult during construction and no more than one adult per year or three adults over the lifetime of the project.

On October 18, 2018, the Service amended consultation (84320-2015-F-0161.AMD1) to reduce the acres of project disturbance from 751 acres to 660 acres. This project has not yet been

constructed.

NV Energy Dry Lake Solar Energy Center at Harry Allen

On May 1, 2015, the Service issued a biological opinion (84320-2015-F-0162; Service 2015d) to the BLM for the NV Energy Dry Lake Solar Energy Center at Harry Allen Project. The project involves the construction, O&M, and decommissioning of a 20 MW PV solar project on 155 acres of BLM lands within the SEZ. One hundred acres are previously disturbed and fenced, leaving 55 acres of new disturbance for the project.

Desert tortoise pre-project surveys completed for the Project documented one adult tortoise on the 55 acres. The biological opinion identified a threshold of two adult and subadult and 13 hatchling and juvenile desert tortoises could be taken by capture within this area of the project. Incidental take for mortality or injury was identified as no more than one adult during construction and no more than one adult per year or two adults over the lifetime of the project.

On June 28, 2018, the BLM informed the Service that the project will be reducing the acres of disturbance from 55 to zero, as no disturbance will occur on lands that are not previously disturbed. Based on this information, the Service considered the project to be completed.

Invenergy Harry Allen Solar Energy

On May 1, 2015, the Service issued a biological opinion (84320-2015-F-0163; Service 2015d) to the BLM for the Invenergy Harry Allen Solar Energy Project. The project involves the construction, O&M, and decommissioning of a 112 MW PV solar project on 594 acres of BLM lands within the SEZ. Other facilities include an access road and gen-tie line pads, construction areas, and pull sites.

Desert tortoise pre-project surveys documented 17 adult and sub-adult desert tortoises on 725 acres. The biological opinion identified a threshold of 32 adult and subadult and 210 juvenile desert tortoises could be taken by capture within this area of the project. Incidental take for mortality or injury was identified as no more than one adult during construction and no more than one adult per year or three adults over the lifetime of the project.

On July 5, 2018, the Service amended consultation (84320-2015-F-0161.AMD1) to increase the project size from 594 to 640 acres. All 640 acres were surveyed during pre-project surveys, so incidental take was not changed from the original. This project has not yet been constructed.

Tribal Travel Plaza Water Pipeline

On August 6, 2007, the Service issued a biological opinion (Service 2007; 1-5-05-FW-536, Tier 3) to the U.S. Department of Housing and Urban Development for their proposed funding to construct a water pipeline from an existing well to the existing Tribal Travel Plaza. Construction of the water pipeline resulted in 17.57 acres of desert tortoise habitat disturbance. No desert tortoises were reported taken as a result of the project.

Habitat Conservation Plans (HCPs)

Approximately 89 percent of Clark County consists of public lands administered by the Federal government, thereby providing little opportunity for mitigation for the loss of desert tortoise habitat under an HCP on non-Federal lands. Alternatively, funds are collected under HCPs and spent to implement conservation and recovery actions on Federal lands as mitigation for impacts that occur on non-Federal lands. Lands managed by BLM are included in these areas where mitigation funds are used to promote recovery of the desert tortoise.

The Southeastern Lincoln County Multiple Species Habitat Conservation Plan (MSHCP) was developed by three applicants (Lincoln County, City of Caliente, and Union Pacific Railroad), BLM, and the Service. This MSHCP and associated incidental take permit exempts incidental take for the desert tortoise and southwestern willow flycatcher (*Empidonax traillii extimus*) within the 30,000-acres permit area while contributing to the conservation for these two listed species. The MSHCP will benefit the tortoise by (1) restoring habitat impacted by wildfires, (2) assisting with development and implementation of a head starting program, (3) providing funding for much needed research, (4) translocating tortoises out of harm's way, (5) fencing development areas, and (6) prohibiting the possession of pet tortoises.

On November 22, 2000, the Service issued an incidental take permit (TE-034927) to Clark County, Nevada, including cities within the County and NDOT for actions proposed in their MSHCP. The incidental take permit allows incidental take of desert tortoise for a period of 30 years on 145,000 acres of non-Federal land in Clark County, and within NDOT ROW, south of the 38th parallel in Nevada.

As partial mitigation under the MSHCP, the County purchased a conservation easement from the City of Boulder City in 1994. The term of the easement is 50 years and it will be retained in a natural condition for recovery of the desert tortoise and conservation of other species in the area. Certain uses shall be prohibited within the easement including motor vehicle activity off designated roads, livestock grazing, and any activity that is inconsistent with tortoise conservation. Much of the easement also designated desert tortoise critical habitat. Within the boundary of the easement, Boulder City reserved a Solar Energy Zone for energy development projects including Nevada Solar One, Copper Mountain, and Copper Mountain North.

Other Existing Linear Disturbances and Anthropogenic Features

The Union Pacific Railroad crosses through the Moapa River Indian Reservation just west of I-15 and east of the proposed Project. The railroad presents a barrier to tortoise movement, but tortoises are likely capable of crossing the railroad at certain locations. Several large culverts exist that allow tortoise passage underneath the levee for the railroad. Unpaved roads and the access road that extends beyond the paved portion of Las Vegas Boulevard provides public, Band, and project access to the action area.

Interstate 15 (I-15) occurs outside the Reservation, south and east of the Project site and runs southwest-northeast. I-15 has been fenced to exclude tortoises and thus restricts east-west

movement of tortoises in the area. Several large culverts exist that allow tortoise passage underneath the interstate. Unpaved roads and the access road that extends beyond the paved portion of Las Vegas Boulevard provides public, Band, and project access to the action area. A northeast to southwest BLM utility corridor occurs within the Reservation, east and south of the Project site and recipient areas.

Other anthropogenic features include collection of desert tortoises for pets, food, and commercial trade; collision with vehicles on roads and highways; mortality from gunshots; predation; and OHV travel cross-country or on trails. In the action area, there is previous disturbance from OHV travel, weeds, and ground disturbance from multiple linear facilities such as pipelines and transmission lines.

Connectivity- All Projects

Genetic and demographic connectivity occurs throughout the Dry Lake Valley. The Project is located near the modeled least cost corridor for the desert tortoise. Least-cost path models identify potential linkages within which an animal would have the best chance of survival according to a specified “cost surface.” High-probability, high-quality habitat corresponds to “low cost” for tortoise occupancy (Averill-Murray et al. 2013). This type of evaluation provides an estimation of relative potential for animal passage across the entire landscape, including the identification of potential barriers to movement. East-west least-cost corridors of habitat exist northeast and south of the action area. Predictors of habitat quality for tortoise movement include intermediate distances from minor roads, increasing density of desert washes, and increasing amounts of vegetation cover (Gray et al. 2019).

It is likely that the desert tortoise population within the action area is genetically connected to the populations within the Mormon Mesa CHU due to the short, relatively unencumbered distance between the two. Home ranges of the desert tortoises within the action area likely overlap with the ranges of tortoises found in the connectivity corridor allowing for reproduction and exchange of genes between the two populations. The home ranges of the tortoises found within the corridor also likely overlap with the ranges of tortoises within the Mormon Mesa CHU allowing for a genetic link between the tortoise population in the action area with the populations found within the CHU.

Demographic connectivity describes a pattern of habitat or vegetation that is connected with other areas of similar habitat or vegetation. Demographic connectivity also refers to the degree to which population growth and vital rates are affected by dispersal. Demographic connectivity exists between the desert tortoise population in the action area and the populations in the surrounding areas because some of the existing barriers are permeable. Desert tortoise fencing on I-15 and existing culverts should substantially be reducing road mortality and actually increase tortoise survival and connectivity.

Recreation

Recreational use on roads and trails and large-volume, high-speed travel on major roads and

highways has contributed to desert tortoise mortality, habitat loss, habitat degradation, and habitat fragmentation. Many highways have been fenced to exclude tortoises including U.S. Highway 95 south of Las Vegas; U.S. Highway 93 north of Las Vegas; State Routes 161, 163, 164, and 165; and Interstate 15 northeast of Las Vegas.

Upper Respiratory Tract Disease

Upper respiratory track disease (URTD) was discovered in 1990 and is currently a major cause of mortality in portions of their range. Habitat degradation, poor nutrition, and drought have increased the desert tortoises' susceptibility to this disease (Service 1994). It is thought that URTD is transmitted between desert tortoise populations when desert tortoises are captured as pets and subsequently released.

Status of the Moapa Dace in the Action Area

While there are no Moapa dace within the project footprint, groundwater pumping within the action area could affect the entire range of the species, therefore the environmental baseline is the same as the rangewide description above.

Factors Affecting the Moapa Dace in the Action Area

Groundwater Use Memorandum of Agreement

On January 27, 2006 a MOA was signed by SNWA, MVWD, CSI, the Band, and the Service, regarding groundwater withdrawal of 16,100 afy from the regional carbonate aquifer in Coyote Spring Valley and California Wash Basins that included conservation measures for the Moapa dace. The MOA outlined specific conservation actions that each party would complete in order to minimize potential impacts to the Moapa dace should water levels decline in the Muddy River system as a result of the cumulative withdrawal of 16,100 afy of groundwater from two basins within the regional carbonate aquifer system. The MOA and PBO included conservation measures and in-stream flow level triggers that were listed in the *Status of the Species* section.

In the January 30, 2006, PBO for the proposed Muddy River MOA (1-5-05-FW-536; Service 2006), the Service estimated that the cumulative actions of parties to the MOA could result in a 31 percent reduction in the flows at the Warm Springs West in the Pedersen Unit of the NWR, reducing the flows to 2.7 cfs. This translates into a roughly 22 percent loss in riffle habitat and 16 percent loss in pool habitat in that area for the Moapa dace. Should flows at the Warm Springs West gage decline to a flow below 2.7 cfs, the amount of incidental take for any project-specific action under the MOA would be exceeded for the Moapa dace and water use from those anticipated in the intra-Service PBO would be reduced. Six projects have been proposed under the PBO, which have been explained in detail in the *Status of the Species* section.

Kane Springs Valley Groundwater Development Project

On October 29, 2008, the Service issued a non-jeopardy biological opinion (84320-2008-F-0007; Service 2008c) to the Ely District Office of the BLM for the purpose of permitting the

construction of groundwater production and monitoring wells, water pipelines, storage tanks, power transmission lines and substations, access roads, and fiber optic lines by the Lincoln County Water District (LCWD), Lincoln County Power District Number 1, and the Lincoln County Telephone Company. The proposed action also included the pumping of 1,000 afy of water from the Kane Springs Valley aquifer, which is within the low-gradient, high-transmissivity zone that connects Kane Springs Valley, Coyote Springs Valley, and the Warm Springs Area Basins. The analysis stated it would be difficult to determine effects resulting specifically from this project from those resulting from the 2006 MOA PBO (described above). However, concurrent monitoring of the Kane Springs well was required in addition to the monitoring required in the 2006 PBO. The project proponents also agreed to (1) reduce groundwater pumping by half in the Kane Springs Valley should stream flows reach 3.15 cfs or less but greater than 3.0 cfs at the Warm Springs West gage and (2) stop pumping in Kane Springs Valley should stream flows reach 3.0 cfs or less at the Warm Springs West gage. Results from the two-year pumping test described above includes impacts from groundwater pumping from this project.

Habitat Acquisition

In February 2006, the Secretary of the Interior approved funding through the Southern Nevada Public Lands Management Act for SNWA to purchase 1,218 acres of land historically known as the Warm Springs Ranch, located in the Moapa Valley. In 2007, SNWA completed the purchase and committed to protect and preserve the property as a natural area. By purchasing the property, SNWA was able to protect the majority of the Moapa dace population and its habitat and prevent the property from being developed for residential purposes.

Habitat Improvement Projects

On July 17, 2008, the Service issued a biological opinion (84320-2008-F-0417; Service 2008b) to the U.S. Army Corps of Engineers for their proposed issuance of a permit to SNWA for habitat restoration, establishment, and enhancement activities in the Lower Pederson Stream of the Warm Springs Natural Area. The permit allowed SNWA to restore part of the lower Pederson channel to a pre-modified alignment and construct an artificial channel connecting the stream to the channel. Incidental take of all Moapa dace occurring in the project area could be harassed during the course of activities, which was estimated to be approximately 100 fish. An additional 20 Moapa dace may have been harmed (wounded or killed) during the course of salvage activities. An unknown number of Moapa dace eggs and/or larvae may have been harmed during the course of activities due to desiccation of approximately 3,229 square feet of sheet flow.

Invasive Species and Predator Control

The introduction and establishment of non-native fish, particularly tilapia and mollies, continue to be a predation threat to Moapa dace. Efforts to control and monitor tilapia are currently underway.

Altered Flow Regimes

Habitat loss has occurred from water diversions and impoundments. Reductions to surface spring-flows resulting from groundwater development reduces spawning, nursery habitats, and the food base for the species.

Wildfires

A major wildfire occurred on July 1, 2010, affecting the Moapa dace. According to population survey data, up to 60 percent of the existing Moapa dace occurred within the action area at the time the fire started. Post-fire survey data indicate that most dace within the affected area quickly moved to safer areas in response to the fire. Although the number of dace that were lost during the fire is unknown, the Service estimates that less than 50 individuals were lost during the event and in the immediate aftermath.

Reproductive ecology study

On December 28, 2012, the Service issued a biological opinion (84320-2013-F-0029; Service 2012d) for issuance of a recovery permit to the University of Arizona for the capture of up to 40 adult Moapa dace in order to study their reproductive ecology to determine whether and how the species can be bred successfully in captivity. The consultation was reinitiated, and the Service issued a second biological opinion (84320-2013-F-0029.R001) on December 3, 2013, to include the capture and study of an additional 30 dace. The Service determined that neither action was likely to jeopardize the continued existence of the Moapa dace because enough dace would remain in the wild population to compensate for the loss.

EFFECTS OF THE PROPOSED ACTION

Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

The updated Endangered Species Act regulations (84 FR 44976) combine effects into “all effects.” Even though we discuss separate categories of effects, direct and indirect effects, this biological opinion complies with the new regulations.

Desert Tortoise Direct Effects

Direct effects are the immediate effects of the action and are not dependent on the occurrence of any additional intervening actions for the impacts to species or critical habitat to occur. The proposed Project will permanently and temporarily impact approximately 2,285 acres of desert tortoise habitat and contribute towards the combined effects to the 1,870-acre recipient area as a result of translocation of all project tortoises as discussed in the translocation effects section. The project will permanently and temporarily impact approximately 0.09 percent of the total

2,626,111 million acres available within the Northeastern Mojave Recovery Unit (Darst 2014). The habitat that will be permanently disturbed (120 acres) constitutes only approximately 0.005 percent of the habitat in the Northeastern Mojave Recovery Unit.

The direct and indirect impacts of the Project were determined based on Project-specific characteristics, such as area of proposed land disturbance, technology to be used, and amount of earth-moving or surface alteration required.

Construction and O&M Effects on Desert Tortoises

Injury and Mortality

Death and injury of desert tortoises could result from excavation activities such as clearing and grubbing of vegetation; trenching activities and entrapment in open trenches and pipes; and collisions with or crushing by vehicles or heavy equipment, including individuals that take shelter under parked vehicles and are killed or injured when vehicles are moved. Desert tortoises that enter or attempt to cross project access roads may be struck resulting in death or injury. Mortality mechanisms also include individual desert tortoises or their eggs being crushed or buried in burrows during construction and O&M-related activities. Because of increased human presence in the area, desert tortoises may be killed or injured due to collection or vandalism associated with increased encounters with workers, visitors, and unauthorized pets. Desert tortoises also may be attracted to the construction area by application of water to control dust, placing them at higher risk of death or injury.

Because the solar field would be enclosed with permeable fencing and most vegetation would be maintained onsite during operations, it is likely that tortoises would pass through the solar field and reoccupy it to some extent, though the extent to which tortoise would reoccupy the site is unknown at this time. The presence of desert tortoises in the solar field may result in injuries or death during routine maintenance of facilities. Tortoises outside of the fenced solar field may also be injured or killed due to truck traffic along the gen-tie line and associated access roads.

We estimate that all life stages of desert tortoise that occur within the direct effects action area may be adversely affected by the proposed action. Our estimate of the numbers of desert tortoises that are likely to occur within the action area is from pre-project survey data. We acknowledge, however, that not all individuals killed or injured during construction and O&M activities will be detected by biologists, biological monitors, or project staff and subsequently reported to the Service. The inability to detect all tortoises is largely due to the cryptic nature of desert tortoises, fossorial habits, and limited abundance. In the case of juveniles and eggs, their small size and location underground reduce detection probabilities of these life stages. Another confounding factor is that scavengers may locate, consume, or remove carcasses before monitors can locate them.

Overall, we expect death and injury of most subadult and adult tortoises to be avoided during construction and O&M activities through the implementation and compliance of Minimization Measures, including the use of authorized desert tortoise biologists and biological monitors who

will be onsite during pre-construction and construction activities. A Worker Environmental Awareness Program will inform all personnel about the desert tortoise, including checking under vehicles prior to moving them and what to do should they encounter a tortoise. Tortoise injury and mortality will also be minimized through flagging and fencing the construction boundaries, installing and monitoring desert tortoise fencing around construction areas, and clearing and translocating tortoises within the project areas prior to beginning work. Enforced speed limits and signs will also aid in preventing injury or mortality to desert tortoise.

Vibration

Equipment that would cause surface disturbance and otherwise operate during construction will be limited to what would be needed to grade dirt access roads, to install solar arrays, to trench for installation of cable and wiring, and to install the small operations building and the proposed electric substation. Areas outside of the exclusion fence may experience short-term vibrations that could potentially disturb desert tortoises and could alter breeding, feeding, and sheltering, which could lead to poor health and increased risk of mortality. Vibration is unlikely to be noticeable more than 40 or 50 feet beyond the source. Construction taking place near the perimeter edge of the exclusion fence is limited. Only burrows within 50 feet of the fence at the time of activity could be impacted by vibration. Blasting during construction would also produce vibration. Ground vibrations could cause stress to tortoises, which may result in avoidance of the area, thereby increasing the risk of mortality from increased temperatures or predators. The number of tortoises that could be impacted by vibration is expected to be minimal, if any.

Adverse effects from blasting would be avoided through implementation and compliance of proposed Minimization Measure 14. If blasting is required in desert tortoise habitat, detonation will only occur after the area has been surveyed and cleared by an authorized desert tortoise biologist no more than 24 hours prior. A minimum 200-foot buffered area around the blasting site will be surveyed. A larger area will be surveyed depending on the anticipated size of the explosion as determined by the authorized desert tortoise biologist. All desert tortoises above ground within the surveyed area will be moved 500 feet from the blasting site to a shaded location or placed in an unoccupied burrow. Desert tortoises that are moved will be monitored or penned to prevent returning to the buffered survey area. Tortoises located outside of the immediate blast zone and that are within burrows will be left in their burrows. All potential desert tortoise burrows, regardless of occupied status, will be stuffed with newspapers, flagged, and location recorded using a global positioning system (GPS) unit. Immediately after blasting, newspaper and flagging will be removed. If a burrow or cover site has collapsed that could be occupied, it will be excavated to ensure that no tortoises have been buried and are in danger of suffocation. Tortoises removed from the blast zone will be returned to their burrow if it is intact or placed in a similar unoccupied or constructed burrow.

Ground-disturbing activities during O&M will be substantially less than during construction of the Project, such that no adverse effects from ground vibration on desert tortoises are expected to occur during O&M.

Dust

Construction activities and O&M vehicle traffic on the roads within the action area could generate dust that could affect vegetation adjacent to and within the action area in the short-term. Long-term adverse effects from dust on vegetation are not expected to occur. The buildup of dust on plant leaves could affect photosynthetic productivity and nutrient and water uptake, resulting in loss of potential foraging plants for desert tortoises. It is assumed that this low-level dusting effect during construction would be minimal and most likely washed away during rainstorms. Dust levels are expected to be reduced for the Project that will utilize mowing as compared to traditional methods, due to retention of plants and less disturbance to soil crusts and desert pavement. Construction BMPs would be in place to monitor and decrease dust pollution if required by use of polymeric stabilizers in the soil or with frequent watering with water trucks or other means.

Effects from dust would be addressed through implementation of a Dust Abatement Plan with project design features to control dust impacts during all phases of the project.

Noise

Existing noise sources around the action area include road traffic from I-15, railroad traffic (Union Pacific Railroad), aircraft flyover (primarily from Nellis Air Force Base in North Las Vegas), and OHV usage. Noise generated during construction would be temporary in nature and is expected to last approximately 18 months. Construction activities would require the use of dozens of pieces of equipment. Noise levels at 50 feet from the two loudest equipment types for each construction activity, representing a conservative noise level, are expected to be between 68 and 85 decibels. Desert tortoises outside of the proposed solar facility boundary may experience intermittent exposure to increased noise levels but the impacts would be temporary, and desert tortoise are not expected to be substantially affected given their range of movement.

Noise levels during the O&M phase of the Project are expected to be insignificant. The amount of noise during O&M would not represent a significant change from the current ambient levels.

Increased noise levels may affect desert tortoise foraging and sheltering behavior, leading to poor health and increased risk of mortality, during construction and operations of the facility over a 50-year period. While limited data exist on the effect of noise on desert tortoises, Bowles et al. (1999) demonstrated that the species has relatively sensitive hearing (i.e., mean = 34 dB SPL) but few physiological effects were observed with short-term exposures to jet aircraft noise and sonic booms. These results cannot be extrapolated to chronic exposures over the lifetime of an individual or a population. Based on the ability of other species to adapt to noise disturbance, noise attenuation as distance from the project increases, and the fact that desert tortoises do not rely on auditory cues for their survival, we do not expect any desert tortoises to be injured or killed as a result of project-related noise impacts.

Project Access (Roads and Fencing)

Primary access to the proposed Project site would be via I-15, US Highway 93, and North Las

Vegas Boulevard to existing improved roads on the Reservation. These existing roads include the road built to provide access to the nearby existing K Road Solar Facility and the road providing access to the existing aggregate operation and water wells that would be adjacent to the Project. Access to project work areas outside of the fenced facilities may kill or injury desert tortoises due to increased use of existing routes.

When fencing is installed, tortoises that are released back into the area can find their access to previously used burrows cut off. This can lead to exposure to high temperatures that can raise carapace temperature to lethal limits (Peaden et al. 2017). The same study documented increasing carapace temperatures due to pacing along the fence. There is no published literature on how long a tortoise can withstand prolonged extreme temperatures before succumbing to death. Shrubs remaining along and near fences would help in preventing such mortality by providing shade.

The primary effect of project access on desert tortoises is the risk of vehicle strikes. Because all workers will participate in the WEAP (Minimization Measures 8 and 18) and speed limits will be limited to 25 mph (Minimization Measures 10 and 20), workers may be less likely to strike desert tortoises than a casual user. In addition, clearance surveys (Minimization Measure 6) and the use of authorized desert tortoise biologists and monitors during construction of the access roads (Minimization Measures 4 and 5).

We cannot predict how many individuals will be killed or injured due to project-related access because of variables such as weather conditions, the nature and condition of roads, public use that may be confused with project use, and activity patterns of desert tortoises at the time the roads are in use; however, we expect this number to be small.

Effects of Loss of Habitat

The Project includes the installation of temporary desert tortoise exclusion fencing around the solar facility, utilizing gates and cattle guards (with ramps) at ingress/egress locations during construction. The permanent perimeter fence would be constructed inside of the exclusion fencing. Exclusion fencing would be removed after construction, allowing tortoises to move onto and through the site during operations.

Vegetation would be cleared along access roads, at the Project substation and O&M building, at inverters, and along cable trenches. However, most native vegetation within the solar field would be left in place during construction. Equipment would drive and crush vegetation, preserving the integrity of root balls and allowing it to regrow after construction. Tall shrubs would be trimmed to allow for installation of panels. While we are considering the mowed areas to be temporarily disturbed, this acreage is technically permanently altered due to the installation and operation of the solar facility; however, vegetation would likely recover (and will be monitored), and it is anticipated that an unknown number of desert tortoises would re-occupy the site. Mowing and trimming allows vegetation to remain in place, thereby allowing tortoises to re-inhabit the solar field after construction and continue using the burrows within their home ranges.

A total of approximately 120 acres of occupied desert tortoise habitat would be permanently disturbed and up to 2,165 acres would be temporarily disturbed as a result of project implementation.

Construction equipment would not operate beyond the fenced boundary with the exception of the access road and the gen-tie ROWs. Roads that are not designated as open by the Applicant and the Band are not to be used by project personnel unless accompanied by a biological monitor.

Because recovery of vegetation in the desert can take decades or longer, ground-disturbing impacts associated with the Project may be long-term. Vasek et al. (1975) found that the Mojave Desert transmission line construction and O&M activities resulted in an unvegetated maintenance road, enhanced vegetation along the road edge and between tower sites (often dominated by nonnative species), and reduced vegetation cover under the towers, which recovered significantly but not completely in about 33 years. Webb (2002) determined that absent active restoration following extensive disturbance and compaction in the Mojave Desert, soils in this environment could take between 92 and 124 years to recover. Other studies have shown that recovery of plant cover and biomass in the Mojave Desert could require 50 to 300 years in the absence of restoration efforts (Lovich and Bainbridge 1999). Based on a quantitative review of studies evaluating post-disturbance plant recovery and success in the Mojave and Sonoran deserts, Abella (2010) found that reestablishment of perennial shrub cover (to amounts found on undisturbed areas) generally occurs within 100 years but no fewer than 40 years in some situations. He also found that a number of variables likely affect vegetation recovery times, including but not limited to climate (e.g., precipitation and temperatures), invasion by nonnative plant species, and the magnitude and extent of ongoing disturbance. Because the majority of the Project will employ drive-and-crush temporary disturbance on vegetation cut to a minimum of 18 inches, the likelihood of vegetation recovery is much faster than if the vegetation was cut to the ground or completely removed.

The proposed Project will permanently and temporarily impact approximately 2,285 acres of desert tortoise habitat and contribute towards the combined effects to the 1,870-acre recipient area as a result of translocation of all project tortoises as discussed in the translocation effects section. The project will directly impact approximately 0.09 percent of the total 2,626,111 million acres available within the Northeastern Mojave Recovery Unit (Darst 2014). The habitat that would be permanently disturbed (120 acres) constitutes approximately 0.005 percent of the habitat in the Northeastern Mojave Recovery Unit. While the model does not take into account anthropomorphic disturbances that have historically or are currently affecting the species, it is unlikely that consideration of these would result in a substantial change in this estimate.

While this percentage (0.005) does not constitute a numerically significant portion of the Northeastern Mojave Recovery Unit, we do not have the ability to place a numerical value on edge effects, habitat degradation, and overall fragmentation that the proposed action may cause or that occurs in the recovery unit as a whole. As a result, the low percentage of habitat within the recovery unit that would be lost underestimates impact of the proposed project on the desert tortoise, especially in light of existing land uses, changes in species composition, and fire regimes due to establishment of nonnative plant species, existing and increasing disease and

predation rates, and the expansion of human occupancy in what were once remote desert landscapes. The revised recovery plan (Service 2011a) and 5-year review (Service 2010a) provide detailed discussions of these and other past, present, and future threats facing the desert tortoise.

Handling and Translocation Effects

All desert tortoises found on the project site will be captured and removed according to the Translocation Plan (Appendix). Effects would occur both to the translocated tortoises and to the resident tortoises where translocatees are moved. An estimated 79 adult tortoises will be moved within the recipient area (including both those translocated up to 500 m surrounding the fenced solar field and those indirectly translocated more than 500 m). These numbers could be higher depending upon the actual number of tortoises in the area during clearance. We estimate that the totals could be 25 percent higher (99 translocated tortoises). Translocated tortoises would be handled, have transmitters affixed, given health assessments with tissue sampling, and moved. Tortoises could incur injury or death. Some adult tortoises would be passively or actively reintroduced to mowed areas of the Project site after construction as detailed in the Disposition Plan. Smaller juvenile tortoises would be moved under the same geographic criteria as adults.

Capture and translocation of desert tortoises may result in accidental death and injury from stress or disease transmission associated with handling tortoises, stress associated with moving individuals outside of their established home range, stress associated with artificially increasing the density of tortoises in an area and thereby increasing competition for resources, and disease transmission between and among translocated and resident desert tortoises. Capture and handling of translocated and resident desert tortoises for the purposes of conducting health assessments, which includes visual inspection relative to body condition, clinical signs of disease, and collection of biological samples for disease screening (i.e., blood samples to test for antibodies to pathogens), could result in accidental death or injury.

Capturing, handling, and moving tortoises for the purposes of translocating them out of the project areas or out of harm's way (along the gen-tie line) may result in accidental death or injury if these methods are performed improperly, such as during extreme temperatures or if individuals void their bladders and are not rehydrated. Averill-Murray (2002) determined desert tortoises that voided their bladders during handling had lower overall survival rates (0.81 to 0.88) than those that did not void (0.96). If multiple desert tortoises are handled by biologists without the use of appropriate protective measures and procedures, such as reusing latex gloves, pathogens may be spread among individuals. The Applicant's translocation plan will include protocols to minimize translocation effects and will continue to be adaptively managed over time to facilitate successful translocation. Because the Applicant will employ desert tortoise biologists approved by the Service and adhere to the most recent Service guidance in addition to implementing the conservation measures outlined in the proposed action, we anticipate any mortality or injury to desert tortoises from activities associated with removing individuals from the proposed project sites is unlikely.

Translocation has the potential to increase the prevalence of diseases, such as URDT, in

translocated and resident desert tortoises. Physiological stresses associated with handling and movement or from density-dependent effects could exacerbate this risk if translocated individuals with subclinical URTD or other diseases that present symptoms subsequent to translocation. This potential conversion of translocated desert tortoises from a non-contagious to contagious state may increase the potential for infection in the resident population above pre-translocation levels. To minimize this risk, health assessments (physical and biological) would be conducted on all desert tortoises to be translocated prior to being released in accordance with the most recent Service guidance (Service 2019b).

Translocated desert tortoises will not be released into the recipient area until results of the disease tests have been received and the Service approves the disposition plan for each individual. While awaiting test results, desert tortoises will be monitored *in-situ* or penned (i.e., quarantined) onsite no longer than 12 months. Handling and blood collection may result in elevated stress levels that render individuals more susceptible to disease or dehydration from loss of fluids. Because the Applicant will employ experienced biologists, approved by the Service and trained to perform health assessments and collection of biological samples, we do not expect these activities to result in death or injury of any individuals. Furthermore, disease screening and quarantine procedures will reduce the potential for introduction and spread of disease due to translocation.

Any desert tortoises placed in quarantine pens could increase their exposure and vulnerability to stress, dehydration, and inadequate food resources. However, because desert tortoises will be monitored regularly, care will be administered following specific procedures, and the quarantine period will not exceed 12 months, we anticipate that quarantined individuals are unlikely to experience death or injury from the vulnerabilities identified above. The potential exists, however, for predators or poachers to target quarantined desert tortoises. This risk also is expected to be minimized through regularly scheduled monitoring in accordance with the desert tortoise translocation plan. Desert tortoises monitored *in-situ* may be subject to similar effects as those in quarantine pens; however, because these individuals will be confined to large areas within their existing home ranges, we anticipate that the potential for increased stressors would be relatively low and adequate shelter and food resources would be accessible until translocation.

While we cannot reasonably predict if an increase in disease prevalence within the resident population may occur due to translocation, we believe the following measures will reduce the magnitude of this risk:

- The Applicant will use experienced biologists and approved handling techniques that are unlikely to result in substantially elevated stress levels in translocated animals;
- desert tortoises in the project footprint are currently part of a continuous population with the resident populations of the recipient site and are likely to share similar pathogens and immunities;
- density-dependent stresses are unlikely to occur for reasons stated below;
- any animal that has clinical signs of disease or ELISA-positive blood test will not be translocated; and
- long-term monitoring of translocated individuals will be implemented to determine the

prevalence of disease transmission.

Because ELISA testing can yield false-positive results (i.e., an animal may test positive even though it is not a carrier of the disease), the removal of healthy individuals from the translocated population may occur due to concern over disease. These individuals would be removed from the wild and, thereby, no longer contribute to the environmental baseline for the action area. Removing these individuals may inadvertently reduce the resistance of the population to disease outbreaks. Because the Applicant would coordinate with the Service and follow-up testing of ELISA-positive individuals would be performed, the potential for removing false-positive individuals from the translocated population is low. Consequently, we conclude that few, if any, desert tortoises would be removed from the population due to false-positive results. Similarly, some of the animals that test positive may have survived past disease infections and remain healthy. Despite gaps in our knowledge relative to disease pathology and recognition that removal of seropositive desert tortoises may eliminate individuals with superior fitness and genetic adaptations for surviving disease from the gene pool, the low number of individuals expected to be removed would not be large enough to affect population genetics in the wild.

Boarman (2002), in a review of literature on threats to the desert tortoise, stated that the adverse effects of translocating desert tortoises include increased risk of mortality, spread of disease, and reduced reproductive success. Translocated desert tortoises have a tendency, at least initially, to spend more time aboveground moving through their environment than animals within their home ranges; this tendency exacerbates at least some of these threats.

Field et al. (2007), Nussear (2004), and Nussear et al. (2012) have conducted studies focused on translocating desert tortoises and found that translocated animals seem to reduce movement distances following their first post-translocation brumation to a level that is not significantly different from resident populations. As time increases from the date of translocation, most desert tortoises change their movement patterns from dispersed, random patterns to more constrained patterns, which indicate an adoption of a new home range (Nussear 2004). Walde et al. (2011) found that movement patterns of desert tortoises translocated from Fort Irwin differed from those of animals studied elsewhere but describe their results as “apparent trends” because they have not completed analyses to determine if these trends were statistically significant. Translocated animals moved greater distances than residents and controls through the four years of their study.

Desert tortoises that were translocated short distances moved much shorter distances than those that were translocated long distances. Moving desert tortoises shorter distances can result in the animals attempting to return to their original capture site. Attempts to return to the capture site would cause individuals to spend relatively greater amounts of time aboveground; if they encounter and follow fence lines during this movement, it may further increase the amount of time they spend aboveground. These behaviors may expose them to elevated risks of predation and exposure to temperature extremes that they would otherwise avoid. The applicants propose to locate desert tortoises translocated from the solar facility via telemetry as outlined in the LTMP to ensure that they not exhibiting behaviors that may endanger their well-being such as walking along the exclusion fence. Overall, because we expect desert tortoises would be moved and monitored by authorized biologists, few, if any, tortoises are likely to be killed or injured as

a result of being translocated from the Project site.

Hinderle et al. (2015) found that almost half of desert tortoises translocated 2 km returned to their capture site; only one desert tortoise moved 5 km returned to the capture site; and no desert tortoises returned home from 8 km away. The propensity for desert tortoises to attempt to return to their capture site would increase the likelihood that they would encounter an exclusion fence and pace it; while pacing the fence, they may be attacked by predators or exposed to extreme weather. Despite the fact that Hinderle et al. (2015) found that almost half of the animals in their study returned to their capture sites, more than half did not. The potential exists that these animals remained within their home ranges after translocation and made no effort to return to the capture site, at least immediately.

Desert tortoises that spend less time aboveground are less vulnerable to predation and environmental extremes. Regardless of the distance desert tortoises would be moved, we expect that animals that are moved from the project sites would spend more time aboveground and moving, at least during the first year, which means they would be more vulnerable to predators, adverse interactions with other desert tortoises, and weather conditions than resident or control animals. During this first year of increased movement, desert tortoises would also be more likely to engage in fence pacing behavior, which can lead to hyperthermia and death. Having vegetation remain along fences will help minimize this effect. In spring 2013, biologists translocated 108 adult and 49 juvenile desert tortoises from approximately 2,000 acres of the K Road Moapa Solar Project on the Moapa River Indian Reservation northeast of Las Vegas; they also monitored 18 adult desert tortoises as controls or residents. Extremely high temperatures during the summer may have killed two or more adult translocated desert tortoises. Predators likely killed eight juvenile translocated desert tortoises. No resident or control desert tortoises died during monitoring.

As with prior translocations (Nussear 2004, Field et al. 2007), we anticipate that predation is likely to be the primary source of post-translocation mortality particularly for small tortoises. The level of winter rainfall may dictate the amount of predation observed in desert tortoises (Drake et al. 2009, Esque et al. 2010). We are aware of two instances where monitoring of large numbers of control and resident desert tortoises accompanied the translocation of desert tortoises (Fort Irwin and Ivanpah Solar Electric Generating System). At Fort Irwin, Esque et al. (2010) found that “translocation did not affect the probability of predation: translocated, resident, and control tortoises all had similar levels of predation.” At the Ivanpah Solar Electric Generating System, the numbers of translocated, resident, and control desert tortoises that have died since the onset of work at the Ivanpah Solar Electric Generating System are roughly equal (Davis 2014), which seems to indicate that translocation is not a factor in these mortalities; among translocated, resident, and control animals, predation by canids is the greatest source of mortality. To minimize the risk of predation, the Disposition Plan will include release sites preferentially located away from known areas of concentrated predator sign if any are identified.

Drought conditions seem to affect translocated and resident desert tortoises similarly. Field et al. (2007) monitored translocated and resident desert tortoises during drought conditions and found no significant difference between resident and translocated animals. Field et al. (2007) noted that

most of the translocated desert tortoises “quickly became adept at life in the wild,” despite the harsh conditions. Consequently, we have concluded that the amount of rainfall preceding translocation is not likely to decrease the survival rate of desert tortoises that would be moved from within the project areas.

Nussear et al. (2012) investigated the effects of translocation on reproduction in 120 desert tortoises. They found that, in the first year since translocation, the mean reproductive effort for translocated desert tortoises was slightly less than that of residents. Nussear et al. (2012) noted that the translocated animals may have benefited from being fed while in the pre-translocation holding facility. If the food provided in the facility increased their production of eggs in the first year after translocation, translocated desert tortoises that were not held in captivity and fed prior to release may have produced fewer eggs than he observed in his experiment. In the second and third year after translocation, the mean number of eggs was not different between resident and translocated desert tortoises. Given the long reproductive life of desert tortoises and the fact that translocated animals produced the same number of eggs as residents the first year after translocation, the decrease in the output of eggs from translocation desert tortoises for a year will not have a measurable effect on the overall health of the population, either locally or on a broader scale.

In spring 2009, 570 tortoises were translocated from the United States Army National Training Center at Fort Irwin in California south of the project boundary. Genotypes were determined for the translocated male tortoises and an additional 190 resident male tortoises (Mulder et al. 2017). In 2012, 96 female tortoises (50 resident and 46 translocated) were tracked, and nests were visited until blood samples were taken from all live hatchlings (97 hatchlings from 36 nests) and genotyped. The paternity was determined for 35 hatchlings, and all 35 hatchlings were found to be offspring of resident males, with translocated males producing no offspring (Mulder et al. 2017). Translocated males could have reduced fitness due to stress or expended energy in a new environment. Since this is only one study, it is not known if this occurs for all translocated males and, if so, how long it takes before translocated males start breeding.

Translocation also affects resident desert tortoises within the maximum dispersal area due to local increases in population densities. Desert tortoises from the solar facility site would be moved to areas now supporting a resident population, which may result in increased inter-specific encounters and, thereby, an increased potential for spread of disease, potentially reducing the health of the overall population; increased competition for shelter sites and other limited resources; increased competition for forage, especially during drought years; and increased incidence of aggressive interactions between individuals (Saethre et al. 2003). To minimize potential density-dependent effects, recipient areas must be of sufficient size to accommodate and maintain the resident and translocated desert tortoises (Service 2019b).

The 1,870-acre recipient site represents 0.07 percent of the 2,626,111 million acres of remaining desert tortoise habitat in the Northeastern Mojave Recovery Unit. The estimated number of tortoises within the recipient site is approximately 20, which results in a pre-translocation density of approximately 2.6 adult tortoises per km². The maximum recommended post-translocation density within the Northeastern Mojave Recovery Unit is 6.1 adult tortoises per km² (Service

2018b). This Project is unique in that the tortoise density within the solar field is already above this level (8.9 tortoises per km²).

Based on survey data, an estimated 79 adult tortoises may be translocated. Approximately one quarter (~20 tortoises) may be returned back into the interior of the solar site following construction. The remaining three quarters (~60 tortoises) would be translocated to the nearest suitable habitat outside of the fenced solar site within 500 m. These translocations (plus resident tortoises) could result in a post-translocation density of 10.5 tortoises per km² within the recipient area.

The majority of the solar field would not be graded during construction and existing vegetation would be left largely intact; permanent fencing for the project would be permeable to desert tortoises, and all returned and many translocated tortoises may return to the project area following construction. The post-translocation density within the recipient area and solar site is only projected to be 6.1 tortoises per km² after construction is completed and tortoises are allowed to reinhabit the solar site. Table 8 shows the post-translocation and relocation tortoise density estimates.

Table 8. Adult tortoise densities before and after translocation and relocation

Translocation recipient area size (km²)	Current # of tortoises in recipient area	Current estimated density in recipient area (# tortoises per km²)	# of tortoises post translocation (resident and translocated)¹	Temporary post-translocation density in recipient area (# tortoises per km²)¹	Post-translocation and post-relocation density in recipient area and solar site (# tortoises per km²)^{1,2}
7.6	20	2.6	80	10.5	6.1

¹ These numbers may be higher if more than the estimated 79 tortoises are translocated.

² 80 resident and translocated tortoises + 20 returned = 100 tortoises. 100 tortoises / 16.5 km² = 6.1 tortoises/ km²

We expect the density within the recipient site and solar site to be lower, however, since tortoises within the 1,870-acre recipient site will be allowed to move within their home-range and would likely expand into the 7,112-acre Study Area Recipient Site. If we assume that the tortoise density is the same throughout the Study Area Recipient Site as the density within the translocation recipient area (2.6 tortoises per km²), then we would assume there to be 75 resident adult tortoises (28.8 km² x 2.6 tortoises per km² = 75 tortoises) within the 7,112 acres. After all translocation is completed after construction, the average tortoise density for the entire Study Area Recipient Site and the solar site would be approximately 4.1 tortoises per km² ([75 + ~80 tortoises] / [28.8 + 8.9 km²] = 4.1 tortoises per km²).

We anticipate that density-dependent effects on resident desert tortoise populations are likely to be minor for the following reasons:

- Health assessments will be performed on all desert tortoises prior to translocation and relocation, thus decreasing the potential for introduction of infectious diseases to the recipient areas;
- tortoise density will be the highest in the recipient area only during construction;
- relocation and translocation will be implemented such that individuals are distributed throughout the area;
- the recipient areas are contiguous with suitable desert tortoise habitat, which will facilitate dispersal into other areas; and
- long-term monitoring will provide opportunities to implement adaptive management to address any observed unanticipated effects.

During the translocation work at Fort Irwin, researchers tested over 200 desert tortoises for differences in the levels of corticosterone, which is a hormone commonly associated with stress responses in reptiles; Drake et al. (2012) “did not observe a measureable physiological stress response (as measured by [corticosterone]) within the first two years after translocation”. The researchers found no difference in stress hormone levels among resident, control, and translocated desert tortoises. For these reasons, we conclude that the addition of translocated desert tortoises to the recipient areas would not result in detrimental effects to translocated or resident animals.

Various studies have documented mortality rates of 0, 15, 21, and 21.4 percent of translocated desert tortoises in other areas (Nussear 2004, Field et al. 2007). Nussear (2004) found that mortality rates among translocated desert tortoises were not statistically different from that observed in resident populations. However, this study did not compare mortality rates in resident populations to those in control groups; therefore, we cannot determine if the translocation caused increased mortality rates in the resident population. Recent studies in support of the Fort Irwin expansion compared mortality rates associated with resident and translocated desert tortoise populations with that of control populations; preliminary results indicated translocation did not increase mortality above natural levels (Esque et al. 2010). This and other fieldwork indicate that desert tortoise mortality is most likely to occur during the first year after release. After the first year, translocated individuals are likely to establish new home ranges and mortality is likely to decrease.

The probability for survival for tortoises over 160 mm was studied in the vicinity of the Ivanpah solar facility during a 5-year study (58 translocated tortoises, 112 resident tortoises, and 149 control tortoises; Dickson et al. 2019). Translocated tortoises were found to have 89% to 99% the survival rates of resident or control tortoises. This may be because tortoises were released within 500 m of their home range or because tortoises were translocated in early spring, giving them time to dig burrows and become familiar with the environment before the heat of the summer. Another study of four translocation sites (Nafus et al. 2017) tested the relationship of habitat features to translocation dispersal and survival of juvenile desert tortoises in southern Nevada. Findings indicated that the presence of rodent burrows, substrate texture, and wash presence provided refugia, allowing tortoises to avoid predator detection and reduce overall

mortality.

Natural mortality rates of juvenile desert tortoises are greater than those of adult tortoises. In general, we expect that healthy populations have a large number of desert tortoises smaller than 180 mm (Turner et al. 1987), but only limited information exists on the actual numbers of small tortoises in a given area. Additionally, juvenile desert tortoises use resources differently than do adults (Wilson et al. 1999) and we expect that juveniles and adults interact much less frequently than do adults. Due to differences in habitat use influenced by both physical and physiological differences between adult and juvenile desert tortoises, we expect overlapping of ranges during growth and dispersal of the juvenile desert tortoise. Consequently, we do not expect translocating juvenile desert tortoises at higher densities than adult animals would result in any density-dependent adverse effects.

Tortoises that move over large areas can result in greater overlap with other desert tortoise home ranges. If translocated animals have disproportionately higher contact opportunities and increase the connectivity of animals across the landscape, they could rapidly facilitate disease spread if infected. Translocated animals, though often healthy at the time of selection, may be at high risk of acquiring infection from residents and facilitating spread. High mobility after release may increase contact opportunity, and stress associated with translocation may increase susceptibility or make a virulent infection more virulent (Aiello et al. 2014). Several circumstances that are likely to reduce the magnitude of the threat of disease prevalence being exacerbated by translocation include (1) the applicants will use experienced authorized biologists and approved handling techniques that are unlikely to result in substantially elevated stress levels in translocated animals; animals are less likely to succumb to disease when they are not stressed; (2) desert tortoises on the project site are currently part of a continuous population with the resident populations of the recipient sites and are likely to share similar pathogens and immunities; (3) Drake et al. (2012) indicated that translocation does not seem to increase stress in desert tortoise; (4) density-dependent stress is unlikely to occur for the reasons discussed previously in this section; and (5) Service-trained biologists will perform health assessments using Service-approved protocols (Service 2019b) and will not translocate any desert tortoise showing severe clinical signs of disease but will transport the animal to an agency-approved quarantine as described in the translocation plan (Appendix).

Based on the information described above, we anticipate that survival rates of adult desert tortoises moved from the project sites will not significantly differ from that of animals that have not been moved. We expect that desert tortoises would be at greatest risk during the time they are spending more time aboveground than resident animals. We cannot precisely predict the level of risk that will occur after moving desert tortoises because regional factors that we cannot control or predict (e.g., drought, predation related to a decreased prey base during drought, etc.) would likely influence the mortality rates.

While we have data to help evaluate the effects to tortoises translocated into the short-distance and distant release areas, we have much less information regarding effects to tortoises that will get placed into holding facilities and moved back into the solar facility after construction. While the site will contain native vegetation that desert tortoises rely on for forage and shelter, this

vegetation will have been mowed and crushed in order to install the solar panels. The site will also contain new access roads that were not previously within the site that will fragment the landscape to some extent. There is currently one ongoing study of a solar site that left vegetation within the facility and allowed tortoises access to the site. The Valley Electric Association constructed a solar project on 80 acres in Pahrump, Nevada. Vegetation onsite was mowed and crushed while solar panels were installed. Four tortoises were held in pens during construction, affixed with transmitters, and released back into the solar site in October 2017. Monitoring reports to the Service have documented that two of these tortoises, a female and male, have been found within and around the solar site since construction. In 2019, the female was found within the facility nine times and the male was located within the facility once. The vegetation in the facility has rebounded from being crushed, and the tortoises appear to be using the site as habitat. While this project is small in scale in comparison to the proposed Project, we believe it is likely that tortoises placed back into the solar site will utilize the site. There is also a chance that tortoises placed back into the mowed site will move out of the site after release. Identifying how tortoises respond to being placed back into site, how and if they use the site, and how many stay within the site is the main focus of the habitat use study that will be funded by the Applicant. BLM and the Applicant will also adaptively manage tortoises post construction, and will work with the Service to remedy any unforeseen adverse effects to desert tortoises from being released in, and having access to the site.

In conclusion, we do not anticipate that capture and moving desert tortoises out of harm's way would result in death or injury because these individuals would remain near or within their existing home range, which is not likely to result in significant social or competitive impacts to resident desert tortoises in the area. Following release of desert tortoises translocated outside of their home range, a small number may die due to exposure, stress, dehydration, inadequate food resources, and increased predation. We anticipate most of this mortality is likely to occur in the first year after release, during the period that translocated animals are attempting to establish new home ranges. In addition, we anticipate that a small number of resident desert tortoises at the recipient area may die from natural causes due to these same vulnerabilities. However, we cannot determine if mortality rates in the translocated or resident populations would be above natural mortality levels for the recipient area. In addition, the potential impacts of capturing, handling, and moving tortoises for the purposes of translocation would be avoided or reduced through implementation of the actions specified in the implementation of the Service-approved translocation plan (Appendix). Lastly, as described in the translocation plan, translocated desert tortoises will be allowed back into the Project site, monitored, findings reported to the Service, and adaptive management strategies implemented as needed.

Post-Translocation Monitoring

Based on the description of post-translocation monitoring in the translocation plan and our estimate of the number of desert tortoises that require translocation, we anticipate that the Applicant will attach transmitters to approximately 135 subadult and/or adult desert tortoises (i.e., approximately 79 to be translocated, 36 in the recipient site, and 20 in the control site) to facilitate monitoring. Thus, desert tortoises will have transmitters attached and be monitored and handled periodically for health assessments throughout the short-term monitoring period. A

subset of these tortoises will continue to be monitored for two years post-construction as part of the LTMP; approximately 60 tortoises are expected to be included in the long-term monitoring (20 at each site). Some potential exists that handling of desert tortoises may cause elevated levels of stress that may render these animals more susceptible to disease or dehydration from loss of fluids. However, because the Applicant will employ experienced biologists approved by the Service, we do not expect handling and monitoring activities to result in death or injury of any individuals.

Long-term monitoring consists of two primary goals: (1) direct tracking of translocated individuals to assess re-occupation of the project area and (2) a mark-recapture occupancy survey to assess densities of tortoises within the project area and estimate the proportion of those tortoises that were initially translocated from the project area.

Post-translocation monitoring provides for adaptive management. Action can be taken if unpredicted scenarios occur. For instance, if translocated and returned tortoises do not end up using the mowed areas of the solar facility, densities within the recipient areas may increase to high levels. If the monitoring documents that tortoises have rapidly declining body condition scores or other factors of concern, tortoises would be moved to a holding facility until a location is determined for additional translocation.

Desert Tortoise Indirect Effects

Indirect effects are those for which the proposed action is an essential cause, and that are later in time, but still reasonably certain to occur. If an effect will occur whether or not the action takes place, the action is not an essential cause of the indirect effect. In contrast to direct effects, indirect effects are more subtle, and may affect tortoise populations and habitat quality over an extended period of time, long after surface-disturbing activities have been completed. Indirect effects are of particular concern for long-lived species such as the desert tortoise because project-related effects may not become evident in individuals or populations until years later.

The area of indirect effects is defined as the area within 0.5 miles of the project area including the proposed translocation area. We have expanded this area in order to capture connectivity effects between the Arrow Mountain Range to the west and the Muddy Mountain Range to the east. Indirect effects do not involve ground-disturbing activities but instead consider effects from habitat fragmentation, decreased connectivity, lighting, herbicide use, and accidental spills of hazardous materials associated with the project. The effects are caused by the proposed action, but they are later in time, reasonably certain to occur, and have the potential to impact desert tortoise and their habitat in the surrounding area. The magnitude of indirect effects is expected to decrease as distance from the action area increases. Potential indirect effects from the proposed action would be addressed through implementation of project design features that control impacts such as soil erosion, dust, stormwater runoff, and water quality during all phases of the project. In addition, the applicants would prepare and implement a Worker Education and Awareness Plan, Raven Management Plan, Integrated Weed Management Plan, Spill Prevention

and Emergency Response Plan, and Hazardous Materials and Waste Management Plan.

Lighting

Temporary lighting would be used during construction at dawn and dusk at the construction offices, laydown yard, and substation area. There may also be mobile lighting located at entrances during construction. Lighting would likely be used more during the wintertime to ensure safe working conditions for personnel. Minimal lighting would be used onsite and would be directed inward and downward. Site lighting could include motion sensor lights for security purposes. Lighting used onsite would be of the lowest intensity foot candle level, in compliance with any applicable requirements from the Band, measured at the property line after dark. The Project's lighting system would provide O&M personnel with illumination for both normal and emergency conditions near the main entrance, O&M building, and the Project substation. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be downward facing and shielded to focus illumination on the desired areas only. Therefore, light trespass on surrounding properties would be minimal. If lighting at individual solar panels or other equipment is needed for night maintenance, portable lighting would be used. Nighttime construction would be rare, but artificial lighting could cause behavioral changes in tortoises, causing them to come out of their burrows. This could expose them to possible mortality from predators or stress-induced fence pacing. Project lighting is not expected to have a more than negligible effect on desert tortoises near and adjacent to the Project.

Predator Subsidies

Avian predators, such as the common raven (*Corvus corax*), and scavengers (e.g., coyotes) benefit from a myriad of resource subsidies provided by human activities as a result of substantial development within the desert because food and water subsidies and roosting and nesting substrates would otherwise be unavailable; these animals prey on eggs, juvenile, and adult desert tortoises. These subsidies can include food (e.g., garbage), water (e.g., detention ponds), nesting substrates (e.g., transmission lines and fencing), cover, and safety from inclement weather or predators (e.g., office buildings). Human activities also facilitate expansion of raven and coyote populations into areas where they were previously absent or in low abundance. Ravens likely will frequent the project areas because of the potential availability of such subsidies. Aside from the Tribal community, no other human communities occur in the action area. Road-kill of wildlife along I-15 provides additional attractants and subsidies for opportunistic predators and scavengers but is not likely to increase appreciably as a result of the project. Carcasses of any type (bird, mammal, etc.) may attract predators to the project site. Removal of carcasses when found would eliminate the odor and further attraction to the site by predators.

Facility infrastructure, such as gen-tie and transmission lines, fences, buildings, and other structures on the project site may provide perching, roosting, and nesting opportunities for ravens and other avian predators. Natural predation rates may be altered or increased when natural habitats are disturbed or modified. Common raven populations in some areas of the Mojave

Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the desert (Boarman 2002). Since ravens were scarce in the Mojave Desert prior to 1940, the existing level of raven predation on juvenile desert tortoises is considered an unnatural occurrence (BLM 1990). In addition to ravens, feral dogs have emerged as significant predators of desert tortoises adjacent to residential areas. Though feral dogs may range several miles into the desert and have been found digging up and killing tortoises (Evans 2001), there have not been any reports of feral dogs in the Project area.

There has also been confirmed predation on desert tortoise by red-tailed hawks (*Buteo jamaicensis*). In spring 2015, a study in the Chemehuevi critical habitat unit in California, found juvenile tortoise scutes within red-tailed hawk pellets under transmission line structures (Anderson and Berry 2019). Of the pellets collected, 4.4 percent contained one to several juvenile tortoise scutes. This is the first report of predation on tortoises by red-tailed hawks.

To avoid and minimize the availability of project sources for predators, subsidies will be minimized by Minimization Measures 11, 12, and 21 which propose trash and litter control and monitoring for the presence of ravens and other predators. A Raven Management plan will be implemented if predator densities substantially increase near the facility. Specific minimization actions to be implemented include onsite trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens.

Exposure to Chemicals

The primary wastes generated at the Project during construction, operation, and maintenance would be nonhazardous solid and liquid wastes. Limited quantities of hazardous materials would be used and stored on the Project site. The ESS, if included, could include 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 onsite during construction would be the fuels, lubricating oils, and solvents associated with construction equipment, which could impact desert tortoise through poisoning causing decreased health or mortality. 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 small office operations, and other miscellaneous solid wastes.

The Applicant will prepare a Spill Prevention and Emergency Response Plan and a Hazardous Materials and Waste Management 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.

Mechanical treatment of weeds is the preferred method for the Project; however, herbicides may be used if necessary, which could cause decreased health or mortality to tortoises. Herbicide use would follow those approved in BLM's Programmatic EIS (PEIS) for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Managed Lands in 17 Western

States (BLM 2007, 2016). The applicant would implement a Site Restoration Plan and an Integrated Weed Management Plan that specifies procedures for managing vegetation and minimizing the spread of non-native and noxious weeds, including integrated pest management and use of herbicides. Standard Operating Procedures will be incorporated into the Integrated Weed Management Plan and implemented. The herbicides that may be used in mowed areas, based on those allowed on BLM lands, include aminopyralid, clopyralid, imazapyr, imazapic, glyphosate, metasulfuron methyl, and rimsulfuron. These herbicides are considered to have very low toxicity to mammals, birds, and fish when applied in accordance with all product label requirements and restrictions. There is limited literature on toxicity trials involving reptiles, but exposure to such chemicals may cause changes in behavior, symptoms of poisoning (swollen eyes, nasal discharge, immobility, etc.), or even mortality with repeated exposure. Effects from exposure would be much greater in juvenile tortoises than larger adults. Herbicides that are believed to have deleterious effects on reptiles, such as 2,4-D, would not be allowed. Any herbicide use would be implemented during the less active tortoise season.

Water is the preferred method for reducing dust for the Project; however, palliatives may be used in permanent disturbance areas at the beginning of construction where tortoises have been excluded. Approved palliatives for use in desert tortoise habitat include Road Bond 1000, Soil Cement (for roads and heavy traffic areas), Formulated Soil Binder 1000 (for non-traffic areas on finer soils), and Plas-Tex (for non-traffic areas on sandier/rockier soils). Since palliatives would only be used in areas where tortoises have been excluded, they should not come into contact with these substances. If tortoises were to come into contact with palliatives, the consequences could be decreased health or mortality.

Nonnative Plant Species

Another indirect effect from the development of the proposed project is the potential introduction and spread of nonnative, potentially invasive plant species into habitats adjacent to or within the project sites; invasive plant species reduce habitat quality for desert tortoise, in particular, foraging habitat (Tracy et al. 2004), leading to reduced tortoise health and potentially mortality. Construction and O&M activities of the proposed project components may increase distribution and abundance of nonnative species within the action area due to ground-disturbing activities that favor these species. Project equipment may transport nonnative propagules into the project area where they may become established and proliferate. In addition, the introduction of nonnative plant species may lead to increased wildfire risk, which ultimately may result in future habitat losses (Brooks and Esque 2002) and changes in forage opportunities for desert tortoises.

Invasion of non-native plants can affect the quality and quantity of plant foods available to desert tortoises. Nonnative species generally do not provide adequate nutrition to desert tortoises (Abella and Berry 2016); when they out-compete native forage plants, they reduce the amount of food available to desert tortoises. Drake et al. (2016) studied captive Mojave desert tortoises and their response to a variety of diets ranging from all native grass to all invasive grass (*Bromus rubens*). They found that 37 percent of the tortoises given only an invasive grass diet were found dead or were removed from the experiment due to poor body condition. The all-invasive grass group fared the worst of all diet groups, including those that mixed native and invasive grasses.

Diets that include invasive species in the Mojave Desert may decrease desert tortoise health and therefore, survivorship and reproduction potential. Females may lay fewer eggs, although we are unaware of any research that demonstrates this effect; many other factors influence egg production in desert tortoises. We expect no injury or mortality to desert tortoises from the presence of non-native species, but there could be a decrease in reproduction and an effect on how tortoises are distributed across the range.

The Applicant will implement a Weed Management Plan prior to the initiation of ground-disturbing activities. Measures in the Weed Management Plan include mapping areas of current weeds, inspecting heavy equipment for weed seeds before being allowed entry in the project site, cleaning equipment before moving to another area, and using certified weed free straw or hay wattles for erosion control.

While we cannot reasonably predict the increase in nonnative species abundance that this project may cause within the action area, the degradation of habitat due to spread of nonnative plants would be minimized through the measures outlined in the Weed Management Plan. The Service has determined that successful implementation of the Weed Management Plan (Minimization Measure 7) will sufficiently minimize potential effects of weeds in the action area.

Edge Effects

The edge effect is a term commonly used in conjunction with the boundary between natural habitats and disturbed or developed land. Typical edge effects that can degrade the surrounding habitat include increased human foot traffic, vehicle use, trash, predation, and invasive species. The Project includes placement of a permanent security fence along the solar field boundary. The fence may create roosting sites for ravens or birds of prey; however, these effects would be reduced through implementation of anti-perching devices and other control measures detailed in the approved Raven Management Plan. Because the Project will leave vegetation within the solar field, there will be no definitive disturbance boundary between the habitat outside the perimeter fence and the vegetation left inside the project, so edge effects from solar development are minimal. Introduction of weeds from construction or soil disturbance has been addressed.

Because few data exist relative to edge effects from noise, light, vibration, and increased dust from construction and O&M activities, we cannot determine how these potential impacts may affect desert tortoise populations adjacent to the development sites. The lack of information is especially relevant when evaluating effects to individuals within the habitat linkage that would be impacted by the proposed project. Thus, the magnitude and extent of these edge effects cannot be articulated at this time but could conceivably disturb individual desert tortoises to the extent that they abandon all or a portion of their established home ranges and move elsewhere.

Effects on Population Connectivity

Landscape genetic analysis performed by Latch et al. (2011) identified both natural (slope) and anthropogenic (roads) landscape variables that significantly influenced desert tortoise gene flow

of a local population. Although they found a higher correlation of genetic distance with slope compared to roads, desert tortoise pairs from the same side of a road exhibited significantly less genetic differentiation than tortoise pairs from opposite sides of a road. Project access roads are not anticipated to decrease population connectivity substantially beyond the existing conditions.

As discussed in the revised recovery plan (Service 2011a) and elsewhere, habitat linkages are essential to maintaining rangewide genetic variation (Edwards et al. 2004b, Segelbacher et al. 2010) and the ability to shift distribution in response to environmental stochasticity, such as climate change (Ricketts 2000, Fischer and Lindenmayer 2007). Natural and anthropomorphic constrictions (e.g., I-15) can limit gene flow and the ability of desert tortoises to move between larger blocks of suitable habitat and populations. In the action area, existing anthropomorphic constrictions compound effects of natural barriers on desert tortoise population connectivity.

The proposed Project would be constructed at the north end of Dry Lake Valley with existing natural barriers to tortoise movement resulting in a somewhat isolated population. The western boundary of Dry Lake Valley is defined by the Arrow Canyon Range, and the North Muddy Mountain Range is the eastern boundary. Potential movement of desert tortoises of the action area is restricted by U.S. 93 to the south, the Las Vegas and Arrow Canyon ranges to the west, and I-15 and a railroad to the east. If tortoises move through the culverts under the railroad and I-15, they would be restricted to the east by the North Muddy Mountains. The area north of the action area is characterized as major east-west drainages, steep and rugged slopes, and mesas. Tortoise movement north of the action area would be hindered by steep topography. We do not anticipate that the proposed action would affect potential movement of tortoises north of the action area, within either the Mormon Mesa or Beaver Dam CHUs.

Because the Project will leave vegetation within the solar field and allow tortoises to reoccupy the site following construction, the action area will continue to be used as part of the connectivity corridor. Due to this, we anticipate that opportunities for desert tortoise connectivity would not be significantly modified by the construction of the Project.

Effects Associated with Climate Change

Increases in atmospheric carbon are responsible for changes in climate. As we discussed in the *Status of the Species - Rangewide* section for desert Tortoise of this biological opinion, climate change is likely to cause frequent or prolonged droughts with an increase of the annual mean temperature in the range of the desert tortoise. Increased temperatures would likely adversely affect desert tortoises by limiting their ability to be aboveground. A decrease in rainfall would likely result in fewer annual plants that are important for the nutritional well-being of desert tortoises.

Plant communities in arid lands sequester carbon by incorporating it into their tissues. Plants also respire carbon into the substrate, where it combines with calcium to form calcium carbonate; calcium carbonate also sequesters carbon (Allen and McHughen 2011). The permanent removal of plant life from approximately 120 acres within the action area is likely to reduce the amount of carbon that natural processes can sequester in this localized area. Because the Project would

be mowed and regrowth of shrubs would occur, this effect would be greatly reduced (compared to using traditional methods on the entire project), though we do not have the ability to quantify the difference that mowing would cause.

The Project is unlikely to affect desert tortoises in a measureable manner with regard to carbon sequestration. The amount of carbon sequestration that would be lost would be minor because the Project would affect a small portion of the entire Mojave desert. Some researchers have questioned the amount of carbon sequestration that occurs in arid areas. Schlesinger et al. (2009) contend that previous high estimates of carbon sequestration in the Mojave Desert bear re-examination. The reduction in the use of fossil fuels, due to the use of the proposed solar facility, would prevent more carbon from entering the atmosphere than would occur by the vegetation that is currently present within the areas being disturbed by construction.

The Project is unlikely to alter the surface albedo¹ of the action area to the degree that it affects local climatic conditions. Millstein and Menon (2011) found that large-scale PV plants in the desert could lead to significant localized temperature increases (0.4 °C) and regional changes in wind patterns because the solar panels are less reflective than many substrates in the desert. As we discussed above, increases in temperatures would likely impair the activity patterns of desert tortoises.

The proposed Project is unlikely to affect desert tortoises in a measurable manner with regard to changes in the albedo of the action area. Although Millstein and Menon's model raises an important issue to consider, it is based on numerous assumptions that would affect how a solar facility may actually affect the local environment. Millstein and Menon acknowledge that their assumptions regarding the density of solar panels within the plant and the effectiveness of the panels would influence predictions of the amount of heat generated by the facility. Specifically, they assumed that solar panels would completely cover the ground surface (the panels generally do not cover the entire surface of the ground, which could alter the reflectivity they predicted) and a specific efficiency of the panels (they acknowledge that more efficient panels are being developed that generate less heat). Additionally, the model assumes specific reflectivity of the desert surface in two places (near Harper Dry Lake in western Mojave Desert and near Blythe in the Colorado Desert) that may be substantially different than that of the action area. All of these factors would likely render the model's predictions somewhat different than real-world conditions and outcomes.

Millstein and Menon's model may be inappropriate for the scale of this biological opinion. The two modeled solar plants in Millstein and Menon's model covered 4,633,207 acres. The area covered by solar panels under consideration in the proposed action for this biological opinion would be approximately 2,200 acres. Consequently, the modeled solar plants that generated a local temperature increase of 0.4 degree Celsius were approximately 2,194 times larger than the area within the perimeter fence of the proposed solar facility. Therefore, the proposed action is

¹ Albedo is the amount of light reflected by an object. An object that reflects more light is heated less. The opposite is also true; an object that reflects less light is heated more.

unlikely to change local temperatures or regional wind patterns.

Effects of Habitat Compensation

To offset the loss and modification of tortoise habitat, the Applicant will provide habitat compensation as described in Compensatory Mitigation Measures 20 and 21. All of the funds will go toward a habitat use study in order to monitor metrics of vegetation change under the solar panels and use of the vegetation onsite for forage and cover by tortoises. Desert tortoise monitoring (tracking and mark recapture) are considered a key component of the habitat use study, and funds could also be used for this.

Although the compensation and protection of vegetation within the Project would not create new habitat within the recovery unit, it will provide a funding source and a means to study if leaving vegetation in the solar field provides the forage and cover that tortoises need long term. Costs associated with project construction monitoring and survey and removal of tortoises and their disposition (e.g., translocation, care at an onsite facility) are in addition to the habitat use study and are the responsibility of the Applicant.

Desert Tortoise Conclusions

Reproduction

Disturbance associated with solar facility construction would not have a measurable long-term effect on reproduction of individual desert tortoises that live within or adjacent to the solar facility because intense construction activity would occur over a relatively brief period of time (approximately 18 months) relative to the reproductive life of female desert tortoises.

Furthermore, desert tortoises are well adapted to highly variable and harsh environments and their longevity helps compensate for their variable annual reproductive success (Service 1994).

Because the desert tortoises will be translocated from the site prior to construction and all the adult individuals found will be moved, we expect that few, if any, adult animals will die as a result of construction. Juvenile desert tortoises may be killed because they are more difficult to find; however, the reproductive ecology of the desert tortoise is such that reproductive individuals (i.e., adult animals) play a more important role in maintaining populations than those that are not able to reproduce (i.e., juvenile animals), in large part because of the higher mortality rates of eggs and juvenile desert tortoises. Consequently, the loss of juvenile animals and eggs should not have a measurable effect on the reproductive capacity of desert tortoises in the area.

Translocated desert tortoises may exhibit decreased reproduction in the first year following translocation. However, research conducted by Nussear et al. (2012) suggests the reproductive rates of translocated desert tortoises are likely to be the same as those of resident animals in subsequent years. Based on work conducted by Saethre et al. (2003), we do not expect the increased density of desert tortoises that would result from translocation to affect the

reproduction of resident animals.

Because translocated tortoises may reinhabit the solar facility after construction, we anticipate that the proposed solar facility is not likely to have a measureable effect on reproduction of the desert tortoise in the action area. These tortoises may not undergo the effects of translocation on reproduction because they will remain within their same immediate home range. Because the effect on reproduction would be minimal, the proposed action would not affect reproduction in the remainder of the recovery unit or throughout the range of the species.

We cannot provide an estimate to the number of eggs that would be lost as a result of surface disturbance. In areas where eggs would be lost, we anticipate that the loss of eggs would not be significant at a population level because areas where eggs would be lost comprises a small proportion of the reproductive capacity of the action area. In addition, most of the eggs that may be lost are unlikely to produce individuals that would reach reproductive age due to high rates of natural mortality.

For these reasons, we expect that the proposed action is likely to have a negligible effect on the reproductive capacity of desert tortoises in the action area.

Numbers

We expect that the construction of the Project is likely to injure or kill few adult desert tortoises. Many more tortoises are likely to be captured and moved prior to project activities. Based on tortoise surveys and a 25 percent buffer, we estimate that up to 105 adult tortoises and 690 juvenile tortoises may experience some type of take during construction of all components (solar fields, roads, gen-tie line). Although we expect most to be captured and moved, some may be injured or killed.

The proposed minimization measures, including the installation of exclusion fencing around the perimeter of the project and surveys by qualified biologists, will detect and remove tortoises from areas within the perimeter fence during construction. The perimeter fence will reduce the likelihood of injury or mortality to tortoises that may enter project areas from adjacent habitat. With the exception of vehicular travel on access roads, project activities would be conducted inside the exclusion fence. Based on the results of studies of translocated tortoises conducted at Fort Irwin and the Ivanpah Solar Electric Generating System, we expect that the majority of these animals will survive the translocation and potentially reinhabit the project site after construction. We expect that the greatest risk to adult desert tortoises would occur during construction when numerous workers and heavy equipment will be present.

Desert tortoises may also be killed or injured during O&M, since the site will open for tortoises to reoccupy after construction. We assume that most of the mortalities during O&M will be juvenile tortoises that are difficult to see. Adult tortoises should be visible to workers during O&M and will be avoided or moved as needed.

The 2014 abundance estimate for the Northeastern Mojave Recovery Unit is 46,701 adult desert

tortoises (Allison and McLuckie 2018). The overall number of desert tortoises would greatly increase if we included individuals smaller than 180 mm. Consequently, even the loss of all 105 adult desert tortoises estimated to be translocated or moved from the project would comprise a very small portion (approximately 0.22 percent) of the overall population within the Northeastern Mojave Recovery Unit and an even smaller portion (0.05 percent) of desert tortoises rangewide (212,343 tortoises).

We expect that many of the juvenile desert tortoises and eggs within the boundaries of the solar facilities are likely to be killed or injured during construction because of their small size and cryptic nature. We also expect that the applicants would likely find some juvenile animals and translocate or move them out of harm's way.

Although we are not comparing the overall estimate of the numbers of juvenile desert tortoises likely to be killed or injured to the overall numbers within the recovery unit, we can reasonably conclude that the number of juvenile desert tortoises affected by the proposed projects is a small percentage of the population in the Northeastern Mojave Recovery Unit. Since juvenile tortoises have naturally higher mortality rates than adult tortoises, the loss of these juveniles is not likely to appreciably diminish the overall tortoise population. The key to recovery is to ensure that reproducing adult tortoises have high survival rates and are reproducing.

For these reasons, we expect that the proposed action is likely to have a minimal negative effect on the numbers of desert tortoises in the action area.

Distribution

The permanent loss of 120 acres of desert tortoise habitat that would result from construction of the Project would not appreciably reduce the distribution of the desert tortoise. Based on the Nussear et al. (2009) model and our calculations (Darst 2014), 2,626,111 acres of desert tortoise habitat remain in the Northeastern Mojave Recovery Unit. Consequently, the proposed action would result in the loss of approximately 0.005 percent of the total amount of desert tortoise habitat in the Northeastern Mojave Recovery Unit and approximately 0.0007 percent of the total amount of desert tortoise habitat rangewide (16,745,848 acres).

Because the Project will be leaving vegetation within the solar field and allowing tortoises to reinhabit the site after construction, the connectivity of the Dry Lake Valley and Coyote Springs Valley will continue to function. The existing connectivity in the action area is discussed in the *Factors Affecting the Desert Tortoise in the Action Area* section.

For these reasons, we expect that the proposed action is likely to have a negligible effect on the distribution of desert tortoises in the action area.

Effects on Recovery

To achieve recovery, each recovery unit must contain well distributed, self-sustaining populations across a sufficient amount of protected habitat to maintain long-term population

viability and persistence (Service 2011a).

We do not have the ability to place a numerical value on edge effects, habitat degradation, impacts to habitat connectivity, and overall fragmentation that the proposed action may cause. As a result, the percentage of habitat within the recovery unit that would be affected may be greater than the area physically disturbed; however, we still expect the direct and indirect disturbance would not constitute a numerically significant portion of the affected recovery unit. Therefore, we anticipate adequate intact habitat will remain in which desert tortoises will be able to forage, breed, and shelter.

The construction, O&M, and decommissioning of the Project is unlikely to negatively affect the ability of the desert tortoise to reach stable or increasing population trends in the future, since the proposed action will only have a negligible to minimal negative effect on reproduction, numbers, and distribution of desert tortoises in the action area. The Project will allow vegetation to remain on the majority of the site, and tortoises will be allowed back into the solar field to utilize the area. The site does not contain desert tortoise designated critical habitat and is not located in an area that is considered important for the recovery of the desert tortoise (e.g., critical habitat, ACEC, or linkage for the desert tortoise). Therefore, we conclude that the proposed action will not appreciably reduce the likelihood of recovery of the Mojave desert tortoise.

Moapa Dace Effects

The Moapa dace will not be directly affected by the physical construction and O&M of the proposed action; however, groundwater pumping will likely indirectly affect the headwater spring discharges of the Muddy River, and therefore, the Moapa dace. The magnitude and timing of impacts from pumping in Coyote Spring Valley and California Wash basins are uncertain. Differences in boundary conditions relating to the areal extent of the aquifer and location of the pumping, transmissivity, and permeability all influence the magnitude and timing of pumping impacts. Also, if the proposed project pumping lowers carbonate water levels in the Warm Springs Area further, not all springs will be affected equally. The decrease in spring discharge will be proportional to the decrease in head elevation at each spring. Higher elevation springs have a lower head difference initially and are more susceptible to decreases in groundwater levels. Therefore, the higher elevation springs will be affected proportionately more for a given decline in groundwater levels. The highest elevation springs occur on the Pedersen Unit of the Moapa Valley NWR, an area which also comprises some of the most important spawning habitat for Moapa dace in the system.

In the PBO for the MOA, the Service (2006) used the potential effects on spring discharge at the Warm Springs West gage to predict potential effects to Moapa dace habitat. Under the terms of the MOA, if flows reach 2.7 cfs at the Warm Springs West Gage, the pumping from Coyote Spring Valley will be reduced to 724 afy and the pumping from California Wash will be reduced to 1,250 afy. This 724 afy will replace the flows (1 cfs) that MVWD once used from the Jones Spring (on the Moapa Valley NWR's Aparcar Unit) to meet their water demands, which would be utilized for the Moapa dace on the Moapa Valley NWR per the MOA. The following assumptions are used relative to groundwater pumping if the 2.7 cfs "Average Flow Level" as

identified in the MOA is reached:

- The Arrow Canyon Well will be turned back on and will resume pumping at the current rate of 2,400 afy to meet MVWD's existing municipal water demands;
- 724 afy will be pumped from MX-5 and RW-2 wells in the Coyote Spring Valley by SNWA to replace MVWD's municipal commitment from the Jones Spring;
- No additional pumping in Coyote Spring Valley will occur; and
- Pumping in the California Wash is assumed to be limited to 1,250 afy of the existing permitted water rights held by the Tribe.

The primary effect to the Moapa dace of diminished flows within the spring channels will be a decrease in the hydraulic conditions that create the diversity of habitat. A decrease in velocity and depth within riffles would result in a decrease of invertebrate and phytoplankton (food) production. Drift stations in pools are maintained by the scouring effect of turbulent flow. Scour will decrease in pools as water velocity and depth at the upstream end of the pool decreases. Perhaps the most prominent impact that would occur as a result of decreased discharge and subsequent depth is the reduction of overall volume of water that will be available to the species within the channel. Scoppettone et al. (1992) demonstrated that Moapa dace size is scaled to water volume. Thus, larger water volumes provide the habitat necessary for increased food production and subsequently larger fish, therefore greater fecundity. Hence, more numerous, larger eggs provide a better opportunity for the long-term survival of the species.

Additional factors that would influence channel and hydraulic characteristics within the stream channels following a decline in spring discharge include, but are not limited to, changes in sediment transportation rates and the alteration of riffle and pool maintenance that is accomplished at the present rate of discharge in each spring channel. Additionally, vegetative encroachment and subsequent channel obstruction may also occur as the wetted cross sectional area of the channel decreases and new surfaces become exposed for vegetation growth. Decreases in these parameters will likely have an adverse impact on the overall diversity and quantity of hydraulic habitat.

The Pedersen Unit of the Moapa Valley NWR is one of the six spring complexes that the Moapa dace depends on for successful reproduction. It includes the highest elevation spring, presumed most susceptible to groundwater level declines. The analysis presented in the PBO for the MOA (Service 2006) estimated that at 3.02 cfs there is a 25 percent loss in flow on the Pedersen Unit compared to 1998 conditions. This loss is estimated to reduce available riffle habitat by 17 percent and pool habitat by 13 percent within the Pedersen Unit. In addition to the loss of habitat, decreased flows would also result in a loss of temperature that would extend downstream, thereby reducing the thermal load in the system and thus the amount of available habitat at the appropriate spawning temperature.

Additional effects of the proposed groundwater pumping associated with the project on the Moapa dace were previously analyzed in the 2006 PBO, which evaluated the effects of the cumulative groundwater withdrawal of 16,100 afy from the carbonate aquifer in Coyote Spring Valley and California Wash on the endangered Moapa dace. The Band is only one of multiple parties that will be withdrawing groundwater from the Coyote Spring Valley and California

Wash basins under the programmatic action.

To date, biological opinions for site-specific actions that have been tiered to the 2006 PBO and are still active included analyses for CSI's appropriated water rights of 4,600 afy from the Coyote Spring Valley basin (Tier 1); SNWA's appropriated water right of 9,000 afy from the Coyote Spring Valley basin (Tier 2); 7 afy of the Band's appropriated 2,500 afy of water (Tier 3); 72 afy of water during 5 years of construction and 40 afy during O&M of the Band's appropriated 2,500 afy of water for the K Road Solar Energy Project (Tier 5); 375 afy of water during 2 years of construction and 30 afy during O&M of the Band's appropriated 2,500 afy of water for the Moapa Solar Energy Center Project (Tier 6); 1,350 AF of water of SNWA's 9,000 afy during construction and operation of the Playa Solar Project on BLM lands within the Dry Lake Solar Energy Zone (Tier 7); and 200 AF of water during construction and 20 afy during O&M of the Band's appropriated 2,500 afy of water for the proposed Eagle Shadow Mountain Solar project (Tier 8). The highest use of water for the Band would be during construction of the proposed Project when 375 afy of water would be needed for two years for Moapa Solar Energy Center and 200 AF for Eagle Shadow Mountain Solar, but construction is not likely to occur at the same time. The use of up to 97 afy of water during O&M for all projects will contribute to adverse effects on the Muddy River Springs area discharge and subsequently the Moapa dace as analyzed in the 2006 PBO.

Because pumping for the proposed project will occur concurrently with the potential pumping of up to 6,100 afy in the carbonate aquifer of Lower White River Flow System, it will not be possible to detect the reduction of flow in the Muddy River Springs Area that would be attributable to pumping for the Eagle Shadow Mountain Solar Project. Given the 2,500 afy authorized by the State Engineer to the Band and the small portion of this to be used for project construction and O&M, effects from this project will be difficult to detect relative to effects of pumping the total 16,100 afy as described in the PBO for the MOA. The use of 200 AF during construction and up to 20 afy during O&M is only a small portion of the cumulative 16,100 afy allowed under the PBO. Adverse effects from the project to Moapa dace habitat are expected to be minor given this relatively small volume of water use. Additionally, relative to the total volume of 16,100 afy under the PBO for the MOA, cumulative water use will be curtailed per the MOA to protect Moapa dace and its habitat. Use of groundwater for the project will become part of the environmental baseline for future groundwater withdrawals for the affected aquifer.

Moapa Dace Conclusions

The proposed locations of groundwater withdrawal for the Project occur within the Coyote Spring Valley and California Wash basins, which, via groundwater, also provide habitat for the Moapa dace. The Applicant would use existing Band water rights, and the proposed action would include the withdrawal of up to 200 AF of water over an approximately 18-month period for construction-related activities and approximately 20 afy for operations and maintenance.

The 2006 PBO (Service 2006) analyzed groundwater withdrawal of up to 16,100 afy (which includes the water use associated with this project) from the carbonate aquifer connected to the Coyote Spring Valley and California Wash basins. The intra-Service PBO concluded that the

withdrawal of 16,100 afy of groundwater would not result in “jeopardy” for the Moapa dace, in part because the 2006 MOA provides for the protection of Moapa dace habitat from ground water pumping by curtailing water use of the MOA parties in the event flows in the Muddy River Springs Area, specifically at the Warm Springs West Gage, drop below specific triggers. The Service estimated that the incidental take of Moapa dace at the programmatic level under implementation of the MOA would be a 22-percent loss in riffle habitat and a 16-percent loss in pool habitat. The proposed level of water use for the Project is within the analysis of effects of the intra-Service PBO. No direct effects to Moapa dace are anticipated to occur during construction, O&M, or decommissioning of the project. Applicant will further minimize adverse effects to the Moapa dace by ensuring that all water use is minimized to the maximum extent possible during project construction and O&M. As proposed in the groundwater monitoring and reporting plan, the amount of water withdrawn for the project will be metered to ensure that anticipated water extraction levels are not exceeded.

Reproduction

The proposed action may result in the take of Moapa dace through harm (i.e., habitat modification or degradation that results in death or injury), though this will be difficult to detect. Any loss of fish or their habitat would impact reproduction. Future and on-going biological and hydrological studies will assist in determining how any flow reductions or thermal load losses will affect Moapa dace reproduction. Due to the proposed low water usage for the Project, there are likely to be minimal effects to Moapa dace reproduction in the action area.

Numbers

The proposed action may result in the take of Moapa dace through harm (i.e., habitat modification or degradation that results in death or injury), but the actual death or injury of fish will be difficult to detect. Because there is relatively low water usage proposed for the Project, there are likely to be minimal effects to Moapa dace numbers in the action area. Future and on-going biological and hydrological studies will assist in determining how any flow reductions or thermal load losses will affect Moapa dace numbers. In-stream flow triggers will also provide for the curtailment of groundwater pumping should those flow levels be reached, which should further reduce the numbers of dace that would be affected.

Distribution

The proposed action may result in habitat modification or degradation due to lowering of water levels. Any loss of habitat would decrease the distribution of Moapa dace. While we cannot estimate the potential loss of habitat from the Project, future and on-going biological and hydrological studies will assist in determining how any flow reductions or thermal load losses will affect Moapa dace habitat and their distribution. Due to the proposed low water usage for the Project, there are likely to be minimal effects to Moapa dace distribution in the action area.

Effects on Recovery

There are no acres of disturbance allowed for Moapa dace habitat under this biological opinion. In 1983, the Service prepared a recovery plan for Moapa dace, which was updated and approved by the Service in 1996 and identified various tasks to guide recovery (Service 1996). The Service assigned the Moapa dace the highest recovery priority because (1) it is the only species within the genus *Moapa*, (2) the high degree of threat to its continued existence, and (3) the high potential for its recovery (Service 1996).

The actions needed for recovery include (1) protect instream flows and historical habitat within the upper Muddy River and tributary spring systems, (2) conduct restoration and management activities, (3) monitor the Moapa dace population, (4) research population health, and (5) provide public information and education.

Habitat loss and non-native species are contributing factors to the decline of Moapa dace, but we anticipate habitat loss will be minimal, and there will be no introduction of non-native species under the proposed action. We anticipate effects on recovery of the Moapa dace from the proposed Project to be negligible. Therefore, we conclude that the proposed action will not appreciably reduce the likelihood of recovery of the Moapa dace.

CUMULATIVE EFFECTS

Cumulative effects are those effects of future State, private, or Tribal activities, not involving Federal activities that are reasonably certain to occur within the action area of the particular Federal action subject to consultation pursuant to section 7 of the Act. Cumulative effects do not include future Federal activities that are physically located within the action area of the particular Federal action under consultation. Past and present impacts of non-federal actions are considered part of environmental baseline conditions. Most of the action area is federally owned, and any future projects on these lands would be subject to separate section 7 consultation. Projects that may result in adverse effects to the desert tortoise on private and non-Federal land are anticipated to fall under purview of existing HCPs and associated incidental take permit.

Increased development would cause continued habitat loss, degradation, and fragmentation for the local desert tortoise population, as well as increased harm of individual desert tortoises, contributing to the cumulative degradation of the area. Planned future actions such as future transmission line and road corridors, electrical power substations, and industrial solar power plants would likely continue this trend. Most future actions in the action area would likely require section 7 consultation.

The Arrow Canyon Solar Project (200 MW PV project) and the Southern Bighorn Solar and Storage Center (300 MW and 135 MW storage system) have recently been proposed and would be located on the Moapa River Indian Reservation. Since the action areas are managed by the BIA and BLM, section 7 consultation would be required.

CONCLUSION

Desert Tortoise Jeopardy Conclusion

When determining whether a proposed action is likely to jeopardize the continued existence of a species, we are required to consider whether the action would “reasonably be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR 402.02).

After reviewing the rangewide status of the species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service’s biological opinion that the proposed action is not likely to jeopardize the continued existence of the desert tortoise. The Service has reached this conclusion based on the following:

1. Project impacts to desert tortoise will be minimized or avoided through implementation of measures described in the proposed action. The BIA, the Applicant, and their contractors will implement numerous measures (e.g., clearance surveys, use of authorized desert tortoise biologists and desert tortoise monitors) to ensure that most tortoises are located and moved out of harm’s way and potential desert tortoise injury and mortality is minimized on project work sites.
2. Most adult desert tortoises on the project site will be found and translocated; most or all of these tortoises will survive the translocation.
3. Mitigation and remuneration fees, based on acres disturbed, will fund an important habitat use study for this newly innovative solar design.
4. Genetic and demographic connectivity will be minimally reduced and continue to function.
5. Long-term monitoring will likely identify any significant adverse population effects, if they occur, which can be addressed through adaptive management.
6. The project would not significantly affect the rangewide number, distribution, population connectivity, or reproduction of the desert tortoise. Desert tortoises that are moved out of harm’s way and placed within their home range will remain in the wild with no long-term adverse effects to survival and reproduction.
7. The number of desert tortoises anticipated to be killed or injured is low relative to the estimated number of tortoises occurring within the action area and impacted recovery unit. Even if all 105 estimated adult tortoises were lost due to program activities, the loss would account for 0.22 percent of all adult tortoises within the recovery unit and an even lower percent (0.05) of all adult tortoises rangewide. Biologists will find most adult desert tortoises during clearance surveys, so killing all 105 adult tortoises is unlikely.
8. The amount of desert tortoise non-critical habitat proposed to be permanently disturbed is small relative to the amount available in the action area and within the Northeastern Mojave Recovery Unit. The proposed action would result in a loss of approximately 0.005 percent of the habitat in the recovery unit and only 0.0007 percent loss of habitat rangewide (120 acres of 16,745,848 total acres).
9. There will be no impacts to desert tortoise designated critical habitat.
10. The effects of the project on desert tortoise would not precluded recovery of this species.

Moapa Dace Jeopardy Conclusion

After reviewing the rangewide status of the species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the Moapa dace. The Service has reached this conclusion based on the following:

1. The effects of the proposed action on the Moapa dace are within the scope of the actions and effects analyzed in the associated non-jeopardy 2006 PBO (Service 2006).
2. The highest use of water for the Band would be during construction when 375 afy of water would be needed for two years for the Moapa Solar Energy Center and 200 AF for Eagle Shadow Mountain Solar Project, but construction is not likely to occur at the same time. The use of up to 97 afy of water during O&M for all projects will contribute to adverse effects on the Muddy River Springs area discharge and subsequently the Moapa dace as analyzed in the 2006 PBO. All projected uses are well under the Band's allotted 2,500 afy as designated in the PBO.
3. The proposed Project would not significantly affect the rangewide reproduction, numbers, distribution, or effects on Moapa dace recovery.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(0)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

In June 2015, the Service finalized new regulations implementing the incidental take provisions of section 7(a)(2) of the Act. The new regulations also clarify the standard regarding when the Service formulates an incidental take statement [50 CFR 402.14(g)(7)], from "...if such take may occur" to "...if such take is reasonably certain to occur." This is not a new standard, but merely a clarification and codification of the applicable standard that the Service has been using and is consistent with case law. The standard does not require a guarantee that take will result; only that the Service establishes a rational basis for a finding of take. The Service continues to rely on the best available scientific and commercial data, as well as professional judgment, in reaching these determinations and resolving uncertainties or information gaps.

The measures proposed by BIA as part of this incidental take statement are nondiscretionary and

must be implemented by BIA, or other jurisdictional Federal agencies as appropriate, so that they become binding conditions of any project, contract, grant, or permit issued by BIA, or other jurisdictional Federal agencies as appropriate, in order for the exemption in section 7(o)(2) to apply. The Service's evaluation of the effects of the proposed actions includes consideration of the measures developed by BIA, to minimize the adverse effects of the proposed action on the desert tortoise. Any subsequent changes in the minimization measures proposed by BIA, or other jurisdictional Federal agencies as appropriate, may constitute a modification of the proposed action and may warrant reinitiation of formal consultation, as specified at 50 CFR § 402.16.

The BIA, or other jurisdictional Federal agency, has a continuing duty to regulate the activity that is covered by this incidental take statement as long as the affected area is retained in Federal ownership or control. If BIA, or other jurisdictional Federal agency, (1) fails to require the project proponent to adhere to the action-specific terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document or (2) fails to retain oversight to ensure compliance with action-specific terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT AND EXTENT OF TAKE

Desert Tortoise

The proposed action will result in take (primarily by capture) of all desert tortoises that occur within the fenced perimeter of the proposed solar facility and in harm's way within the development areas of the gen-tie lines and access road and areas where tortoise exclusion fencing would be installed. Table 9 identifies the incidental take threshold for all age classes of desert tortoises during construction activities. Additional desert tortoises in the action area, including buffer areas, may be affected by the project to the extent that incidental take may occur; however, such effects are anticipated to be minor and involve mostly alteration in feeding, sheltering, and reproduction behavior due to reduction or fragmentation of their home ranges.

We acknowledge that we cannot precisely quantify the amount of take that will occur during all project activities. Some of the constraints that make it difficult to determine desert tortoise densities and abundance include the cryptic nature of the species (i.e., individuals spend much of their lives underground or concealed under shrubs), inactivity in years of low rainfall, and low abundance across a broad distribution within several different habitat types. In addition, population numbers and distribution of individuals fluctuate in response to weather patterns and other biotic and abiotic factors over time. The number of juvenile desert tortoises is even more difficult to quantify because of their small size, location underground, and low detection probabilities during surveys. The following paragraphs define the form of take and the number of individuals we anticipate will be taken by project activities.

Areas Associated with Construction and O&M Activities

All desert tortoises and most nests with eggs within the proposed fence perimeter for the solar facility will be taken as result of the project. Some nests with eggs may survive within the solar

field because it will be mowed and not bladed. The actual number of individuals that may be missed during clearance surveys and killed during construction is unknown. We expect most tortoises missed would be hatchlings and juveniles. Locating the carcasses of small tortoises or egg fragments is unlikely. To address this issue, we have used the total threshold for capture of subadult and adult individuals (i.e., up to 105 tortoises) on the proposed project sites as a surrogate measure of mortality of the smaller size classes. Using this threshold as a surrogate assumes that our method used to calculate the estimated abundance of subadult and adult desert tortoises also allows us to calculate the number of juveniles that may be affected. Detecting more than 105 subadult and adult desert tortoises on the Project site, however, would indicate that a larger number of juveniles may be killed or injured during construction and would require reinitiation.

Based on the measures proposed by BIA, desert tortoise survey data, and the proposed action, we anticipate that up to 99 adult and sub-adult tortoises will be captured within the fenced perimeter for the solar facility and translocated; and up to 2 adult or sub-adult desert tortoises may be killed or injured.

We do not know exactly how many desert tortoises will be encountered in harm's way outside the fenced solar site; however, take in the form of capture and moving of desert tortoises resulting from these incidental detections is estimated and exempted to ensure mortality and injury of desert tortoises is minimized. Based on the survey data, we estimated that 6 adult or sub-adult tortoises may be within the project area of the gen-tie lines. Because additional tortoises may wander into the linear project site, we estimate that 30 desert tortoises may occur in harm's way outside the fenced solar facility during construction and will be captured and moved. We estimate that no more than one subadult or adult desert tortoise may be injured or killed during construction outside of the fenced solar site.

For all construction activities (both inside and outside of fenced areas), we estimate that up to 50 juvenile tortoises (those that will be detected) may be captured and moved or translocated and 590 juveniles may be incidentally killed or injured (although only up to 50 of those may actually be detected) during construction. An undetermined number of tortoise eggs will be destroyed as a result of the project.

Any take in either form in addition to what is described above would require reinitiation.

O&M activities may result in incidental take, in the form of mortality or injury, of no more than two subadult or adult desert tortoise per year or a total of 12 for the life of the project within the solar field open to desert tortoise and no more than one subadult or adult desert tortoise per year or a total of 7 for the life of the project outside of the fenced areas. O&M activities may also result in mortality or injury of 5 juvenile desert tortoises in a single year, not to exceed 50 for the life of the project (includes both within and outside of fenced areas). It is difficult to know how many tortoises may be within the solar site when decommissioning activities occur over 50 years in the future. Because we cannot estimate, we have combined take for O&M and decommissioning activities. It is also not possible to estimate the number of juveniles that may be injured or killed during O&M and decommissioning activities that will not be detected.

Estimating the number of adult and juvenile tortoises captured and moved during O&M and decommissioning is also difficult. The majority of the tortoises that will get captured and moved during O&M and decommissioning will be within the solar site that is open for desert tortoises to inhabit.

If we use the tortoise density estimated for the solar field after construction when tortoises may reinhabit the site (6.1 tortoises per km²), we would estimate there to be 54 adults and sub-adults and 355 juveniles post construction. Capturing and moving adults and juveniles could occur often during O&M due to daily driving within the site and performing needed maintenance. We estimate that 10 percent of the estimated adults and juveniles could get moved on an annual basis (5 adults and 36 juveniles). The total take for capturing and moving for adults and juveniles over the 30-year project life would be 250 adults and 1,800 juveniles.

All incidental take is outlined in Table 9.

Table 9. Desert tortoise incidental take thresholds.

Type of take	Construction (detected)	Construction (not detected)	O&M and decommissioning activities	Total Incidental Take
Death or injury-subadults & adults (≥180 mm) inside solar field	2	0	12 ¹	14
Death or injury-subadults & adults (≥180 mm) outside solar field	1	0	7 ²	8
Death or injury-hatchlings & juveniles (<180 mm) inside and outside solar field	50	590 ³	50 ⁴	690
Capture-subadults & adults (≥180 mm)	We estimate that 99 adults/subadults may be moved within the solar field and 30 outside of the solar field and 56 resident tortoises in the recipient areas	N/A ⁵	250 ⁶	435
Capture-hatchling & juveniles (<180 mm)	We estimate that 50 juveniles may be moved during all construction activities	N/A ⁵	1,800 ⁷	1,850

¹ Not to exceed 2 per calendar year or 12 during the life of the project within fenced areas open to desert tortoise.

² Not to exceed one per calendar year or 7 during the life of the project.

³ Not detected due to their small size and location underground.

⁴ Not to exceed 5 per calendar year or 50 during the life of the project.

⁵ Not applicable - It is not possible to not detect a tortoise that has been captured and moved.

⁶ Not to exceed 5 per calendar year or 250 during the life of the project (50 years).

⁷ Not to exceed 36 per calendar year or 1,800 during the life of the project (50 years).

The temporary and permanent disturbance of up to 2,285 acres of habitat from construction of the proposed solar project, gen-tie line, and access roads may result in harm to desert tortoises that use this area as part of their home range. If the proposed project-related activities result in impacts to desert tortoise habitat beyond this acreage, the amount or extent of take will be exceeded.

Our estimate of the numbers of desert tortoises that are likely to occur within the action area is derived from the pre-project survey data, estimates based on recent tortoise density, and other solar project clearance data. We acknowledge that more individuals may be killed or injured during construction and O&M activities than is in the incidental take statement because they will not be detected. The inability to detect all tortoises is largely due to the cryptic nature of desert tortoises, their fossorial habits, and their limited abundance; and in the case of juveniles and eggs, their small size and location underground that reduce detection probabilities of these life stages. Another confounding factor is that scavengers may locate, consume, or remove carcasses before biologists or monitors can locate them. If detected injury and mortality numbers exceed those in the incidental take statement, we will assume that the take for non-detected injury and mortality has also been exceeded. Reinitiation will then occur for both detected and non-detected injury and mortality take.

The number of desert tortoise eggs taken as a result of the proposed action is unknown, but we exempt the incidental take of all eggs. In the effects analysis, we explained that we cannot estimate the number of eggs that may be present if surface disturbance occurs during the tortoise nesting season (approximately May through September). So while we cannot estimate for the number of eggs, should more than 129 adult and sub-adult tortoises be moved, reinitiation would occur. Reinitiation could indicate that more eggs may be destroyed during construction due to higher numbers of tortoises in the action area.

Should the extent of incidental take exceed the level identified, reinitiation of consultation would be required (see Reinitiation Requirement).

Areas Associated with Short-distance and Long-distance Translocation

Take in the form of capture would occur affecting up to 129 adult and sub-adult desert tortoises in harm's way (99 within the solar site and 30 along the gen-tie line) and approximately 56 resident desert tortoises in support of translocation activities at recipient and control areas. We anticipate that health assessments, including collection of biological samples, and attaching transmitters would be performed on all individuals moved from the solar site. Although the release of up to 99 adult and subadult tortoises may disrupt normal behaviors of resident tortoises in the short-distance translocation areas, we do not believe this level of disruption will result in incidental take of more than a small number (e.g., <5) of individuals. If this take were to occur, it could not be determined if the translocation of project tortoises caused the resident tortoise mortality or if it was due to natural causes. We do not anticipate that the collection of blood samples of those animals that will be moved out of the Project will result in the death or injury of any individuals because Service-approved authorized desert tortoise biologists will perform health assessments in accordance with the most recent Service guidance (Service 2019b).

The post-translocation monitoring program will include attaching transmitters and conducting periodic health assessments. Although transmittered desert tortoises may be captured multiple times over the course of the post-translocation monitoring period, we do not anticipate that any tortoises will be directly killed or injured due to post-translocation monitoring activities.

An unknown number of translocated desert tortoises may be preyed upon by predators. If monitoring determines that predation of translocated tortoises exceeds 10 percent of the tortoises translocated, the BIA, Service, and applicants will meet and consider additional measures to minimize this effect. We do not estimate in the take statement how many tortoises may be taken through predation, as it is not possible to calculate such outcomes.

Moapa Dace

The Service anticipates that incidental take of Moapa dace through harm (i.e., habitat modification or degradation that results in death or injury) is unlikely to occur. If it were to occur, the actual death or injury of fish would be difficult to detect because (1) the species has a small body size and (2) finding a dead or impaired specimen is unlikely in a flowing stream environment. However, habitat modification or degradation that could result in take of Moapa dace would be detectable and measurable. Therefore, we are expressing take of Moapa dace in terms of habitat loss resulting from changes in habitat characteristics, such as water temperature, water chemistry, and water flows. Although the extent of effects to the species as a result of the proposed action is not yet known, future and on-going biological and hydrological studies will assist us in determining how flow reductions and thermal load losses will affect Moapa dace habitat, food availability, reproduction, and fecundity.

Perhaps the most significant impact to Moapa dace habitat that could result from implementation of the proposed action, as a result of decreased discharge and subsequent wetted area, is the reduction of overall volume of water that would be available to the species within the channel. Larger water volumes provide the habitat necessary for increased food production and subsequently larger fish, thus greater fecundity. Hence, more numerous, larger eggs provide a better opportunity for species long-term survival.

We have estimated that withdrawal of 200 AF of groundwater over 18 months during construction and 20 afy of groundwater estimated to be needed during O&M of the Project may contribute to the incidental take of Moapa dace by potentially reducing riffle and pool habitat. However, habitat loss and associated incidental take of Moapa dace specific to the proposed Project is difficult to separate from the other parties simultaneously withdrawing groundwater from different locations within the same carbonate aquifer. Given this, we established habitat loss and associated incidental take of Moapa dace by evaluating the impacts to Moapa dace habitat on a landscape level in the 2006 PBO. Incidental take is not authorized under the PBO but deferred to project-specific (tiered) opinions.

Based on the analysis in the intra-Service PBO, which established a cumulative loss threshold for all groundwater withdrawal of up to 16,100 afy of 22 percent riffle habitat and 16 percent pool habitat for the Moapa dace, the total incidental take of Moapa dace for the Eagle Shadow Mountain Solar Project will be considered cumulative to the same threshold. As a surrogate for this habitat-based incidental take, should flows at the Warm Springs West gage decline to a flow below 2.7 cfs, the amount of incidental take for all tiered actions under the MOA, including the proposed Project, would be exceeded for the Moapa dace.

EFFECT OF TAKE

In the accompanying biological opinion, the Service determined that these levels of anticipated take associated with this project alone are not likely to jeopardize the continued existence or adversely affect the recovery of the Mojave desert tortoise or Moapa dace. This determination is based in part on the implementation of minimization measures detailed in this biological opinion and BA provided by BIA with their request for consultation and subsequent discussions during the consultation period.

REASONABLE AND PRUDENT MEASURES (RPMS) WITH TERMS AND CONDITIONS

The BIA, the Band, and Applicant will implement numerous minimization measures included as part of the proposed action to minimize the incidental take of Mojave desert tortoise. Our evaluation of the proposed action is based on the assumption that the actions as set forth in the “Proposed Minimization Measures” section of this biological opinion will be implemented. The Service believes these measures are adequate and appropriate to minimize the incidental take of desert tortoise. Therefore, we are not including any reasonable and prudent measures with terms and conditions in this incidental take statement.

Any proposed changes to the minimization measures or in the conditions under which project activities were evaluated may constitute a modification of the proposed action. If this modification causes an effect to Mojave desert tortoise not considered in this biological opinion, reinitiation of formal consultation pursuant to the implementing regulations of section 7(a)(2) of the Act (50 CFR § 402.16) may be warranted.

To be exempt from the prohibitions of section 9 of the Act, the BIA, the Band, and the Applicant, including all agents, consultants, and contractors, must comply with the proposed measures in the Description of the Proposed Action incorporated into this incidental take statement by reference. Collectively, these measures are intended to minimize the impact of incidental take on the Mojave desert tortoise and Moapa dace and are non-discretionary.

REPORTING REQUIREMENTS

The BIA must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement. The BIA will ensure that a report documenting desert tortoise encounters, incidental take (including capture and moving), and effectiveness and compliance with the desert tortoise protection measures is prepared and submitted to the Service’s Southern Nevada Fish and Wildlife Office in Las Vegas.

Reports are required quarterly during the duration of construction and annually during O&M for the life of the facilities. The BIA may delegate this responsibility to the applicants. In addition, a final construction report will be submitted to the Service within 60 days of completion of construction of the project. All quarterly reports are due by the 10th of each of the following months (January, April, July, October), and annual reports are due February 1 of each year. The Service anticipates the first annual report by February 1, 2021, if construction or project

activities occur in 2020. Annual status updates shall be provided to the Service during O&M activities for the life of the facility.

Specifically, all reports must include information on any instances when desert tortoises were killed, injured, or handled; the circumstances of such incidents; and any actions undertaken to prevent similar incidents from reoccurring. Additionally, the reports should provide detailed information regarding each desert tortoise handled or observed and the names of all monitors involved in the project and the authorized desert tortoise who supervised their actions.

Information will include the following: location (GPS), date and time of observation, whether desert tortoise was handled, general health, and whether it voided its bladder, location desert tortoise was moved from and location moved to, unique physical characteristics of each tortoise, and effectiveness and compliance with the desert tortoise protection measures. Any incident occurring during project activities that was considered by the FCR, authorized desert tortoise biologist, or biological monitor to be in non-compliance with this biological opinion will be documented immediately by the authorized desert tortoise biologist.

Additional reporting requirements for translocation and monitoring are within the Translocation Plan (Appendix).

DISPOSITION OF DEAD OR INJURED SPECIMENS

To ensure that the protective measures are effective and are being properly implemented, BIA shall contact the Service immediately if a desert tortoise is killed or injured as a result of any activity covered under this biological opinion. Upon locating a dead or injured desert tortoise within the action area, notification must be made by phone to the Southern Nevada Fish and Wildlife Office at (702) 515-5230. At that time, the Service and BIA shall review the circumstances surrounding the incident to determine whether additional protective measures are required. Care should be taken in handling sick or injured animals to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death.

In conjunction with the care of sick or injured desert tortoises or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by the Service to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

Injured desert tortoises shall be delivered to any qualified veterinarian for appropriate treatment or disposal. Dead desert tortoises suitable for preparation as museum specimens shall be frozen immediately and provided to an institution holding appropriate Federal and State permits per their instructions. Should no institutions want the desert tortoise specimens, or if it is determined that they are too damaged (crushed, spoiled, etc.) for preparation as a museum specimen, then they may be buried away from the project area or cremated, upon authorization by the Service. BIA or the Applicant shall bear the cost of any required treatment of injured desert tortoises, euthanasia of sick desert tortoises, or cremation of dead desert tortoises. Should sick or injured desert tortoises be treated by a veterinarian and survive, they may be transferred as directed by the Service.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. In order for the Service to be kept informed of actions that either minimize or avoid adverse effects or that benefit listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations. The Service hereby makes the following conservation recommendations:

1. We recommend the BIA and the Band work with solar energy project applicants to design and construct solar projects in desert tortoise habitat to allow all vegetation (other than that necessary for project infrastructure) to remain underneath the solar panels and allow tortoise to repatriate these areas following construction.
2. We recommend the BIA and the Band continuously monitor the recorded groundwater level in the reservation production well that will be pumped for this project in order to validate the anticipated impacts from pumping.
3. We recommend that the Applicant consider Band members for certain tortoise monitoring activities.
4. We recommend that the Band salvage plants on the solar project site for use in habitat enhancement or restoration on the Reservation.
5. We recommend that the Band and Applicant consider retrofitting the existing irrigation diversion of the Muddy River on the Reservation to function as a barrier to non-native fish, which are a threat to the Moapa dace, as well as a diversion structure in consultation with the Service.
6. Desert tortoise fencing installed for the previously proposed Ash Grove Cement Project should be removed or breaches established to reduce fragmentation of the habitat and reduce the threat to tortoises and other wildlife.
7. We recommend the removal of all carcasses (any species) found within the project site to eliminate such subsidies and prevent attraction to the site by predators.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in your request received June 11, 2019. As required by 50 CFR § 402.16, reinitiation of consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed

species or critical habitat that was not considered in the biological opinion or written concurrence; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

An agency shall not be required to reinitiate consultation after the approval of a land management plan prepared pursuant to 43 U.S.C. 1712 or 16 U.S.C. 1604 upon listing of a new species or designation of new critical habitat if the land management plan has been adopted by the agency as of the date of listing or designation, provided that any authorized actions that may affect the newly listed species or designated critical habitat will be addressed through a separate action-specific consultation. This exception to reinitiation of consultation shall not apply to those land management plans prepared pursuant to 16 U.S.C. 1604 if (1) fifteen years have passed since the date the agency adopted the land management plan prepared pursuant to 16 U.S.C. 1604 and (2) five years have passed since the enactment of Public Law No. 115-141 [March 23, 2018] or the date of the listing of a species or the designation of critical habitat, whichever is later.

If you have any questions about this biological opinion, please contact Carla Wise in the Southern Nevada Fish and Wildlife Office at (702) 515-5230 or by e-mail at Carla_Wise@fws.gov. Please reference File Nos. 08ENVS00-2019-F-0132 and 08ENVS00-2019-I-0133 in future correspondence concerning this consultation.

cc: Chairman, Moapa Band of Paiutes, Moapa, Nevada
Regional Environmental Protection Officer, Bureau of Indian Affairs, Western Regional
Office, Phoenix, Arizona
Supervisory Biologist - Habitat, Nevada Department of Wildlife, Las Vegas, Nevada

LITERATURE CITED

DESERT TORTOISE

- Abella, S. R. 2010. Disturbance and plant succession in the Mojave and Sonoran deserts of the American Southwest. *International Journal of Environmental Research and Public Health* 7:1248-1284.
- Abella S.R. and K.H. Berry. 2016. Enhancing and restoring habitat for the desert tortoise. *Journal of Fish and Wildlife Management* 7(1):255-279; e1944-687X. doi: 10.3996/052015-JFWM-046.
- Aiello, C.M., K.E. Nussear, A.D. Walde, T.C. Esque, P.G. Emblidge, P. Sah, S. Bansal, and P.J. Hudson. 2014. Disease dynamics during wildlife translocations: disruptions to the host population and potential consequences for transmission in desert tortoise contact networks. *Animal Conservation* 17 (supplement 1):27-39.
- Allen, M.F., and A. McHughen. 2011. Solar power in the desert: are the current large-scale solar developments really improving California's environment? Center for Conservation Biology, University of California. Riverside, California.
- Allison, L.J. and E.D. McCoy. 2014. North American tortoise abundance. Pages 118-126 in D.C. Rostal, E.D. McCoy, and H.R. Mushinsky (eds.), *Biology and Conservation of North American Tortoises*. Johns Hopkins Univ. Press.
- Allison, L.J. and A.M. McLuckie. 2018. Population trends in Mojave desert tortoises (*Gopherus agassizii*). *Herpetological Conservation and Biology* 13(2):433-452.
- Anderson, K. and K.H. Berry. 2019. *Gopherus Agassizii* (Agassiz's desert tortoise). Predation. *Natural History Notes in Herpetological Review* 50(2):351.
- Averill-Murray, R.C. 2002. Effects on survival of desert tortoises (*Gopherus agassizii*) urinating during handling. *Chelonian Conservation and Biology* 4:430-435.
- Averill-Murray, R.C., C.R. Darst, N. Strout, and M. Wong. 2013. Conserving Population Linkages for the Mojave Desert Tortoise (*Gopherus agassizii*). *Herpetological Conservation and Biology* 8(1):1-15.
- Berry, K. H. 1986. Desert tortoise (*Gopherus agassizii*) relocation: Implications of social behavior and movements. *Herpetologica* 42:113-125.
- Boarman, W. I. 2002. Threats to desert tortoise populations: A critical review of the literature. U.S. Geological Survey, Western Ecological Research Center, Sacramento, California.
- Bowen, L., A.K. Miles, K.K. Drake, S.C. Waters, K.E. Nussear, and T.C. Esque. 2015. Integrating gene transcription-based biomarkers to understand desert tortoise and ecosystem health. *EcoHealth* 1-12.

- Bowles, A. E., E. Eckert, L. Starke, E. Berg, L. Wolski, and J. Matesic, Jr. 1999. Effects of flight noise from jet aircraft and sonic booms on hearing, behavior, heart rate, and oxygen consumption of desert tortoise (*Gopherus agassizii*). AFRL-HE-WP-TR-1999-0170. Sea World Research Institute, Hubbs Marine Research Center, San Diego, California. 157 pp.
- Britten, H.B., B.R. Riddle, P.F. Brussard, R. Marlow, and T.E. Lee Jr. 1997. Genetic delineation of management units for the desert tortoise, *Gopherus agassizii*, in northeastern Mojave Desert.
- Brooks, M.L. and T.C. Esque 2002. Alien annual plants and wildfire in desert tortoise habitat: status, ecological effects, and management. *Chelonian Conservation and Biology* 4:330-340.
- Bureau of Land Management (BLM). 1990. Draft raven management plan for the California Desert Conservation Area. Prepared by Bureau of Land Management, California Desert District, Riverside, California.
- BLM (Bureau of Land Management). 2007. Vegetation treatments using herbicides on Bureau of Land Management lands in 17 western states programmatic environmental impact statement. U.S. Department of the Interior, Bureau of Land Management, Washington, D.C. <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage¤tPageId=103592>
- Bureau of Land Management (BLM). 2015. Desert Renewable Energy Conservation Plan. Proposed land use plan amendment and final environmental impact statement. Dated October. Sacramento, California. <https://drecp.org/finaldrecp/#phase1>
- BLM (Bureau of Land Management). 2016. National vegetation treatments using Aminopyralid, Fluroxypyr, and Rimsulfuron in 17 western states final programmatic environmental impact statement. U.S. Department of the Interior, Bureau of Land Management, Washington, D.C. <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage¤tPageId=103601>
- Bureau of Land Management (BLM) and Department of Energy (DOE). 2012. Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States. Volume 4, Chapter 11: Nevada Proposed Solar Energy Zones. FES 12-24. DOE/EIS-0403. <http://solareis.anl.gov/documents/fpeis/index.cfm>
- Burge, B.L. 1977. Movements and behavior of the desert tortoise, *Gopherus agassizii*. University of Nevada - Las Vegas thesis. 426 pgs.
- Burroughs, M. 2012. Electronic mail. Information on solar projects in desert tortoise habitat in Nevada for which the Service has issued biological opinions. Dated April 26. Fish and

- wildlife biologist, Southern Nevada Fish and Wildlife Office, U.S. Fish and Wildlife Service. Las Vegas, Nevada.
- Burroughs, M. 2014. Electronic mail. Status of solar projects in Nevada. Dated January 27. Fish and wildlife biologist, Southern Nevada Fish and Wildlife Office, U.S. Fish and Wildlife Service. Las Vegas, Nevada.
- Cardno, Inc. 2018. Desert Tortoise Post-Translocation Report. June 2018 – Final Report. Moapa Southern Paiute Solar Facility. 209 pp.
- Christensen, J. H. , Hewitson, B. , Busuioc, A. , Chen, A. , Gao, X. , Held, R. , Jones, R. , Kolli, R. K. , Kwon, W. K. , Laprise, R. , Magana Rueda, V. , Mearns, L. , Menendez, C. G. , Räisänen, J. , Rinke, A. , Sarr, A. , Whetton, P. , Arritt, R. , Benestad, R. , Beniston, M. , Bromwich, D. , Caya, D. , Comiso, J. , de Elia, R. and Dethloff, K. 2007. Regional climate projections, *Climate Change, 2007: The Physical Science Basis. Contribution of Working group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, University Press, Cambridge, Chapter 11, ISBN: 978-0-521-88009-1.
- Cota, M. 2014. Electronic mail. Number of desert tortoises found on the Silver State South Project site. Dated November 25. Wildlife biologist, Pahrump Field Office, Bureau of Land Management. Las Vegas, Nevada.
- Daitch, D. 2015. Electronic mail. Notifications of desert tortoises found on the Cinco Solar project. Dated November 6. Rincon Consultants. Monterey, California.
- Darst, C. 2014. Excel Spreadsheet. Calculations of modeled desert tortoise habitat by recovery unit with impervious surfaces. Dated May 6. Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service. Reno, Nevada.
- Davis, D. 2014. Electronic mail. ISEGS master tortoise list, October 2014. Dated November 3. Environmental specialist III, Ivanpah Solar Thermal, Nipton, California.
- Dickson, B.G., R.D. Scherer, A.M. Kissel, B.P. Wallace, K.M. Langin, M.E. Gray, A.F. Scheib, and B. Weise. 2019. Multiyear monitoring of survival following mitigation-driven translocation of a long-lived threatened reptile. *Conservation Biology* 0(0):1-12.
- Drake, K.K., T.C. Esque, K.E. Nussear, C. Aiello, P. Emblidge, P.A. Medica. 2009. An annual report for the Fort Irwin desert tortoise translocation project. Prepared for the U.S. Army National Training Center, Natural Resource Program Manager. 47 pp.
- Drake, K.K., KE. Nussear, T.C. Esque, AM. Barber, KM. Vittum, P.A. Medica, C.R. Tracy, and K.W. Hunter. 2012. Does translocation influence physiological stress in the desert tortoise? *Animal Conservation* 15(2012):560-570.
- Drake, K.K., T.C. Esque, K.E. Nussear, L.A. Defalco, S.L. Soles-Sciulla, A.T. Modlin, and P.A.

- Medica. 2015. Desert tortoise use of burned habitat in the eastern Mojave Desert. *Journal of Wildlife Management* 79(4):618-629.
- Drake, K.K., L. Bowen, K.E. Nussear, T.C. Esque, A.J. Berger, N.A. Custer, S.C. Waters, J.D. Johnson, A.K. Miles, and R.L. Lewison. 2016. Negative impacts of invasive plants on conservation of sensitive desert wildlife. *Ecosphere* 7(10):e01531. 10.1002/ecs2.1531
- Duda, J.J., A.J. Krzysik, and J. E. Freilich. 1999. Effects of drought on desert tortoise movement and activity. *Journal of Wildlife Management* 63:1181-1192.
- Edwards, T., E. W. Stitt, C. R. Schwalbe, and D. E. Swann. 2004a. *Gopherus agassizii* (desert tortoise) movement. *Herpetological Review* 35:381-382.
- Edwards, T.E., C.R. Schwalbe, D.E. Swann, and C.S. Goldberg. 2004b. Implications of anthropogenic landscape change on inter-population movements of the desert tortoise. *Conservation Genetics*. 5:485-499.
- Esque, T. C., K. E. Nussear, K. K. Drake, A. D. Walde, K. H. Berry, R. C. Averill-Murray, A. P. Woodman, W. I. Boarman, P. A. Medica, J. Mack, and J. S. Heaton. 2010. Effects of subsidized predator, resource variability, and human population density on desert tortoise populations in the Mojave Desert. *Endangered Species Research* 12:167–177.
- Evans, R. 2001. Free-roaming dog issues at the United States Marine Corps Air Ground Combat Center, Twentynine Palms, California. *Proceedings of the 2001 Desert Tortoise Council Symposium*.
- Field, K. J., C. R. Tracy, P. A. Medica, R. W. Marlow, and P. S. Corn. 2007. Return to the wild: translocation as a tool in conservation of the desert tortoise (*Gopherus agassizii*). *Biological Conservation* 136:232-245.
- Fischer, J., and D. B. Lindenmayer. 2007. Landscape modification and habitat fragmentation: a synthesis. *Global Ecology and Biogeography* 16(3):265-280.
- Fraser, J. 2014a. Electronic mail. Number of desert tortoises found on the Genesis and Desert Sunlight solar sites. Dated January 28. Fish and wildlife biologist, Palm Springs Fish and Wildlife Office, U.S. Fish and Wildlife Service. Palm Springs, California.
- Fraser, J. 2014b. Electronic mail. Number of desert tortoises found on the Blythe and McCoy solar sites. Dated November 5. Fish and wildlife biologist, Palm Springs Fish and Wildlife Office, U.S. Fish and Wildlife Service. Palm Springs, California.
- Fry, J.A., G. Xian, S. Jin, J.A. Dewitz, C.G. Homer, L. Yang, C.A. Barnes, N.D. Herold, and J.D. Wickham. 2011. National Land Cover Database for the Conterminous United States. Analysis of land cover change in the continental United States from 2001 to 2006 using Landsat ETM+ and TM imagery. 9 pp.

- Germano, D.J., R.B. Bury, T.C. Esque, T.H. Fritts, and P.A. Medica. 1994. Range and habitat of the desert tortoise. Pages 57-72, *In* R.B. Bury and D.J. Germano (eds.), *Biology of the North American Tortoises*. National Biological Survey, Fish and Wildlife Research 13, Washington, D.C.
- Gray, M.E., B.G. Dickson, K.E. Nussear, T.C. Esque, and T. Chang. 2019. A range-wide model of contemporary, omnidirectional connectivity for the threatened Mojave desert tortoise. Accepted for publication by *Ecosphere* on 7/10/2019.
- Hagerty, B.E. 2008. Ecological genetics of the Mojave Desert tortoise. Ph.D. Dissertation. University of Nevada, Reno.
- Hagerty, B.E. and C.R. Tracy. 2010. Defining population structure for the Mojave desert tortoise. *Conservation Genetics*. 11(5):1795-1807.
- Hagerty, B. E., K. E. Nussear, T. C. Esque, and C. R. Tracy. 2011. Making molehills out of mountains: landscape genetics of the Mojave desert tortoise. *Landscape Ecology* 26:267-280.
- Harless, M. L., A. D. Walde, D. K. Delaney, L. L. Pater, and W. K. Hayes. 2009. Home range, spatial overlap, and burrow use of the desert tortoise in the West Mojave Desert. *Copeia* 2009:378-389.
- Henen, B.T. 2019. Electronic mail. Number of desert tortoises found on the Marine Corps Air Ground Combat Center at Twentynine Palms expansion project. Dated January 25. Fish and wildlife biologist, Palm Springs Fish and Wildlife Office, U.S. Fish and Wildlife Service. Palm Springs, California.
- Hinderle, D., R.L. Lewison, A.D. Walde, D. Deutschman, W.I. Boarman. 2015. The effects of homing and movement behaviors on translocation: desert tortoises in the western Mojave Desert. *Journal of Wildlife Management* 79(1):137–147.
- Ironwood Consulting, Inc. 2014. Annual compliance report: April - December 2014. Biological resources. Stateline Solar Farm. Bureau of Land Management case file number: CACA-48669. San Bernardino County, California.
- Ironwood Consulting, Inc. 2016. Desert tortoise 2016 third quarter and final report. Playa Solar Project, Clark County, Nevada. File No. 84320-2015-F-0139. Las Vegas, Nevada.
- Latch, E. K., W. I. Boarman, A. Walde, and R. C. Fleischer. 2011. Fine-scale analysis reveals cryptic landscape genetic structure in desert tortoises. *PLoS one* 6(11): e27794. doi:10.1371/journal.pone.0027794.
- Longshore, K.M., J.R. Jaeger, and J.M. Sappington. 2003. Desert tortoise (*Gopherus agassizii*)

- survival at two eastern Mojave Desert sites: death by short-term drought? *Journal of Herpetology* 37(1):169-177.
- Lovich, J. E., and D. Bainbridge. 1999. Anthropogenic degradation of the southern California desert ecosystem and prospects for natural recovery and restoration. *Environmental Management* 24:309-326.
- Millstein, D., and M. Menon. 2011. Regional climate consequences of large-scale cool roof and photovoltaic array deployment. *Environmental Research Letters* 6(3):034001.
- Mulder, K.P., A.D. Walde, W.I. Boarman, A.P. Woodman, E.K. Latch, and R.C. Fleischer. 2017. No paternal genetic integration in desert tortoises (*Gopherus agassizii*) following translocation into an existing population. *Biological Conservation* 210:318–324.
- Murphy, R.W., K.H. Berry, T. Edwards, and A.M. McLuckie. 2007. A genetic assessment of the recovery units for the Mojave population of the desert tortoise, *Gopherus agassizii*. *Chelonian Conservation and Biology* 6:229-251.
- Nafus, M.G., T.C. Esque, R.C. Averill-Murray, K.E. Nussear, and R.R. Swaisgood. 2017. Habitat drives dispersal and survival of translocated juvenile desert tortoises. *Journal of Applied Ecology* 54:430–438.
- NewFields Environmental and Engineering, LLC. 2011. Biological Monitoring and Tortoise Clearance Report for Silver State North Solar Project. Dated May2011. Prepared for First Solar. Prepared by NewFields, Las Vegas, Nevada.
- NewFields Environmental and Engineering, LLC. 2014. Field Contact Representative and Biological Monitoring Post Construction Report for the Copper Mountain Solar 3 Gen-Tie Line and Access Road. Dated July 2014. Prepared for Bureau of Land Management and U.S. Fish and Wildlife Service. Prepared by NewFields, Las Vegas, Nevada.
- Nussear, K. E. 2004. Mechanistic investigation of the distributional limits of the desert tortoise, *Gopherus agassizii*. Dissertation, University of Nevada, Reno. 213 pp.
- Nussear, K.E., T.C. Esque, R.D. Inman, L. Gass, K.A. Thomas, C.S.A. Wallace, J.B. Blainey, D.M. Miller, and R.H. Webb. 2009. Modeling habitat of the desert tortoise (*Gopherus agassizii*) in the Mojave and parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona. U.S. Geological Survey Open-File Report 2009-1102.
- Nussear, K.E., C.R. Tracy, P.A. Medica, D.S. Wilson, R.W. Marlow, and P.S. Com. 2012. Translocation as a conservation tool for Agassiz's desert tortoises: Survivorship, reproduction, and movements. *The Journal of Wildlife Management*; DOI: 10.1002/jwmg.390.
- O'Connor, M.P., L.C. Zimmerman, D.E. Ruby, S.J. Bulova, and J.R. Spotila. 1994. Home range

- size and movements by desert tortoises, *Gopherus agassizii*, in the eastern Mojave Desert. *Herpetological Monographs* 8(1994): 60-71.
- Oftedal, O.T., S. Hillard, and D.J. Morafka. 2002. Selective spring foraging by juvenile desert tortoises (*Gopherus agassizii*) in the Mojave Desert: Evidence of an adaptive nutritional strategy. *Chelonian Conservation and Biology* 4:341-352.
- Peaden, J.M., A.J. Nowakowski, T.D. Tuberville, K.A. Buhlmann, and B.D. Todd. 2017. Effects of roads and roadside fencing on movements, space use, and carapace temperatures of a threatened tortoise. *Biological Conservation* 214 (2017):13-22.
- Ricketts, T. H. 2000. The matrix matters. *The American Naturalist* 158:87-99.
- Saethre, M.B., T.C. Esque, P.A. Medica, R. Marlow, and C.R. Tracy. 2003. Determining carrying capacity of desert tortoises. Abstract of a paper present at the 28th Annual Meeting and Symposium of the Desert Tortoise Council.
- Schlesinger, W.H., J. Belnap, and G. Marion. 2009. On carbon sequestration in desert ecosystems. *Global Change Biology* 15(6):1488-1490.
- Segelbacher, G., S. A. Cushman, B. K. Epperson, M. Fortin, O. Francois, O. J. Hardy, R. Holderegger, P. Taberlet, L.P. Waits, and S. Manel. 2010. Applications of landscape genetics in conservation biology: concepts and challenges. *Conservation Genetics* 11:375-385.
- Tracy, C.R., R. Averill-Murray, W.I. Boarman, D. Delehanty, J. Heaton, E. McCoy, D. Morafka, K. Nussear, B. Hagerty, and P. Medica. 2004. Desert Tortoise Recovery Plan Assessment. Prepared for the U.S. Fish and Wildlife Service. Reno, Nevada.
- Turner, F. B., P. A. Medica, and C. L. Lyons. 1984. Reproduction and survival of the desert tortoise (*Scaptochelys agassizii*) in Ivanpah Valley, California. *Copeia* 4:811-820.
- Turner, F. B., P. Hayden, B. L. Burge, and J. B. Roberson. 1986. Egg production by the desert tortoise (*Gopherus agassizii*) in California. *Herpetologica* 42:93-104.
- Turner, F. B., K. H. Berry, D. C. Randall, and G. C. White. 1987. Population ecology of the desert tortoise at Goffs, California, 1983-1986. Report to Southern California Edison Co., Rosemead, California.
- U.S. Fish and Wildlife Service (Service). 1990. Biological opinion on the proposed right-of-way grant for the Kern River Gas Transmission Company natural gas pipeline- California and Nevada (1-5-87-F-36R). Dated December 21. Letter to Chief, Environmental Compliance and Projects Analysis Branch, Federal Energy Regulatory Commission, Washington, D.C. From Regional Director, Fish and Wildlife Service, Portland, Oregon.

- U.S. Fish and Wildlife Service (Service). 1994. Desert tortoise (Mojave population) recovery plan. Portland, Oregon.
- U.S. Fish and Wildlife Service (Service). 1997. Programmatic biological opinion for implementation of multiple use activities within the Las Vegas Field Office (1-5-97-F-251). Dated November 25. Memorandum to District Manager, Bureau of Land Management, Las Vegas, Nevada. From Field Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 1998. Programmatic biological opinion for implementation of proposed actions in the Las Vegas District's proposed resource management plan/final environmental impact statement (1-5-98-F-053). Dated June 18. Memorandum to District Manager, Bureau of Land Management, Las Vegas, Nevada. From Field Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2001. Biological opinion (1-5-01-F-463) for listed species associated with a natural gas-fired power plant on the Moapa Indian Reservation. Dated December 20. Memorandum to Field Representative, Paiute Field Office, Bureau of Indian Affairs, St. George, Utah. From Field Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2002. Biological opinion and request for concurrence with effect determination for listed and proposed species associated with the Kern River Gas Transmission Company project in California, Nevada, Utah, and Wyoming (1-5-02-F-476). Docket no. CP01-422-000. Dated July 9. Letter to Leader, Gas Branch I, Federal Energy Regulatory Commission, Washington, D.C. From Field Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2006. Intra-Service programmatic biological opinion for execution of the proposed Muddy River memorandum of agreement (MOA) regarding the groundwater withdrawal of 16,100 acre-feet per year (afy) from the regional carbonate aquifer in the Coyote Spring Valley and California Wash basins and establishment of conservation measures for the Moapa dace, Clark County, Nevada (1-5-05-FW-536). Dated January 30. Memorandum to Manager, California/Nevada Operations, Fish and Wildlife Service, Sacramento, California. From Field Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2007. Biological opinion (1-5-05-FW-536, Tier 3) for water pipeline to the Tribal Travel Plaza. Dated August 6. Letter to U.S. Department of Housing and Urban Development, Southwest Office of Native American Programs, Phoenix, Arizona. From Field Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2008a. Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert

Tortoise. 156 pp.

- U.S. Fish and Wildlife Service (Service). 2009a. Desert tortoise (Mojave population) field manual (*Gopherus agassizii*). Region 8, Sacramento, California.
- U.S. Fish and Wildlife Service (Service). 2009b. Biological opinion and concurrence with effect determinations for listed and proposed species associated with the UNEV pipeline development and utility right-of-way project. (UTU-79766, NVN-82386, UT-920; 6-UT-09-F-023). Dated November 13. Memorandum to state Director, BLM Utah State Office, Salt Lake City.
- U.S. Fish and Wildlife Service (Service). 2010a. Mojave population of the desert tortoise (*Gopherus agassizii*) 5-year review: summary and evaluation. Desert Tortoise Recovery Office. Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2010b. Formal consultation for the Silver State Solar Project (NextLight Renewable Power, LLC), Clark County, Nevada. File No. 84320-2010-F- 0208. Dated September 16. Memorandum to Field Manager, Pahrump Field Office, Bureau of Land Management, Las Vegas, Nevada. From State Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2010c. Revised biological opinion for the Lucerne Valley Chevron Solar Project, San Bernardino County, California (3031 (P) CA-680.33) (8-8-10-F- 61R). Memorandum to Field Manager, Barstow Field Office, Bureau of Land Management, Barstow, California. Dated September 29. From Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.
- U.S. Fish and Wildlife Service (Service). 2010d. Biological opinion on the Genesis Solar Energy Project, Riverside County, California. Memorandum to Field Manager, Palm Springs South Coast Field Office, Bureau of Land Management, Palm Springs, California. Dated November 2. From Field Supervisor, Carlsbad Fish and Wildlife Office. Carlsbad, California.
- U.S. Fish and Wildlife Service (Service). 2010e. Biological opinion on the Blythe Solar Power Plant, Riverside County, California. Memorandum to Field Manager, Palm Springs South Coast Field Office, Bureau of Land Management, Palm Springs, California. Dated October 8. From Field Supervisor, Carlsbad Fish and Wildlife Office. Carlsbad, California.
- U.S. Fish and Wildlife Service (Service). 2010f. Formal and informal consultation under section 7 of the Endangered Species Act for the Amargosa Farm Road Solar Energy Project, Nye County, Nevada. File nos. 84320-2010-F-0315 and 84320-2010-1-0316. Memorandum to Field Manager, Pahrump Field Office, Bureau of Land Management, Las Vegas, Nevada. Dated November 1. From State Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.

- U.S. Fish and Wildlife Service (Service). 2010g. Programmatic biological opinion for Federal Highway Administration activities implemented by the Nevada Department of Transportation (84320-2010-F-0285). Dated September 27. Letter to FHWA, Carson City, Nevada. From Field Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2011a. Revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). Sacramento, California.
- U.S. Fish and Wildlife Service (Service). 2011b. Biological opinion on BrightSource Energy's Ivanpah Solar Electric Generating System Project, San Bernardino County, California [CACA- 48668, 49502, 49503, 49504] (8-8-10-F-24R). Dated June 10. Memorandum to District Manager, California Desert District, Bureau of Land Management, Moreno Valley, California. From Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.
- U.S. Fish and Wildlife Service (Service). 2011c. Biological opinion on Copper Mountain North Solar Project, Boulder City, Clark County, Nevada. Memorandum to Field Manager, Las Vegas Field Office, Bureau of Land Management, Las Vegas, Nevada; Director, Public Works, City of Boulder City, Boulder City, Nevada; Adaptive Management Coordinator, Desert Conservation Program, Las Vegas, Nevada; Supervisory Biologist – Habitat, Nevada Department of Wildlife, Las Vegas, Nevada. Dated December 29. From State Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2011d. Biological opinion on the Mojave Solar, LLC's Mojave Solar Project, San Bernardino County, California (8-8-11-F-3). Letter sent to Director of Environmental Compliance, Loan Guarantee Program, Department of Energy, Washington, D.C. and Field Manager, Barstow Field Office, Bureau of Land Management, Barstow, California. Dated March 17. From Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.
- U.S. Fish and Wildlife Service (Service). 2011e. Biological opinion on the Desert Sunlight Solar Farm Project, Riverside County, California. Memorandum to Field Manager, Palm Springs South Coast Field Office, Bureau of Land Management, Palm Springs, California. Dated July 6. From Field Supervisor, Carlsbad Fish and Wildlife Office. Carlsbad, California.
- U.S. Fish and Wildlife Service (Service). 2011f. Biological opinion on the Rice Solar Energy Project, Riverside County, California. Dated July 27. Letter to John, Holt, Environmental Manager, Desert Southwest Customer Service Region, Western Area Power Administration, Phoenix, Arizona. From Jim A. Bartel, Field Supervisor, Carlsbad Fish and Wildlife Office. Carlsbad, California.
- U.S. Fish and Wildlife Service (Service). 2011g. Biological opinion on the reinitiation of consultation for operation and maintenance of the Kern River and Mojave Gas

Transmission pipeline in Nevada, California, Utah, and Wyoming (84320-2011-F-0337). Dated September 28. Memorandum to Assistant Field Manager, Bureau of Land Management, Las Vegas, Nevada. From Field Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.

U.S. Fish and Wildlife Service (Service). 2012a. Biological opinion for Techren Boulder City Solar Project, Boulder City, Clark County, Nevada. Dated December 28, 2012. Memorandum to Field Manager, Las Vegas Field Office, Bureau of Land Management, Las Vegas, Nevada; Director, Public Works, City of Boulder City, Boulder City, Nevada; Adaptive Management Coordinator, Desert Conservation Program, Las Vegas, Nevada; Supervisory Biologist – Habitat, Nevada Department of Wildlife, Las Vegas, Nevada. From State Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.

U.S. Fish and Wildlife Service (Service). 2012b. Biological opinion for the K Road Moapa Solar Project, Moapa River Indian Reservation, Clark County, Nevada. Memorandum to Superintendent, Southern Paiute Agency, Bureau of Indian Affairs. St. George, Utah. Dated March 7. From State Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.

U.S. Fish and Wildlife Service (Service). 2012c. Biological opinion for the Proposed Addition of Maneuver Training Lands at Fort Irwin, California (8-8-11-F-38R). Dated April 27. Letter to Chief of Staff, Headquarters, National Training Center and Fort Irwin, Fort Irwin, California. From Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.

U.S. Fish and Wildlife Service (Service). 2013a. Biological opinion for the Stateline Solar and Silver State Solar South Projects, San Bernardino County, California, and Clark County, Nevada. Dated September 30. Memorandum to Field Manager, Needles Field Office, Bureau of Land Management, Needles California, and Assistant Field Manager, Las Vegas Field Office, Bureau of Land Management, Las Vegas, Nevada. From Acting Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.

U.S. Fish and Wildlife Service (Service). 2013b. Biological opinion reinitiation of Copper Mountain North Solar Project, Boulder City, Clark County, Nevada. Memorandum to Field Manager, Las Vegas Field Office, Bureau of Land Management, Las Vegas, Nevada; Director, Public Works, City of Boulder City, Boulder City, Nevada; Adaptive Management Coordinator, Desert Conservation Program, Las Vegas, Nevada; Supervisory Biologist – Habitat, Nevada Department of Wildlife, Las Vegas, Nevada. Dated August 8. From State Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.

U.S. Fish and Wildlife Service (Service). 2013c. Biological opinion on the McCoy Solar Power Project, Riverside County, California. Dated March 6. Memorandum to Field Manager, California Desert District Office, Bureau of Land Management, Moreno Valley, California. From Field Supervisor, Carlsbad Fish and Wildlife Office. Carlsbad, California.

- U.S. Fish and Wildlife Service (Service). 2013d. Biological opinion on the Desert Harvest Solar Project, Riverside County, California [CACA 044919]. Dated January 15. Memorandum to Field Manager, Palm Springs-South Coast Field Office, Bureau of Land Management, Moreno Valley, California. From Field Supervisor, Carlsbad Fish and Wildlife Office. Carlsbad, California.
- U.S. Fish and Wildlife Service (Service). 2013e. Programmatic biological opinion (84320-2010-F-0365) for implementation of proposed actions in the Las Vegas District's proposed resource management plan/final environmental impact statement. Dated January 2. Memorandum to Assistant Field Manager, Bureau of Land Management, Las Vegas, Nevada. From State Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2014a. Biological opinion for the Townsite Solar Transmission Project. Dated July 24. Memorandum to Environmental Manager, Western Area Power Administration, U.S. Department of Energy, Phoenix, Arizona; Supervisory Biologist - Habitat, Nevada Department of Wildlife, Las Vegas, Nevada. From State Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2014b. Biological opinion for Res Americas Moapa Solar Energy Center, Moapa River Indian Reservation, Clark County, Nevada. Dated January 21. Memorandum to Superintendent, Southern Paiute Agency, Bureau of Indian Affairs, St. George, Utah. From State Supervisor, Nevada Fish and Wildlife Office. Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2015a. Biological opinion for the Valley Electric Association's Community Solar Project Low-Effect Habitat Conservation Plan. Dated October 8. Memorandum to Assistant Regional Director, Ecological Services, Sacramento, California. From Field Supervisor, Southern Nevada Fish and Wildlife Office. Las Vegas, Nevada.
- U.S. Fish and Wildlife Service (Service). 2015b. Biological opinion for the RE Barren Ridge 1 LLC's RE Cinco Generation Intertie Line and RE Cinco Solar Project, Kern County, California (2831-03 (P) CACA-53735 CAD000.06). Dated February 11. Memorandum to Field Manager, Ridgecrest Field Office, Bureau of Land Management, Ridgecrest, California, and Deputy Regional Director, Region 8, U.S. Fish and Wildlife Service, Sacramento, California. From Field Supervisor, Carlsbad Fish and Wildlife Office. Carlsbad, California.
- U.S. Fish and Wildlife Service (Service). 2015c. Biological opinion for the Soda Mountain Solar Project, San Bernardino County, California [2831-03(CP), CACA-49584, CAD000.06/CAD080]. Dated January 13. Memorandum to District Manager, California Desert District, Bureau of Land Management, Moreno Valley, California. From Field Supervisor, Carlsbad Fish and Wildlife Office. Carlsbad, California.
- U.S. Fish and Wildlife Service (Service). 2015d. Biological opinion for four solar energy

- projects in the Dry Lake Solar Energy Zone. Dated May 1. Memorandum to Assistant Field Manager of Natural Resources, Las Vegas Field Office, Bureau of Land Management, Las Vegas, Nevada. From Field Supervisor, Southern Nevada Fish and Wildlife Office. Las Vegas, Nevada.
- U.S. Fish and Wildlife Service (Service). 2015e. Biological opinion for the Aiya Solar Energy Project. Dated December 18. Memorandum to Deputy Regional Director – Trust Services, Western Regional Office, Bureau of Indian Affairs, Phoenix, Arizona. From Field Supervisor, Southern Nevada Fish and Wildlife Office. Las Vegas, Nevada.
- U.S. Fish and Wildlife Service (Service). 2015f. Range-wide monitoring of the Mojave desert tortoise (*Gopherus agassizii*): 2013 and 2014 annual reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2016a. Biological opinion on the Land Use Plan Amendment under the Desert Renewable Energy Conservation Plan, California. Dated August 16. Memorandum to Deputy State Director, Division of Natural Resources, Bureau of Land Management, Sacramento, California. From Field Supervisor, Carlsbad Fish and Wildlife Office. Carlsbad, California.
- U.S. Fish and Wildlife Service (Service). 2016b. Range-wide monitoring of the Mojave desert tortoise (*Gopherus agassizii*): 2015 and 2016 annual reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2017a. Biological opinion on the Land Acquisition and Airspace Establishment, Twentynine Palms, California. Letter to Lieutenant Colonel of Marine Air Ground Task Force Training Command, Twentynine Palms, California. Dated January 31. From Field Supervisor, Palm Springs Fish and Wildlife Office. Palm Springs, California.
- U.S. Fish and Wildlife Service (Service). 2017b. Preparing for any action that may occur within the range of the Mojave desert tortoise (*Gopherus agassizii*). Region 8, Sacramento, California.
- U.S. Fish and Wildlife Service (Service). 2018a. Range-wide monitoring of the Mojave desert tortoise (*Gopherus agassizii*): 2017 annual reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2018b. Translocation of Mojave desert tortoises from project sites: plan development guidance. U.S. Fish and Wildlife Service, Las Vegas, Nevada.
- U.S. Fish and Wildlife Service (Service). 2019a. Request for concurrence with effect determination for Mojave desert tortoise associated with Arrow Canyon Solar Project geotechnical activities in Clark County, Nevada. Dated July 30. Memorandum to

Regional Environmental Protection Officer, Bureau of Indian Affairs, Phoenix, Arizona.
From Field Supervisor, Southern Nevada Fish and Wildlife Office. Las Vegas, Nevada.

U.S. Fish and Wildlife Service (Service). 2019b. Health Assessment Procedures for the Mojave Desert Tortoise (*Gopherus agassizii*): A Handbook Pertinent to Translocation. Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.

Vasek, F. C., H. B. Johnson, and D. H. Eslinger. 1975. Effects of pipeline construction on creosote bush scrub vegetation of the Mojave Desert. *Madroño* 23:1-13.

Walde, A. D., A. P. Woodman, and W. I. Boarman. 2008. Desert tortoise surveys and research in the southern and western expansion areas of Fort Irwin, 2008 summary report. Prepared for the Department of the Army. Fort Irwin, California by ITS Corporation. 14 pp.

Walde, A.D., W.I. Boarman, and A.P. Woodman. 2011. Comparing translocation methods and effectiveness for desert tortoises at Fort Irwin, a comprehensive study: 2011 report. Dated December 31. 19 pp.

Wallis, I. R., B. T. Henen, and K. A. Nagy. 1999. Egg size and annual egg production by female desert tortoises (*Gopherus agassizii*): the importance of food abundance, body size, and date of egg shelling. *Journal of Herpetology* 33:394-408.

Webb, R. H. 2002. Recovery of severely compacted soils in the Mojave Desert, California, USA. *Arid Land Research and Management* 16: 291-305.

Wilson, D.S., D.J. Morafka, C.R. Tracy, and K.A. Nagy. 1999. Winter activity of juvenile desert tortoise (*Gopherus agassizii*) in the Mojave Desert. *Journal of Herpetology* 33(3): 496-501.

Wise, C. 2018. Electronic mail. Status of solar projects in Nevada. Dated June 28. Fish and wildlife biologist, Southern Nevada Field Office, U.S. Fish and Wildlife Service. Las Vegas, Nevada.

MOAPA DACE

Coburn, M. M. and T. M. Cavendar. 1992. Interrelationships of North American cyprinid. Pages 328-273 *in* Systematics, Historical Ecology, and North American Freshwater Fishes. R. L. Mayden (ed.). Stanford University Press, Stanford, California. 969 pp.

Cross, J. N. 1976. Status of the native fish fauna of the Moapa River (Clark County, Nevada). *Transactions of the American Fisheries Society* 105(4):503-508.

Deacon, J. E. and W. C. Bradley. 1972. Ecological distribution of the fishes of the Moapa (Muddy) River in Clark County, Nevada. *Transactions of the American Fish Society*

101(3): 408-419.

- Eakin, T.E., 1964. Ground-water Appraisal of Coyote Spring and Kane Spring Valleys and Muddy River Springs Area: Lincoln and Clark Counties, Nevada. Department of Conservation and Natural Resources.
- Heckman, R.A., 1988. Presence of the Asian fish tapeworm (*Bothriocephalus rzcheilogmzthi*), in the Moapa-Muddy River area, Nevada. Brigham Young University, Provo, Utah.
- Hubbs, C. L. and R. R. Miller. 1948. Two new, relict genera of cyprinid fishes from Nevada. University of Michigan Museum of Zoology Occasional Paper 507:1-30.
- LaRivers, I. 1962. Moapa dace. *In* Fishes and fisheries of Nevada. Nevada State Fish and Game Commission, Carson City.
- Minckley, W.L. and Barber, W.E., 1971. Some aspects of biology of the longfin dace, a cyprinid fish characteristic of streams in the Sonoran Desert. *The Southwestern Naturalist*, pp.459-464.
- Muddy River Biological Advisory Committee 2017. Moapa Dace Count Fall 2017. <https://www.fws.gov/uploadedFiles/MoapaDace2017%20508%20checked.pdf>
- Ono, R. D., J. D. Williams, and A. Wagner. 1983. Vanishing fishes of North America. Stone Wall Press, Washington, D.C. 257 pages.
- Resource Concepts, Inc. 2005. Biological assessment/biological evaluation, Coyote Springs Investment. Prepared for Coyote Springs Investment, LLC, Sparks, Nevada. 38 pages plus appendices.
- Rinne, J. N., and W. L. Minckley. 1991. Native fishes of arid lands: a dwindling resource of the desert southwest. General Technical Report RM-206. Fort Collins, Colorado; U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 45 pp.
- Scopettone, G. G. 1993. Interactions between Native and Non-native Fishes of the Upper Muddy River, Nevada. *Transactions of the American Fisheries Society* 122:599-608.
- Scopettone, G.G., H.L. Burge, P.L. Tuttle, M. Parker, and N.K. Parker. 1987. Life history and status of the Moapa dace (*Moapa coriacea*). Unpublished report: U.S. Fish and Wildlife Service, National Fisheries Research Center, Seattle, Washington. 77 pages.
- Scopettone, G. G., H. L. Burge, and P. L. Tuttle. 1992. Life history, abundance, and distribution of Moapa dace (*Moapa coriacea*). *Great Basin Naturalist* 52:216-225.
- Scopettone, G.G., Rissler, P.H., Nielsen, M.B. and Harvey, J.E., 1996. Abundance of Moapa

- dace (*Moapa coriacea*) and Virgin River chub (*Gila seminuda*) in the Muddy River, with information on fish distribution. Unpublished Report: National Biological Service, California Science Center, Reno Field Station, Reno, Nevada.
- Scoppettone, G.G., Rissler, P.H., Nielsen, M.B. and Harvey, J.E., 1998. The status of *Moapa coriacea* and *Gila seminuda* and status information on other fishes of the Muddy River, Clark County, Nevada. *The Southwestern Naturalist*, pp.115-122.
- Scrugham, J.G. 1920. Order of determination of relative rights to the Muddy River and its tributaries. Judgment and Decree, Case No. 377. State Engineer, Carson City, Nevada. 23 pp. + exhibits.
- U.S. Fish and Wildlife Service (Service). 1996. Recovery plan for the rare aquatic species of the Muddy River Ecosystem. Portland, Oregon. 60 pp.
- U.S. Fish and Wildlife Service (Service). 2006. Intra-Service programmatic biological opinion for the proposed Muddy River memorandum of agreement regarding the groundwater withdrawal of 16,100 acre-feet per year from the regional carbonate aquifer in Coyote Spring Valley and California Wash Basins, and establish conservation measures for the Moapa Dace, Clark County, Nevada. Intra-Service biological opinion, File No. 1-5-05-FW-536. January 11, 2006.
- U.S. Fish and Wildlife Service (Service). 2008b. Biological opinion (84320-2008-F-0417) for aquatic habitat restoration, establishment, and enhancement activities in the Lower Pederson Stream of the Warm Springs Natural Area in Moapa Valley, Clark County, Nevada. Dated July 17. Letter to Acting Regulatory Project Manager, St. George Regulatory Office, U.S. Army Corps of Engineers, St. George, Utah. From Field Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2008c. Biological opinion (84320-2008-F-0007) for the Kane Springs Valley groundwater development project in Lincoln County, Nevada. Dated October 29. Memorandum to Field Manager, Ely Field Office, Bureau of Land Management, Ely, Nevada. From Field Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada.
- U.S. Fish and Wildlife Service (Service). 2012d. Biological opinion (84320-2013-F-0029) for the issuance of a recovery permit for the capture of Moapa dace for a reproductive ecology study. Dated. December 28. Memorandum to Endangered Species Division Chief, Pacific Southwest Region, Sacramento, California. From State Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada.
- Wilson, B.L., Deacon, J.E. and Bradley, W.G., 1966. Parasitism in the fishes of the Moapa River, Clark County, Nevada. University of Nevada, Las Vegas.

APPENDIX. DESERT TORTOISE TRANSLOCATION PLAN

**DESERT TORTOISE TRANSLOCATION
PLAN: EALE SHADOW MOUNTAIN
SOLAR PROJECT
CLARK COUNTY, NEVADA**

**Prepared for:
U.S. FISH AND WILDLIFE SERVICE
Southern Nevada Field Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130**

**Prepared by:
Bureau of Indian Affairs
325MK 8me LLC
ENValue**

November 2019

TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 DESCRIPTION OF PROJECT	1
2.0 GOALS AND OBJECTIVES	3
2.1 PLAN OVERVIEW	3
3.0 PROJECT AREA, TORTOISE ESTIMATES, AND HEALTH.....	5
3.1 PROJECT AREA DESCRIPTION	5
3.2 PROJECT AREA SURVEYS AND RESEARCH EFFORT	5
3.3 SOLAR SITE TORTOISE ESTIMATES.....	5
4.0 RECIPIENT SITES.....	7
4.1 RECIPIENT SITE DESCRIPTION	7
4.2 RECIPIENT SITE SURVEYS AND RESEARCH EFFORT	7
4.3 RECIPIENT SITE DENSITY ESTIMATE	8
4.4 CONTROL SITE	8
4.5 REPORTING REQUIREMENTS DURING THIS PHASE (SECTIONS 3.0 AND 4.0).....	9
5.0 TRANSLOCATION/RELOCATION PROCEDURES	10
5.1 OVERVIEW OF TRANSLOCATION/RELOCATION PROCEDURES.....	10
5.2 TRANSLOCATION REVIEW PACKAGE AND DISPOSITION PLAN	14
5.2.1 Social Groups and Spatial Relationships.....	14
5.2.2 Shelter Site Type and Availability	14
5.2.3 Predator Sign Densities	15
5.3 PASSIVE EXCLUSION DURING FENCE CONSTRUCTION	15
5.4 HEALTH ASSESSMENTS, VENIPUNCTURE, SAMPLE COLLECTION.....	16
5.5 TRANSLOCATION	17
5.6 QUARANTINE FACILITIES.....	19
5.7 CLEARANCE SURVEYS	19
5.8 POST-CLEARANCE TRANSLOCATION PROCEDURES	21
6.0 MONITORING, ADAPTIVE MANAGEMENT, AND REPORTING	21
6.1 SHORT TERM (≤12 MONTH) MONITORING.....	21

6.2 LONG TERM MONITORING	22
6.2.1 Direct Tracking.....	22
6.2.2 Mark-recapture.....	23
6.2.3 Health Assessments and Ultrasounds.....	23
6.3 ADAPTIVE MANAGEMENT	23
6.4 REPORTING	24
7.0 REFERENCES	26

1.0 INTRODUCTION

This translocation plan describes the methods for moving Mojave desert tortoises (*Gopherus agassizii*) from the development area of the proposed Eagle Shadow Mountain Solar Project (Project); also discussed are estimates of tortoise densities, health status; and details of proposed post-translocation monitoring, and reporting. All activities described in this translocation plan will be managed and overseen by the Applicant.

The area directly and indirectly affected by the development of the solar facility and translocation efforts totals approximately 9,312 acres in addition to the proposed gen-tie route and associated access roads (study area). The up to approximately 2,200-acre solar site would be developed as part of the Project. The remaining approximately 7,112 acres represent the Study Area Recipient Site which is immediately adjacent to the solar site. Tortoises from the solar site may be translocated into the Study Area Recipient Site and monitored post-translocation. All translocation activities described in this plan will be coordinated between the Proponent (and associated contractor(s)), the Moapa Band of Paiutes (Band), the Bureau of Indian Affairs (BIA), and Bureau of Land Management (BLM) as coordinating agencies/entities, and other appropriate agencies, such as U.S. Fish and Wildlife Service (USFWS).

1.1 DESCRIPTION OF PROJECT

The solar site would be located entirely on the Moapa River Indian Reservation (Reservation). Major onsite facilities include a 300MW AC solar field comprised of multiple blocks of photovoltaic (PV) solar panels mounted on single-axis tracking systems, associated inverter and transformer equipment, an electrical collection system, an energy storage system (ESS), a project substation, and operations and maintenance (O&M) facilities. The offsite facilities would include an approximately 12.5-mile single- or dual-circuit 230kV gen-tie located on the Reservation, BLM-administered lands, and private lands. Most of the gen-tie would be within a Federally-designated utility corridor on the Reservation. This line would require a right-of-way (ROW) width of 125 to 200 feet. Additional offsite facilities include an existing road that would provide access to the Project and existing and newly constructed access roads that would facilitate construction, operation, and maintenance of the gen-tie. Temporary facilities that would be removed at the end of construction include laydown and construction areas and water storage tanks also located on the Reservation. Power produced by the Project would be conveyed to the regional transmission system via the gen-tie interconnection to NV Energy's existing 230kV Reid Gardner Substation. **Figure 1** shows the project lease area and major components of the proposed project.

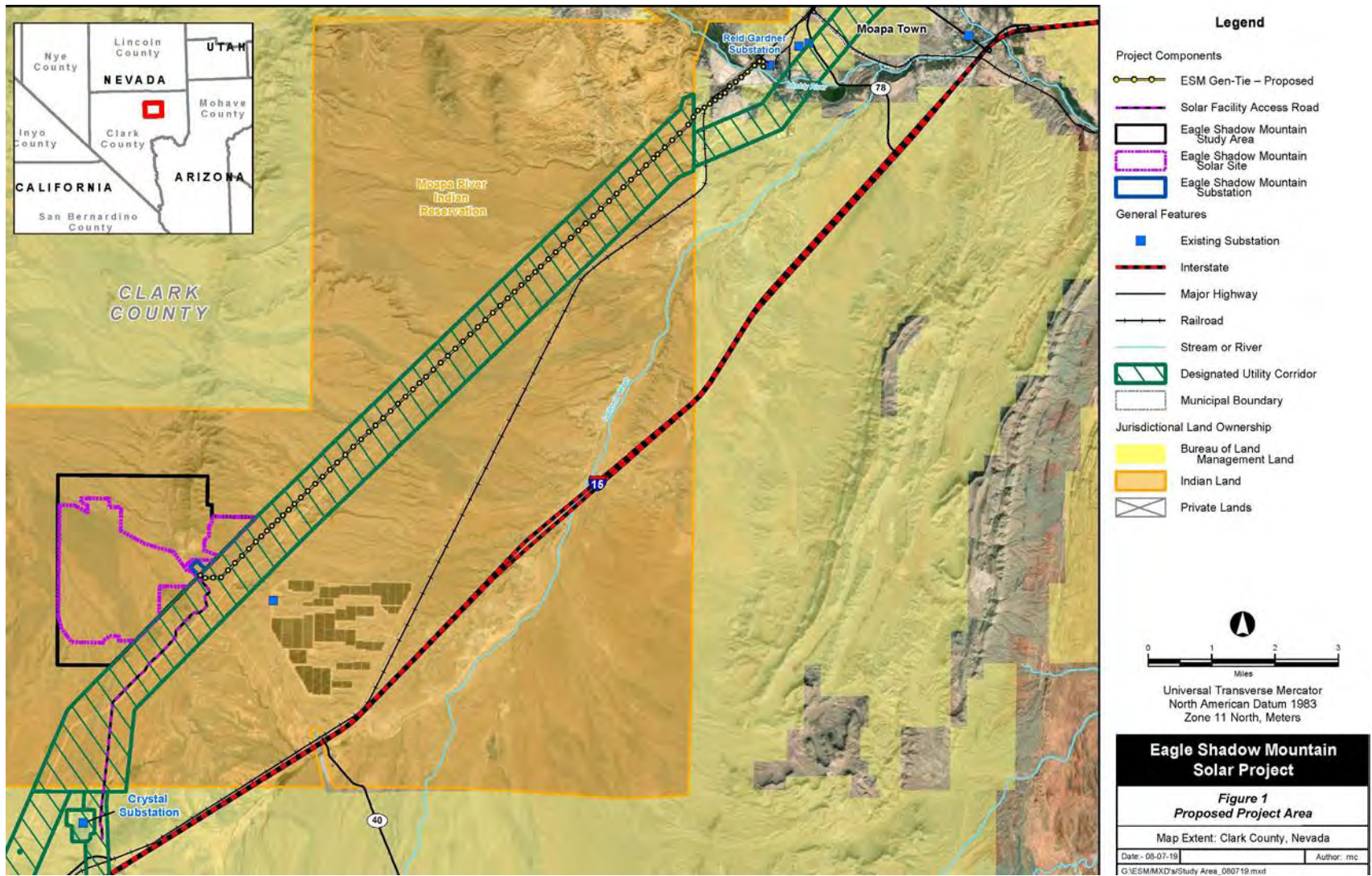


Figure 1. Proposed project area.

2.0 GOALS AND OBJECTIVES

The Project area (also called the solar site) is known to be occupied by the Mojave desert tortoise, a state and federally threatened species (USFWS 1990). To help minimize impacts to tortoise populations, need-based translocation to augment depleted populations has been identified as a key management strategy (USFWS 2011). Here, some tortoises discovered in the impact area will be directly translocated into nearby recipient areas (which also possess existing tortoise populations) and other tortoises will be moved to holding pens before releasing them back into the project area or translocating them to other suitable areas as determined in consultation with USFWS, following the completion of construction. The goal is to directly translocate only those tortoises that are found within approximately 500 meters of the fenceline and to temporarily pen and return to the project area those tortoises found within > approximately 500 meters of the fenceline. Tortoises found > approximately 500 meters from the fenceline may be translocated into nearby recipient locations on a case-by-case basis if determined appropriate through consultation with USFWS. In an effort to select recipient sites which meet the criteria of USFWS guidelines (USFWS 2018), as updated in coordination with USFWS, data on the habitat and tortoise densities within the Project areas and the surrounding recipient area was collected in Fall 2018 and Fall 2019.

The objectives of this translocation plan are to provide:

- 1 Estimates of tortoise population density within the Project site and recipient sites;
- 2 Detailed descriptions of pre-clearance, translocation/return, and post-translocation/return monitoring methods;
- 3 Methods to avoid and minimize stress, disturbance, and injuries to translocated/returned and resident tortoises; and,
- 4 Strategies for post-translocation/return monitoring and reporting to help maximize survivorship and evaluate the short-term effectiveness of translocation/return.

2.1 PLAN OVERVIEW

These steps are presented in the chronological order in which they have been or will be conducted and have been compiled from USFWS guidance (USFWS 2018), as updated in coordination with BLM, BIA, and USFWS.

Those tasks listed under Sections 3.0 and 4.0 were completed by the Proponent in fall 2018. The steps outlined in Sections 5.0 and 6.0 are planned to occur prior to and during construction of the project, and for post-translocation monitoring. Data collection and reporting are discussed under each section.

For purposes of this plan, the tortoise active season is defined as April 1 to May 31 and September 1 to October 31. All other times of the year are referred to as the less active season. “Known individuals” refers to any tortoise previously observed during the Fall 2019 project surveys or that will be subsequently identified opportunistically during pre-translocation monitoring within the Project area prior to the start of clearance activities. “Additional

individuals” refers to tortoises that may be identified during clearance surveys but were not previously recorded within the Project area. A total of 101 animals are currently translocated and considered “known tortoises”. Adult tortoises are animals ≥ 180 mm MCL, and juvenile tortoises are animals < 180 mm MCL.

The following timeline provides a general description of the sequence of events:

Fall of 2018

- Translocation of tortoise was determined necessary for the development of Project.
- Initial transect surveys were conducted within the project area and portions of proposed recipient site (defined as the area immediately outside the project area boundaries plus a 1.5 km buffer) to estimate tortoise densities. During this survey effort, no tortoises were marked or given health assessments. However, these surveys serve as the basis for all density estimates for both the solar site and the recipient site.

Fall 2019 - Spring 2020

- Surveys within the project area and receiver site to collect health assessment information about existing tortoise populations.
- Anticipated preparation of first Translocation Review Package (TRP) for first translocation event, which will include proposed disposition (UTMs plus a buffer), health assessment data, enzyme-linked immunosorbent assay (ELISA) results for the pathogens *Mycoplasma agassizii*, and *M. testudineum*, and quantitative polymerase chain-reaction (qPCR) results for *Mycoplasma agassizii*, *M. testudineum*, and testudinid herpesvirus 2., if available. Addenda for unknown adults located during clearance efforts including health assessment data and photographs will be submitted incidentally to BLM, BIA, and Desert Tortoise Recovery Office (DTRO) for approval.

Beyond 2020

- Continued monitoring of translocated tortoises or resurvey prior to translocation.
- Short-term and long-term monitoring will begin, following translocation, on a subset of tortoises. (Section 6.1)

3.0 PROJECT AREA, TORTOISE ESTIMATES, AND HEALTH

3.1 PROJECT AREA DESCRIPTION

The Project is located southwest of the Town of Moapa, in the Dry Lake Valley, which is within the southern portion of the Basin and Range province characterized by mountains interspersed with north-south trending valleys. Specifically, the Arrow Canyon Range to the west flanks this portion of the Dry Lake Valley and the North Muddy Mountains are to the east.

Mojave creosote bush scrub is the dominant vegetation community in the study area. This vegetation community is common throughout Clark County. This community typically is dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) with other associated species. Also, Sahara mustard (*Brassica tournefortii*), a plant species designated by the Nevada Department of Agriculture (NDA) as a Category B weed species, is likely found within the area or nearby. Category B species are defined by NDA as “weeds established in scattered populations in some counties of the state; actively excluded where possible, and actively eradicated from nursery stock dealer premises; control required by the state in areas where populations are not well established or previously unknown to occur.”

Vegetation within the proposed Project area previously has been mildly disturbed by various activities including off-highway vehicle recreation, flooding, and existing power line construction.

3.2 PROJECT AREA SURVEYS AND RESEARCH EFFORT

To assess the status of the desert tortoise in the proposed project area (and portions of the recipient site, see **Section 4.2**), field surveys were conducted. On September 10 through October 19, 2018, biologists experienced with the biota of southern Nevada and the Mojave Desert conducted pre-project tortoise surveys within the Project area in accordance with the 2018 USFWS protocol (USFWS 2018). Additional surveys were performed during the Fall of 2019 aimed at locating tortoises that will require translocation, and for collecting health information on residents in the recipient site. Animals located were affixed with radio transmitters; a total of 101 animals are currently being tracked between the solar site and the recipient site.

3.3 SOLAR SITE TORTOISE ESTIMATES

Data collected within the solar site during the fall 2018 survey was analyzed using the USFWS 2018 Protocol. Forty-four (44) live adult tortoises (38 within the solar site and 6 within the gen-tie) and six (6) juvenile tortoises were observed within the solar site and gen-tie ROW in the fall of 2018. The distribution of live tortoises is shown on **Figure 2**. Using USFWS tortoise abundance estimation methodology, the estimated number of tortoises within the solar site is approximately 79 (95% confidence interval: 35.7-176.1).

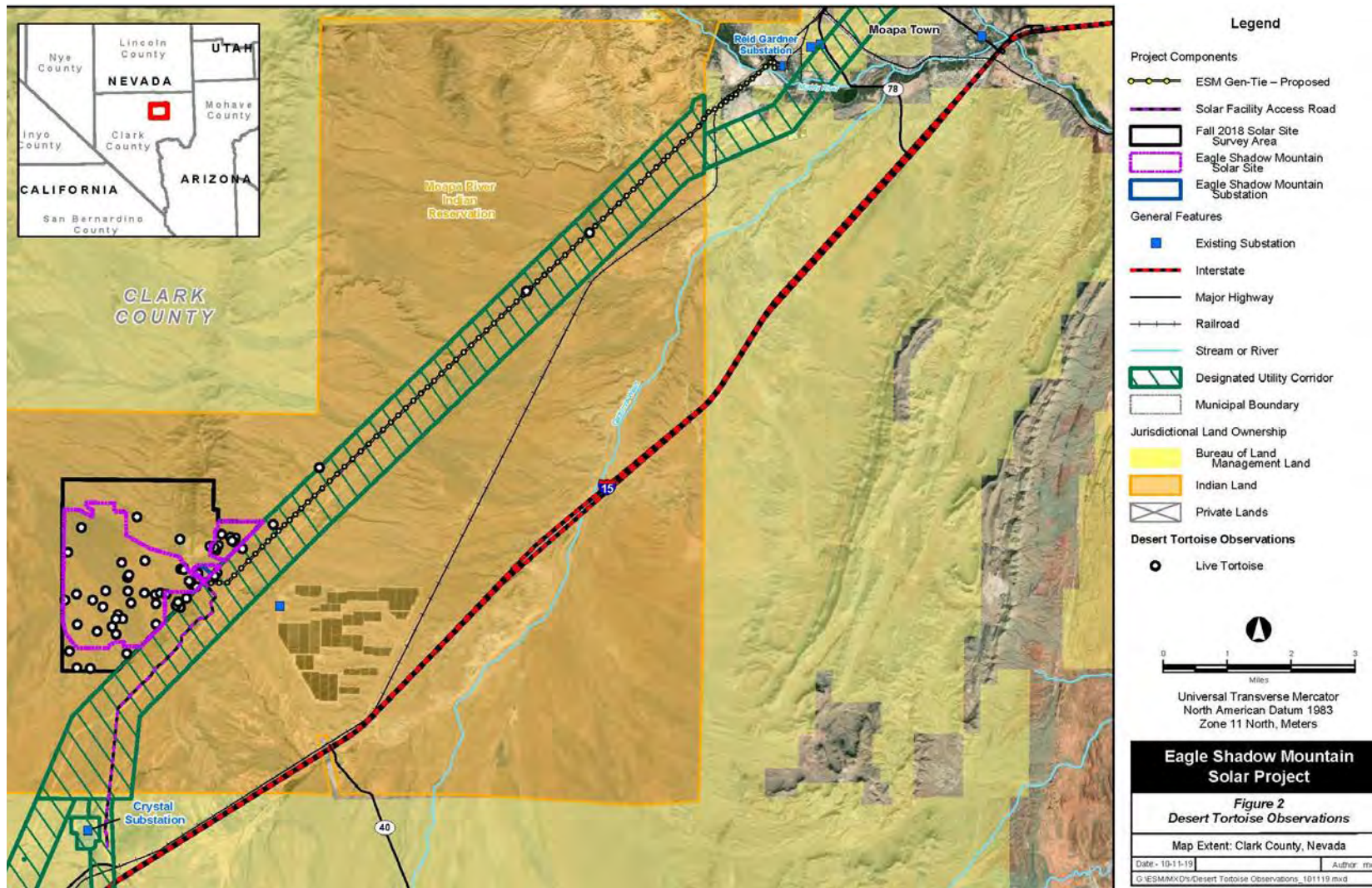


Figure 2. Desert tortoise observations.

4.0 RECIPIENT SITES

4.1 RECIPIENT SITE DESCRIPTION

The recipient site for this project is defined as a 1.5-km buffer around the set of potential release locations (which is, itself, defined as a 500 m buffer around the fenceline of the proposed solar site; See **Section 5.0**). Some areas within the 1.5-km buffer have been excluded due to the presence of barriers to tortoise movement and occupancy (e.g., steep terrain) or other factors (e.g., areas proposed by the tribe for future development). The recipient site exhibits similar topographic, hydrologic, and vegetative characters as the solar site. It is largely dominated by creosote bush – white bursage desert scrub. This community is typically dominated by creosote bush shrubs (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*), 0.5-1.5 meters tall, widely spaced, usually with bare ground between. Other common species in this community typically include boxthorn (*Lycium* sp.), hop sage (*Grayia spinosa*), desert trumpet flower (*Eriogonum inflatum*), and Arabian schismus (*Schismus arabicus*). Many species of ephemeral herbs may flower in late March and April if the winter rains are sufficient. This plant community is usually found on well drained secondary soils with very low water-holding capacity on slopes, fans, and valleys. Other, less numerous species of annuals appear following summer thundershowers. This creosote bush scrub is typical of the Mojave Desert.

As described below, tortoises located within approximately 500 meters of the outer boundary, or fenceline of the solar site would be translocated to the nearest area immediately adjacent to the solar site that is not proposed for development. Tortoises located within the interior of the solar site, greater than approximately 500 meters from the fenceline, would be penned, then either returned to the solar site, or translocated to another suitable area determined on a cases-by-case basis through consultation with USFWS, following construction (these tortoises would be kept in temporary holding pens during construction activities). Tortoises within the gen-tie corridor would be locally relocated out of harm's way (up to a maximum distance of approximately 300 m).

4.2 RECIPIENT SITE SURVEYS AND ASSESSMENT EFFORT

The northern and southwestern portions of the Recipient Site was surveyed as part of the desert tortoise survey described in **Section 3.2**. One-hundred-percent coverage surveys were conducted over the entire area following USFWS protocols (USFWS 2009, 2018). A survey designed to generate a subsample of tortoises and areas in the remainder of the Recipient Site was completed in Fall 2019. These surveys focused on capturing tortoises to perform health assessments on approximately 10 tortoises on the western and southeastern sides of the proposed project. Combining these results with previous survey information will provide a geographically complete picture of the health status of tortoise populations in all portions of the proposed Recipient Site.

Only 16 of the 101 tortoises assessed to-date have shown non-normal health results; eight (8) were located within the project area and 8 were within the recipient site. Of the 8 tortoises with non-normal results in the recipient area most (6) were located to the northeast of the project area. Health assessment results from sample collection (e.g., ELISA, qPCR, etc.) are not yet available, thus, health assessment results are based on visual inspection only. The full set of up to date

health assessment results as well as spatial coordinates are included in the Appendix.

4.3 RECIPIENT SITE DENSITY ESTIMATE

Surveys conducted in the northern portion of the Recipient Site documented 10 adult desert tortoises in 2018. The estimated number of tortoises within this portion of the recipient site (after accounting for non-detection of present individuals, per USFWS guidance; 2018) is approximately 20 (95% confidence interval: 7.2-54.7). This results in a pre-translocation density of the 1,870-acre northern Recipient Site of approximately 2.64 adult tortoises/sq. km (which is then extrapolated to be the approximate density in the larger approximately 7,112 acre total recipient site). The maximum recommended post-translocation density within the North Eastern Mojave Recovery Unit (NEMRU) is 6.1 adult tortoises/sq. km (USFWS 2018). The Project is expected to move approximately 79 tortoises. However, approximately $\frac{1}{4}$ of these may be returned to the interior of the project site following construction. The remaining approximately $\frac{3}{4}$ (~60 tortoises) of the tortoises would be moved to the nearest suitable site outside the proposed disturbance areas – a distance of less than 500 m. These translocations could result in a post translocation density of up to approximately 4.73 tortoises/sq. km². Additionally, given the short distance of these translocations, these tortoises would likely be moved a distance within the typical diameter of a tortoise home-range and would, therefore, not contribute substantially to increased densities in the recipient site. Furthermore, the majority of the solar site would not be graded during construction and existing vegetation would be crushed and/or trimmed; permanent fencing for the project would be permeable to desert tortoises and many relocated or translocated tortoises are expected to return to the project area following construction. Finally, while the density of tortoises in the portions of the recipient site to the west and southeast of the project has not been directly estimated, the northern portions of the Recipient Site show higher densities that appear to decrease to the south, suggesting that translocations to the west or southeast may have lower resultant post-translocation densities. For these reasons, the ultimate post-translocation density within the Recipient Site is expected to be substantially lower than 10.57 tortoises/sq. km and the proposed translocation procedures would largely preserve the existing spatial juxtaposition of tortoises in and around the Project site and recipient site.

Finally, the density targets for relocation areas were promulgated, in large part, to reduce the risk of increased disease transmission. Since tortoises would be moved very short distances during this Project, it is unlikely that individuals would experience disease transmission risks to which they are not already exposed.

If the total number of adult tortoises found during clearance surveys exceeds the project's translocation limit, as established by the project's Biological Opinion (BO), then the Proponent would be subject to any additional coordination, surveys, and assessment required as a result of BLM/BIA's re-initiation of Section 7 consultation with USFWS.

4.4 CONTROL SITE

The project proposes to use data from ongoing research efforts at the Coyote Springs ACEC as

² Recipient site areas = 7,112 acres = 28.78 sq. km.

of DT in recipient site = tortoise density \times area = 2.64 DT/sq. km \times 28.78 sq. km = 75.98 \approx 76

#of DT post-translocation = current population + translocations = 76 + 60 = 136

New recipient site density = # of DT post-translocation/area = 136/28.78 = 4.73

its control, or another control site that would be approved by the USFWS. Coordination with the U.S. Geological Survey, Western Ecological Research Center is ongoing to ensure that the timing and data collection are consistent with that described in **Section 6.2**.

4.5 REPORTING REQUIREMENTS DURING THIS PHASE (SECTIONS 3.0 AND 4.0)

The Proponent shall prepare TRPs for both known and unknown individuals prior to translocation, including a 14-day DTRO review period for known tortoises. Alternate timelines to be discussed with DTRO prior to translocation if weather and/or logistical considerations become a factor. Reporting requirements include:

- Reporting requirements for 10(a)(1)(a) research permit (to be terminated once the BO is issued).
- Reporting requirements for the BO, as applicable.
- Incidental reporting requirements for any injuries/mortalities.
- Report results of tortoise density estimates and health assessment results to BIA, BLM, and USFWS.

5.0 TRANSLOCATION/RELOCATION PROCEDURES

5.1 OVERVIEW OF TRANSLOCATION/RETURN PROCEDURES

This section provides details of the following steps for each translocation event (in chronological order):

- A. If the tortoise is discovered > approximately 500 meters from the project fence line, the individual will be moved to a temporary holding pen, located near the project and held during construction. Because vegetation would not be removed during construction (though would be crushed and/or trimmed) these tortoises may be returned to the interior of the completed solar project as close to their original capture site as possible. Penned tortoises may be translocated to a different area on a case-by-case basis as determined in consultation with USFWS. The Proponent and the Band/BIA/BLM will coordinate with DTRO to ensure that release sites do not conflict with prior or subsequent translocations and meet the needs of the long-term monitoring plan. Surveys of the project area will be conducted and will include health assessments which will contribute to the identification of specific Recipient sites.

If a tortoise is discovered < approximately 500 meters from the project fence line, the recipient site will be the nearest suitable location outside the project fence line.

- B. A Translocation Review Package (TRP; disposition plan) will be submitted for approval that includes all tortoises to be moved from the Project Site (both tortoises to be translocated and tortoises to be penned and potentially returned to the project interior; no TRP will be required for tortoises found along the gen-tie line as they would simply be moved from harm's way). Results from health assessments conducted prior to translocation will be used to develop the TRP (See Section 5.2), and a final review of the TRP for known individuals will occur prior to translocation. The TRP will also include dispositions for all unknown individuals, both adults and juveniles, and a final review of the TRP for unknown individuals will occur whenever possible, if timing allows.
- C. Passive exclusion of tortoises during project-specific fence construction (See Section 5.3).
- D. Health assessments, which include collection of samples via venipuncture and oral swabs, will occur prior to translocation for all tortoises that will be relocated back into the project area or translocated to the recipient site (Section 5.4).
- E. After health assessments and following approval of the final TRP, move individuals found greater than approximately 500 meters from the fence line into temporary holding pens and translocate known individuals that are located less than approximately 500 meters from the fence line from the project site(s), provided tortoises pass visual health assessment on day of translocation (Section 5.5).
- F. Conduct 100% clearance surveys per protocol within the Project site (Section 5.7).

- G. Subsequent TRP addenda (including health data and photographs) and translocation of additional individuals including juvenile tortoises, as discovered during project-specific clearance surveys. Subsequent translocation phases of the project would be conducted as per USFWS guidelines (USFWS 2018), as updated in coordination with USFWS, until all known tortoises are removed from the solar site.

Table 1 – Disposition activities for known and unknown individuals found within a Project Site.

Status	Initial Location	Weight (g)	MCL (mm)	Class	Mark	Transmitter	1 st Health Assessment (Venipuncture and sample collection, occurring within a year of translocation) ¹	2nd Health Assessment (Visual, 14 – 30 days prior to translocation) ¹	Final TRP Review	Final Health Assessment (Visual, immediately prior to translocation) ¹	Translocate/ Return	
Unknown	>500m from fence line	< 100		Hatchling	Yes	No	Yes (NO samples)	Yes (if timing allows)	Yes	Yes	Upon detection: Hold in temporary pens, return following construction.	
		≥ 100	< 180	Juvenile	Yes	Yes	Yes	Yes (if timing allows)	Yes	Yes	Upon detection: Hold in temporary pens, return following construction.	
		≥ 100	≥ 180	Adult ^{2,3}	Yes	Yes	Yes ²	Yes (if timing allows)	Yes ³	Yes	After TRP approval ⁴ : Hold in temporary pens, return following construction.	
	<500m from fence line	< 100		Hatchling	Yes	No	No	N/A	N/A	No	Yes	Upon detection: translocate
		≥ 100	< 180	Juvenile	Yes	Yes	Yes	N/A	N/A	Yes	Yes	After TRP approval: Translocate
		≥ 100	≥ 180	Adult ^{2,3}	Yes	Yes	Yes	No	No	Yes	Yes	After TRP approval: Translocate

Status	Initial Location	Weight (g)	MCL (mm)	Class	Mark	Transmitter	1 st Health Assessment (Venipuncture and sample collection, occurring within a year of translocation) ¹	2 nd Health Assessment (Visual, 14 – 30 days prior to translocation) ¹	Final TRP Review	Final Health Assessment (Visual, immediately prior to translocation) ¹	Translocate/ Return
Known	>500m from fence line	≥ 100	< 180	Juvenile	Yes	Yes	Yes	Yes	Yes	Yes	Upon detection: Hold in temporary pens, return following construction.
		≥ 100	≥ 180	Adult ^{2,3}	Yes	Yes	Yes ²	Yes	Yes ³	Yes	After TRP approval ⁴ : Hold in temporary pens, return following construction.
	<500m from fence line	≥ 100	< 180	Juvenile	Yes	Yes	Yes	Yes	Yes	Yes	After TRP approval: Translocate
		≥ 100	≥ 180	Adult ^{2,3}	Yes	Yes	Yes	Yes	Yes	Yes	After TRP approval: Translocate

¹The 1st, 2nd and final health assessments may occur concurrently; depending on size class and when in the process tortoises are located.

²For adult tortoises located during the winter months, venipuncture will occur in the next health assessment season, and agency consultation is needed prior to translocating an adult tortoise during the winter months.

³Unknown adults may be translocated prior to receiving ELISA results if the percentage of unknowns compared to the known population is low and acceptable to the DTRO. Coordination with the DTRO is necessary to translocate prior to ELISA results.

5.2 TRANSLOCATION REVIEW PACKAGE AND DISPOSITION PLAN

The Translocation Review Package and Disposition Plan for the project will provide an overview of tortoises' demographic information, health and disease status, and proposed disposition location. Each TRP submitted will require approval by the Band, BIA, BLM (on BLM lands only), and DTRO prior to tortoise translocation. Disease results <1-year old can be used in the TRP (disposition plan) for initial planning purposes. Each TRP will include dispositions for all known individuals to be moved in the subsequent season (including tortoises located >500 m from the fenceline that would be penned), nests, eggs, juvenile tortoises, and a number of unknown adult tortoises, and will be submitted for agency review and approval 14 days prior to translocation.

TRPs will be coordinated with the Band, BIA, BLM (where applicable), and USFWS to determine the best disposition planning and will consider the construction schedule to determine the best disposition of tortoises prior to translocation. Criteria identified below will inform and help determine specific locations for translocation. Maps with GIS layers will be the primary tool used to assemble the data and identify translocation localities for each group or individual.

Close coordination with DTRO is needed if less than 2 weeks TRP review time is necessary. Any potential exceptions or deviations to the plan due to weather or other logistics must be discussed with DTRO to determine acceptable translocation timing.

The Proponent, the Band, BIA, and BLM will coordinate with DTRO to ensure associated release sites meet the needs of the long-term monitoring plan.

TRP/disposition planning will identify the following information requested in the Draft Translocation Guidance (USFWS 2019) for each adult known individual to be translocated:

- Disposition plan (see Appendix H in USFWS 2019 or more recent) for the project-site tortoises and health summary of resident and control tortoises;
- Complete survey data from the project, recipient, and control sites;
- Photographs of individual tortoises as specified on the health assessment data sheet;
- Health assessment data sheets for resident, control, and project-site tortoises, if not submitted previously;
- Maps of the recipient site, showing proposed release points of project-site tortoises;
- Maps of the project site (including all project phases and all relevant digital GIS layers), illustrating distribution and health status of project-site tortoises and proposed release sites of tortoises to be moved < 500 m (if applicable); and
- Any other project-specific information that supports or clarifies translocation decisions.

5.2.1 Social Groups and Spatial Relationships

Tortoises are known to have social hierarchies within populations. Using up-to-date information at the time of each project translocation event, tortoises with nearby home ranges will be presumed to be a cohort and will preferentially be translocated in a manner which seeks to maintain some degree of social connectivity, when consistent with the goals of the USFWS long term monitoring plan. To the extent feasible, known social groups and spatial relationships will be mimicked in the final disposition plan.

5.2.2 Shelter Site Type and Availability

When determining a release location for an individual tortoise, release site preference will be to find a like-for-like shelter resource. Every attempt will be made to find similar cover sites and

habitat to that at the location of each individual on a Project site, otherwise all translocatees shall be released at the most appropriate and available unoccupied shelter sites (e.g., soil burrows, caliche caves, rock caves, in shade at base of shrubs, etc.). Because of the impermanent nature of soil burrows and cave availability, prior to submitting the final Disposition Plan and determining exact areas of release, potential release sites will be re-investigated for existing burrows and caliche or rock caves that can be used for shelter sites. Known active/inactive tortoise burrows discovered during the surveys would be re-investigated for this purpose.

5.2.3 Predator Sign Densities

While some predator sign is expected across any desert landscape, areas where sign is concentrated may indicate a poor choice for tortoise disposition planning. Fresh sign will be noted during ground-truthing for shelter sites, and the Disposition Plan will include translocation sites preferentially located away from known areas of concentrated predator sign, if any.

5.3 PASSIVE EXCLUSION DURING FENCE CONSTRUCTION

During the installation of temporary exclusion fencing, an attempt will be made to passively exclude known and/or additional individuals found during fence installation, from the Project site using the guidelines in **Table 3**. The location and boundary delineation of any such project fencing will be coordinated between the Proponent and the agencies.

Table 2 – Passive exclusion methods during fence construction.

Side of Fence Line	Season	Methods
Outside	All	Leave animal outside fence and construct fence.
>500m Inside Fence	Less active	Leave individual in burrow on Project until translocation (Section 5.5) in following active season. Translocation or passive exclusion of some individuals may be considered with agency consultation and approval.
<500m Inside Fence		Leave individual in burrow on Project until translocation (Section 5.5) in following active season. Relocation or passive exclusion of some individuals may be considered with agency consultation and approval.
>500m Inside Fence	Active	Translocate as discussed in Section 5.5
<500m Inside Fence		Attempt to passively exclude by creating and observing temporary gap(s) in fence line as well as temporary exclusion fencing preventing the tortoise from moving into the site interior. If the individual does not passively exit the project site, then translocate immediately outside of fence and monitor as discussed in Section 5.5. These individuals would still be marked and would undergo health assessments but no TRP would be prepared for passively excluded tortoises.

5.4 HEALTH ASSESSMENTS AND SAMPLE COLLECTION

Health assessments and sample collection will follow the most recent USFWS guidelines (USFWS 2019). At least one full health assessment with sample collection will be performed for all tortoises to be translocated. Samples will be collected via venipuncture and oral swab. In addition to standard enzyme-linked immunosorbent assay (ELISA) testing of plasma, oral swabs will be tested via quantitative polymerase chain reaction (qPCR) for *Mycoplasma agassizii*, *M. testudineum*, and testudinid herpesvirus 2. Samples and their results are valid for one year will be repeated if translocation is delayed.

All known tortoises from the project that had biological samples previously collected, will receive two visual health assessments (includes full physical examination including oral cavity) within 14 – 30 days prior to the translocation. Adult (≥ 180 mm MCL) unknown individuals from the project located incidentally or during clearance will be health assessed and translocated on a case-by-case basis in close coordination with DTRO (see Table 2).

Juvenile (< 180 mm MCL) tortoises discovered >500 meters from the project fence line will be given a full health assessment, including sample collection, where size/weight permit, prior to translocation. Any tortoise which does not pass the health algorithm (USFWS 2019, Appendix G) at the time of translocation (e.g. showing severe injury or severe clinical signs of disease) would not be translocated and their disposition discussed with USFWS (Section 5.6) and the applicable project proponent would begin coordination with the agencies as to that individual's final disposition.

Any biological samples not sent to laboratories for testing will be deposited with the University of California Los Angeles, along with fees to cover sample processing, as per USFWS (2019) guidance.

5.5 TRANSLOCATION

The first translocation phase of the Project will include known individuals from the Project site. Known tortoises will be translocated from the project site after health assessments and approval of final TRP, provided tortoises in the known cohort pass visual health assessment on the day of translocation (Section 5.4).

Translocation will follow installation of exclusionary tortoise fence, as determined in coordination with the agencies. Translocation events will occur to specific locations outlined in the approved project-specific TRP and Disposition Plan; The project will employ two strategies for moving tortoises, depending on the initial capture location of each animal.

- a. **Short-distance Translocation:** Tortoises found within approximately 500 meters of the solar facility fenceline would be translocated to areas immediately outside of the project's temporary exclusion fencing. Following the completion of construction, the exclusion fencing would be removed; the permanent site fencing would be permeable to desert tortoises and existing vegetation on the project site is expected to be crushed and or trimmed to facilitate construction and operation of the project. Therefore, the short-distance translocation strategy is designed to allow tortoises to freely move through, and potentially re-occupy, the site following construction.
- b. **Indirect Translocation or return to project site:** Tortoises found in the interior of the solar facility fenceline (> approximately 500 meters from the exclusion fence) would be moved to temporary pens for the duration of construction and may be returned to the solar facility interior (as close to original capture location as possible) as soon as construction activities are complete. Penned tortoises may be translocated to an alternate suitable location following construction, as determined on a case-by-case basis through Consultation with USFWS.

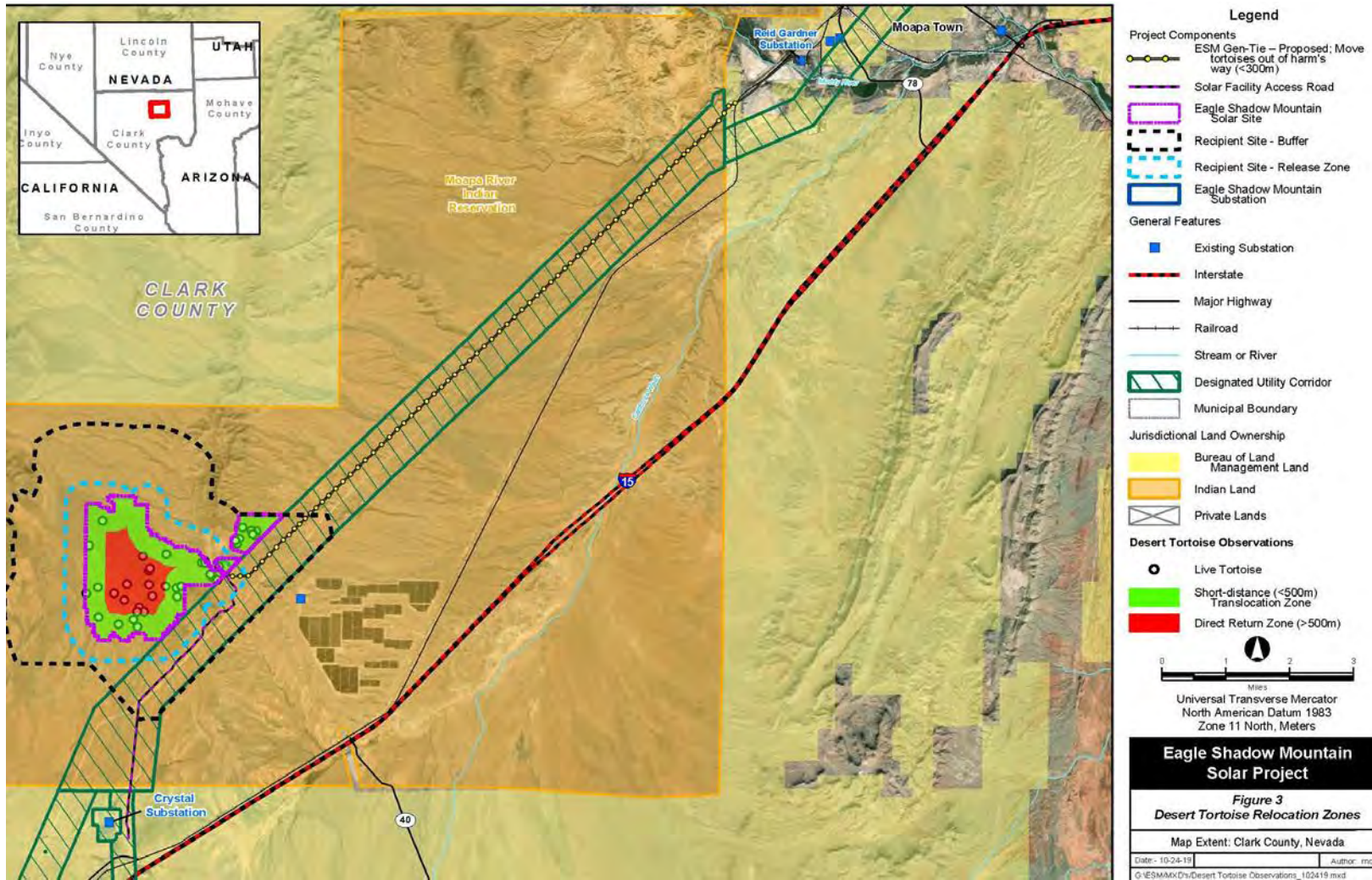


Figure 3. Desert tortoise recipient sites.

The density of tortoises within the Recipient site is variable. Preference will be given to translocating tortoises into areas as close to the initial capture location in an effort to keep them within their activity area (home range); other release locations may be considered as necessary (e.g. if timing of project development, exclusion fencing, or other reason precludes within-home range translocation). Specific considerations to be included will be based on the construction schedule and will determine the best disposition timing of tortoises at time of individual translocation events. Decisions related to performing health assessments, venipuncture and sample collection, transmittering, and translocation, of all individuals are outlined in Table 10.

5.6 QUARANTINE FACILITIES

Tortoises may be held *in-* or *ex-situ* (e.g. if temperatures do not allow for translocation, or if tortoises do not pass the health assessment) for a maximum of 12 months. Previously constructed and approved enclosure pens are present adjacent to the Project site and would be used if any quarantine is necessary. Quarantine would only be used as necessary (with the exception of those tortoises to be temporarily penned and released directly back into the project area), in coordination with USFWS.

Key elements of caring for penned desert tortoises will include:

- Ensuring each desert tortoise is housed individually to prevent potential disease transmission.
- To the extent feasible the sites where pens are constructed should have ample vegetation that is minimally disturbed during construction and appropriate soil for tortoises to dig their own burrows. Ideally, each pen would have ample vegetation such as creosote bush, yuccas, ephedra, and bursage to provide shade, and other plants like globe-mallow to serve as food sources.
- In pens where there is not sufficient native vegetation to nourish the animal, some produce (kale, collards, dandelion greens, etc.) may be used to supplement diet. Additionally, Mazuri Tortoise Diet 5M21 may also be considered if appropriate
- Water would be provided during the active season until the time they enter hibernation.
- Measures would be taken to reduce potential for contamination such as disinfecting footwear after leaving a pen.

More details about caring for penned tortoises are found in current USFWS guidance (USFWS 2018) which would be followed.

5.7 CLEARANCE SURVEYS

It is expected that the majority of adult tortoises occupying the Project area will be known individuals. Some of these individuals will likely be passively excluded during perimeter fencing activities, and the remainder of the known individuals will be moved during the project translocation event. This section assumes USFWS protocol clearance surveys would be conducted during the more active season (spring or fall). Under specific scenarios, clearance

might also be attempted during the less active season during appropriate temperature windows in coordination between the Proponents and the agencies.

Clearance surveys on the Project will be conducted after tortoise exclusion fencing is effectively installed on the site. Clearance surveys will be conducted in accordance with this plan, the Biological Opinion for the Project, and the *Desert Tortoise Field Manual* (USFWS 2009), or most current protocols.

The following conditions will apply:

- 1 Clearance surveys at the project site must consist of at least 2 consecutive surveys of the site. Surveys shall involve walking transects less than or equal to 5 meters wide under typical conditions. In areas of dense vegetation or when conditions limit the ability of the surveyors to locate desert tortoises, transects should be reduced in width accordingly. Clearance surveys should be conducted when desert tortoises are most active (April through May or September through October) but may be conducted during the less active season if necessary and in coordination with the USFWS. If desert tortoises are found during the second pass, the USFWS may require a third survey.
- 2 During the first pass, all sign (scat, carcasses, tracks, etc.) should be removed from the Project area. All burrows are recommended to be inspected and excavated during the first pass, including canid complexes, caliche caves, and tortoise burrows. Larger complexes that take longer/require equipment to excavate (and are not completely excavated on the first pass) are recommended to be fenced with temporary exclusion fencing in the event the burrow/den/complex is occupied by a tortoise.
- 3 All tortoise scat will be collected or crushed and tracks or mating rings brushed out during each pass of the clearance surveys to facilitate locating tortoises that may have been missed on previous passes. All carcasses will be documented by GPS.
- 4 Clearance surveys will be scheduled to occur in the best temperature window hours to the extent feasible to maximize the likelihood of finding active tortoises (e.g. when they are likely to be above ground). Guidelines recommend all clearance activities (capture, transport, release, etc.) shall occur when ambient temperatures are below 95 degrees F (35 degrees C) and not anticipated to rise above 95 degrees F (35 degrees C) before handling and processing desert tortoises are completed (USFWS 2009), and translocation guidance recommends releases should occur between April 1 – May 31, and September 1 – October 15. Translocation may be attempted outside the active season if necessary and in consultation with the USFWS. Further guidance states that translocations may occur when temperatures range from 18-30°C (65-85°F) and are not forecasted to exceed 32°C (90°F) within 3 hours of release or 35° (95°F) within 1 week of release. Additionally, forecasted daily low temperatures should not be cooler than 10° C (50°F) for one week post-release. (USFWS 2018). Exceptions to these temperature thresholds may be granted in coordination with USFWS.
- 5 When an additional (i.e., unknown) adult or juvenile individual is found during clearance surveys, it will be assigned a unique number and marking using paper tags per USFWS

(2015), transmitter applied, and given two health assessments prior to translocation (one full health assessment including sample collection prior to translocation plus a visual health assessment at time of translocation). Tortoises found > approximately 500 m from the project fence line may be moved to pens upon detection and while health assessments are ongoing. Final TRPs for additional (unknown) individuals will be reviewed by the agencies prior to translocation for these additional individuals, when timing allows.

5.8 POST-CLEARANCE TRANSLOCATION PROCEDURES

After final clearance is complete, there remains a possibility of finding tortoises within the project site, especially small tortoises <180 mm MCL. For tortoises that are <180 mm MCL and eligible to be translocated upon detection (Table 3), final disposition will be coordinated with USFWS (e.g., penning of other case-specific options may be considered). For tortoises that are \geq 180 mm MCL, translocation will occur after TRP approval is obtained.

6.0 MONITORING, ADAPTIVE MANAGEMENT, AND REPORTING

All activities related to translocation, compliance, and biological monitoring will be managed and overseen by the Project proponent and conducted in the field by qualified third-party firms providing Authorized Biologists and biological monitors as approved under the Project's BO and associated incidental take statement. Standardized data sheets and/or digital data recorders will be used to record individual tortoise locations, behavior, health indications, burrow locations, etc. during all monitoring activities. Post-translocation monitoring will include a short-term monitoring effort (one year) to monitor the translocated tortoises' immediate well-being, and a long-term monitoring program developed in coordination with the Band, USFWS and BIA (Section 6.1 and 6.2), outlined prior to translocation. All monitoring would be carried out within the Project area as well as the recipient site and a control site. Most monitoring protocols below refer to proportions (or all) of the translocated population – note that as these prescriptions apply to the recipient site and control sites, only a subset of tortoises would be used to provide sufficient comparison to the project area.

6.1 SHORT TERM (\leq 12 MONTH) MONITORING

For the short-term monitoring program, all translocated individuals described in this translocation plan would be monitored, by the Project Proponent, for a period of up to one year after each individual tortoise's first translocation date. Transmitters used for this project may include global positioning system (GPS) technology and/or traditional VHF radio telemetry. The goal will be to enable the collection of high-resolution movement data with minimal field effort and animal handling. The goal of this period of more intensive monitoring is to increase survivorship. A total of 20 translocated tortoises (selected using a stratified random design to include a balanced sex and age distribution) as well as tortoises returned to the project interior or translocated to another suitable site as determined on a case-by-case basis through consultation with USFWS, will be monitored for one-year post translocation: nominally at the frequency outlined below. The Proponent will coordinate with BIA and USFWS for any monitoring schedule which is reduced from this schedule and to which tortoises each proponent's monitoring plan applies.

Transmitters will be changed throughout the monitoring period, as necessary due to damage, to maintain battery life, etc. Any transmittered tortoises will be evaluated prior to discontinuing telemetry; individual tortoises may remain in the monitoring program on a case-by-case basis to ensure their well-being (i.e. tortoises consistently found on a fence line, not digging their own burrows, or showing a low body condition score).

At a minimum, translocated tortoises will be monitored as follows, as directed by the BIA and USFWS (noting that GPS based tracking, if utilized, would far exceed these tracking frequencies):

- Once within 24 hours of release,
- Once daily for two weeks after release,
- One time per week during active season (as defined by site-specific movement data),
- Once per week during the less active summer season and twice per month during less active winter season,
- The Proponent will coordinate with the agencies to discuss individual translocated tortoises that display behaviors that otherwise endanger their well-being. Actions may include more frequent monitoring of such individual(s) and/or actions to aid survival of the individual(s) tortoise.

One health assessment (with venipuncture and oral swabs) will be conducted post-translocation for all individuals during the first year, between May 15 – October 31 (tortoises released in the spring will be health assessed in the subsequent fall), as per guidelines (USFWS 2019) or by specific approval by USFWS. Any health problems or mortalities observed will be reported to USFWS according to the requirements of the Project BO, which shall also include as full an investigation as possible to determine cause. Fresh carcasses, after a full site investigation, will be recovered for necropsy as directed by the USFWS. Animals showing severe clinical signs of disease at any time will be reported by the respective proponent to the agencies for coordination of disposition.

6.2 LONG TERM MONITORING

Long-term monitoring would consist of three primary goals: 1) additional direct tracking of individual movements to assess re-occupation of the project area as well as environmental covariates potentially influencing tortoise movements; 2) mark-recapture occupancy surveys to assess densities of tortoises within the project area and estimate the proportion of those tortoises that were initially translocated from the project area; and 3) assessment of evidence of reproduction on the site.

6.2.1 Direct Tracking

Direct tracking would continue for a minimum of two years following translocation to determine space-use patterns of translocated desert tortoises. In the project area, this tracking program would include: 1) tortoises that were held in pens and directly relocated to the project site; and 2) approximately 20 of the tortoises translocated a short distance. In the recipient site and the control area a sufficient subset of available tortoises would be tracked for comparison to the project site.

This direct tracking would estimate the proportion of sampled tortoises that re-occupy the Project area in the short term, behavioral correlates of any such re-occupation (e.g., time to re-occupancy, home-ranging behaviors, etc.) and whether the release location influences the ultimate re-occupation or the dynamics of such re-occupation. Tortoises that have ceased to make substantial movements may be removed from the direct tracking program early. Similarly, a subset of tortoises may be retained for direct tracking in years 3-5, as determined necessary depending on the movement behaviors observed. Annual reports would be prepared for this portion of the long-term monitoring and would be submitted to the Band, BIA and USFWS. The Proponent would also collect environmental covariates of movement during years 1 and 2 (and any contingency years added as part of adaptive management) that will be used to assess the vegetative recovery of the project area and how such recovery influences the movement ecology of tortoises. A random or systematic sample of vegetative monitoring plots will be established within the project area. At each plot, biologists will assess: species composition (including the relative abundance of non-native species); structural metrics (e.g., shrub height, aerial cover of shrubs, herbs, grasses,); evidence of past or ongoing disturbance; and, shrub growth (using, e.g., stem elongation). Vegetative metrics that potentially relate to tortoise movement behaviors will be extrapolated to the larger environment using krigging and included as covariates in tortoise movement models (e.g., integrated step-selection analysis) to assess the degree to which these factors influence tortoise behavior.

6.2.2 Mark-recapture

Five (5) years following the completion of construction a one-hundred-percent coverage survey of the project area would be conducted using standard USFWS survey protocols. Individuals marked at the end of the tracking study would be noted so that a mark-recapture model (e.g. program MARK) could be used to assess demographic parameters associated with translocated individuals. Specific attention would be paid to the presence and abundance of juvenile tortoises, which indicate reproduction (See also **Section 6.2.3**). Additionally, these surveys would be able to estimate the proportion of tortoises re-occupying the Project area during O&M that were initially translocated or directly relocated to the project interior. Reports describing survey methods and results would be prepared following the survey and submitted to the Band, BIA and USFWS. Additional surveys may be required as described in **Section 6.3**.

6.2.3 Health Assessments and Ultrasounds

Health assessments of translocated tortoises would be performed in years 1, 2 and 5 following the completion of construction. These health assessments would be performed only on those tortoises enrolled in the tracking program in **Section 6.2.1**. Health assessment protocols will follow USFWS guidance (USFWS 2019). Any samples not used for tests would be archived, along with appropriate fees, with UCLA. In addition to standard health assessment protocols, ultrasound will be used to search for gravid females to be used as evidence of reproduction. Additional health assessments may be required under certain circumstances (**Section 6.3**).

6.3 ADAPTIVE MANAGEMENT

The Proponent will have ongoing coordination with the agencies throughout these efforts. Adaptive management strategies will be coordinated between the Proponent, their field staff, the Band, BIA and USFWS.

If there are valid concerns *in the field regarding immediate threat to one or more tortoises*, field staff will make adaptive management decisions in the best interest of the tortoise through 1) coordination in the field; 2) phone calls to agency personnel and the proponent designated representative made within 24 hours to describe the actions taken and results of the actions; and, 3) a brief email report from field staff that describes the adaptive management actions taken and reasons for and results of these actions.

If there are valid concerns *in the field that do not pose an immediate threat to one or more tortoises*, proponent's field staff and designated proponent management representative will notify the Band, BIA and USFWS of proposed adaptive management decisions via e-mail and field personnel will wait up to one week for concurrence or additional direction and response from agency personnel before actions are taken.

Additional tracking may be required if tortoises have not shown movements consistent with the establishment of home ranges. In such cases, direct tracking may be extended into years 3-5 for a subset of tortoises, as appropriate. Additional health assessments and ultrasounds may be required during years 3, 6, and/or 7 following construction if unanticipated circumstances arise (e.g., a spike in disease prevalence, complete lack of evidence of reproductive activity, etc.). Finally, an additional mark-recapture survey may be required in year 7 following construction if survival models show low juvenile recruitment, project-specific population declines, or other concerns. No monitoring will be required to extend past 7 years following construction. All decisions to implement additional monitoring will be made collaboratively between the Proponent, USFWS, BLM (when appropriate), BIA, and the Tribe.

6.4 REPORTING

Documentation of all activities will be compiled and data synthesized throughout the duration of translocation and monitoring. Data sheets used in the field will be developed in coordination with USFWS. Findings, data, and recommendations will be submitted by the Proponent to the USFWS and appropriate wildlife and/or permitting agencies as required in the project BO. Minimum data requirements will conform to the current translocation health assessment guidance. A quarterly report (via email) summarizing all activities (including a summary of handling, clearance, and translocation events, health and disease results, recommendations for improved management strategies; and post-release tracking vectors and associated data in the digital format using UTM coordinates and WGS 84 datum for all spatial components) shall be provided to the BIA and USFWS during the short term (12 month) monitoring effort. All injuries and mortalities discovered during monitoring will be reported to the Southern Nevada Fish and Wildlife Office and BIA by telephone (702-515-5230) or email, within 24 hours. The report must include the tortoise ID, date, time, location of the carcass (UTMs), a photograph, cause of death, if known, and any other pertinent information (e.g., sex, size, date and UTMs of last known live location). All activities will be recorded on standardized data sheets and/or on digital data recorders.

Following the completion of the long-term post-translocation monitoring period, a final report will be completed that will assess the overall success of the translocation and monitoring program. The final report will summarize the one-year post-translocation monitoring activities, and other compliance-related reporting as specified in the BO, and will discuss any observed

differences in individual behaviors; overall tracking of health assessments for each individual; and any adaptive management employed throughout the one-year monitoring period with an assessment of the success of each adaptive management strategy. Reporting timelines and report content will be coordinated with USFWS guidance to ensure appropriate content is included per permit requirements.

7.0 REFERENCES

- Boarman, W., Goodlett, T., Goodlett, G., Hamilton, P., 1998. Review of radio transmitter attachment techniques for turtle research and recommendations for improvement. *Herpetological Review* 29, 26 - 33.
- Bureau of Land Management and Ironwood Consulting Inc. Desert Tortoise Translocation Plan. Silver State South Project. January 7, 2013.
- Environmental Assessment DOI-BLM-NV-S010-2014-0126-EA December 2014, Dry Lake Solar Energy Center Project, ENVIRONMENTAL ASSESSMENT, File Number: N-93337APPLICANT93337APPLICANT, Nevada Power Company d/b/a NV Energy
- Environmental Assessment DOI-BLM-NV-S010-2015-0042-EA March 2015, Dry Lake Solar Energy Center at Harry Allen Project, ENVIRONMENTAL ASSESSMENT, File Number: N-93586, APPLICANT Nevada Power Company d/b/a NV Energy
- Environmental Assessment DOI-BLM-NV-S010-2014-0127-EA December 2014, Playa Solar Project (Dry Lake Solar Energy Zone Parcels 2, 3, & 4)
- Environmental Assessment DOI-BLM-NV-S010-2014-0125-EA December 2014, Harry Allen Solar Energy Center Project, ENVIRONMENTAL ASSESSMENT File Number: N-93321, APPLICANT Invenergy Solar Development, LLC
- Nussear, K.E., T.C. Esque, R.D. Inman, L. Gass, K.A. Thomas, C.S.A. Wallace, J.B. Blainey, D.M. Miller, and R.H. Webb. 2009. Modeling Habitat of the Desert Tortoise (*Gopherus agassizii*) in the Mojave and Parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona. U.S. Geological Survey Open-File Report 2009-1102. Reston, Virginia: U.S. Department of the Interior, U.S. Geological Survey.
- U.S. Fish and Wildlife Service (USFWS). 1990. Endangered and threatened wildlife and plants: Determination of threatened status for the Mojave population of the desert tortoise, ed. USFWS, Ventura, CA.
- USFWS. 2009. Desert Tortoise (Mojave Population) Field Manual: (*Gopherus agassizii*). Region 8, Sacramento, California.
- USFWS. 2010. Preparing For Any Action That May Occur Within The Range Of The Mojave Desert Tortoise (*Gopherus agassizii*). 18 pages.
- USFWS. 2011. Revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, Pacific Southwest Regions, Sacramento, California. 222 pp.
- USFWS. 2019. Health Assessment Procedures for the Mojave Desert Tortoise (*Gopherus agassizii*): A Handbook Pertinent to Translocation. Desert Tortoise Recovery Office. U.S. Fish and Wildlife Service, Reno, Nevada.
- USFWS. 2019. Draft Translocation of Mojave Desert Tortoises from Project Sites: Plan Development Guidance. Desert Tortoise Recovery Office, Reno, NV.

APPENDIX – CURRENT DESERT TORTOISE HEALTH ASSESSMENT RESULTS

TORTOISE ID	DATE OF ASSESSMENT	LATITUDE	LONGITUDE	HEALTH STATUS FROM VISUAL ASSESSMENT*
ESM 001	2019-09-11	36.54897	-114.79768	Normal
ESM 002	2019-09-11	36.54927	-114.78985	Normal
ESM 003	2019-09-12	36.5504	-114.79254	Normal
ESM 004	2019-09-14	36.52331	-114.82069	Normal
ESM 005	2019-09-22	36.5444	-114.8101	Normal
ESM 006	2019-09-16	36.52738	-114.83643	Normal
ESM 007	2019-09-16	36.52992	-114.83339	Normal
ESM 008	2019-09-16	36.5294	-114.82295	Normal
ESM 009	2019-09-17	36.52856	-114.83354	Normal
ESM 010	2019-09-17	36.53199	-114.8093	Normal
ESM 011	2019-09-17	36.53274	-114.80594	Normal
ESM 012	2019-09-17	36.53355	-114.8175	Normal
ESM 013	2019-09-18	36.53531	-114.8053	Normal
ESM 014	2019-09-18	36.53531	-114.80529	Normal
ESM 015	2019-09-18	36.53541	-114.8054	Normal
ESM 016	2019-09-18	36.53657	-114.81392	Normal
ESM 017	2019-09-19	36.53509	-114.81109	Normal
ESM 018	2019-09-19	36.53754	-114.81111	Normal
ESM 019	2019-09-19	36.53761	-114.80077	Normal
ESM 020	2019-09-19	36.53886	-114.80128	Normal
ESM 021	2019-09-20	36.53768	-114.81122	Weak, Both eyes closed, Whitish flaking, Skinny, BCS 3
ESM 022	2019-09-20	36.53963	-114.82058	Normal
ESM 023	2019-09-20	36.53964	-114.82063	Normal
ESM 024	2019-09-20	36.53534	-114.80505	Normal
ESM 025	2019-09-21	36.5419	-114.80273	Normal
ESM 026	2019-09-21	36.54192	-114.80273	Normal
ESM 027	2019-09-21	36.54119	-114.79862	Normal
ESM 028	2019-09-21	36.54122	-114.79856	Normal
ESM 029	2019-09-21	36.55338	-114.79383	Normal
ESM 030	2019-09-21	36.55452	-114.79659	Normal
ESM 031	2019-09-21	36.55457	-114.79658	Abnormal breathing, Sunken Eyes, BCS 3
ESM 032	2019-09-22	36.54573	-114.81244	Normal
ESM 033	2019-09-22	36.54539	-114.79608	Normal
ESM 034	2019-09-22	36.548	-114.78793	Normal
ESM 035	2019-09-23	36.52992	-114.83292	Normal
ESM 036	2019-09-23	36.54808	-114.81619	Normal
ESM 037	2019-09-24	36.55036	-114.80726	Normal
ESM 038	2019-09-24	36.55009	-114.80372	Normal
ESM 039	2019-09-25	36.55464	-114.82074	Normal
ESM 040	2019-09-26	36.55724	-114.83256	Normal

TORTOISE ID	DATE OF ASSESSMENT	LATITUDE	LONGITUDE	HEALTH STATUS FROM VISUAL ASSESSMENT*
ESM 041	2019-09-26	36.53676	-114.81177	Mucous Discharge Both Eyes
ESM 042	2019-09-27	36.55777	-114.80294	Right Naris Eroded, Left eye Mucous Discharge, Both Eyes Periocular Swelling
ESM 043	2019-09-27	36.56078	-114.80384	Normal
ESM 044	2019-09-27	36.56114	-114.80798	Both eyes sunken with periocular swelling
ESM 045	2019-09-27	36.56087	-114.80991	Normal
ESM 046	2019-09-29	36.55934	-114.83972	Normal
ESM 047	2019-09-29	36.55058	-114.83321	Normal
ESM 048	2019-10-05	36.51855	-114.82555	Normal
ESM 049	2019-10-06	36.52207	-114.80039	Normal
ESM 050	2019-10-06	36.53665	-114.78727	Normal
ESM 051	2019-10-06	36.51956	-114.8184	Normal
ESM 052	2019-10-07	36.55109	-114.77463	Normal
ESM 100	2019-09-11	36.54737	-114.79302	Normal
ESM 101	2019-09-11	36.54944	-114.79034	Abnormal breathing, Left eye periocular swelling, Right eye sunken
ESM 102	2019-09-12	36.55119	-114.78287	Normal
ESM 103	2019-09-12	36.55145	-114.79248	Normal
ESM 104	2019-09-12	36.54711	-114.79825	Left naris occluded and eroded, Right naris occluded, Left eye sunken
ESM 105	2019-09-13	36.52276	-114.83393	Normal
ESM 106	2019-09-13	36.52362	-114.83003	Normal
ESM 107	2019-09-14	36.52501	-114.82013	Normal
ESM 108	2019-09-15	36.52613	-114.82032	Normal
ESM 109	2019-09-15	36.52613	-114.82026	Normal
ESM 110	2019-09-15	36.52611	-114.82024	Left naris occluded, Left eye sunken with serous discharge
ESM 111	2019-09-16	36.5275	-114.8138	Left eye esunken with periocular swelling, Right naris occluded
ESM 112	2019-09-16	36.52775	-114.81367	Normal
ESM 113	2019-09-17	36.52857	-114.82489	Normal
ESM 114	2019-09-17	36.53181	-114.8224	Normal
ESM 115	2019-09-17	36.5318	-114.82239	Left eye serous discharge with conjunctival swelling, both eyes periocular swelling
ESM 116	2019-09-17	36.53352	-114.83315	Normal
ESM 117	2019-09-18	36.53502	-114.81168	Normal

TORTOISE ID	DATE OF ASSESSMENT	LATITUDE	LONGITUDE	HEALTH STATUS FROM VISUAL ASSESSMENT*
ESM 118	2019-09-18	36.53511	-114.8116	Normal
ESM 119	2019-09-18	36.53613	-114.83314	Normal
ESM 120	2019-09-18	36.53653	-114.82479	Normal
ESM 121	2019-09-19	36.53151	-114.83494	Normal
ESM 122	2019-09-19	36.53148	-114.83448	Normal
ESM 123	2019-09-19	36.53783	-114.83226	Left naris occluded, Left eye serous discharge
ESM 124	2019-09-19	36.53937	-114.82698	Normal
ESM 125	2019-09-19	36.5387	-114.8211	Normal
ESM 126	2019-09-20	36.53797	-114.81524	Normal
ESM 127	2019-09-20	36.53861	-114.82091	Normal
ESM 128	2019-09-20	36.5415	-114.82897	Normal
ESM 129	2019-09-21	36.54081	-114.8101	Both eyes partially closed with periocular swelling
ESM 130	2019-09-21	36.54084	-114.81008	Normal
ESM 131	2019-09-21	36.54231	-114.80636	Normal
ESM 132	2019-09-21	36.54231	-114.80635	Normal
ESM 133	2019-09-21	36.54345	-114.80929	Normal
ESM 134	2019-09-22	36.54498	-114.81562	Both eyes sunken with serous discharge, right eye has periocular swelling
ESM 135	2019-09-22	36.54498	-114.81561	Normal
ESM 136	2019-09-22	36.54346	-114.82109	Normal
ESM 137	2019-09-22	36.53668	-114.80549	Normal
ESM 138	2019-09-23	36.54636	-114.83254	Normal
ESM 139	2019-09-23	36.54778	-114.83683	Normal
ESM 140	2019-09-23	36.54781	-114.81754	Normal
ESM 141	2019-09-24	36.55201	-114.81625	Left eye fully closed with periocular swelling, Right eye partially closed with periocular swelling, Both naris eroded
ESM 142	2019-10-05	36.55179	-114.81431	Normal
ESM 143	2019-10-05	36.51132	-114.82555	Normal
ESM 144	2019-10-05	36.56219	-114.82722	Normal
ESM 145	2019-10-06	36.53025	-114.84423	Both eyes partially closed
ESM 146	2019-10-06	36.57216	-114.84281	Both eyes partially closed with periocular swelling
ESM 147	2019-10-07	36.54016	-114.84733	Normal
ESM 148	2019-10-07	36.55341	-114.85391	Normal

Appendix Q

Preliminary Hydrology Report

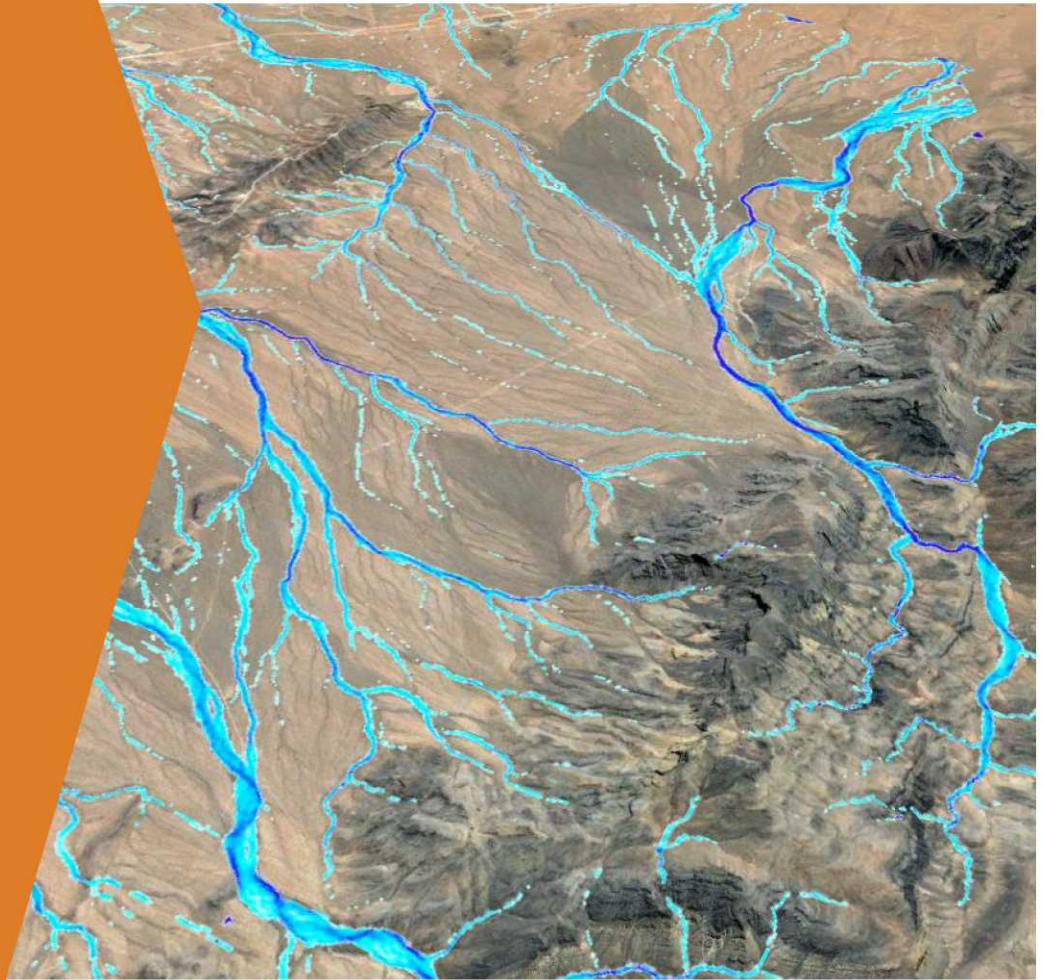
Appendix Q

Preliminary Hydrology Report

Westwood

Preliminary Hydrology Report
Eagle Shadow Mountain Solar

Clark County, Nevada
June 2018



Prepared For:



Preliminary Hydrology Report for
Eagle Shadow Mountain Solar

Prepared for:

8minutenergy
211 Sutter Street, 6th Floor
San Francisco, CA 94108

Prepared by:

Tom Miller
Westwood Professional Services
12701 Whitewater Drive, Suite 300
Minnetonka, MN 55343



Project Number: 0015607.00
Date: 06/07/2018

CONTENTS

List of Exhibits ii

List of Appendices..... ii

OVERVIEW 1

DATA SOURCES 2

OFFSITE HYDROLOGY 3

 FLO-2D..... 3

RESULTS AND DESIGN INFORMATION..... 3

NEXT STEPS 4

REFERENCES 5

EXHIBITS

- Exhibit 1: Location Map
- Exhibit 2: Base Hydrology Map
- Exhibit 3: Soils Map
- Exhibit 4: Landcover Map
- Exhibit 5: Curve Number Map
- Exhibit 6: 100-Year Max Water Depth Map
- Exhibit 6A: 100-Year Max Water Depth Project Area Map
- Exhibit 7: 100-Year Peak Velocity Map
- Exhibit 7A: 100-Year Peak Velocity Project Area Map
- Exhibit 8: 100-Year Scour Map

APPENDICES

- Appendix A: NOAA Atlas 14 Rainfall Data
- Appendix B: Curve Number Table

OVERVIEW

The purpose of the study is to describe the hydrology of the proposed Eagle Shadow Mountain Solar ("the project") and any impacts that the hydrology may play in the design of the solar array.

The preliminary project boundary encompasses approximately 9.47 square miles of land in Clark County, starting approximately 3 miles northwest of Crystal in Clark County, Nevada. (Exhibit 1) At the time of this report, the project consists of preliminary parcels although the layout is not finalized.

The project site is located on a steep to moderate slopes and generally slopes to the southeast. The modeled watershed area encompasses ~55 square miles. The project area has some mild slopes of around 1%-2% and some steeper slopes of 20%-30%.

FEMA has completed a study to determine flood hazard for the selected location, the project area is covered by panel 32003C1050E. The project area contains no mapped FEMA flood hazards (Exhibit 2).

The hydrologic modeling in this report was created using Flo-2D modeling software. Because of the complex and distributary nature of flow paths upstream and through the project site, FLO-2D hydrologic/hydraulic modeling software was utilized to determine flow depths and velocities throughout the site.

Overall, the analysis shows low water depths and velocities (Exhibits 6 and 7) across the majority of the site. During a 100 year storm the flood depths across the majority of the project area are less than 0.5 feet with velocities less than 1 foot/second. See Exhibits 6 and 7 for areas within the project with higher flood depths and velocities. Based on experience on other similar projects, the site is suitable for the planned development by avoiding areas of high flood depths and velocities.

DATA SOURCES

The models and methods for this project utilize a combination of public and private data as shown in Table 1.

Table 1: Data Sources

Data Type	Format	Source	Use
Elevation	5-Meter Digital Elevation Model (DEM)	Intermap Nextmap	Offsite & Onsite FLO-2D Model Elevations
Elevation	10-Meter DEM	USGS Data Gateway	Offsite FLO-2D Model Elevations
Crop Data	Shapefile	USDA 2013 Crop Data Layer	Landcover
Soils	Shapefile	USGS SSURGO Dataset	Curve Numbers
Precipitation	PDF File	NOAA Atlas 14	Design storms
HUC-12 Drainage Boundary	Shapefile	USGS	Define Model Extents
Site Boundary	KMZ	8minutenergy	Define Model Extents
2014 Aerial Photography	ArcGIS Map Service	USDA FSA	Reference

OFFSITE HYDROLOGY

The project area is located approximately 3 miles northwest of Crystal in Clark County, Nevada. The project site is located on steep to moderate slopes and generally slopes to the southeast and south. The modeled watershed area encompasses ~55 square miles. The project area has some mild slopes of around 1%-2% and also includes areas of steeper slopes of 20%-30% through portions of the project area. The potential hydrologic issues in this general landscape are flooding and erosive velocities.

Because of the complex and distributary nature of flow paths upstream and through the project site, a FLO-2D model with 50' grid cells was utilized to determine flow depths and velocities throughout the site.

FLO-2D

FLO-2D is a physical process model that routes rainfall runoff and flood hydrographs over flow surfaces or in channels using the dynamic wave approximation to the momentum equation. FLO-2D offers advantages over 1-D models and unit hydrograph methods by allowing for breakout flows and visualization of flows across a potential site. This is particularly useful on a distributed site that has complex flow regimes. The primary inputs are a DTM (elevation data), curve numbers and precipitation. No hydraulic structures were modeled (roads/berms are overtopped).

Precipitation data obtained NOAA Atlas 14 (Appendix A) for a 100-year, 24-hour rainfall is 2.88 inches for the modeled project watershed. By using the 100-year rainfall event allows for the best initial analysis in order to determine the worst areas of flooding and erosion.

Intermap Nextmap 5 meter elevation data was incorporated into the DTM using the export to xyz file function in Global Mapper for onsite and near-site model elevations and 10-m DEM USGS elevation data was incorporated into the DTM for offsite model elevations. These XYZ files are read directly into FLO-2D.

USDA-NRCS SSURGO soil data provides soil types within the project boundary and full coverage of the contributing watershed. Soils in the area are primarily classified as hydrologic group D in the watershed area and D soils in the project boundary (Exhibit 3). Land cover was obtained from the USDA 2013 Crop Data Layer. Exhibit 4 displays the Land Cover Classes for the entire watershed. Curve numbers were applied to each grid cell in the FLO-2D model based on intersecting the grid with the curve numbers (Exhibit 5).

RESULTS AND DESIGN INFORMATION

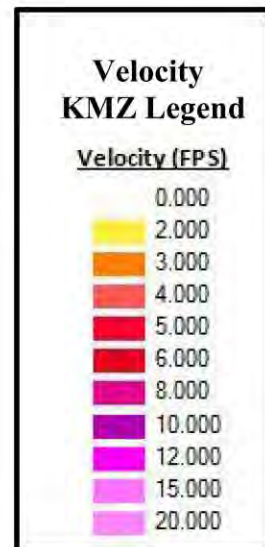
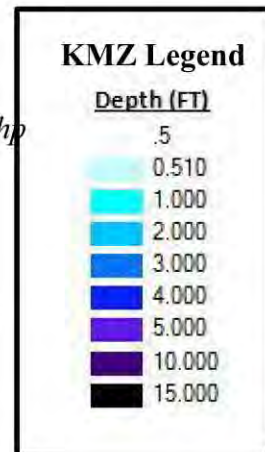
Overall, the analysis shows low water depths and velocities (Exhibits 6 and 7) across the majority of the site (with the exception of channelized areas). During a 100 year storm the flood depths across the majority of the project area are less than 0.5 feet with velocities less than 1 foot/second. See Exhibits 6A and 7A for areas within the project with higher flood depths and velocities. FEMA has completed a study to determine flood hazards, the project area contains no mapped flood zones, but this does not mean that there are no hydrologic risks on the site. Due to the slopes in the area there are areas of high flood depths during storm events creating areas of localized and channelized flooding. These flows have a depth >1'. These areas of the site should have the solar array located in these areas elevated above the ponded water or avoided. Also due to the areas of steeper landscape there is the possibility of erosion onsite near the channels located in portions of the project areas. Based on experience on other similar projects, the overall site is suitable for the planned development by avoiding areas of high flood depths.

NEXT STEPS

1. Final design should account for avoidance of the flood depths and velocities presented in Exhibits 6 and 7 to protect infrastructure.
2. Facilities to be elevated 1' above the 100-year peak flood elevation.

Included Output Files:

1. Shapefile of Flow Depth
2018-05-21_EagleMountain_Prelim_Flow_Depth_at_Cell.shp
 Attribute "ID" = Grid Cell Number
 Attribute "VAR" = Max Flow Depth (Feet)
2. KMZ of Flow Depth
2018-05-21_EagleMountain_Flow_Depth_Preliminary.kmz
 Overlay in Google Earth for graphical representation.
3. Shapefile of Velocity
2018-05-21_EagleMountain_Prelim_Velocity_at_Cell.shp
 Attribute "ID" = Grid Cell Number
 Attribute "VAR" = Velocity (FPS)
4. KMZ of Velocity
2018-05-21_EagleMountain_Velocity_Preliminary.kmz
 Overlay in Google Earth for graphical representation.



REFERENCES

National Engineering Handbook, Part 630 Hydrology. Chapter 9 Hydrologic Soil-Cover Complexes. USDA. NRCS. 210-VI-NEH, July 2004

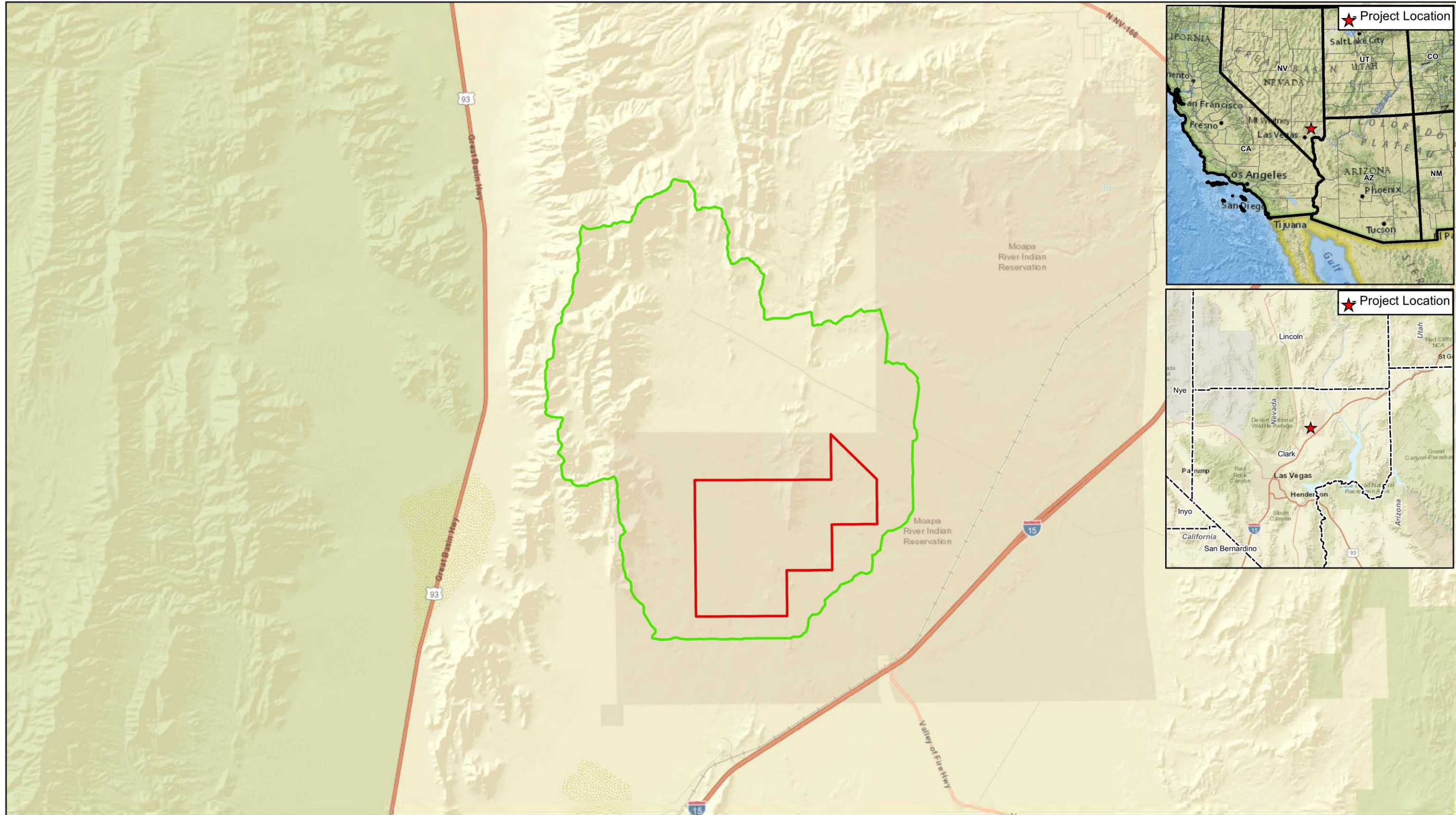
NOAA, & Service, N. W. AHPS Precipitation analysis. Retrieved May 2018, from <http://water.weather.gov/precip/download.php>

USGS. USGS water resources: About USGS water resources. Retrieved May 2018, from <https://water.usgs.gov/GIS/huc.html>

USDA 2013 Crop Data Layer, Landcover data, retrieved May 2018, from https://www.nass.usda.gov/Research_and_Science/Cropland/SARS1a.php



Exhibits



Data Source(s): Westwood (2018); ESRI WMS World Streets Basemap Imagery (Accessed 2018).

Legend

- Project Boundary
- FLO-2D Model Boundary
- County Boundary

Westwood

Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.



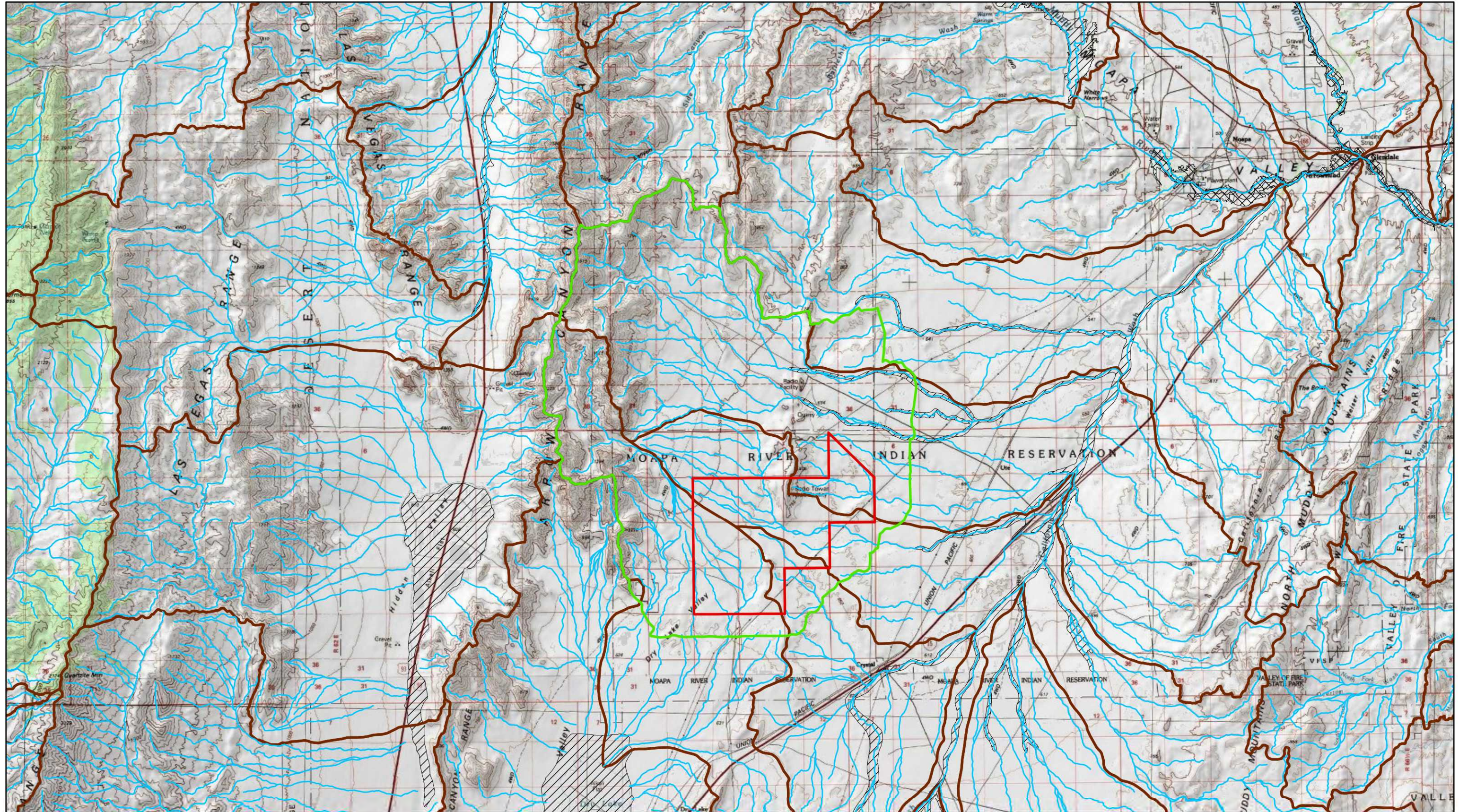
0 2 Miles

Eagle Shadow Mountain Solar

Clark County, Nevada

Exhibit 1: Location Map

June 07, 2018



Data Source(s): Westwood (2018); ESRI WMS World Streets Basemap Imagery (Accessed 2018).

Legend

- Project Boundary
- FLO-2D Model Boundary
- County Boundary
- HUC 12 Boundary
- FEMA Zone A
- FEMA Zone AE
- NHD Flowline

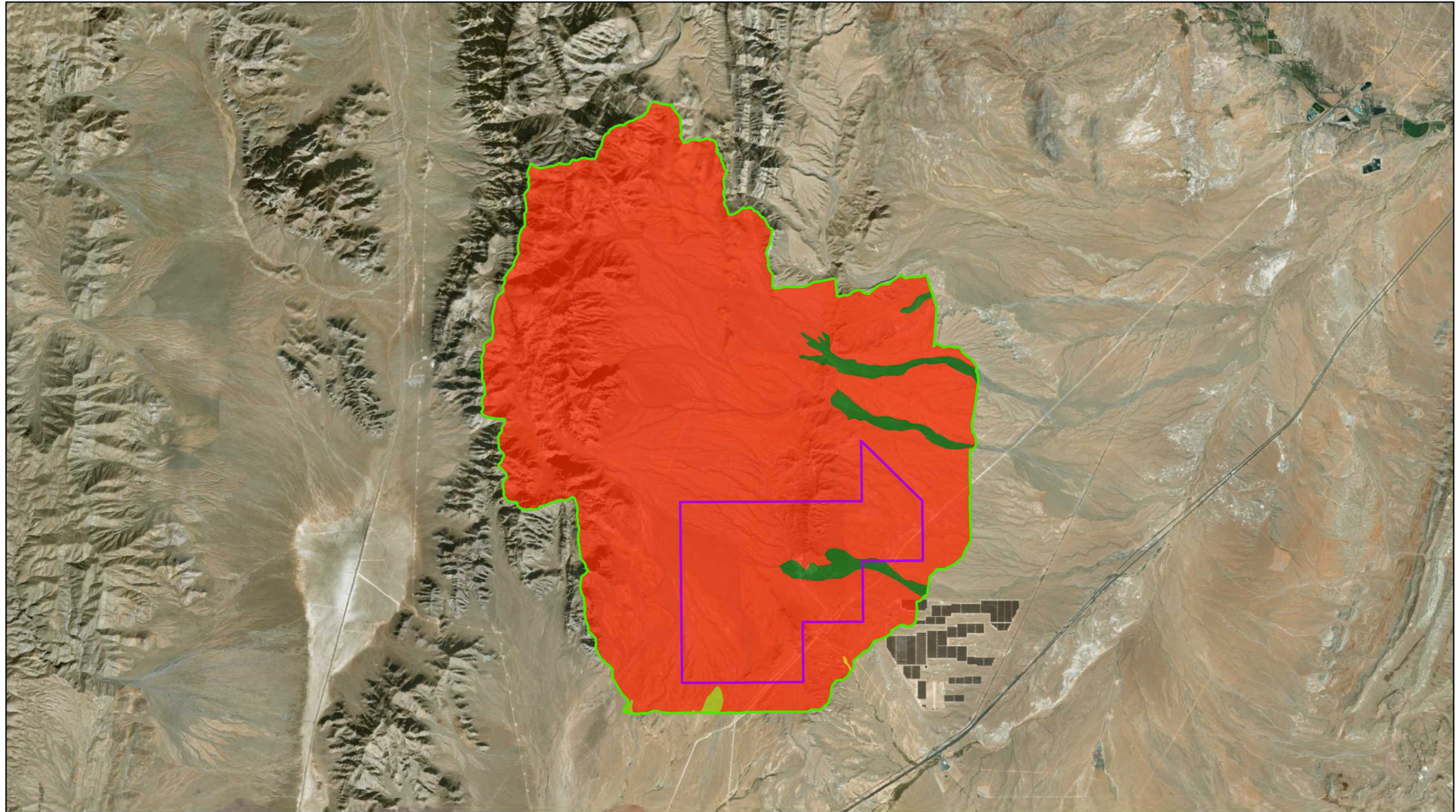
Eagle Shadow Mountain Solar

Clark County, Nevada

Exhibit 2: Base Map

June 07, 2018







Data Source(s): Westwood (2018); ESRI WMS World Streets Basemap Imagery (Accessed 2018).

Legend

 Project Boundary

 FLO-2D Model Boundary

 County Boundary

Hydrologic Soils Group

 A

 B

 C

 D

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.



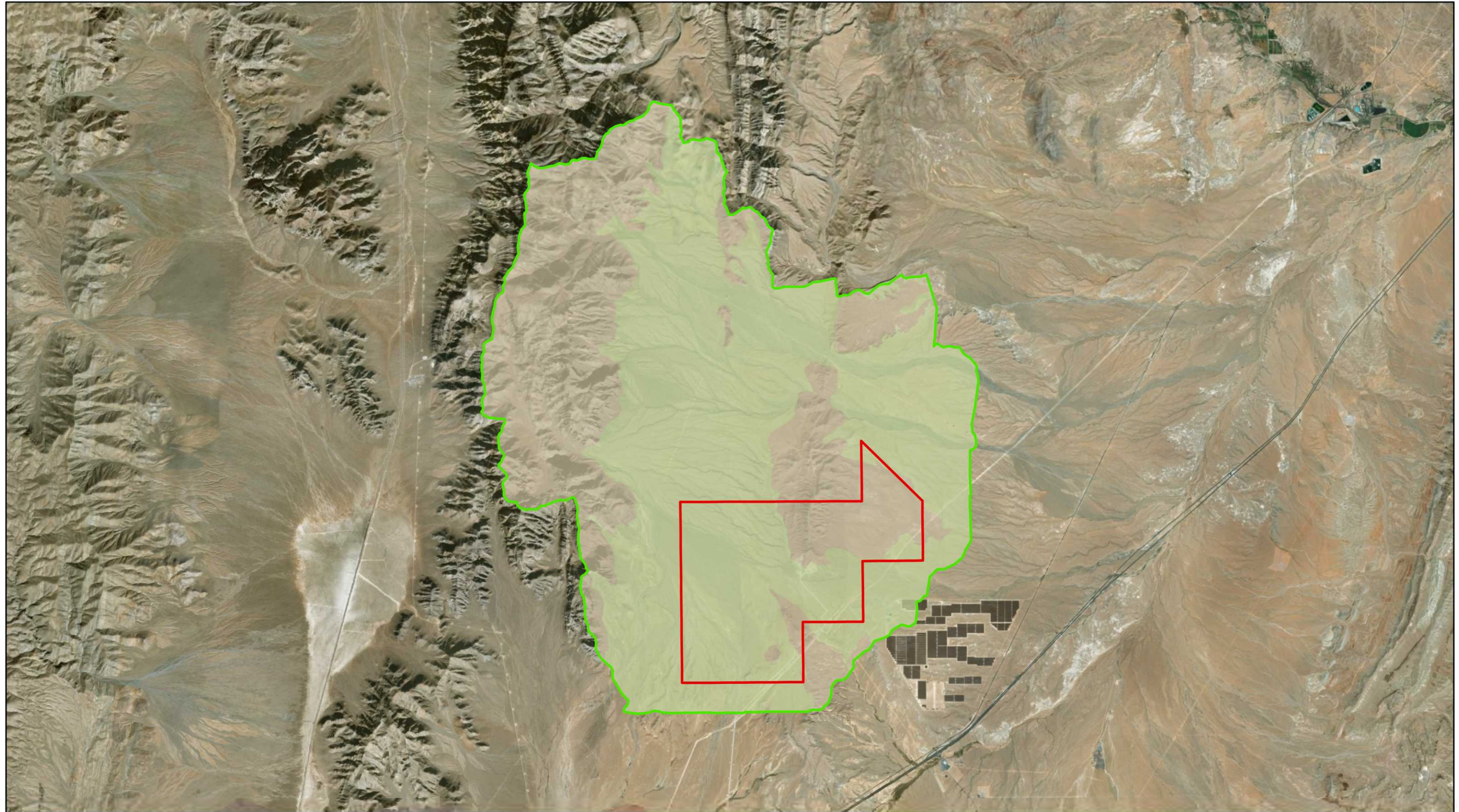
0 1.5 Miles

Eagle Shadow Mountain Solar

Clark County, Nevada

Exhibit 3: Soils Map

June 07, 2018



Data Source(s): Westwood (2018); ESRI WMS World Streets Basemap Imagery (Accessed 2018).

Legend

- | | | | | | |
|---|-----------------------|---|---|---|-----------|
|  | Project Boundary | Landcover |  | Developed | |
|  | FLO-2D Model Boundary |  | Barren |  | Shrubland |
|  | County Boundary | | | | |

Westwood

Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.



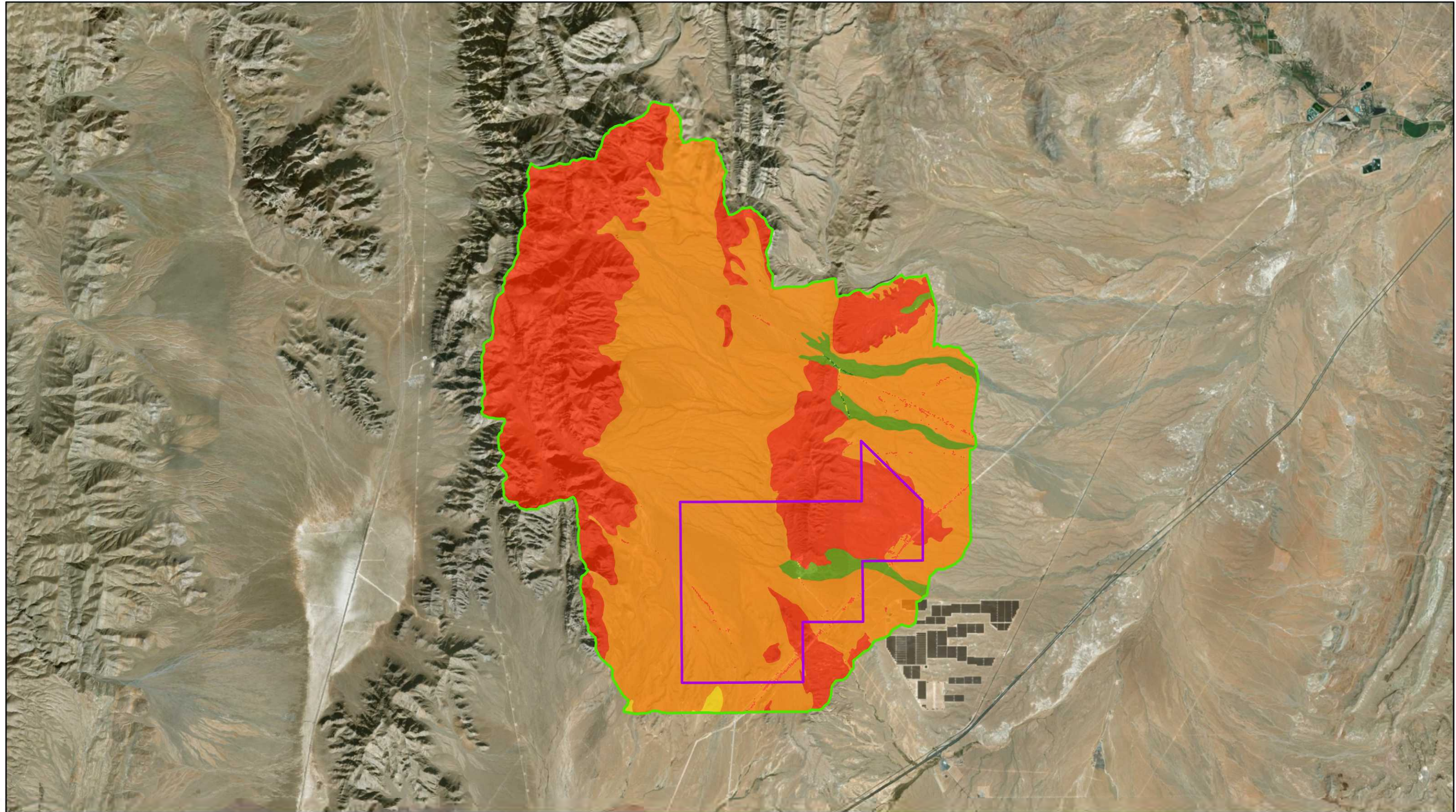
0 1.5 Miles

Eagle Shadow Mountain Solar

Clark County, Nevada










Exhibit 4: Landcover Map

June 07, 2018



Data Source(s): Westwood (2018); ESRI WMS World Streets Basemap Imagery (Accessed 2018).

Legend

-  Project Boundary
 -  FLO-2D Model Boundary
 -  County Boundary
- | Curve Number | |
|---|---------|
|  | 40 - 49 |
|  | 50 - 59 |
|  | 60 - 69 |
|  | 70 - 79 |
|  | 80 - 89 |
|  | 90 - 99 |

Westwood

Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

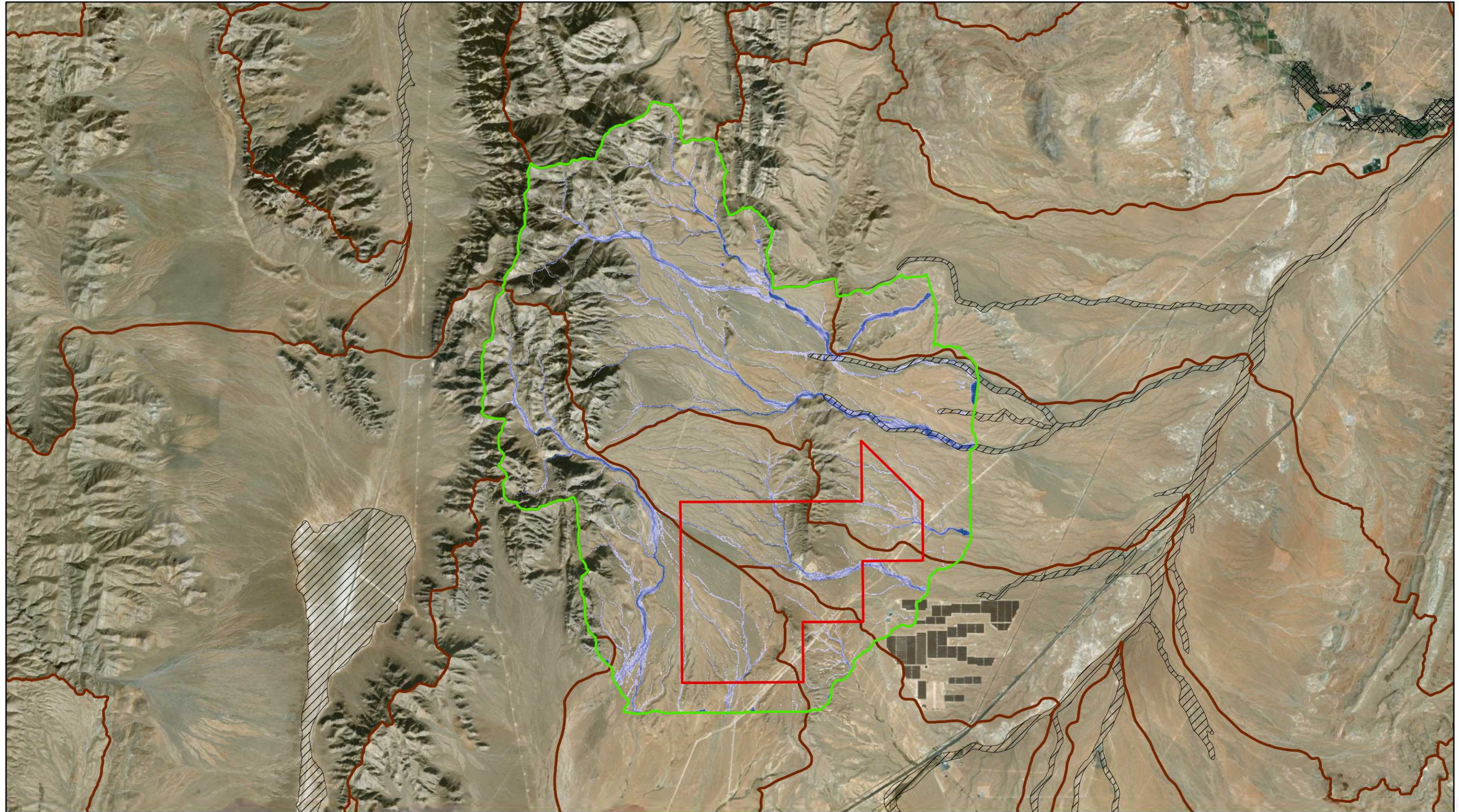


Eagle Shadow Mountain Solar

Clark County, Nevada

Exhibit 5: Curve Number Map

June 07, 2018



Data Source(s): Westwood (2018); ESRI WMS World Streets Basemap Imagery (Accessed 2018).

Legend

- Project Boundary
 - FLO-2D Model Boundary
 - County Boundary
 - HUC 12 Boundary
 - FEMA Zone A
 - FEMA Zone AE
- Peak Flow Depth (ft)**
- | | | | | | | | | | |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------|--|--|
| | | | | | | | | | |
| 0.50 - 1.00 | 1.01 - 1.50 | 1.51 - 2.00 | 2.01 - 2.50 | 2.51 - 3.00 | 3.01 - 4.00 | 4.01 - 6.00 | 6.01+ | | |



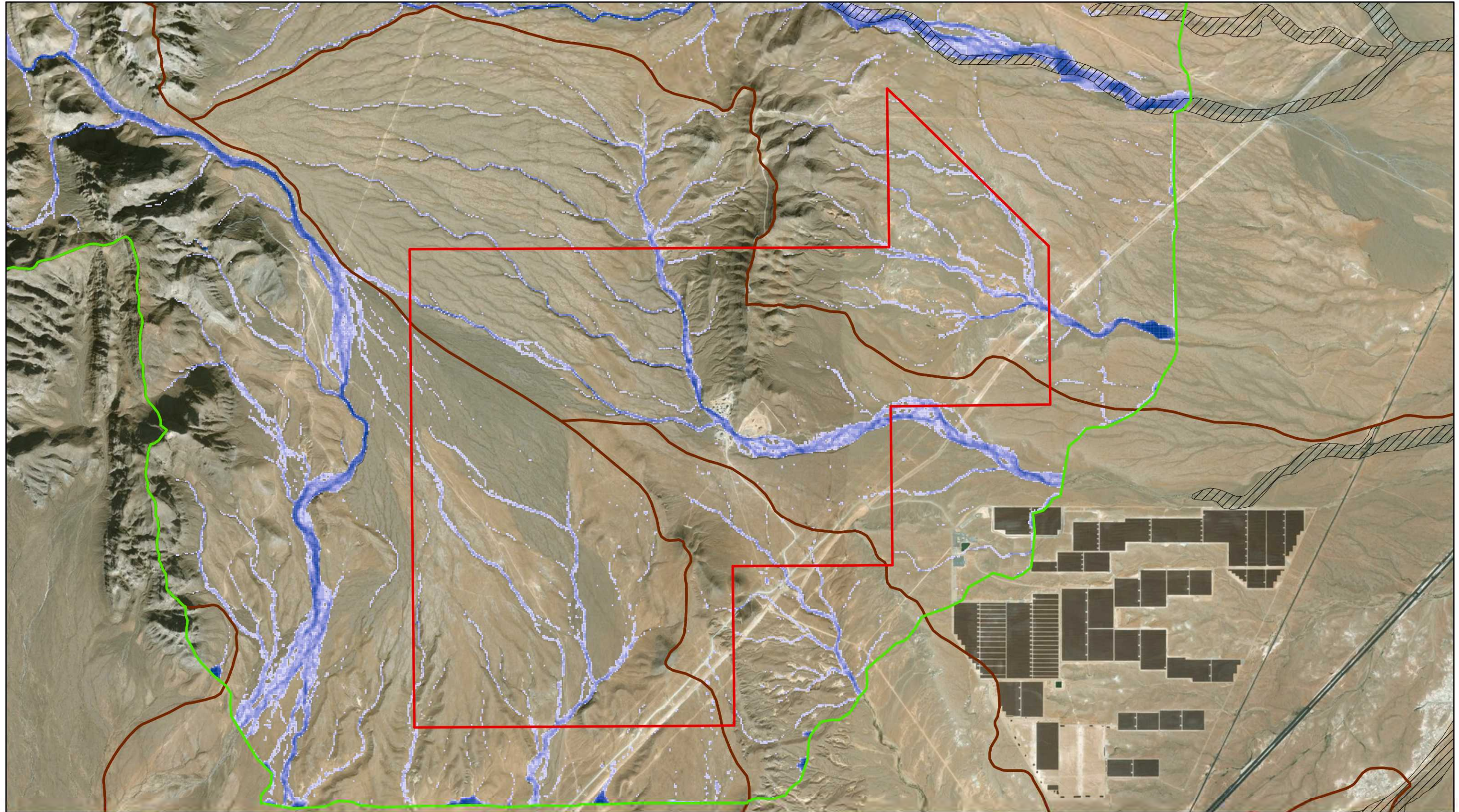
Eagle Shadow Mountain Solar
Clark County, Nevada



Exhibit 6: 100-Year Max Water Depth Map

June 07, 2018

Map Document: N:\0015607_00\GIS\Hydro_Exhibits\2018-05-21_EagleMountain_Exp_100YearMaxWaterDepthMap.mxd mshidreth 6/7/2018 8:24:54 AM

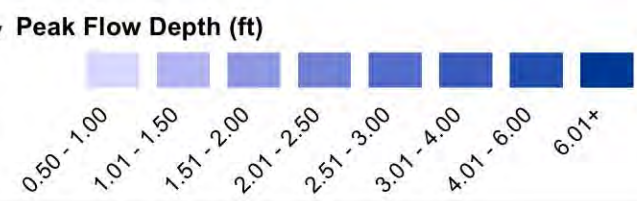


Data Source(s): Westwood (2018); ESRI WMS World Streets Basemap Imagery (Accessed 2018).

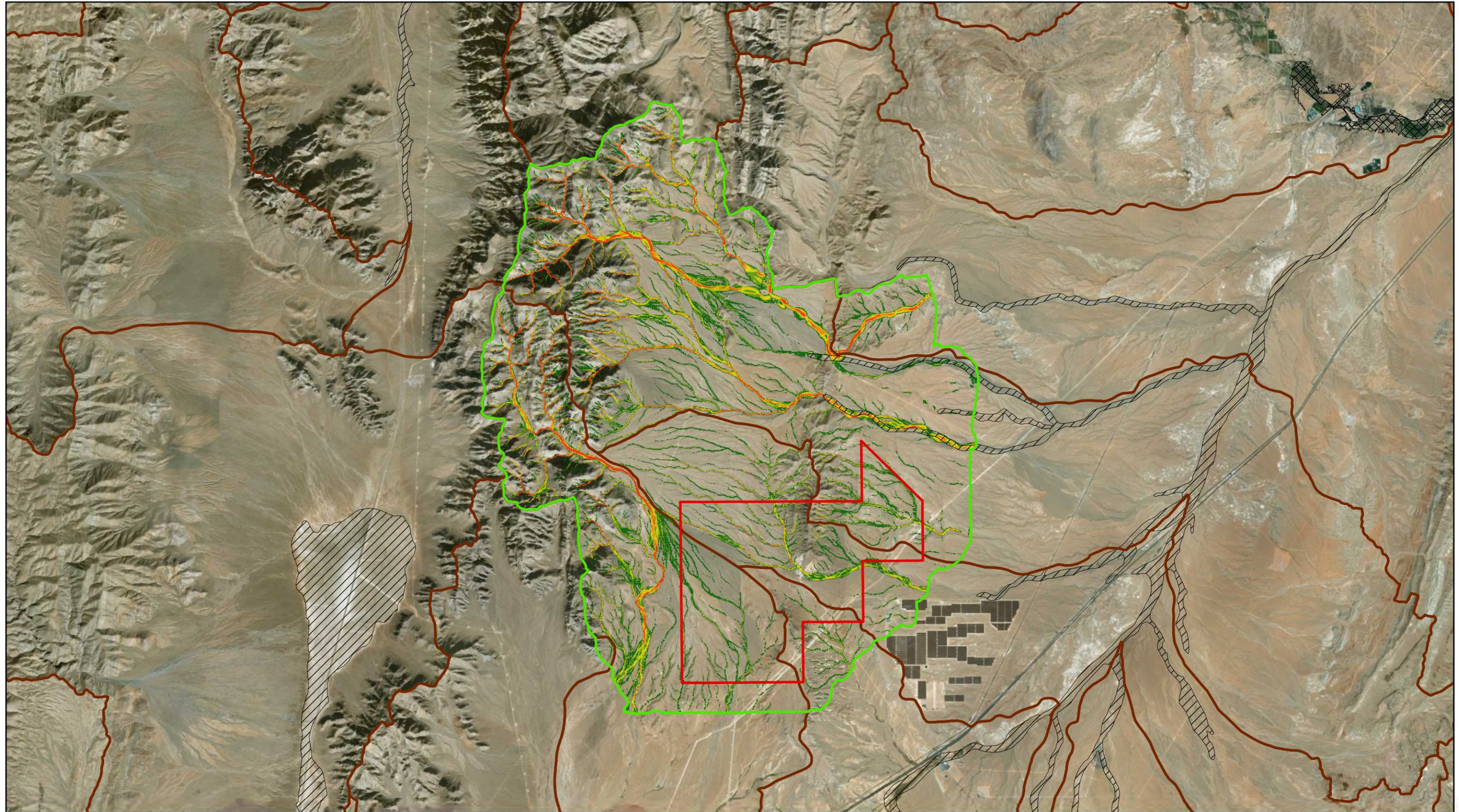
Legend

- Project Boundary
- FLO-2D Model Boundary
- County Boundary

- HUC 12 Boundary
- FEMA Zone A
- FEMA Zone AE



Eagle Shadow Mountain Solar
 Clark County, Nevada
 Exhibit 6A: 100-Year Max
 Water Depth Project Area Map
 June 07, 2018

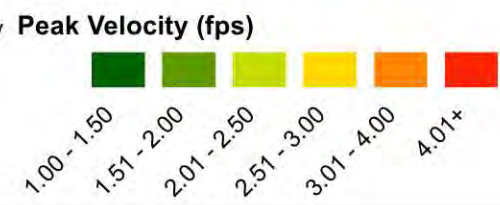


Data Source(s): Westwood (2018); ESRI WMS World Streets Basemap Imagery (Accessed 2018).

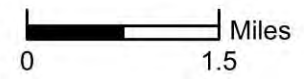
Legend

- Project Boundary
- FLO-2D Model Boundary
- County Boundary

- HUC 12 Boundary
- FEMA Zone A
- FEMA Zone AE



Westwood
 Toll Free (888) 937-5150 westwoodps.com
 Westwood Professional Services, Inc.

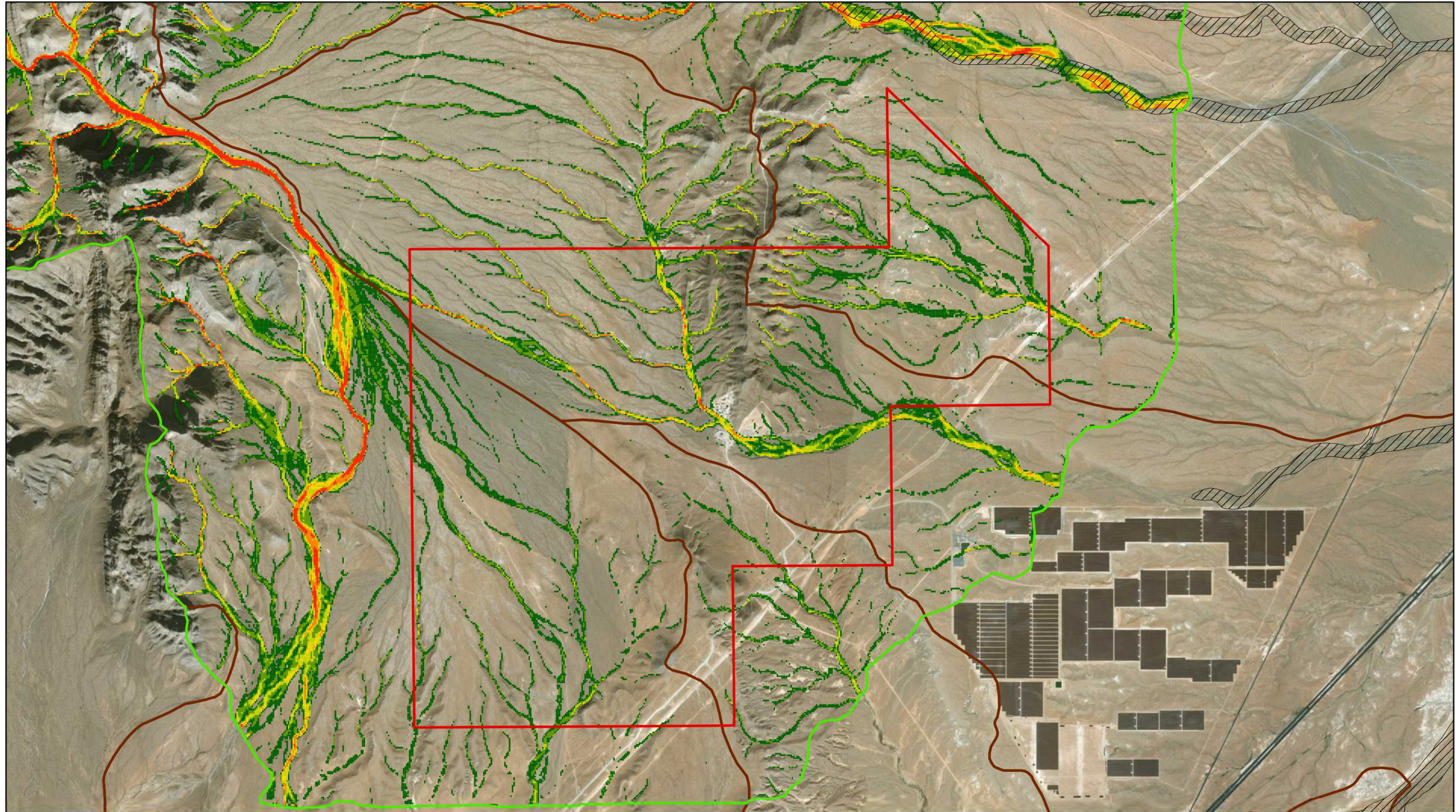


Eagle Shadow Mountain Solar
 Clark County, Nevada

Exhibit 7: 100-Year Peak Velocity Map

June 07, 2018

Map Document: N:\0015607_00\GIS\Hydro Exhibits\2018-05-21_EagleMountain_Ex7_100YearPeakVelocityMap.mxd mshldreth 6/7/2018 8:25:10 AM

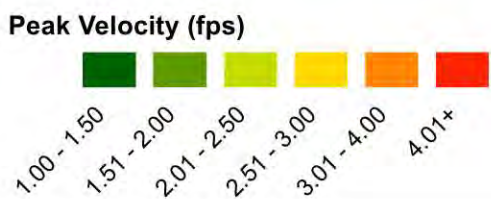


Data Source(s): Westwood (2018); ESRI WMS World Streets Basemap Imagery (Accessed 2018).

Legend

- Project Boundary
- FLO-2D Model Boundary
- County Boundary

- HUC 12 Boundary
- FEMA Zone A
- FEMA Zone AE



Eagle Shadow Mountain Solar

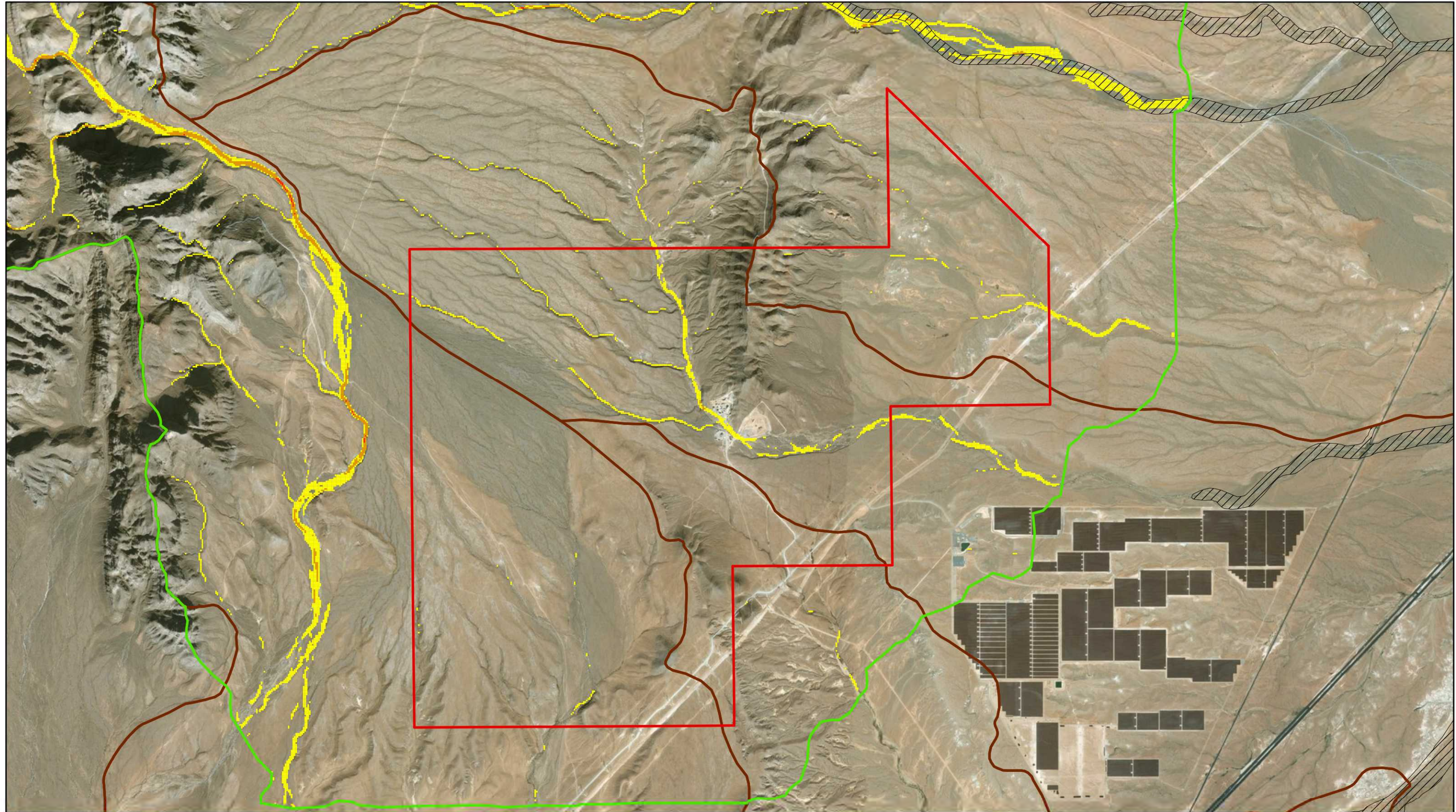
Clark County, Nevada

Exhibit 7A: 100-Year Peak Velocity Project Area Map

June 07, 2018



Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.



Data Source(s): Westwood (2018); ESRI WMS World Streets Basemap Imagery (Accessed 2018).

Legend

- | | | |
|-----------------------|-----------------|-------------------------|
| Project Boundary | HUC 12 Boundary | Scour Depth (ft) |
| FLO-2D Model Boundary | FEMA Zone A | 1.00 - 1.50 |
| County Boundary | FEMA Zone AE | 1.51 - 2.00 |
| | | 2.01+ |

Westwood
 Toll Free (888) 937-5150 westwoodps.com
 Westwood Professional Services, Inc.



Eagle Shadow Mountain Solar
 Clark County, Nevada

Exhibit 8: 100-Year Scour Map

June 07, 2018



Appendix A
NOAA Atlas 14 Rainfall Data



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitana, Deborah Martin,
 Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao,
 Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aeriels](#)

PF tabular

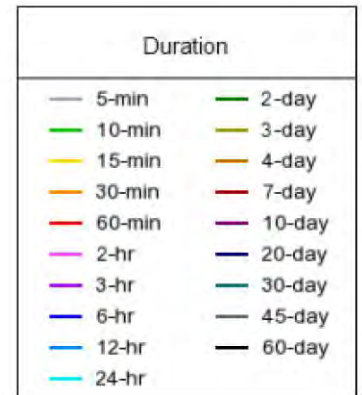
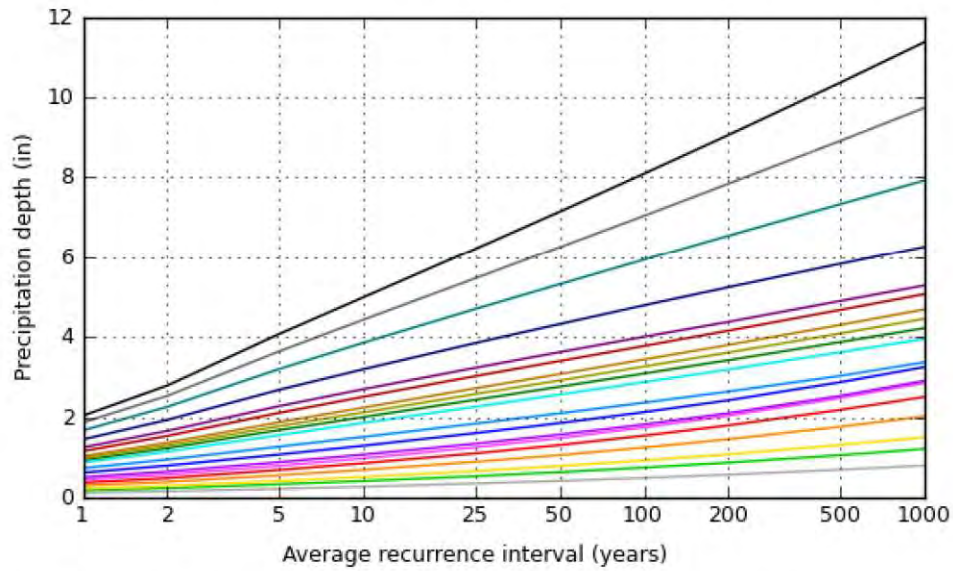
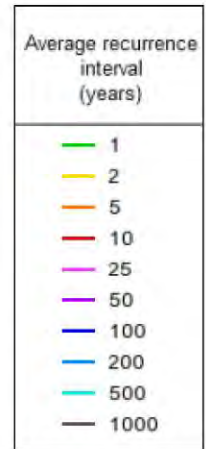
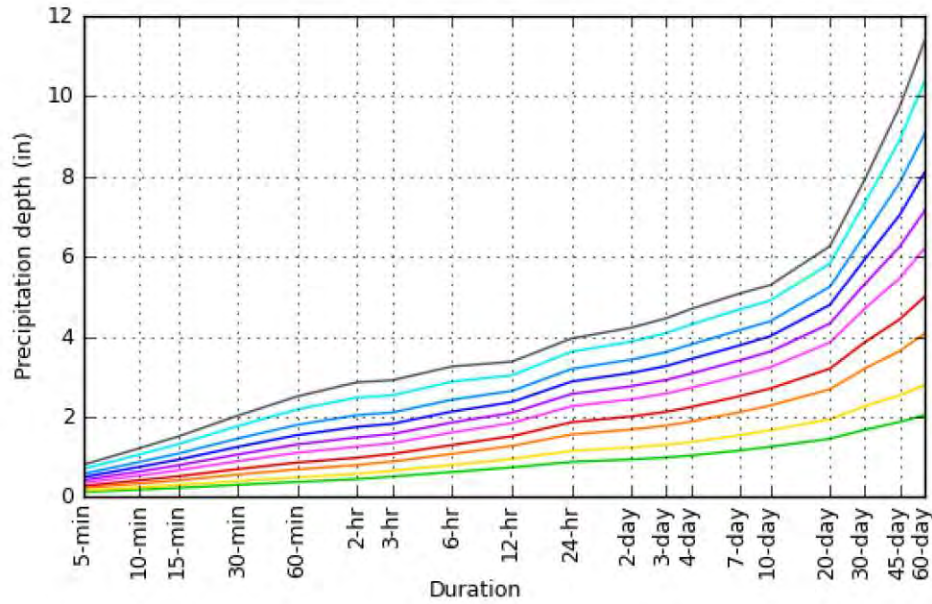
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.118 (0.097-0.141)	0.155 (0.128-0.187)	0.219 (0.181-0.266)	0.272 (0.225-0.332)	0.350 (0.287-0.431)	0.416 (0.339-0.515)	0.491 (0.394-0.613)	0.572 (0.451-0.726)	0.695 (0.538-0.902)	0.798 (0.607-1.06)
10-min	0.180 (0.148-0.215)	0.236 (0.195-0.285)	0.333 (0.275-0.404)	0.414 (0.342-0.505)	0.533 (0.438-0.656)	0.634 (0.515-0.785)	0.747 (0.599-0.934)	0.871 (0.687-1.10)	1.06 (0.818-1.37)	1.21 (0.925-1.61)
15-min	0.223 (0.184-0.266)	0.292 (0.241-0.353)	0.413 (0.341-0.501)	0.514 (0.424-0.626)	0.661 (0.542-0.814)	0.786 (0.639-0.972)	0.926 (0.743-1.16)	1.08 (0.852-1.37)	1.31 (1.01-1.70)	1.51 (1.15-2.00)
30-min	0.301 (0.247-0.359)	0.393 (0.325-0.476)	0.556 (0.459-0.675)	0.692 (0.571-0.843)	0.891 (0.730-1.10)	1.06 (0.861-1.31)	1.25 (1.00-1.56)	1.45 (1.15-1.84)	1.77 (1.37-2.29)	2.03 (1.54-2.69)
60-min	0.372 (0.306-0.444)	0.487 (0.402-0.589)	0.688 (0.568-0.835)	0.856 (0.707-1.04)	1.10 (0.904-1.36)	1.31 (1.07-1.62)	1.54 (1.24-1.93)	1.80 (1.42-2.28)	2.18 (1.69-2.84)	2.51 (1.91-3.32)
2-hr	0.445 (0.374-0.532)	0.575 (0.486-0.692)	0.793 (0.664-0.955)	0.977 (0.811-1.18)	1.25 (1.02-1.50)	1.48 (1.20-1.79)	1.75 (1.38-2.11)	2.04 (1.58-2.48)	2.48 (1.87-3.05)	2.86 (2.10-3.55)
3-hr	0.507 (0.430-0.600)	0.649 (0.553-0.774)	0.882 (0.747-1.05)	1.07 (0.903-1.28)	1.34 (1.12-1.60)	1.57 (1.29-1.88)	1.82 (1.47-2.19)	2.10 (1.67-2.55)	2.53 (1.95-3.10)	2.91 (2.20-3.59)
6-hr	0.621 (0.533-0.732)	0.796 (0.687-0.940)	1.07 (0.922-1.26)	1.29 (1.11-1.52)	1.61 (1.36-1.89)	1.86 (1.55-2.19)	2.13 (1.75-2.52)	2.42 (1.96-2.88)	2.87 (2.27-3.46)	3.25 (2.52-3.96)
12-hr	0.733 (0.639-0.841)	0.947 (0.826-1.09)	1.27 (1.10-1.46)	1.51 (1.31-1.74)	1.84 (1.59-2.11)	2.10 (1.79-2.41)	2.36 (1.99-2.73)	2.64 (2.20-3.08)	3.03 (2.47-3.57)	3.37 (2.71-4.01)
24-hr	0.873 (0.764-0.998)	1.15 (1.01-1.31)	1.56 (1.37-1.78)	1.86 (1.62-2.12)	2.26 (1.96-2.58)	2.57 (2.20-2.94)	2.88 (2.45-3.31)	3.19 (2.68-3.71)	3.62 (2.99-4.25)	3.95 (3.22-4.68)
2-day	0.934 (0.817-1.07)	1.23 (1.08-1.40)	1.68 (1.47-1.91)	2.01 (1.74-2.28)	2.44 (2.10-2.77)	2.76 (2.36-3.16)	3.09 (2.62-3.56)	3.42 (2.86-3.97)	3.87 (3.19-4.56)	4.22 (3.42-5.02)
3-day	0.983 (0.861-1.12)	1.30 (1.14-1.48)	1.78 (1.56-2.02)	2.12 (1.85-2.41)	2.58 (2.23-2.94)	2.92 (2.50-3.34)	3.27 (2.77-3.76)	3.61 (3.03-4.19)	4.09 (3.37-4.80)	4.46 (3.62-5.29)
4-day	1.03 (0.904-1.18)	1.37 (1.20-1.56)	1.88 (1.64-2.14)	2.24 (1.96-2.55)	2.72 (2.36-3.10)	3.08 (2.64-3.51)	3.44 (2.92-3.95)	3.80 (3.20-4.40)	4.30 (3.56-5.04)	4.69 (3.83-5.55)
7-day	1.16 (1.01-1.32)	1.54 (1.35-1.74)	2.11 (1.85-2.39)	2.51 (2.19-2.85)	3.03 (2.63-3.44)	3.40 (2.93-3.88)	3.78 (3.23-4.33)	4.16 (3.52-4.80)	4.67 (3.89-5.45)	5.07 (4.17-5.97)
10-day	1.25 (1.10-1.42)	1.66 (1.46-1.88)	2.28 (2.00-2.58)	2.70 (2.36-3.06)	3.23 (2.81-3.68)	3.62 (3.13-4.13)	4.01 (3.43-4.59)	4.38 (3.71-5.05)	4.90 (4.10-5.70)	5.29 (4.37-6.20)
20-day	1.45 (1.26-1.65)	1.94 (1.69-2.19)	2.68 (2.34-3.04)	3.20 (2.79-3.62)	3.85 (3.34-4.36)	4.32 (3.72-4.91)	4.79 (4.10-5.47)	5.24 (4.45-6.02)	5.83 (4.89-6.78)	6.26 (5.20-7.34)
30-day	1.67 (1.45-1.92)	2.26 (1.96-2.59)	3.20 (2.77-3.66)	3.86 (3.33-4.41)	4.70 (4.03-5.37)	5.32 (4.54-6.10)	5.93 (5.02-6.84)	6.54 (5.49-7.59)	7.33 (6.07-8.59)	7.93 (6.50-9.36)
45-day	1.87 (1.61-2.15)	2.54 (2.19-2.92)	3.64 (3.14-4.18)	4.43 (3.81-5.09)	5.46 (4.66-6.29)	6.25 (5.30-7.22)	7.04 (5.91-8.17)	7.85 (6.52-9.16)	8.91 (7.27-10.5)	9.74 (7.86-11.6)
60-day	2.04 (1.74-2.37)	2.79 (2.39-3.23)	4.07 (3.49-4.71)	4.99 (4.26-5.77)	6.21 (5.25-7.20)	7.14 (6.00-8.29)	8.09 (6.73-9.45)	9.06 (7.46-10.6)	10.4 (8.39-12.3)	11.4 (9.08-13.6)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at low er and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the low er bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

PF graphical

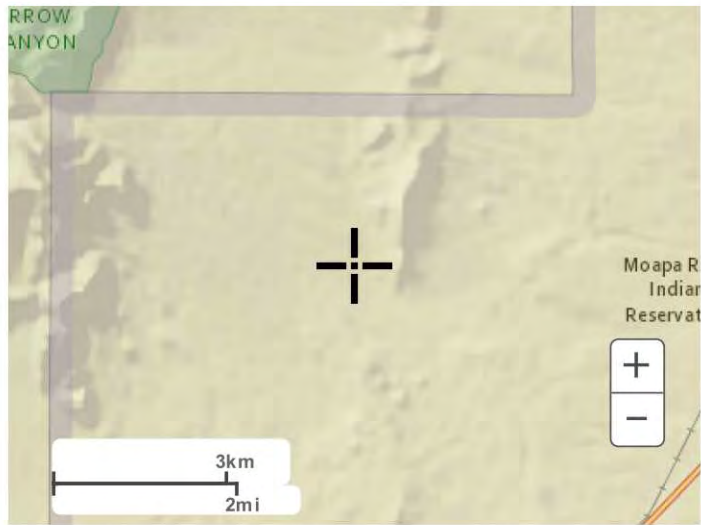
PDS-based depth-duration-frequency (DDF) curves
Latitude: 36.5504°, Longitude: -114.8088°



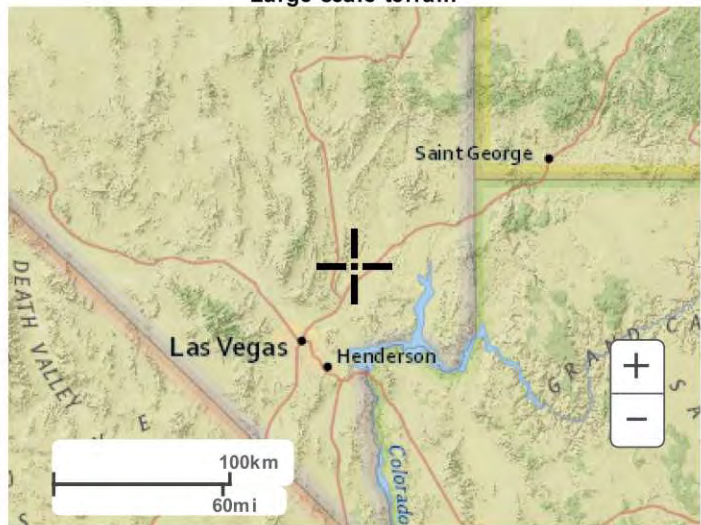
[Back to Top](#)

Maps & aerials

Small scale terrain



Large scale terrain



Large scale map




Large scale aerial



[Back to Top](#)

[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)



Appendix B
Curve Number Table

Table 2. Semi-Arid Curve Numbers (adapted from NEH 630)

Class	Value	Classification Description	Curve Number				
			Soil Type*				
			A	B	C	D	W
Water	11	Open Water - areas of open water, generally with less than 25% cover of vegetation or soil.	98	98	98	98	100
	12	Perennial Ice/Snow - areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.	98	98	98	98	100
Developed	21	Developed, Open Space - areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.	46	65	77	82	100
	22	Developed, Low Intensity - areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.	61	75	83	87	100
	23	Developed, Medium Intensity - areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.	77	85	90	95	100
	24	Developed High Intensity -highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.	89	92	94	95	100
Barren	31	Barren Land (Rock/Sand/Clay) - areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.	77	86	91	94	100
Forest	41	Deciduous Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.	43	55	70	77	100
	42	Evergreen Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.	43	55	70	77	100
	43	Mixed Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.	43	55	70	77	100
Shrubland	51	Dwarf Scrub - Alaska only areas dominated by shrubs less than 20 centimeters tall with shrub canopy typically greater than 20% of total vegetation. This type is often co-associated with grasses, sedges, herbs, and non-vascular vegetation.	55	71	81	89	100
	52	Shrub/Scrub - areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.	55	71	81	89	100
Herbaceous	71	Grassland/Herbaceous - areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.	55	71	81	89	100
	72	Sedge/Herbaceous - Alaska only areas dominated by sedges and forbs, generally greater than 80% of total vegetation. This type can occur with significant other grasses or other grass like plants, and includes sedge tundra, and sedge tussock tundra.	55	71	81	89	100
	73	Lichens - Alaska only areas dominated by fruticose or foliose lichens generally greater than 80% of total vegetation.	55	71	81	89	100
	74	Moss - Alaska only areas dominated by mosses, generally greater than 80% of total vegetation.	55	71	81	89	100
Planted/Cultivated	81	Pasture/Hay - areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.	55	71	81	89	100
	82	Cultivated Crops - areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.	67	78	85	89	100
	83	Small Grains	63	75	83	87	100
Wetlands	91	Woody Wetlands - areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	45	66	77	83	100
	92	Emergent Herbaceous Wetlands - Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	45	66	77	83	100

*A/D, B/D and C/D soils lumped as D soils, W denotes water

**Curve Numbers for NLCD Codes 41-43 have been increased from 30 to 43 as many of these areas are partially grazed Woods-grass combination.

Appendix R

Response to Comments on the DEIS

A



CLARK COUNTY • DEPARTMENT OF AIR QUALITY
4701 W. Russell Road Suite 200 • Las Vegas, NV 89118-2231
(702) 455-5942 • Fax (702) 383-9994
Marci Henson Director

August 21, 2019

Chip Lewis
Regional Environmental Protection Officer
BIA Western Regional Office of Environmental Quality Services
2600 North Center Avenue
4th Floor Mall Room
Phoenix, AZ 85004-3008

E-mail: chip.lewis@bia.gov

Re: Notice of Availability for the Draft Environmental Impact Statement (DEIS) for the proposed Eagle Shadow Mountain Solar Project, Clark County, NV.

Greetings:

The Department of Air Quality (DAQ) has reviewed the Draft Environmental Impact Statement (DEIS) for the Eagle Shadow Mountain Solar (Project) filed by the following cooperating agencies: Bureau of Indian Affairs (BIA) in cooperation with the Moapa Band of Paiute Indians (Tribe); Bureau of Land Management (BLM); Environmental Protection Agency (EPA); Nellis Air Force Base; Nevada Department of Wildlife (NDOW); and United States Fish and Wildlife Service (USFWS). The proposed Federal action is to provide 2200 acres of leased land located on the Moapa Indian Reservation and land owned by Nevada Energy for construction of a 300 megawatt solar photovoltaic electric facility. The solar facility will generate electricity using electric panels. Also included will be inverters, a collection system, an on-site substation and other related facilities including a 12.5 mile 230kV tie transmission line for interconnection of the project. This letter provides DAQ's assessment of the project's conformity with Clark County Air Quality Regulations (AQRs).

1 DAQ determines that this action should have no significant impact to ambient air quality. The proposed project is located within Hydrographic Area 218 (California Wash), which is in attainment or unclassifiable for all criteria pollutants. PM₁₀ is the pollutant primarily associated with construction activities and there are several provisions of the AQRs that regulate proposed construction within Clark County. In particular, the following regulatory requirements may apply depending upon the type of activities taking place at the construction site. In addition, and at a minimum, construction activities taking place will be subject to all applicable (AQRs). These may include the following sections:

2 Section 94 of the AQRs requires that a dust control permit be obtained prior to: (i) soil disturbance or construction activities that impact 0.25 acres or greater, (ii) mechanized trenching 100 feet or greater in length, or (iii) mechanical demolition of any structure 1,000 square feet or greater. Construction activities include, but are not limited to, land clearing; soil and rock excavation, removal, hauling, crushing, or screening; initial landscaping; staging and material storage areas; parking; and access roads. Additionally, Best Available Control Measures must be employed during construction activities at all times. These measures are described in the Construction Activities Dust Control Handbook, which is available online at:

http://www.clarkcountynv.gov/airquality/compliance/Pages/Compliance_DustForms.aspx

3 Section 94 of the AQRs also requires that a construction project involving: (i) ten acres or more, (ii) trenching activities one mile or greater in length, or (iii) structure demolition using implosive or explosive blasting techniques, shall include a detailed supplement to the dust mitigation plan that will become part of the dust control permit as an enforceable permit condition.

4 Any construction project having more than 50 acres of actively disturbed soil at any given time is required to have a Dust Control Monitor as described in Section 94.7.5 of the AQRs. In addition, an application for a Dust Control Permit for a project of 50 acres or more shall contain an actual soils analysis of the entire project.

5 Section 12 of the AQRs requires issuance of a stationary source permit for any applicable source located in Clark County that has a potential to emit a regulated air pollutant that is equal to or greater than the thresholds listed in that section. However, a definitive determination cannot be made until a complete application is submitted to DAQ and reviewed for applicability.

If you have any questions regarding these comments, please contact me at (702) 455-1665 or the Small Business Assistance Program at (702) 455-1524.

Sincerely,

Brenda Whitfield

Air Quality Specialist
Clark County Department of Air Quality
Planning Division
4701 W. Russell Road Suite 200
Las Vegas, NV 89118

BOARD OF COUNTY COMMISSIONERS

STEVE SISOLAK, Chairman • CHRIS GIUNCHIGLIANI, Vice Chair
SUSAN BRAGER • LARRY BROWN • JAMES B. GIBSON • MARILYN KIRKPATRICK • LAWRENCE WEEKLY
YOLANDA T. KING, County Manager



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

B

September 9, 2019

Mr. Chip Lewis
BIA Western Regional Office
2600 North Central Avenue
4th Floor Mailroom
Phoenix, Arizona 85004

Subject: Draft Environmental Impact Statement, Eagle Shadow Mountain Solar Project, Moapa River Indian Reservation, Clark County, Nevada (EIS No. 20190186)

Dear Mr. Lewis:

The U.S. Environmental Protection Agency has reviewed the above-referenced document pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act. The EPA is a cooperating agency for the project and provided scoping comments (February 28, 2019) and comments on Chapters 1 and 2 of the Preliminary Draft EIS (April 4 and May 9, 2019 respectively). We appreciate the opportunity to also review Chapter 3 of the Preliminary Draft EIS; however, we were unable to make the one-week deadline for review.

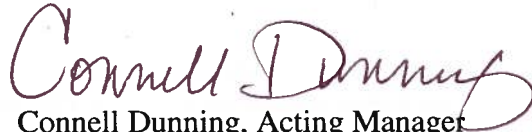
The Draft EIS states that the proposed project would consist of a 300-megawatt solar photovoltaic electricity generation facility, including associated inverter and transformer equipment, an energy storage system, a project substation, and operations and maintenance facilities on up to 2,200 acres located on the Moapa River Indian Reservation. A proposed 12.5-mile long 230 kilovolt generation-tie transmission line would connect the solar project to NV Energy's Reid-Gardner 230kV Substation and would be located on a combination of Tribal lands, Federal lands administered and managed by BLM, and private lands.

Because the proposed Eagle Shadow Mountain Solar Project would be the fourth utility-scale PV solar project on the Moapa River Indian Reservation to be evaluated in an EIS, BIA "incorporated by reference" some analyses from the K-Road Moapa Solar EIS (2012), the Moapa Solar Energy Center EIS (2014), and the Aiya Solar Project EIS (2016). The EPA supports this streamlining effort, intended to meet recently enacted Department of Interior NEPA streamlining guidelines, including a one-year completion deadline. The presence of the completed K-Road project, which is operational and most proximate to the project site, offers an unparalleled opportunity to consider lessons learned from that project's construction and operation - to see if predicted impacts were realized, to assess the effectiveness of mitigation measures, and to inform the adaptive management strategy that is included in the Eagle Shadow Mountain Solar Project. Please see our attached comments requesting use of lessons learned in informing project design regarding erosion and sedimentation, as well as comments addressing NEPA documentation; groundwater impact assessment; additional mitigation for air quality/health impacts; and a mechanism for information sharing regarding the project's novel Desert tortoise strategy.

Effective October 22, 2018, the EPA no longer includes ratings in our comment letters. Information about this change and EPA's continued roles and responsibilities in the review of federal actions can be found on our website at: <https://www.epa.gov/nepa/epa-review-process-under-section-309-clean-air-act>.

The EPA appreciates the opportunity to review this DEIS. When the FEIS is released for public review, please send one copy to the address above (mail code: TIP-2). If you have any questions, please contact me at (415) 947-4161, or contact Karen Vitulano, the lead reviewer for this project, at 415-947-4178 or vitulano.karen@epa.gov.

Sincerely,


Connell Dunning, Acting Manager
Environmental Review Branch

Enclosures: The EPA's Detailed Comments

cc: Greg Anderson, Chairman, Moapa Band of Paiutes
Carla Wise, U.S. Fish and Wildlife Service
Heather MacKinnon, Clark County Department of Air Quality

NEPA Documentation

The Bureau of Indian Affairs is striving for a 1-year NEPA completion timeline, and since three other EISs for solar photovoltaic projects on the Moapa River Indian Reservation have been completed, the Eagle Shadow Mountain Solar Project (ESMSP) EIS is using “incorporation by reference” for several resource impact analyses. As we indicated in our scoping comments, we support this strategy in general, but recommended that any analyses incorporated by reference include a citation and brief description, preferably referencing specific page numbers to assist the reader in retrieving the incorporated analysis. We also recommended the BIA ensure referenced documents are readily available to the public (40 CFR 1502.21), such as including them on the project website. We note, however, that while the reference list in Volume 2, Appendix O includes weblinks to the three EISs, these links were not included anywhere in the body of the EIS, nor were they included on the Eagle Shadow Mountain EIS website. As a result, several impact assessment discussions were not referenced in a manner that members of the public would see or be aware of.

1 | *Recommendation:* We continue to recommend the BIA provide more access for the public to the three EISs that are incorporated by reference, in lieu of project-specific analyses. We recommend including page numbers to the most applicable analyses, as well as a brief summary of the analysis instead of limiting reference to the conclusion only. Also, include weblinks to the documents when the incorporation by reference strategy is first introduced on p. 3-2 of the EIS.

Water Resources

Surface Waters/Ephemeral drainages

We appreciate that the project has been configured to avoid construction within the largest washes and that overall drainage patterns on site would be maintained, consistent with our scoping comments. Especially important is the commitment to limit grading within the solar site, leaving most of the site naturally vegetated, substantially reducing the potential for erosive runoff (p. 3-16). We commend the BIA, the Tribe, and the applicant for these project features.

2 | *Recommendation:* Retain project features that avoid the largest washes and maintain overall drainage patterns on site, and that minimize grading.

Some soil disruption will occur, however, and the DEIS indicates that vegetation would be permanently cleared from roadways and access ways, and within the solar field, some grading would be required for the project substation, operations and maintenance area, battery storage area, perimeter roads around the solar arrays, electrical equipment pads, where the panel support foundations are driven or drilled, and on a small graded pad within each solar array for the inverter and transformer (p. 2-10). As such, there would be a potential for increased erosion or sedimentation on- or off-site due to construction and operation and maintenance activities and the DEIS predicts that suspended sediments would be high during significant storm events (p. 3-16).

The DEIS states that avoiding large drainages and maintaining overall drainage patterns would help reduce erosion and sedimentation impacts during and following construction (p. 3-16). A preliminary hydrology study was conducted to determine flow paths and volumes, and the DEIS states that, overall, the analysis showed low water depths and velocities across most of the site except in channelized areas

(p. 3-13). However, we note that the preliminary hydrology study was not included in the appendices. Additionally, it appears only the 100-year flood was modeled, which may be insufficient when planning for future climactic scenarios. As we noted in our scoping comments, during the construction of the nearby K-Road Solar Project in 2014, a large storm washed out erosion and sediment control measures and disrupted construction. Since both this and the K-Road project include adaptive management in relation to erosion and sedimentation, we recommended including any monitoring data or observations from the completed K-Road Solar Project and any adaptive measures needed as a result, including whether there have been any wash-outs or flooding incidents since 2014. In this way, lessons learned could be incorporated into this project to inform stormwater management at the ESMSP site. No such information is included in the DEIS or appendices. An essential component of a reasonably complete mitigation discussion is an assessment of whether the proposed mitigation measures can be effective¹. While the presence of a completed solar project on the Reservation enables this DEIS to incorporate several impact analyses by reference, including soil resources, it also provides the opportunity to inform ESMSP project design and convey real world mitigation effectiveness.

3

Recommendations: Include the preliminary hydrology report in the appendices of the FEIS, to demonstrate avoidance of high flood areas, and to support the minimization of local hydrology effects, flood flows, and the resultant erosion and sedimentation. Provide results of the adaptive management program at the K-Road solar site, indicating whether erosion and sedimentation control measures have failed or required excessive maintenance, or whether stormwater infrastructure has proved insufficient to convey storm flows. Identify the main adaptive measures at K-Road that were implemented to meet resource management objectives, and ensure they are incorporated proactively into ESMSP planning.

Groundwater

The groundwater impact analysis references prior groundwater impact analyses contained in previous EISs. An update to this analysis and conclusions would be beneficial. Groundwater feeds regional springs including the Muddy River Springs which provide habitat for the endangered Moapa dace. Construction of the project would require use of 200 acre-feet water per year (afy) for 18-months. The groundwater impact analysis in the DEIS references the Calpine study based on aquifer testing that occurred in 2000 (Mifflin 2001). There was a more recent modeling update (2013) in the EIS for the Moapa Solar Energy Center, which is incorporated by reference, but this model does not appear to have included aquifer testing². There is a substantial amount of uncertainty in relying on models alone using almost 2 decade-old aquifer testing data. Additionally, the hydrology and groundwater modeling report for the Moapa Solar Energy Center provides the assurance that modeling predictions will be refined once hydraulic responses to groundwater pumping are recorded (Moapa Solar Energy Center EIS, Appendix F, p. 14), but no groundwater monitoring commitment appears to be included in the ESMSP DEIS. The DEIS notes that the groundwater monitoring wells maintained by U.S. Geological Survey in the area have both been trending deeper over the years (p. 3-14).

¹ Neighbors of Cuddy Mountain v. U.S. Forest Service, 137 F.3d 1372, 1381 (9th Cir. 1998)

² This modeling update also relies on a discussion of a Tetra Tech model which includes stated concerns that “sparse physical-property data and conceptual uncertainty result in a model system that is extremely over-prescribed”. This seems to indicate that many of the model input parameters are based upon estimates and professional judgement rather than actual measurements at the site that could result in a model with a high likelihood of not accurately representing current site conditions or accurately predicting future conditions at the site.

The DEIS identifies the 2006 Memorandum of Agreement and Programmatic Biological Opinion (PBO) between the U.S. Fish and Wildlife Service, the Moapa Tribe, and other entities which includes groundwater pumping limitations if the impacts on spring flows in the Muddy River Springs area reach certain decreased flow values detrimental to the endangered Moapa dace. Appendix L, page 5-8 – 5-9 of the DEIS concludes that groundwater pumping associated with the Proposed Action “may affect, and is likely to adversely affect” the Moapa dace because the withdrawal of water could contribute to ongoing adverse effects to the Moapa dace as analyzed in the 2006 PBO. The DEIS does not provide an update regarding the implementation of the PBO and states only that “current monitoring data indicate that no instream flow trigger points have been reached.” Since this discussion refers to the 2013 Moapa Solar Energy Center EIS, it is not clear to what date “current monitoring” refers. Groundwater testing to update the analysis, or a status update of the implementation progress and monitoring results of the 2006 PBO would assist in understanding potential project impacts.

4

Recommendation: Provide an update in the Final EIS regarding the status of stream flows being monitored under the 2006 PBO and the general progress towards implementation of the monitoring, management and conservation measures in the PBO for the Moapa dace. Include the results and dates of the recent monitoring data referred to in the ESMSP DEIS. Discuss the progress of the conservation measures in general, and specifically the ones involving the Tribe (providing the use of the Tribal greenhouse to cultivate native plants for restoration actions in the Muddy River area, and providing access to Tribal lands for the construction and maintenance of at least one fish barrier). Indicate if/when hydraulic responses to pumping will be measured to refine modeling predictions.

Air Quality

Construction Dust Control and Valley Fever Prevention

The DEIS does not evaluate air quality impacts but relies on the analyses from the other solar project EISs on the reservation which concluded that impacts would be less than significant with the implementation of Best Management Practices (BMPs) (p. 3-3). One BMP for the ESMSP (Appendix C) states that the Project would obtain a dust control permit from Clark County Department of Air Quality for *activities outside tribal land*. This permit requires a dust control plan, and the DEIS states that “*Ground disturbing activities would be undertaken in accordance with the approved dust control plan(s)*” but no dust control plan for activities on Tribal land is explicitly specified, and there is no dust control plan included in the Appendices, where other plans (Traffic Plan, Weed Management Plan, etc.) are located.

We note that the Gemini Solar Project DEIS, which is proposed for land adjacent to the reservation, predicted construction-phase exceedances of the National Ambient Air Quality Standard (NAAQS) for particulate matter less than 10 microns (PM₁₀) in its dispersion modeling³. In addition, as noted in the EPA Scoping Comment letter, the project area is suspected endemic for *Coccidioides immitis*, a fungus causing Valley Fever, a potentially fatal disease that has afflicted solar energy project construction workers in California⁴. There were 142 cases of Valley Fever in Clark County in 2017, up from 75 in

³ The Gemini Solar Project is much larger; however, since the alternative that would use only mowing of vegetation, similar to the ESMSP, exceeded NAAQS both before and after mitigation, it indicates that particulates generated from construction of solar projects can be substantial, and points to potential significant cumulative effects.

⁴ See <https://www.cdc.gov/mmwr/volumes/67/wr/mm6733a4.htm>

2016 (Gemini Solar Project DEIS, p. 3-167). The Centers for Disease Control⁵ concluded that, “*As solar farm construction in Coccidioides-endemic areas increases, additional workers will probably be exposed and infected unless awareness is emphasized and effective exposure reduction measures implemented, including limiting dust generation and providing respiratory protection.*”

5

Recommendation: Include a mitigation measure that will require preparation of a dust control plan for work on Tribal land. Consult the U.S. Geological Survey’s operational guidelines for geologic fieldwork in areas endemic for Coccidioidomycosis⁶ for additional mitigation measures. We recommend including the following additional measures in either the Air Quality or Health and Safety BMPs:

- Include training for workers and supervisors on the potential presence of Valley Fever spores, methods to minimize exposure, and how to recognize symptoms.
- Limit workers’ exposure to outdoor dust in disease-endemic areas by (1) providing air-conditioned cabs for vehicles that generate dust and making sure workers keep windows and vents closed, (2) suspending work during heavy winds, and (3) directing them to remove dusty clothing after fieldwork and store in closed plastic bags until washed.
- When exposure to dust is unavoidable, provide approved respiratory protection to filter particles.

Desert Tortoise

The threatened Mojave Desert tortoise is present on the site and most of the project is within the Northeastern Mojave Recovery Unit for desert tortoise as designated by the USFWS’s “Revised Recovery Plan for the Mojave Population of the Desert Tortoise” (p. 3-27). Based on the site surveys, the estimated number of tortoises on the project site was calculated to be 145 (p. 3-28). Because the tortoise density is high, the USFWS would require the development of a separate desert tortoise translocation plan for this project (p. 3-40). The applicant plans to construct temporary desert tortoise exclusion fencing around the solar facility during construction, but permanent perimeter fence, constructed inside of the exclusion fencing, will have a gap at the bottom of the fence, allowing tortoise to move onto and through the site during operations (p. 3-40). We commend BIA, the Tribe and the applicant for working with USFWS to experiment with alternative means to accommodate the desert tortoise, especially since this species is experiencing high cumulative impacts due to many neighboring desert solar projects.

6

Recommendation: Consider methods to share the effectiveness of the modified fence design in facilitating and maintaining desert tortoise movement. Lead agencies, the public, and private companies implementing other solar projects in the area would benefit from learning if raising the fence line can reduce impacts to this species. Consider providing status updates once operations begin and consider posting them on the project website.

⁵ <https://dx.doi.org/10.3201/eid2111.150129>

⁶ <https://pubs.usgs.gov/of/2000/0348/>

RE: Nevada State Clearinghouse Notice E2020-30 (E2020-30 DEIS Eagle Shadow Mountain Solar Project - Clark County)

Jim R. Balderson

C

Thu 8/29/2019 10:27 AM

To: NevadaClearinghouse <NevadaClearinghouse@lands.nv.gov>;

From: NevadaClearinghouse@lands.nv.gov <NevadaClearinghouse@lands.nv.gov>

Sent: Friday, August 16, 2019 5:28 PM

To: Alan Jenne <ajenne@ndow.org>; clytle@lincolnnv.com; Brad Hardenbrook <bhrdnbrk@ndow.org>; James Morefield <jdmore@heritage.nv.gov>; Mark Freese <markfreese@ndow.org>; Tod.oppennborn@nellis.af.mil; zip.upham@navy.mil; Shimi.Mathew@nellis.af.mil; craig.moramore@wildnevada.org; Jennifer Crandell <jcrandell@crc.nv.gov>; 99abw.ccy@nellis.af.mil; whenderson@nvleague.org; ddavis@unr.edu; munteanj@unr.edu; jprice@unr.edu; Karen Beckley <KBeckley@health.nv.gov>; Rebecca Palmer <rlpalmer@shpo.nv.gov>; srupert@govmail.state.nv.us; dmouat@dri.edu; Alisanne Maffei <awmaffei@admin.nv.gov>; bthompson@dot.state.nv.us; Richard Ewell <rewell@tax.state.nv.us>; mison@dot.state.nv.us; Warren Turke. <wturke. @crc.nv.gov>; Michael Visser <mvisser@minerals.nv.gov>; Jim R. Balderson <JBALDERSON@ndep.nv.gov>; Lindsey Lesmeister <llesmeister@ndow.org>; Richard M. Perry <rmpperry@minerals.nv.gov>; jered.mcdonald@lcb.state.nv.us; Cynthia Turiczek <cturiczek@puc.nv.gov>; Moira Kolada <mkolada@ndow.org>; rwarnold@hotmail.com; bob@intermountainrange.com; JEnglish@washoecounty.us; Valerie King <vking@ndep.nv.gov>; robert.turner.3@us.af.mil; Robert.rule@navy.mil; Alysa.Keller@lcb.state.nv.us; Cayenne Engel <engel@forestry.nv.gov>; larry.m.cruz.civ@mail.mil; charles.r.king104.civ@mail.mil; Matt Maples <mmaples@ndow.org>; Tracy Kipke <tkipke@ndow.org>; jnewmar k@ndow.org; Kris n Szabo <kszabo@heritage.nv.gov>; Paul.Ryan@nv.usda.gov; Shirley DeCrona <sdecrona@parks.nv.gov>; Lori Story <lstory@ag.nv.gov>; Anna Higgins <ahiggins@forestry.nv.gov>; Gary Reese <greese@forestry.nv.gov>; Ian Kono <ikono@parks.nv.gov>; Bob J. Halstead <bhalstead@nuc.state.nv.us>; RBonner@dot.state.nv.us; mlanham@landercountynv.org; Meghan Brown <m.brown@agri.nv.gov>; lgroffman@dot.state.nv.us; tmuellet@dot.state.nv.us; kverre@dot.state.nv.us; mcosta@dot.state.nv.us; Kacey KC <kaceykc@forestry.nv.gov>; Birgit Widegren <bwidegren@ndep.nv.gov>; Kim Rigdon <krigdon@ndep.nv.gov>; KHaukohl@dot.state.nv.us; Greg Lovato <glovato@ndep.nv.gov>; Peggy Roefer <proefer@crc.nv.gov>; andrea.randall@snwa.com; cerquiaga@trcp.org; eric Miskow <emiskow@heritage.nv.gov>; esmboc@gmail.com; Janice Keillor <jkeillor@parks.nv.gov>; Seth W. Johnson <swjohnson@puc.nv.gov>; Kelly McGowan <kmcgowan@sagebrushheco.nv.gov>; brian.r.hunsaker.mil@mail.mil; Garrett Wake <gwake@minerals.nv.gov>; Jasmine Kleiber <jkleiber@ndow.org>; m@rubaldandassociates.com; hdrake@tax.state.nv.us; mmiller@fallonnevada.gov; Caleb McAdoo <cmcadoo@ndow.org>; genevieve_skora@fws.gov; aevans@nvnao.org; Bart Chambers <bchambers@dps.state.nv.us>; Chris na Wilson <cswilson@dps.state.nv.us>; Ellery Stahler <estahler@lands.nv.gov>; Greg.e.mckay@gmail.com; tara_vogel@fws.gov; Clifford Banuelos <cbanuelos@ndep.nv.gov>; menders@ndow.org; Jenni Jeffers <jjeffers@ndow.org>; Kenny Pirkle <kpirkle@ndow.org>; lee_carranza@fws.gov; chad_mellison@fws.gov; Jason Salisbury <jsalisbury@ndow.org>; ann.bedlion@navy.mil; donna.withers@navy.mil; Kris Urquhart <kurquhart@ndow.org>; susan_e_cooper@fws.gov; Dan Huser <dhuser@sagebrushheco.nv.gov>; Bettina Scherer <bscherer@dcnr.nv.gov>; Sandy Quilici <squilici@dcnr.nv.gov>; Samantha Thompson <SThompson@dcnr.nv.gov>; Catherine Erskine <c.erskine@dcnr.nv.gov>; John Christopherson <jchrist@forestry.nv.gov>; Ryan S. Shane <rshane@forestry.nv.gov>; Chris Thorson <cthorsen@water.nv.gov>; EQuagliari@carson.org; tyler@nevadadc.org; ckincheloe@carson.org; Deann M. McKay <dmckay@lands.nv.gov>; cgiesinger@washoecounty.us; Zach E. Ormsby <zormsby@parks.nv.gov>; Kelly Thomas <kelly.thomas@ndep.nv.gov>; Sarah Hills <shills@ndep.nv.gov>; Stephanie Simpson <s.simpson@ndep.nv.gov>; Micheline Fairbank <mfairbank@water.nv.gov>; Andre Emme <aemme@lands.nv.gov>; Samatha R. Essig <sessig@parks.nv.gov>; David Bobzien <dbobzien@energy.nv.gov>; Kelli Anderson <kanderson@dps.state.nv.us>; Meredith Gosejohan <mgosejohan@lands.nv.gov>; SERC <SERC@dps.state.nv.us>; Lowell Price <lprice@minerals.nv.gov>; mstewart@lcb.state.nv.us; sscholley@lcb.state.nv.us; alisah@unr.edu; kcaringer@trpa.org; pnielsen@trpa.org;

dzabaglo@trpa.org

Subject: Nevada State Clearinghouse Notice E2020-30 (E2020-30 DEIS Eagle Shadow Mountain Solar Project - Clark County)



NEVADA STATE CLEARINGHOUSE

Department of Conservation and Natural Resources, Division of State Lands

901 S. Stewart St., Ste. 5003, Carson City, Nevada 89701-5246

(775) 684-2723 Fax (775) 684-2721

TRANSMISSION DATE: 08/16/2019

U.S. Bureau of Land Management

Nevada State Clearinghouse Notice E2020-30

Project: E2020-30 DEIS Eagle Shadow Mountain Solar Project - Clark County

Follow the link below to find information concerning the above-mentioned project for your review and comment.

E2020-30 - <http://clearinghouse.nv.gov/public/Notice/2020/E2020-30.pdf>

- **Please evaluate this project's effects on your agency's plans and programs and any other issues that you are aware of that might be pertinent to applicable laws and regulations.**
- **Please reply directly from this e-mail and attach your comments.**
- **Please submit your comments no later than Monday September 23rd, 2019.**

[Clearinghouse project archive](#)

Questions? Andre Emme, Program Manager, (775) 684-2733 or nevadaclearinghouse@state.nv.us

X No comment on this project Proposal supported as written

AGENCY COMMENTS:

Signature: Jim Balderson P.E.

Date: 08/29/2019

Requested By:

Tom Reid Mark Lane Daniel Jacquet Arlan Hiner Arlan Hiner

Distribu on:

- 99ABW Nellis

- Department of Conservation & Natural Resources

- Intermountain Range

Alan Jenne - Department of Wildlife, Elko

Alisa Huckle - UNR Library

Alisanne Maffei - Department of Administration

Alysa Keller - Legislative Counsel Bureau

RE: Nevada State Clearinghouse Notice E2020-30 (E2020-30 DEIS Eagle Shadow Mountain Solar Project - Clark County)

Andre Emme

D

Tue 8/20/2019 9:36 AM

To: NevadaClearinghouse <NevadaClearinghouse@lands.nv.gov>;

Dear Clearinghouse Manager,

In reviewing the ESM Solar Project below, it is noted to be adjacent to the Valley of Fire State Park and the Clark County Grant Lands. Should any components of the project require use of state owned land, the proponent would need to submit an applica. on to the Nevada Division of State Lands which can be found here:

https://lands.nv.gov/uploads/documents/APPLICATION_FORM_StateLands2019Fillable.pdf

Any questions regarding the use of state land can be directed to Deann McKay, 775-684-2729 or via email at dmckay@lands.nv.gov

Thank you for the opportunity to review this project.

From: NevadaClearinghouse@lands.nv.gov [mailto:NevadaClearinghouse@lands.nv.gov]

Sent: Friday, August 16, 2019 5:28 PM

To: Alan Jenne <ajenne@ndow.org>; clytle@lincolnnv.com; Brad Hardenbrook <bhrdnbrk@ndow.org>; James Morefield <jdmore@heritage.nv.gov>; Mark Freese <markfreese@ndow.org>; Tod.oppennborn@nellis.af.mil; zip.upham@navy.mil; Shimi.Mathew@nellis.af.mil; craig.mor more@wildnevada.org; Jennifer Crandell <jcrandell@crc.nv.gov>; 99abw.ccy@nellis.af.mil; whenderson@nvleague.org; ddavis@unr.edu; munteanj@unr.edu; jprice@unr.edu; Karen Beckley <KBeckley@health.nv.gov>; Rebecca Palmer <rlpalmer@shpo.nv.gov>; srupert@govmail.state.nv.us; dmouat@dri.edu; Alisanne Maffei <awmaffei@admin.nv.gov>; bthompson@dot.state.nv.us; Richard Ewell <rewell@tax.state.nv.us>; mison@dot.state.nv.us; Warren Turke. <wturkett@crc.nv.gov>; Michael Visher <mvisher@minerals.nv.gov>; Jim R. Balderson <JBALDERSON@ndep.nv.gov>; Lindsey Lesmeister <llesmeister@ndow.org>; Richard M. Perry <rmpperry@minerals.nv.gov>; jered.mcdonald@lcb.state.nv.us; Cynthia Turiczek <cturiczek@puc.nv.gov>; Moira Kolada <mkolada@ndow.org>; rwarnold@hotmail.com; bob@intermountainrange.com; JEnglish@washoecounty.us; Valerie King <vking@ndep.nv.gov>; robert.turner.3@us.af.mil; Robert.rule@navy.mil; Alysa.Keller@lcb.state.nv.us; Cayenne Engel <engel@forestry.nv.gov>; larry.m.cruz.civ@mail.mil; charles.r.king104.civ@mail.mil; Matt Maples <mmaples@ndow.org>; Tracy Kipke <tkipke@ndow.org>; jnewmar k@ndow.org; Kris Szabo <kszabo@heritage.nv.gov>; Paul.Ryan@nv.usda.gov; Shirley DeCrona <sdecrona@parks.nv.gov>; Lori Story <lstory@ag.nv.gov>; Anna Higgins <ahiggins@forestry.nv.gov>; Gary Reese <greese@forestry.nv.gov>; Ian Kono <ikono@parks.nv.gov>; Bob J. Halstead <bhalstead@nuc.state.nv.us>; RBonner@dot.state.nv.us; mlanham@landercountynv.org; Meghan Brown <m.brown@agri.nv.gov>; lgroffman@dot.state.nv.us; tmuellet@dot.state.nv.us; kverre@dot.state.nv.us; mcosta@dot.state.nv.us; Kacey KC <kaceykc@forestry.nv.gov>; Birgit Widegren <bwidegren@ndep.nv.gov>; Kim Rigdon <krigdon@ndep.nv.gov>; KHaukohl@dot.state.nv.us; Greg Lovato <glovato@ndep.nv.gov>; Peggy Roefer <proefer@crc.nv.gov>; andrea.randall@snwa.com; cerquiaga@trcp.org; eric Miskow <emiskow@heritage.nv.gov>; esmboc@gmail.com; Janice Keillor <jkeillor@parks.nv.gov>; Seth W. Johnson <swjohnson@puc.nv.gov>; Kelly McGowan <kmcgowan@sagebrushco.nv.gov>; brian.r.hunsaker.mil@mail.mil; Garrett Wake <gwake@minerals.nv.gov>; Jasmine Kleiber <jkleiber@ndow.org>; m@rubaldandassociates.com; hdrake@tax.state.nv.us; mmiller@fallonnevada.gov; Caleb McAdoo <cmcadoo@ndow.org>; genevieve_skora@fws.gov; aevans@nvnao.org; Bart Chambers <bchambers@dps.state.nv.us>; Chris Wilson <cswilson@dps.state.nv.us>; Ellery Stahler <estahler@lands.nv.gov>; Greg.e.mckay@gmail.com; tara_vogel@fws.gov; Clifford Banuelos <cbanuelos@ndep.nv.gov>; menders@ndow.org; Jenni

RE: Nevada State Clearinghouse Notice E2020-30 (E2020-30 DEIS Eagle Shadow Mountain Solar Project - Clark County)

Rebecca Palmer

E

Mon 9/23/2019 4:11 PM

To: NevadaClearinghouse <NevadaClearinghouse@lands.nv.gov>;

The Nevada SHPO has reviewed this document and supports it as written. The SHPO does not recommend any changes.

Regards,

Rebecca Lynn Palmer

Administrator/State Historic Preservation Officer
Nevada State Historic Preservation Office
(O): 775-684-3443

rlpalmer@shpo.nv.gov

From: NevadaClearinghouse@lands.nv.gov <NevadaClearinghouse@lands.nv.gov>

Sent: Friday, August 16, 2019 5:28 PM

To: Alan Jenne <ajenne@ndow.org>; clytle@lincolnnv.com; Brad Hardenbrook <bhrdnbrk@ndow.org>; James Morefield <jdmore@heritage.nv.gov>; Mark Freese <markfreese@ndow.org>; Tod.oppennborn@nellis.af.mil; zip.upham@navy.mil; Shimi.Mathew@nellis.af.mil; craig.more@wildnevada.org; Jennifer Crandell <jcrandell@crc.nv.gov>; 99abw.ccy@nellis.af.mil; whenderson@nvleague.org; ddavis@unr.edu; munteanj@unr.edu; jprice@unr.edu; Karen Beckley <KBeckley@health.nv.gov>; Rebecca Palmer <rlpalmer@shpo.nv.gov>; srupert@govmail.state.nv.us; dmouat@dri.edu; Alisanne Maffei <awmaffei@admin.nv.gov>; bthompson@dot.state.nv.us; Richard Ewell <rewell@tax.state.nv.us>; mison@dot.state.nv.us; Warren Turke. <wturke.@crc.nv.gov>; Michael Visher <mvisher@minerals.nv.gov>; Jim R. Balderson <JBALDERSON@ndep.nv.gov>; Lindsey Lesmeister <llesmeister@ndow.org>; Richard M. Perry <rmpperry@minerals.nv.gov>; jered.mcdonald@lcb.state.nv.us; Cynthia Turiczek <cturiczek@puc.nv.gov>; Moira Kolada <mkolada@ndow.org>; rwarnold@hotmail.com; bob@intermountainrange.com; JEnglish@washoecounty.us; Valerie King <vking@ndep.nv.gov>; robert.turner.3@us.af.mil; Robert.rule@navy.mil; Alysa.Keller@lcb.state.nv.us; Cayenne Engel <cengel@forestry.nv.gov>; larry.m.cruz.civ@mail.mil; charles.r.king104.civ@mail.mil; Matt Maples <mmaples@ndow.org>; Tracy Kipke <tkipke@ndow.org>; jnewmark@ndow.org; Kris Szabo <kszabo@heritage.nv.gov>; Paul.Ryan@nv.usda.gov; Shirley DeCrona <sdecrona@parks.nv.gov>; Lori Story <lstory@ag.nv.gov>; Anna Higgins <ahiggins@forestry.nv.gov>; Gary Reese <greese@forestry.nv.gov>; Ian Kono <ikono@parks.nv.gov>; Bob J. Halstead <bhalstead@nuc.state.nv.us>; RBonner@dot.state.nv.us; mlanham@landercountynv.org; Meghan Brown <m.brown@agri.nv.gov>; lgroffman@dot.state.nv.us; tmuellet@dot.state.nv.us; kverre@dot.state.nv.us; mcosta@dot.state.nv.us; Kacey KC <kaceykc@forestry.nv.gov>; Birgit Widegren <bwidegren@ndep.nv.gov>; Kim Rigdon <krigdon@ndep.nv.gov>; KHaukohl@dot.state.nv.us; Greg Lovato <glovato@ndep.nv.gov>; Peggy Roefer <proefer@crc.nv.gov>; andrea.randall@snwa.com; cerquiaga@trcp.org; eric Miskow <emiskow@heritage.nv.gov>; esmboc@gmail.com; Janice Keillor <jkeillor@parks.nv.gov>; Seth W. Johnson <swjohnson@puc.nv.gov>; Kelly McGowan <kmcgowan@sagebrushhco.nv.gov>; brian.r.hunsaker.mil@mail.mil; Garrett Wake <gwake@minerals.nv.gov>; Jasmine Kleiber <jkleiber@ndow.org>; m@rubaldandassociates.com; hdrake@tax.state.nv.us; mmiller@fallonnevada.gov; Caleb McAdoo <cmcadoo@ndow.org>; genevieve_skora@fws.gov; aevans@nvnao.org; Bart Chambers <bchambers@dps.state.nv.us>; Chris Wilson <cswilson@dps.state.nv.us>; Ellery Stahler <estahler@lands.nv.gov>; Greg.e.mckay@gmail.com; tara_vogel@fws.gov; Clifford Banuelos <cbanuelos@ndep.nv.gov>; menders@ndow.org; Jenni

RE: Nevada State Clearinghouse Notice E2020-30 (E2020-30 DEIS Eagle Shadow Mountain Solar Project - Clark County)

Sue Gaskill

F

Tue 9/3/2019 10:20 AM

To: Amanda Brownlee <abrownlee@water.nv.gov>; NevadaClearinghouse <NevadaClearinghouse@lands.nv.gov>;

NEVADA STATE CLEARINGHOUSE

Department of Conservation and Natural Resources, Division of State Lands
901 S. Stewart St., Ste. 5003, Carson City, Nevada 89701-5246
(775) 684-2723 Fax (775) 684-2721



TRANSMISSION DATE: 08/16/2019

U.S. Bureau of Land Management

Nevada State Clearinghouse Notice E2020-30

Project: E2020-30 DEIS Eagle Shadow Mountain Solar Project - Clark County

Follow the link below to find information concerning the above-mentioned project for your review and comment.

E2020-30 - <http://clearinghouse.nv.gov/public/Notice/2020/E2020-30.pdf>

- **Please evaluate this project's effects on your agency's plans and programs and any other issues that you are aware of that might be pertinent to applicable laws and regulations.**
- **Please reply directly from this e-mail and attach your comments.**
- **Please submit your comments no later than Monday September 23rd, 2019.**

[Clearinghouse project archive](#)

Questions? Andre Emme, Program Manager, (775) 684-2733 or nevadaclearinghouse@state.nv.us

___ No comment on this project ___ Proposal supported as written

AGENCY COMMENTS:

Nevada State Clearinghouse*Department of Conservation and Natural Resources**901 South Stewart Street, Suite 5003**Carson City, NV 89701**775-684-2723*<http://clearinghouse.nv.gov>www.lands.nv.gov

DATE: 8/23/2019

Division of Water Resources

Nevada SAI # E2020-030Project: **Project: E2020-30 DEIS Eagle Shadow Mountain Solar Project - Clark County**_____No comment on this project X Proposal supported as written

AGENCY COMMENTS:

General:

All Nevada water laws must receive full compliance.

Any transfer of water rights may be submitted to the State Engineers office as per NRS 533.384. The State Engineer is authorized and is responsible for maintaining water right files and accompanying documents as per NRS Chapters 111, 240, 375, 532, 533 and 534.

**Eagle Shadow Mountain Solar Project
FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS)
RESPONSES TO COMMENTS ON THE DRAFT EIS**

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
Brenda Whitfield Clark County Department of Air Quality Planning Division 4701 W. Russell Road Suite 200 Las Vegas, NV 89118-2231	A - 1	DAQ determines that this action should have no significant impact to ambient air quality. The proposed project is located within Hydrographic Area 218 (California Wash), which is in attainment or unclassifiable for all criteria pollutants. PM10 is the pollutant primarily associated with construction activities and there are several provisions of the AQRs that regulate proposed construction within Clark County.	Comment noted.	No change necessary.
	A - 2	Section 94 of the AQRs requires that a dust control permit be obtained prior to: (i) soil disturbance or construction activities that impact 0.25 acres or greater, (ii) mechanized trenching 100 feet or greater in length, or (iii) mechanical demolition of any structure 1,000 square feet or greater.	As noted in the scoping comments provided by the Department of Air Quality (2/26/19), Clark County's air quality regulatory program is not applicable Moapa tribal lands. However, more than 0.25 acres of lands administered by the BLM and private lands would be disturbed by construction requiring a dust control permit from the County. In addition, the Applicant has committed to the application of BMPs for dust control on the solar site as outlined in Appendix C of the EIS.	No change necessary.
	A-3	Section 94 of the AQRs also requires that a construction project involving: (i) ten acres or more, (ii) trenching activities one mile or greater in length, or (iii) structure demolition using implosive or explosive blasting techniques, shall include a detailed supplement to the dust mitigation plan that will become part of the dust control permit as an enforceable permit condition.	The Project would develop supplements to the dust mitigation plan as needed as confirmed by the Applicant in Appendix C of the EIS.	No change necessary.
	A-4	Any construction project having more than 50 acres of actively disturbed soil at any given time is required to have a Dust Control Monitor as described in Section 94.7.5 of the AQRs. In addition, an application for a Dust Control Permit for a project of 50 acres or more shall contain an actual soils analysis of the entire project.	The Project would have a Dust Control Monitor if needed.	No change necessary.
	A-5	Section 12 of the AQRs requires issuance of a stationary source permit for any applicable source located in Clark County that has a potential to emit a regulated air pollutant that is equal to or greater than the thresholds listed in that section.	A stationary source requiring a permit is not anticipated for this Project. A permit would be acquired by the Applicant if such a source is included in the Project.	No change necessary.
Connell Dunning Acting Manager Environmental Review Branch US Environmental Protection Agency Region IX 75 Hawthorne Street San Francisco, CA 94105	B - 1	Recommendation: We continue to recommend the BIA provide more access for the public to the three EISs that are incorporated by reference, in lieu of project-specific analyses. We recommend including page numbers to the most applicable analyses, as well as a brief summary of the analysis instead of limiting reference to the conclusion only. Also, include weblinks to the documents when the incorporation by reference strategy is first introduced on p. 3-2 of the EIS.	Page numbers are included in Table 3-1. Web links to the previous EIS documents have been added to the introduction on page 3-2. Links to these documents have also been added to ESMSP EIS website.	Links to previous documents have been added to the introduction on page 3-2.
	B - 2	Recommendation: Retain project features that avoid the largest washes and maintain overall drainage patterns on site, and that minimize grading.	These project features are expected to be maintained in the final design for the project.	No change necessary.
	B - 3	Recommendations: Include the preliminary hydrology report in the appendices of the FEIS, to demonstrate avoidance of high flood areas, and to support the minimization of local hydrology effects, flood flows, and the resultant erosion and sedimentation. Provide results of the adaptive management program at the K-Road solar site, indicating whether erosion and sedimentation control measures have failed or required excessive maintenance, or whether stormwater infrastructure has proved insufficient to convey storm flows. Identify the main adaptive measures at K-Road that were implemented to meet resource management objectives, and ensure they are incorporated proactively into ESMSP planning.	The preliminary hydrology study has been included in the FEIS as Appendix Q. There is no documentation available of the adaptive management aspect of the stormwater program at the K-Road solar site. It is expected that similar adaptive management will be incorporated into the SWPPP for the ESMSP.	The preliminary hydrology study has been included in the FEIS as Appendix Q.

**Eagle Shadow Mountain Solar Project
FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS)
RESPONSES TO COMMENTS ON THE DRAFT EIS**

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
	B - 4	Recommendation: Provide an update in the Final EIS regarding the status of stream flows being monitored under the 2006 PBO and the general progress towards implementation of the monitoring, management and conservation measures in the PBO for the Moapa dace. Include the results and dates of the recent monitoring data referred to in the ESMSP DEIS. Discuss the progress of the conservation measures in general, and specifically the ones involving the Tribe (providing the use of the Tribal greenhouse to cultivate native plants for restoration actions in the Muddy River area, and providing access to Tribal lands for the construction and maintenance of at least one fish barrier). Indicate if/when hydraulic responses to pumping will be measured to refine modeling predictions.	The Biological Opinion (BO) for the ESM Solar Project prepared by the USFWS provides a summary of current and approved uses of water from the carbonate aquifer in Coyote Spring Valley and California Wash which was the subject of the PBO. The BO for the ESMSP is included as Appendix P of the FEIS.	The BO for the ESMSP is included as Appendix P of the FEIS.
	B - 5	Recommendation: Include a mitigation measure that will require preparation of a dust control plan for work on Tribal land. Consult the U.S. Geological Survey's operational guidelines for geologic fieldwork in areas endemic for Coccidioidomycosis for additional mitigation measures. We recommend including the following additional measures in either the Air Quality or Health and Safety BMPs: <ul style="list-style-type: none"> • Include training for workers and supervisors on the potential presence of Valley Fever spores, methods to minimize exposure, and how to recognize symptoms. • Limit workers' exposure to outdoor dust in disease-endemic areas by (1) providing air-conditioned cabs for vehicles that generate dust and making sure workers keep windows and vents closed, (2) suspending work during heavy winds, and (3) directing them to remove dusty clothing after fieldwork and store in closed plastic bags until washed. • When exposure to dust is unavoidable, provide approved respiratory protection to filter particles. 	The Applicant has committed to preparing and implementing dust-control BMPs for both tribal and non-tribal lands. The APM regarding dust control in Appendix C has been modified to make this more clear. The suggested measures to reduce potential worker exposure to the <i>Coccidioides</i> fungus have been added as agency-required mitigation in Appendix C of the EIS.	The APM for dust control has been modified in Appendix C. These measures to minimize Valley Fever risk to workers have been added in Appendix C of the EIS.
	B - 6	Recommendation: Consider methods to share the effectiveness of the modified fence design in facilitating and maintaining desert tortoise movement. Lead agencies, the public, and private companies implementing other solar projects in the area would benefit from learning if raising the fence line can reduce impacts to this species. Consider providing status updates once operations begin and consider posting them on the project website.	The USFWS will be responsible for the monitoring of desert tortoise movements and the collection / maintenance of that data.	No change necessary.
Jim Balderson P.E. Nevada Division of Environmental Protection (NDEP), Bureau of Safe Drinking Water	C	No comment on this project.	Comment noted.	No change necessary.
Deann McKay Nevada Division of State Lands (NDSL)	D	In reviewing the ESM Solar Project below, it is noted to be adjacent to the Valley of Fire State Park and the Clark County Grant Lands. Should any components of the project require use of state owned land, the proponent would need to submit an application to the Nevada Division of State Lands which can be found here: http://p://lands.nv.gov/uploads/documents/APPLICATION_FORM_StateLands2019Fillable.pdf	The proposed ESM Solar Project is located on the Moapa Indian River Reservation. The Project site is approximately 10 miles west of the Valley of Fire State Park. The nearest point of the proposed gen-tie line is approximately 6 miles west of the Park. The nearest State school trust lands are about 3 to 4 miles from the north end of the proposed gen-tie line. The Project does not propose to use any state-owned land.	No change necessary.

**Eagle Shadow Mountain Solar Project
FINAL ENVIRONMENTAL IMPACT STATEMENT (FEIS)
RESPONSES TO COMMENTS ON THE DRAFT EIS**

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
Rebecca Lynn Palmer Administrator/State Historic Preservation Officer Nevada State Historic Preservation Office	E	The Nevada SHPO has reviewed this document and supports it as written. The SHPO does not recommend any changes.	Comment noted.	No change necessary.
Nevada Division of Water Resources	F	All Nevada water laws must receive full compliance; any transfer of water rights may be submitted to the State Engineers office as per NRS 533.384; the State Engineer is authorized and is responsible for maintaining water right files and accompanying documents as per NRS Chapters 111, 240, 375, 532, 533 and 534.	Comment noted.	No change necessary.