VOLUME 2

Final
Supplemental Environmental Impact Statement

Arrow Canyon 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

Estimated Lead Agency
Total Costs Associated with
Developing and Producing This EIS
$ 1,480,000

November 2020

Volume 2

Final

SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (FSEIS)

ARROW CANYON SOLAR 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

November 2020

VOLUME 2
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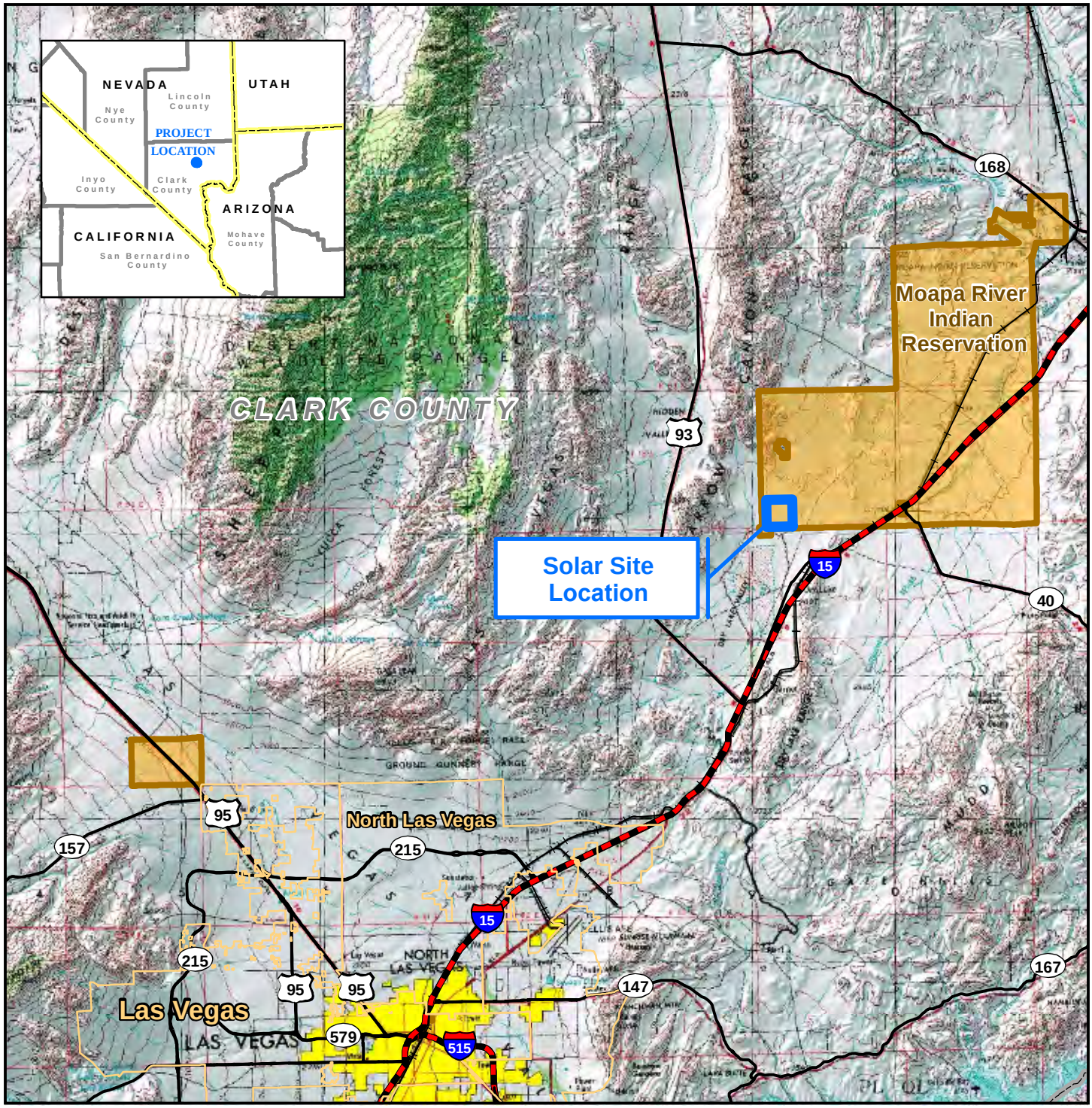


Legend

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

Jurisdictional Land Ownership

- Indian Reservation

0 2 4 6 8 10

Miles

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

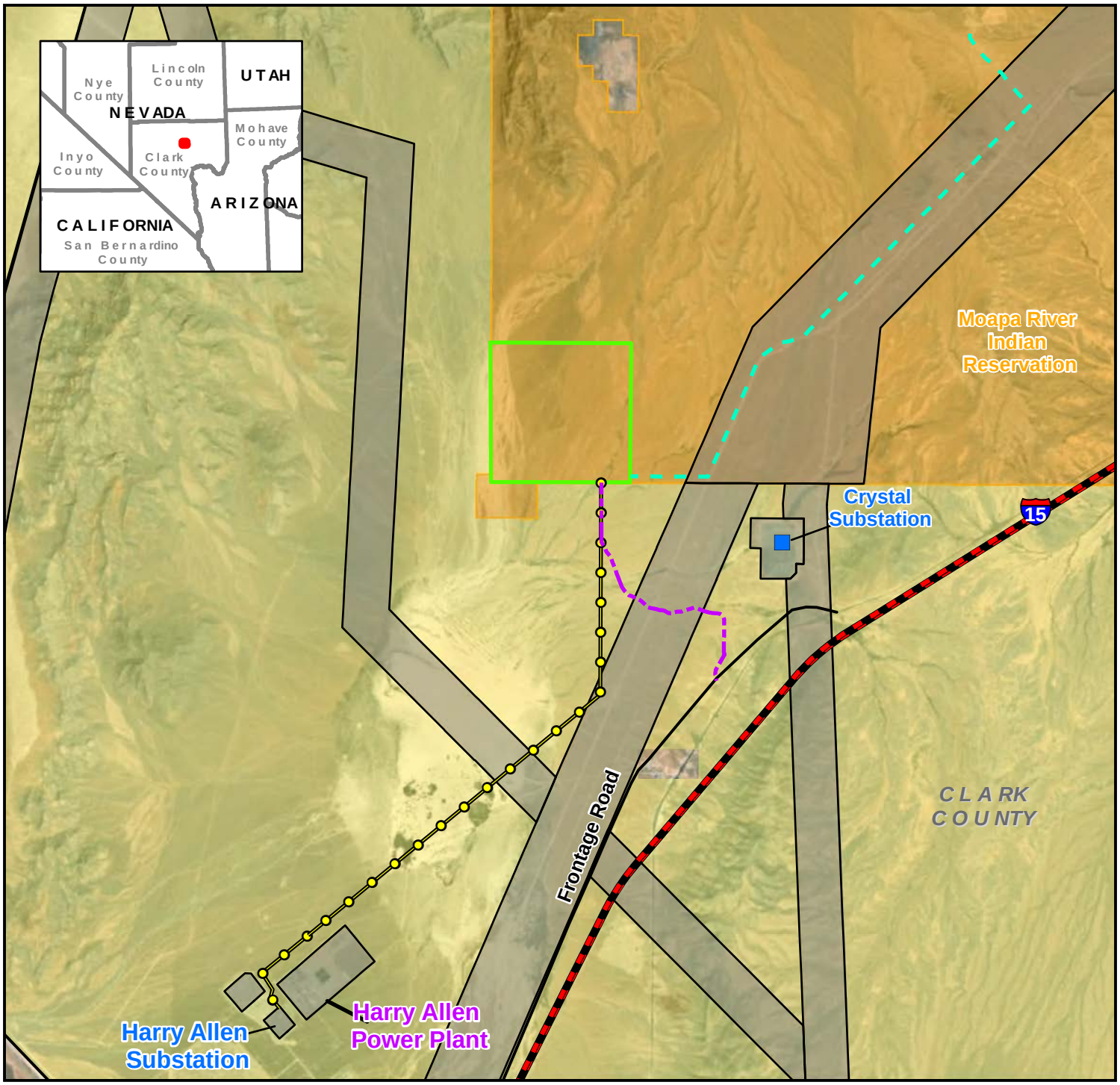
Arrow Canyon Solar Project

FIGURE 1-1
PROJECT LOCATION

Map Extent: Clark County, Nevada

Date: 06-07-13		Author: djb

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



Project Components

- Gen-Tie - Approved
- Access Road - Approved
- Water Pipeline - Approved
- Original MSEC Boundary - Approved

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

0 1 2

Miles

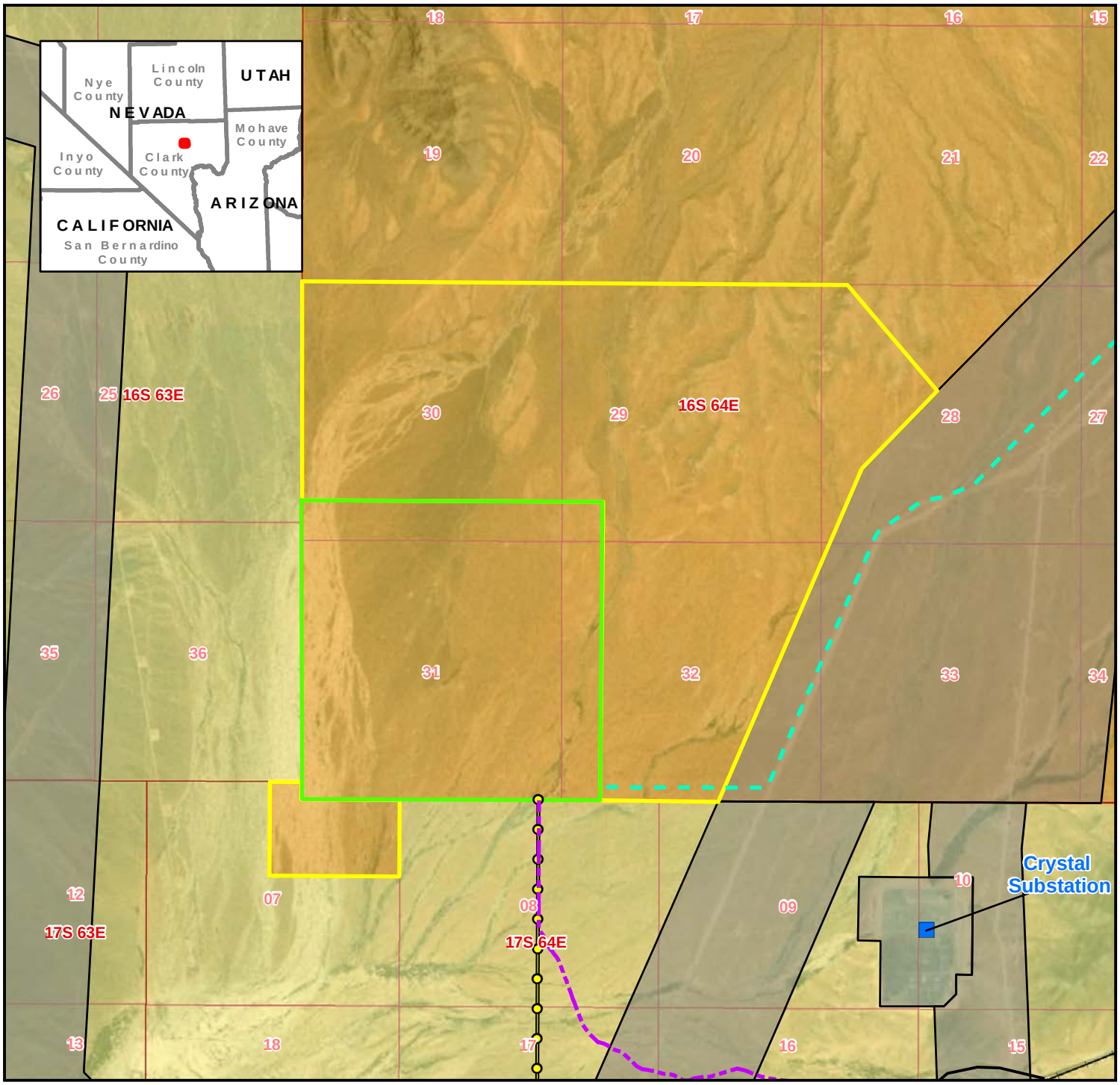
Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

ARROW CANYON SOLAR PROJECT

Figure 1-2
Originally Approved MSEC Project

Map Extent: Clark County, Nevada

Date: 02-17-20 | Author: rnc



Project Components

- Gen-Tie - Approved
- Access Road - Approved
- Water Pipeline - Approved
- Arrow Canyon Expansion Area
- Original MSEC Boundary - Approved

General Features

- Existing Substation
- Interstate
- Major Highway
- Railroad
- Stream or River
- Designated Utility Corridor
- Municipal Boundary
- Township / Range
- Section Line

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Land

0 0.25 0.5

Miles

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

ARROW CANYON SOLAR PROJECT

Figure 1-3
Solar Field Expansion Area

Map Extent: Clark County, Nevada

Date: 02-17-20 | Author: rnc

Moapa Town

Aiya Solar Project
(approved not built)

Muddy River

Reid Gardner Substation

78

Moapa River Indian Reservation

CLARK COUNTY

Eagle Shadow Mountain Solar Project
(approved, under contruction)

K-Road Solar Project
(existing)

Arrow Canyon Solar Project
(proposed)

Moapa Solar Energy Center
(approved not built)

Crystal Substation

15

40

California Wash

South Fork Overton Wash

Legend

Solar Projects

- Eagle Shadow Mountain Solar Project (approved, under contruction)
- Arrow Canyon Solar Project (proposed)
- K-Road Solar Project (existing)
- Moapa Solar Energy Center (approved not built)
- Aiya Solar Project (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

0 1 2 3

Miles

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

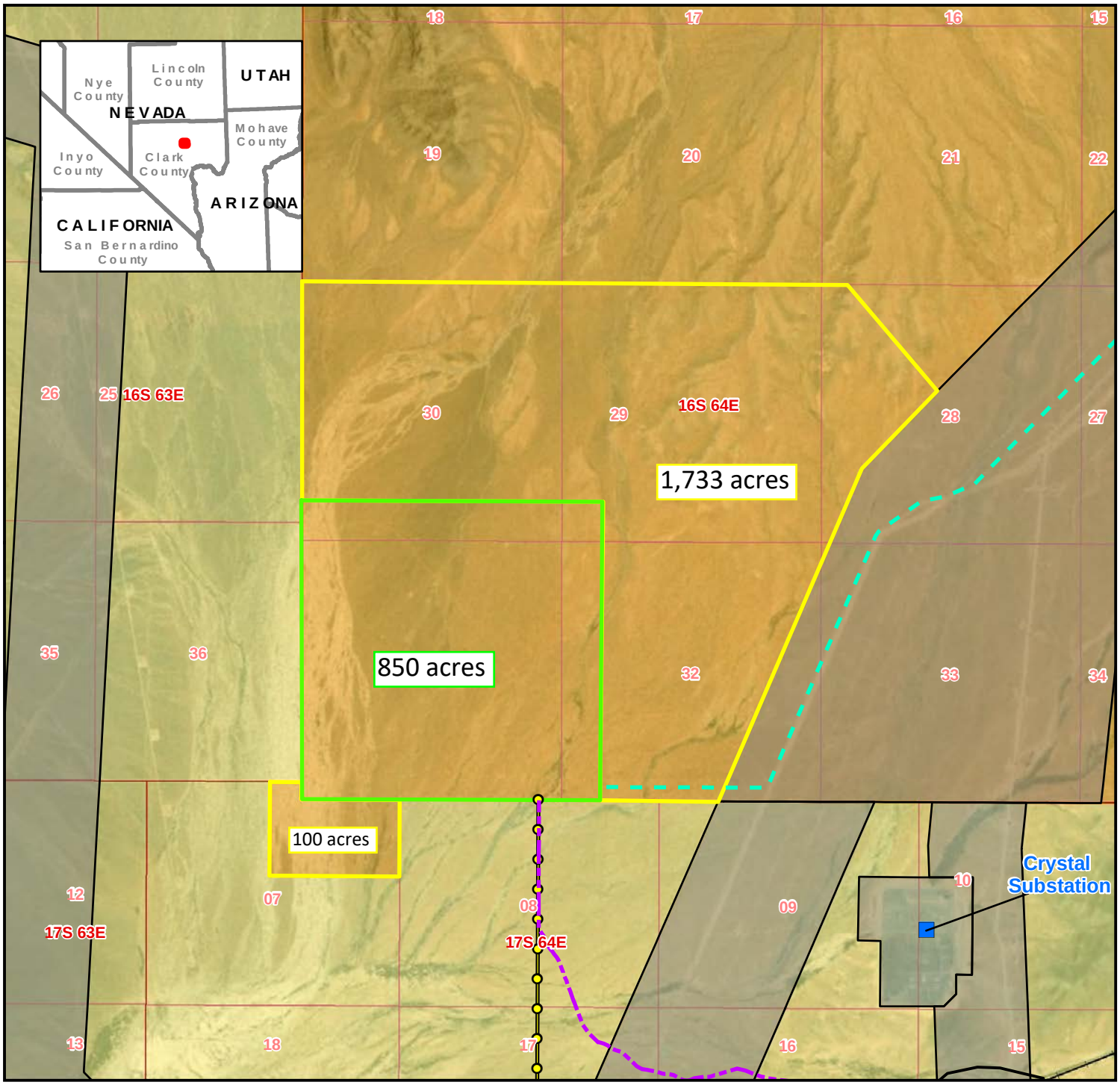
Arrow Canyon Solar

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

Map Extent: Clark County, Nevada

Date: 12-07-20 | Author: rnc

G:\MXD's/Project Location_120720.mxd



LEASE STUDY AREA ACRES

850 acres - original site

1,733 acres - outside corridor

100 acres - SW expansion area

2,683 - Total Lease Study Area Acres

Can develop up to 2,200 acres out of 2,683 acres within lease study area

0 0.25 0.5

Miles

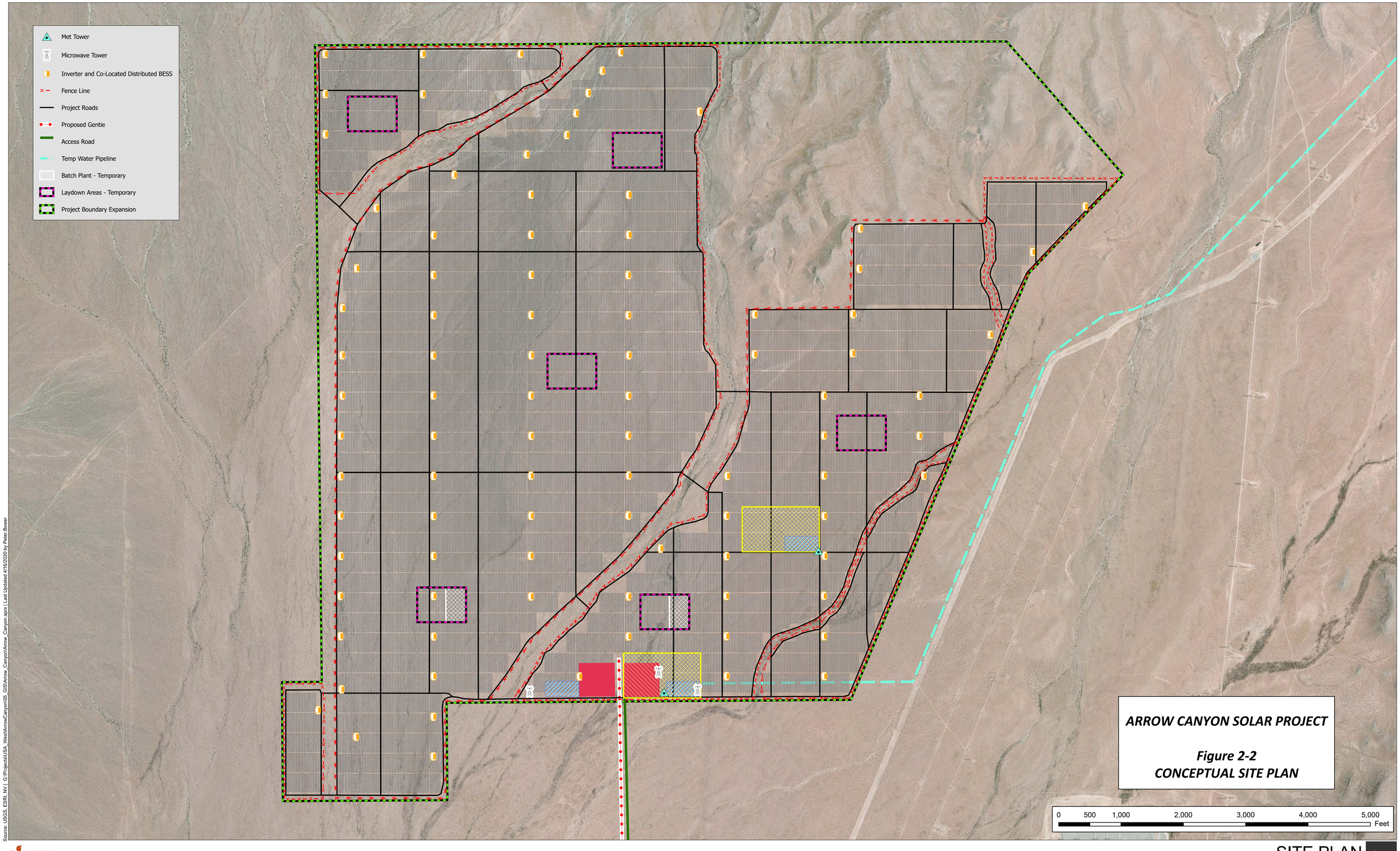
Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

ARROW CANYON SOLAR PROJECT

Figure 2-1
Project Acreages

Map Extent: Clark County, Nevada

Date: 02-17-20 | Author: rnc



ARROW CANYON SOLAR PROJECT

Figure 2-2
CONCEPTUAL SITE PLAN

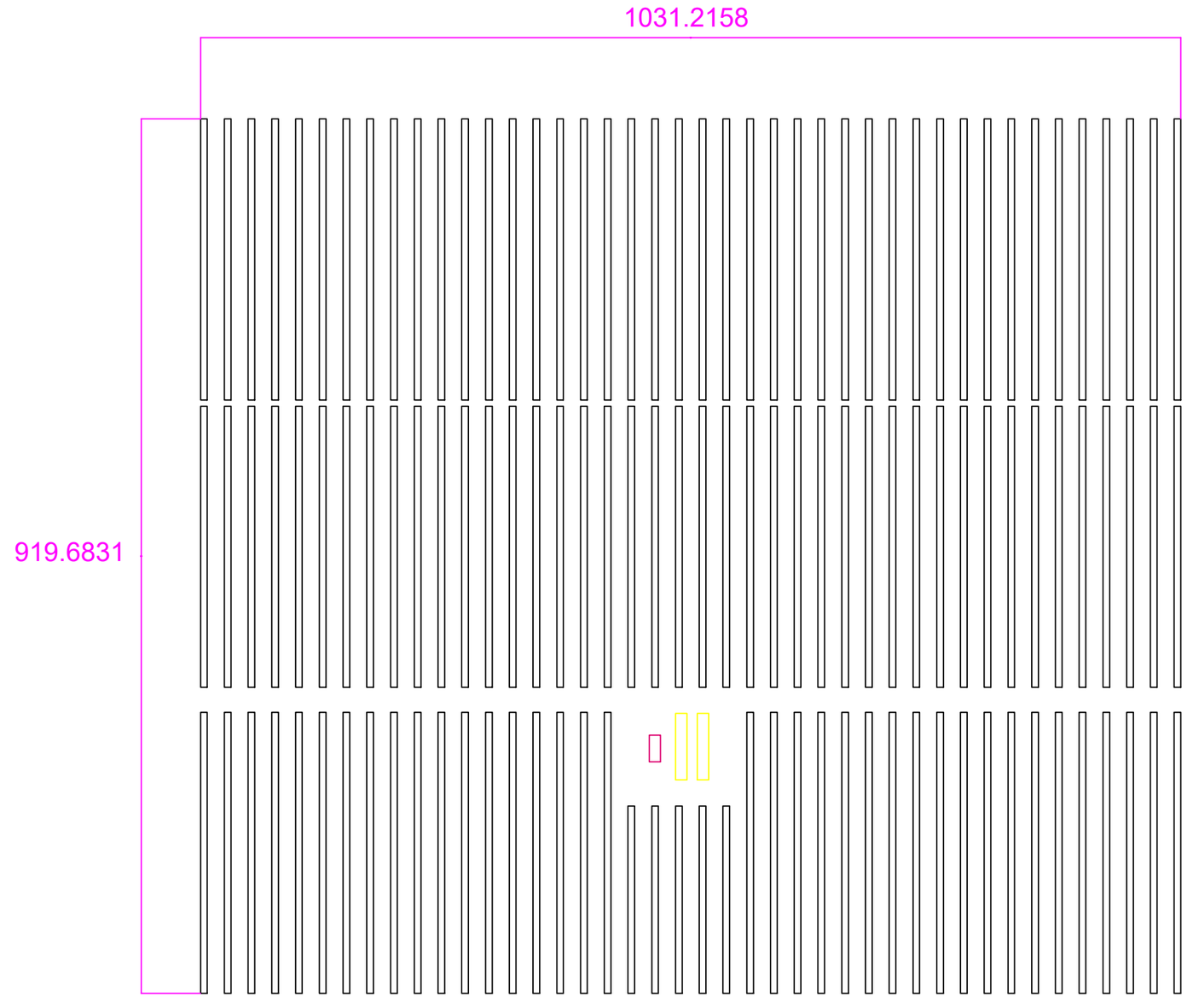
Source: USGS, ESRI, NV | C:\Projects\USA - West\ArrowCanyon\05_GIS\Arrow_Canyon\Arrow_Canyon.aprx | Last Updated 4/16/2020 by Peter Bower

EDF renewable energy

SITE PLAN SP

Arrow Canyon Solar Project | Clark County, Nevada

Conceptual



N

EDF- Renewable Energy
15445 Innovation Drive
San Diego, CA 92128

PROJECT OWNER

EDF- Renewable Energy
15445 Innovation Drive
San Diego, CA 92128

PROJECT ENGINEER

Job Name	Project Name
Date	
Designed By	
Drawn By	
Checked By	

REVISION BLOCK

Symbol	Date	By	Revisions

LEGEND

Figure 2-3

PROJECT DETAILS

Arrow Canyon

PROJECT NAME

Conceptual Block Design

TITLE SHEET

1. Conceptual design. Actual design to be provided by contractor.
2. Drawings are preliminary and draft unless otherwise stated. Variations in system design can occur.
3. Designs, Layouts, Locations and any other information found in this or any linked set of drawings are property of EDF Renewable Energy Corp.
   Use of the drawings or any part of these drawings requires prior consent from EDF Renewable Energy Corp.
4. This drawing is for permitting purposes only. Not for Construction.

NOTES

v.1

SHEET NO.

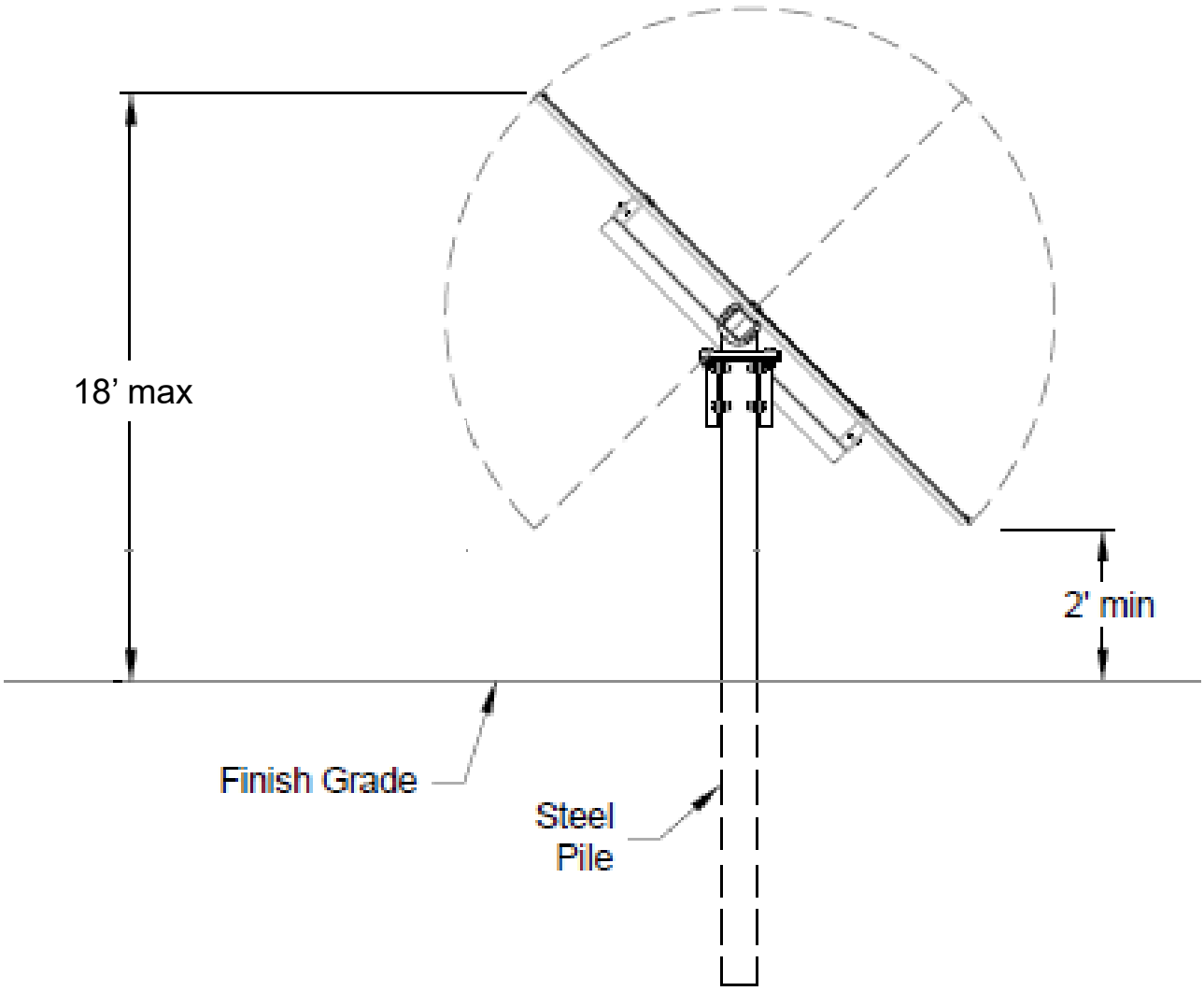
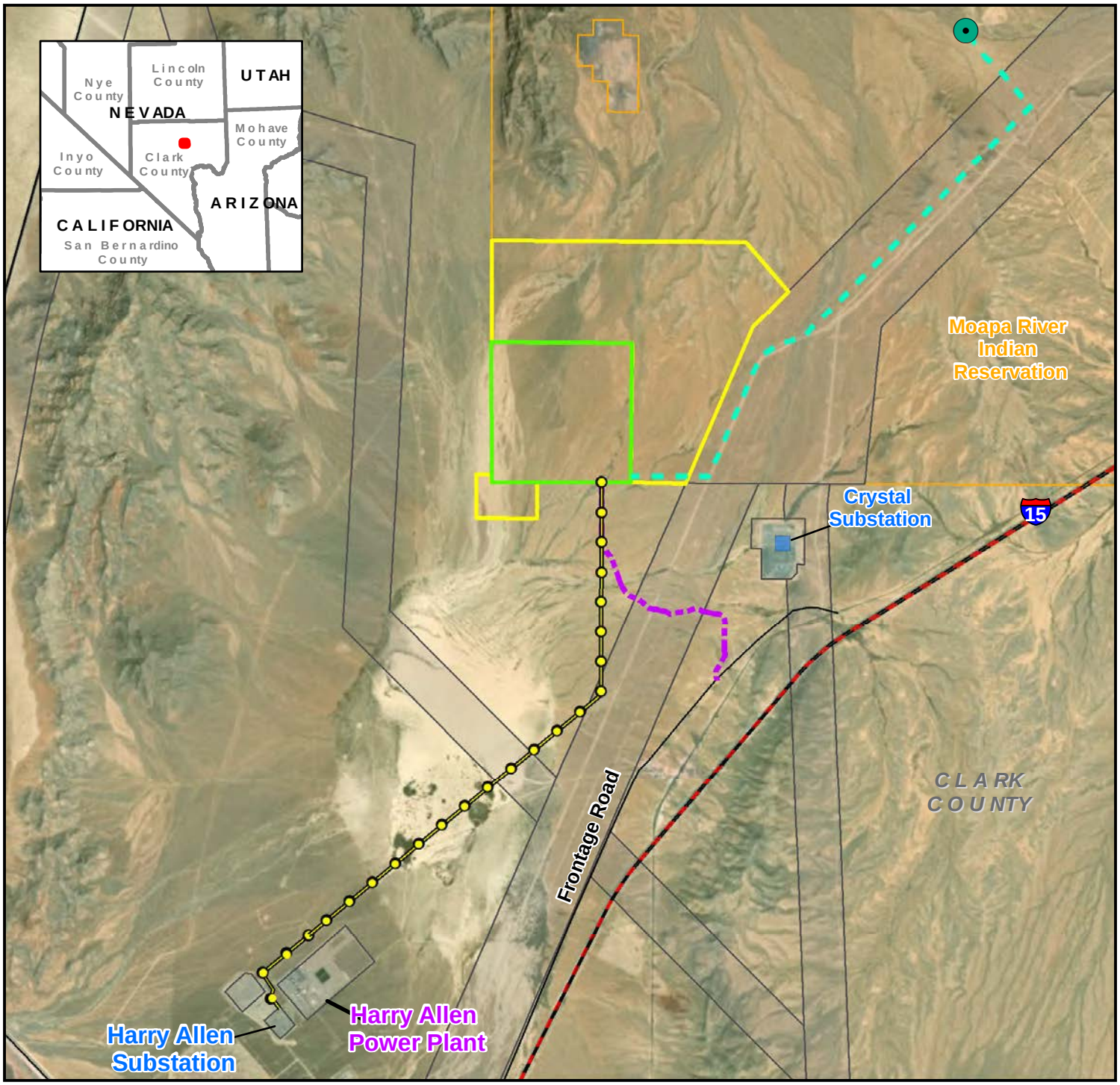


Figure 2-4

Typical Tracker PV Mounting System



Project Components

- Gen-Tie - Approved
- Access Road - Approved
- Water Pipeline - Approved
- Arrow Canyon Expansion Area
- Original MSEC Boundary - Approved

General Features

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

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Land

0 1 2

Miles

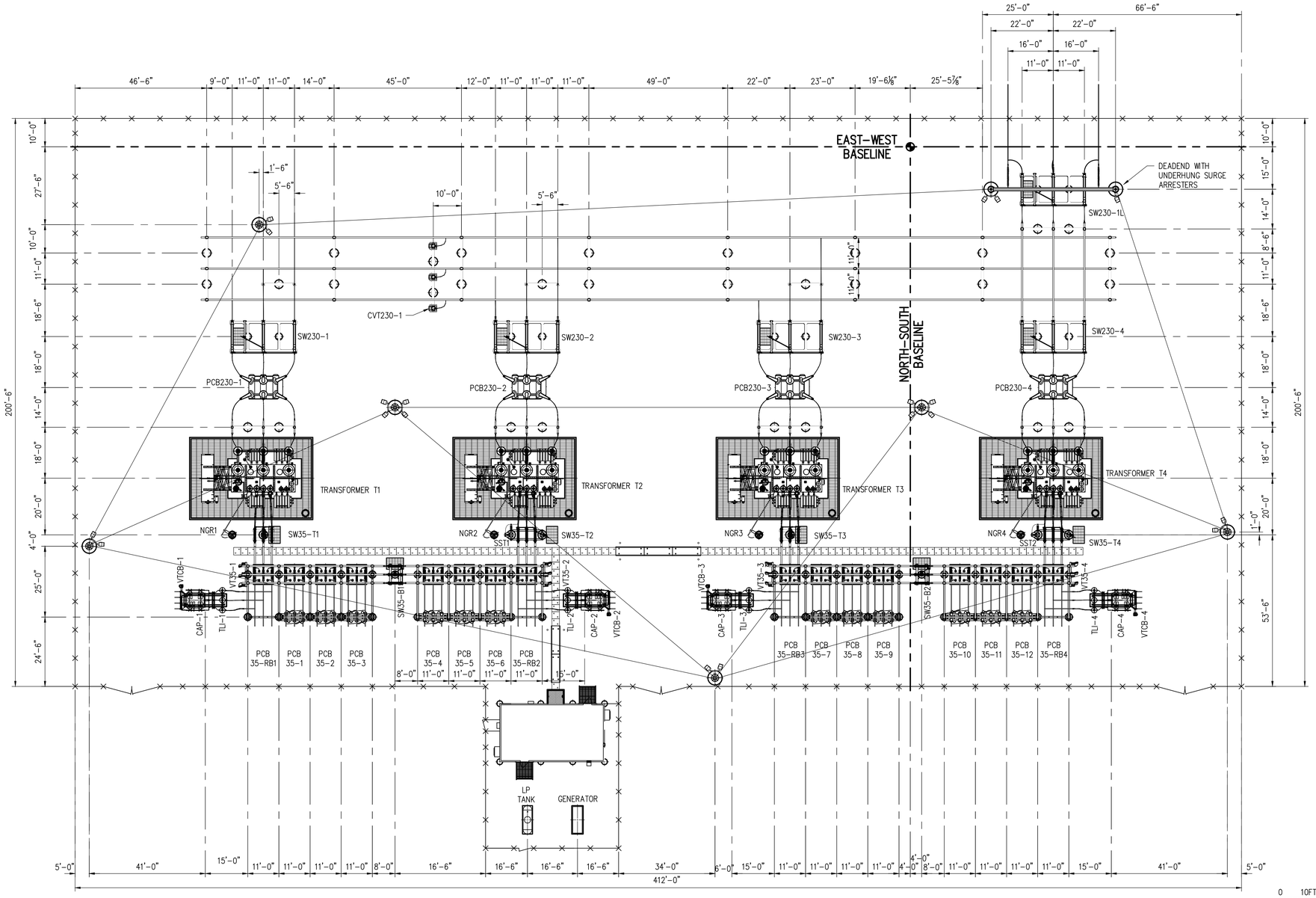
Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

ARROW CANYON SOLAR PROJECT

Figure 2-5
Previously-Approved ROWs

Map Extent: Clark County, Nevada

Date: 03-24-20 | Author: rnc



0 10FT 20FT 40FT

SCALE: 1"=20'–0"

STRUCTURE DESIGN CRITERIA

230 kV CLEARANCE: (900kV BIL)

LIVE PARTS: MIN ø–G=71"
MIN ø–ø=89"

TO GRADE: 15'–0" (BUS)
27'–0" (DRIVEWAY)

34.5 kV CLEARANCE: (200 kV BIL)

LIVE PARTS: MIN ø–G=13"
MIN ø–ø=18"

TO GRADE: 10'–0" (BUS)
22'–0" (DRIVEWAY)

NOTES

ARROW CANYON SOLAR PROJECT

Figure 2-6

Site Substation Conceptual Layout

PRELIMINARY
NOT FOR CONSTRUCTION

FILE LOCATION: L:\EDF RENEWABLE\EDF–XXX PALEN\SUBSTATION\100 CADD\110 WORKING\111 PHYSICAL\PALEN 460 MW\ALS–D–P003–1–OPTION 2.DWG LAST SAVED BY: jdpinnick 9/12/2018 3:36 PM PLOTTED BY: Jill D. Pinnick 9/12/2018 3:37 PM Tab: ALS–D–P003–1

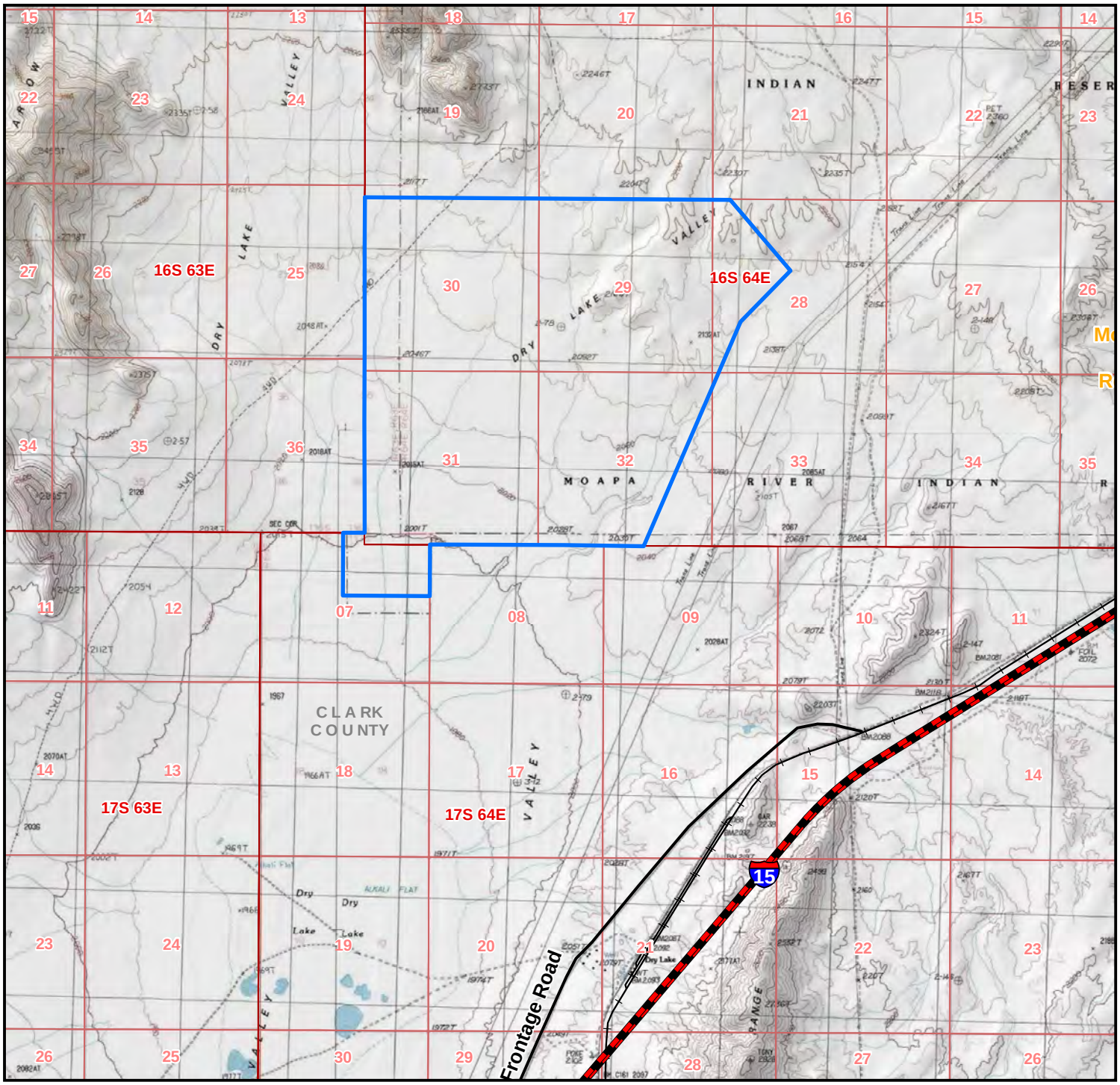
"Engineering with Distinction"
ELECTRICAL CONSULTANTS, INC.
BILLINGS, MONTANA

NO	REVISION	DATE	BY	APR
A	PRELIMINARY	08/23/18	STD	JMT

edF renewables

ENGINEERING RECORD		DATE
DRAWN	DENNING	08/23/18
DESIGNED	DENNING	08/23/18
CHECKED		
APPROVED		
DWG SCALE: 1" = 20'	PLT SCALE: 1:1	

DWG. NAME: ALS–D–P003–1 – OPTION 2 REVISION NO : A



Legend

- Arrow Canyon Project Area
- Interstate
- Major Highway
- Railroad
- Stream or River
- Municipal Boundary
- Township / Range
- Section Line

0 0.25 0.5 0.75 1

Miles

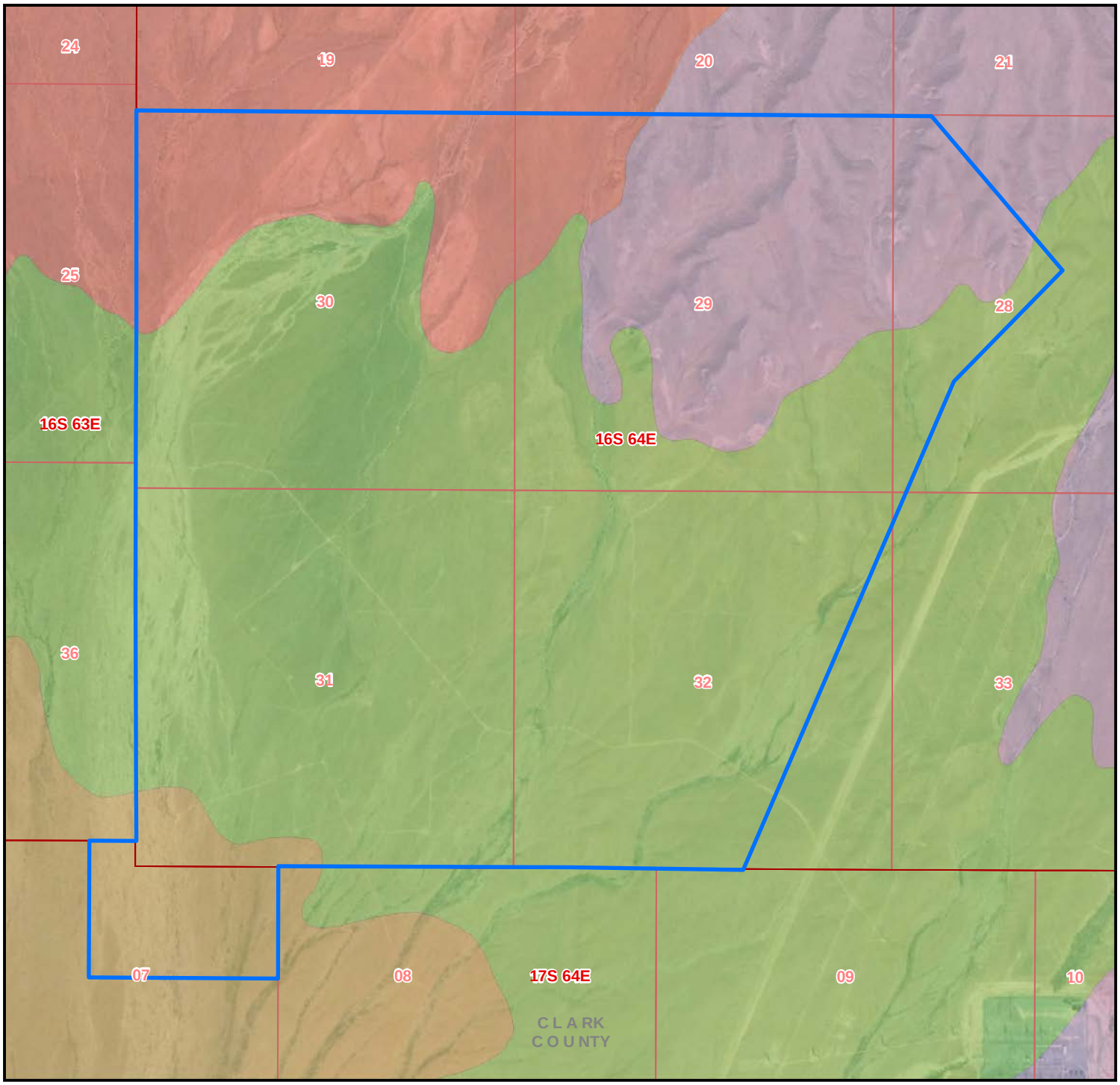
Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

ARROW CANYON SOLAR PROJECT

FIGURE 3-1
LOCAL TOPOGRAPHY

Map Extent: Clark County, Nevada

Date: 06-23-20 | Author: rnc

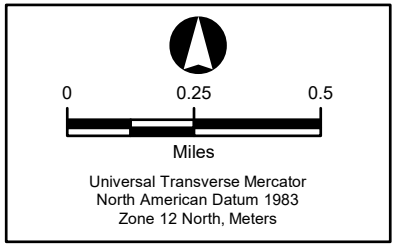


Legend

- Arrow Canyon Project Area
- Stream or River
- Township / Range
- Section Line

Soil Type

- BHC - Bard gravelly fine sandy loam, 2 to 8 percent slopes
- BNB - Bard very stony loam, 2 to 4 percent slopes
- Gv - Grapevine loam
- Ir - Ireteba loam



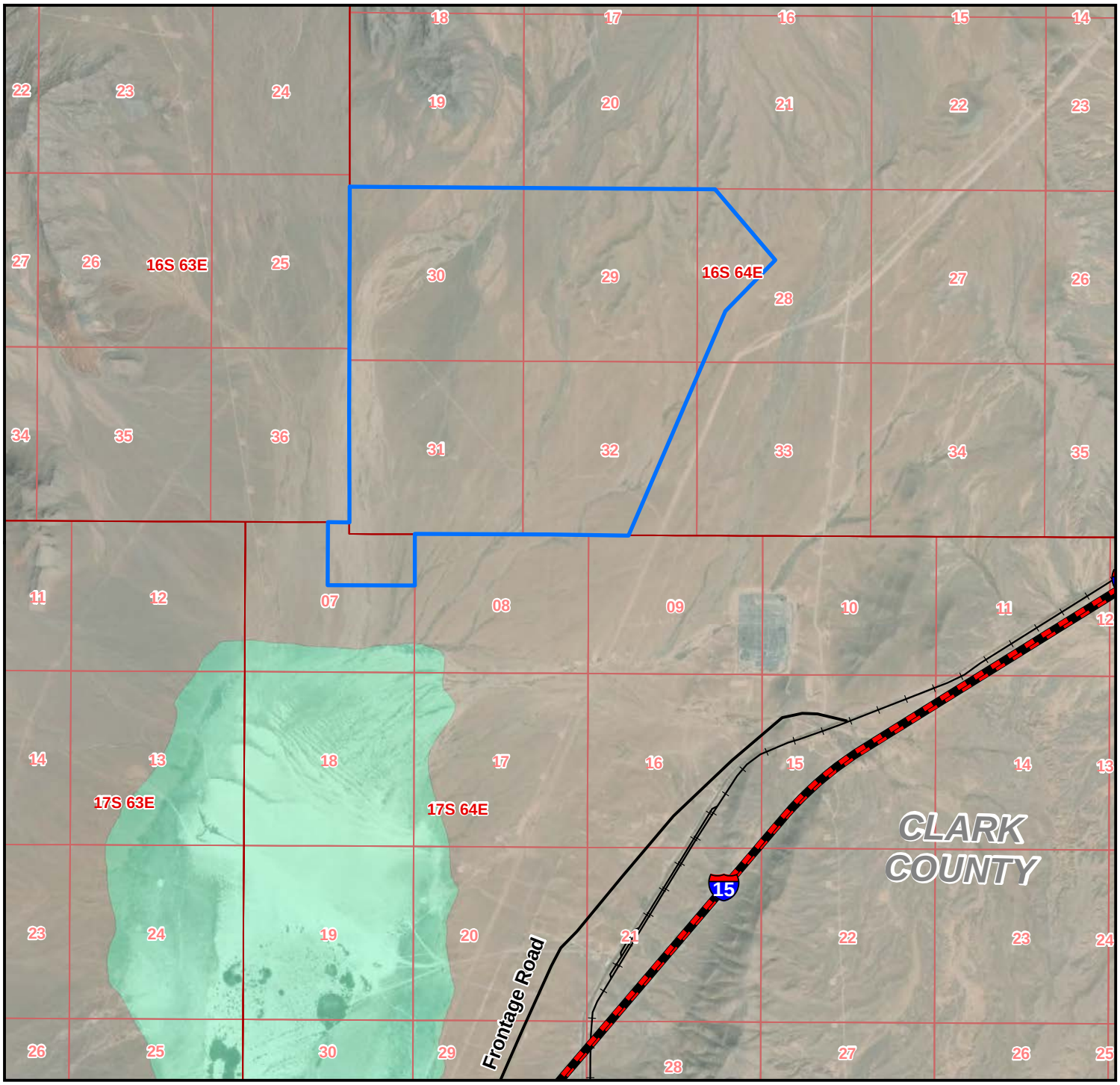
Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

ARROW CANYON SOLAR PROJECT

FIGURE 3-2
SOIL TYPE MAP

Map Extent: Clark County, Nevada

Date: 06-23-20 | Author: rnc



Legend

- Arrow Canyon Project Area
- Interstate
- Major Highway
- Railroad
- Stream or River
- Township / Range
- Section Line

FEMA Flood Zone

- FEMA Flood Zone X
- FEMA Flood Zone A

0 0.25 0.5 0.75 1

Miles

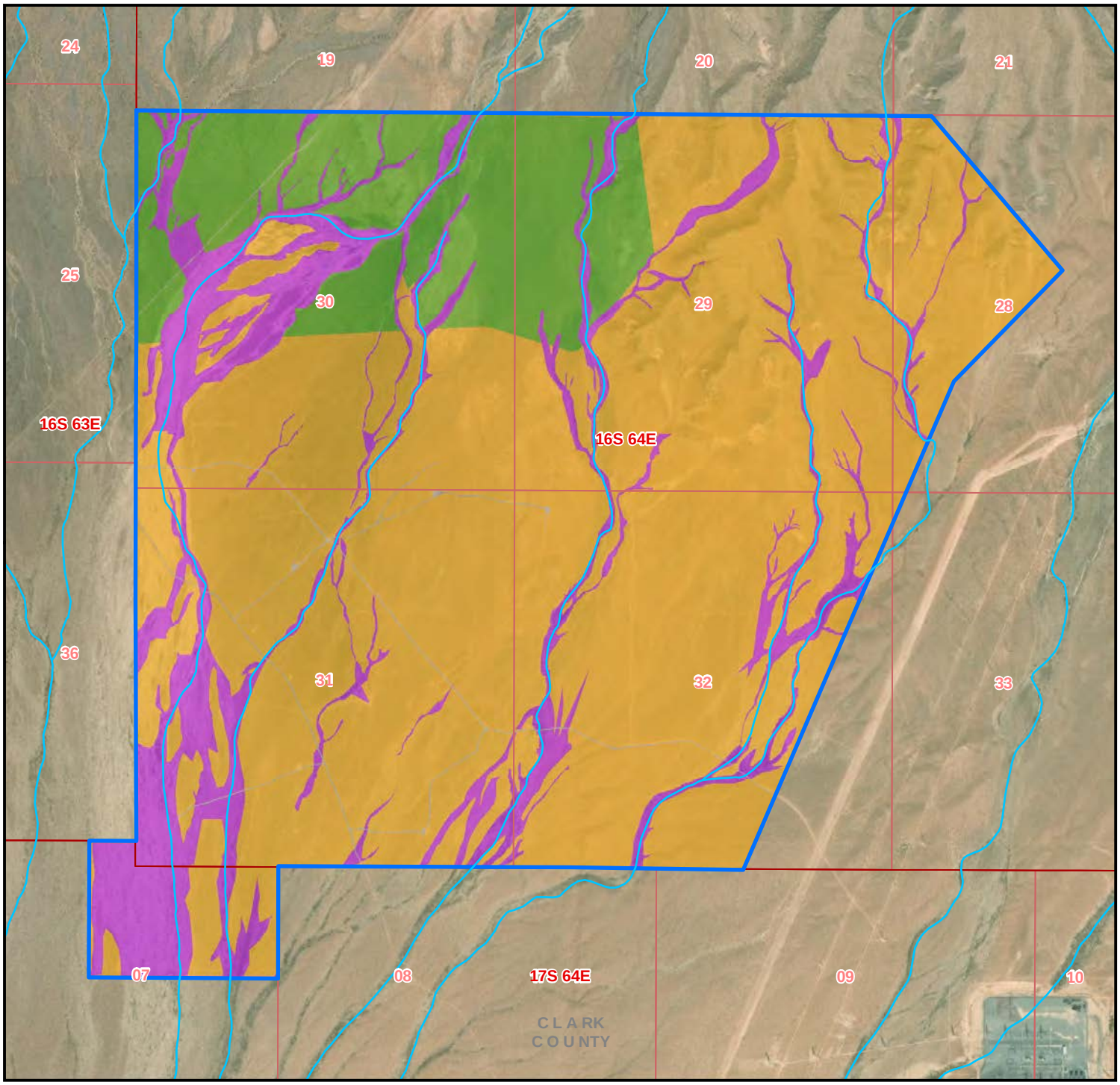
Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

ARROW CANYON SOLAR PROJECT

FIGURE 3-3
FEMA FLOOD ZONE MAP

Map Extent: Clark County, Nevada

Date: 06-25-20 | Author: rnc



Legend

- Arrow Canyon Project Area
- Stream or River
- Township / Range
- Section Line

Vegetation Covertype

- Creosote-White Bursage
- Disturbed
- Mojave Yucca Scrub
- Xeroriparian

0 0.25 0.5

Miles

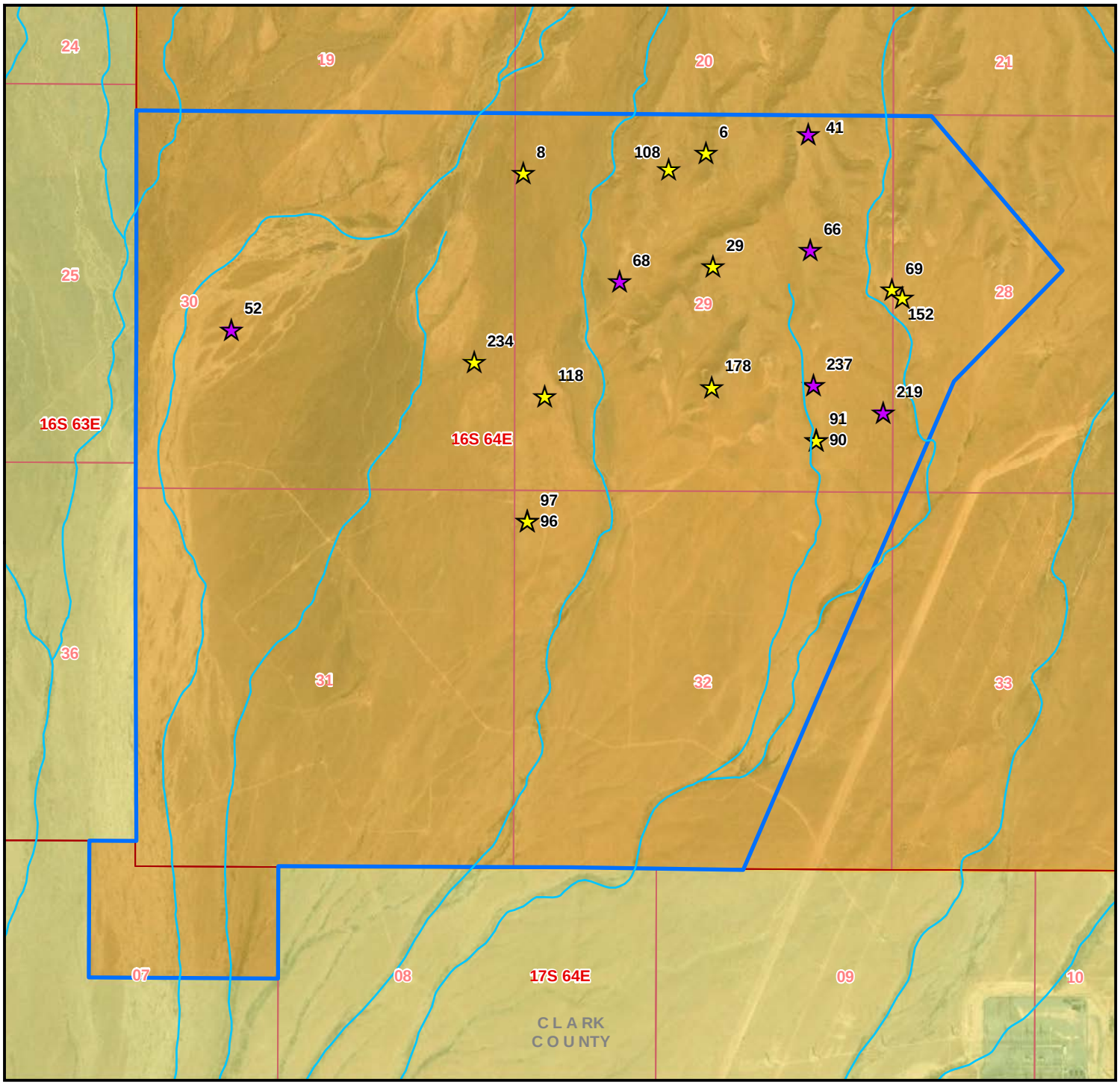
Universal Transverse Mercator
North American Datum 1983
Zone 12 North, Meters

ARROW CANYON SOLAR PROJECT

FIGURE 3-4
VEGETATION COVERTYPE MAP

Map Extent: Clark County, Nevada

Date: 06-25-20 | Author: rnc



Legend

- Arrow Canyon Project Area
- Stream or River
- Township / Range
- Section Line

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Land

Survey Results

- Live Desert Tortoise Observation - Adult
- Live Desert Tortoise Observation - Juvenile

0 0.25 0.5

Miles

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

ARROW CANYON SOLAR PROJECT

FIGURE 3-5
DESERT TORTOISE SURVEY RESULTS

Map Extent: Clark County, Nevada

Date: 06-23-20 | Author: rnc

ARROW CANYON SOLAR PROJECT

Figure 3-6

VIEWSHED ANALYSIS

LEGEND

- KEY OBSERVATION POINT
- PROJECT BOUNDARY
- PROJECT VISIBILITY 15 MILE RADIUS
- ROADS
- OLD SPANISH TRAIL
- SECTION LINES
- RIVERS

N
W E
S

0 0.75 1.5 3 4.5 6 Miles

NOTES:
SOLAR PROJECT VIEWSHED PROJECTED BY (15) -18' TALL STRUCTURES DISTRIBUTED IN PROJECT BOUNDARY

4/27/2020

Figure 3-7a
Existing View from KOP 2
Looking North from I-15 about 3.5 Miles South of the Project Site

Figure 3-7b
Visual Simulation of Original MSEC Project from KOP 2
Looking North from I-15 about 3.5 Miles South of the Project Site

Figure 3-7c
Visual Simulation of ACSP from KOP 2
Looking North from I-15 about 3.5 Miles South of the Project Site

FIGURE 3-8a
EXISTING VIEW FROM KOP 3
LOOKING NORTHWEST FROM I-15 ABOUT 2.0 MILES SOUTHEAST OF THE PROJECT SITE

Figure 3-8b
Visual Simulation of Original MSEC Project from KOP 3
Looking Northwest from I-15 about 2.0 Miles Southeast of the Project Site

Figure 3-8c
Visual Simulation of ACSP from KOP 3
Looking Northwest from I-15 about 2.0 Miles Southeast of the Project Site

Figure 3-9a
Existing View from KOP 4
Looking West from Route 40 / Old Spanish Trail about 6.75 Miles East-Southeast of the of the Project Site

Figure 3-9b
Visual Simulation of Original MSEC Project from KOP 4
Looking West from Route 40 / Old Spanish Trail about 6.75 Miles East-Southeast of the of the Project Site

Figure 3-9c

Visual Simulation of ACSP from KOP 4

Looking West from Route 40 / Old Spanish Trail about 6.75 Miles East-Southeast of the of the Project Site

Figure 3-10a
Existing View from KOP 5
Looking Northwest from the Old Spanish Trail about 7.0 Miles Southeast of the of the Project Site

Figure 3-10b

Visual Simulation of Original MSEC Project Project from KOP 5

Looking Northwest from the Old Spanish Trail about 7.0 Miles Southeast of the of the Project Site

Figure 3-10c

Visual Simulation of ACSP from KOP 5

Looking Northwest from the Old Spanish Trail about 7.0 Miles Southeast of the of the Project Site

Appendix B

Scoping Report

ARROW CANYON SOLAR PROJECT

SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

SCOPING REPORT

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

March 2020

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

1.0 INTRODUCTION

Arrow Canyon Solar LLC (Applicant), a subsidiary of EDF Renewables Development, Inc. (EDFR), has entered into an agreement with the Moapa Band of Paiute Indians (Moapa Band or Band) to expand the solar field lease area for the previously approved but not yet constructed Moapa Solar Energy Center (MSEC) Project located on the Moapa River Indian Reservation (Reservation) in Clark County, Nevada. The solar field ground lease would be expanded from the previously approved 850 acres to up to 2,200 acres for constructing, operating and maintaining, and decommissioning a 200-megawatt (MW) solar energy generating facility using photovoltaic (PV) technology. The expanded solar field and associated facilities are now referred to as the Arrow Canyon Solar Project (ACSP or Project).

The Bureau of Indian Affairs (BIA), as lead agency, in cooperation with the Moapa Band, the Bureau of Land Management (BLM), Environmental Protection Agency (EPA), and the US Fish and Wildlife Service (USFWS)are preparing a Supplemental Environmental Impact Statement (SEIS) that will evaluate the expansion of the ACSP solar field.

The National Environmental Policy Act (NEPA) scoping process is designed to inform and 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 SEIS. 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 SEIS.

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 D** of this report.

PROJECT DESCRIPTION

The proposed ACSP solar generating facility would be constructed entirely within the Reservation on up to 2,200 acres located within a lease study area of approximately 2,683 acres of tribal trust land. These lands are all located within the Reservation in an area set aside by the Band exclusively for the ACSP.

Impacts from the original MSEC Project were analyzed in accordance with the NEPA in a Final Environmental Impact Statement (FEIS) published in February 2014 by the BIA as the lead federal agency. The BLM, the Moapa Band, and others served as cooperating agencies. A Record of Decision (ROD) was signed by the BIA in May 2014 and the solar ground lease was approved one month later in June 2014. The BLM also signed a ROD in May 2014 and issued the necessary rights-of-way (ROW) for the project's linear features in August 2015 (ROW N-88870). The Project's linear features include the following: 1) the Project's main access road from North Las Vegas Boulevard crossing approximately 2.4 miles of federal lands to the Project boundary on the Reservation; 2) a 230-kilovolt generation-tie (gen-tie) line crossing approximately 5.7 miles of federal land from the Project site to the NV Energy-owned Harry Allen Substation; and 3) a water pipeline between an existing water well located on the Reservation and the Project site but within a designated utility corridor managed by the BLM. Currently, the approved MSEC Project and associated linear features have not yet been constructed.

In March 2017, EDFR purchased the MSEC Project and renamed it the ACSP. EDFR subsequently transferred the project to Arrow Canyon Solar, LLC (Applicant) - a fully owned subsidiary of EDFR. In May 2018, the Applicant reached agreement with the Moapa Band to expand the ACSP solar site on the Reservation from the previously-approved 850 acres to 2,200 acres to accommodate the currently planned Project that includes the PV solar field and a battery energy storage system (BESS).

The previously approved linear ancillary facilities, (i.e. main access road, 230kV gen-tie line, and water pipeline) would remain a part of the ACSP project description. They would be unchanged and would be developed as described in the ROW issued by the BLM.

The SEIS analysis will focus on the expansion of the previously approved MSEC solar field.

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 ACSP and solicited their comments.

The BIA announced the Project and the initiation of the scoping process, held public scoping meetings, and invited the public to comment and ask questions. The 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 SEIS, which described the project, announced the public scoping meetings, and outlined the ways to provide comments. The NOI was published in the Federal Register on January 30, 2020 and can be found in **Appendix A**.

PROJECT WEBSITE

A Project website was established for access by anyone at any time during the SEIS process. It provides Project information and an opportunity to submit comments. The website will remain active for the duration of the SEIS process and can be accessed at https://www.arrowcanyonsolarseis.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.

Over 70 scoping letters and maps were mailed on February 2, 2020. 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. The publications included:

- Las Vegas Review-Journal - on February 9 and 16, 2020
- Moapa Valley Progress - on February 12 and 19, 2020

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 comment here" comment form at https://www.arrowcanyonsolarseis.com/.
- Comments could also be provided via email or telephone to Mr. Chip Lewis at chip.lewis@bia.gov; telephone: (602) 379-6750.
- 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 SCOPING MEETINGS

PUBLIC SCOPING MEETINGS

The BIA hosted two public information and scoping meetings – one on the Reservation and the other in Las Vegas at the BLM offices. 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 / Time	City/State/Zip	Address	Attendance
February 25, 2020 5:30PM to 7:00PM	Moapa, NV 89025	Moapa River Indian Reservation Tribal Hall One Lincoln Street	16*
February 26, 2020 5:30PM to 7:00PM	Las Vegas, NV 89130	BLM - Southern Nevada District Office 4701 North Torrey Pines Drive	2*
Total Attendance			**18**

**Note: These attendance numbers do not include individuals from BIA, Applicant, and their consultants.*

The public scoping meeting on the Reservation was conducted as a combination of open house and formal presentation. Sign-in sheets and handouts were available and posters were on display that described the project and NEPA process. Attendees were able to ask questions directly to the agency and Project representatives during the presentation and before/after while viewing posters. The meeting in Las Vegas did not include a formal presentation because the small number of attendees felt it was unnecessary. The same handouts / posters and opportunity to ask questions were provided.

HAND-OUTS

The following handouts were available at the public meetings:

- Copies of the Arrow Canyon scoping letter 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 the meeting on the Reservation, at approximately 5:30 pm, a formal presentation was provided followed by time for questions and answers and ending with an open house. As mentioned above, the meeting in Las Vegas did not include the formal presentation but included an open house.

Ms. Laura Watters, Chairperson of the Moapa Band of Paiute Indians, offered opening remarks. The presentation opened with a welcome and introductions by Mr. Chip Lewis, the Environmental Protection Officer for the BIA, and project manager for the ACSP SEIS.

Mr. Lewis provided an overview of the NEPA process followed by Randy Schroeder of ENValue (the SEIS consultant) who presented the proposed Project with an overview of the technical aspects of the ACSP 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. The scoping meeting presentation is provided in **Appendix C**.

A court reporter was present at both meetings to record the presentation and the public comments expressed. A transcript was provided for the meeting on the Reservation and is provided in **Appendix D**. A transcript was not generated for the meeting in Las Vegas.

INFORMATION STATIONS

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

- How to Participate
- Proposed Action
- NEPA Process/Schedule
- Involved Agencies
- Overall Project Description
- Photovoltaic Technology
- Associated Project Facilities

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

INTERAGENCY SCOPING MEETING

During the afternoon of February 26, an interagency scoping was held at the BLM / USFWS office in Las Vegas. In addition to BIA, the meeting was attended by representatives from USFWS, BLM, and EPA (by phone). **Appendix C** contains information from that meeting and a summary of the discussion is included in **Appendix D**.

4.0 COMMENT EVALUATION

COMMENTS RECEIVED

The scoping period began on January 30, 2020 - the date the NOI was published in the Federal Register. In addition to oral comments received at the two scoping meetings and an interagency meeting, there were 8 comment letters/forms received through a variety of means (see "Methods for Submitting Comments" for more details). All comments were evaluated and copies of them are contained in **Appendix D**.

PROCESSING COMMENTS

Each comment document was read to identify key issues. In some cases, a single comment document contained multiple comments that were identified by resource/issue categories.

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 SEIS.

5.0 ISSUE SUMMARY

This section provides a summary of the key issues identified by the comments provided during scoping for the Arrow Canyon Solar Project. These issues will be addressed in the SEIS analysis.

KEY ISSUES IDENTIFIED DURING SCOPING	
ISSUE TOPIC	**ISSUE/COMMENT**
Water Resources	Need to comply with relevant floodplain and stormwater requirements to minimize erosion and sediment production
	Avoid development within major washes
	Describe the amount and source of the water to be used during construction and operation
Soils	Should include measures to minimize soil disturbance to the extent possible
Vegetation	Should include measures to minimize vegetation clearing to the extent possible
	Should include measures to control weeds to the extent possible
Cultural Resources	Determine whether the lease expansion could have potentials effects to significant cultural sites in the lease study area that would need to be mitigated or avoided.
	Determine whether the project could impact the Old Spanish National Historic Trail
Socioeconomics	Describe the economic development opportunity for the Band
	Describe the jobs for tribal members and others in the region that would be created
	Confirm whether water pipeline is temporary vs permanent. If permanent, Band would prefer it located on tribal land instead of within federal corridor.
	Discuss maintenance on roads used for project access
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 expanded solar field could have on views of the landscape
Air Quality/Public Health	Measures should be implemented to control and minimize fugitive dust and to prevent worker exposure to Coccidioides spores, if present
Cumulative Impacts	Identify impacts from other solar projects and other developments in the area

KEY ISSUES IDENTIFIED DURING SCOPING	
ISSUE TOPIC	**ISSUE/COMMENT**
	Discuss trends of and cumulative impacts to key resources including desert tortoise

6.0 NEXT STEPS

The BIA will develop the Draft SEIS 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 SEIS for review and comment. During this period, the BIA will notify the public of the Draft SEIS availability via a Notice of Availability (NOA) published in the Federal Register and public notices in the local papers. There will also be public meetings where those who are interested may comment on the Draft SEIS.

Any public or stakeholder comments received on the Draft SEIS will be addressed in the Final SEIS. The availability of the Final SEIS 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 https://www.arrowcanyonsolarseis.com/.

Appendix A

Notice of Intent

Native Village of Minto
Native Village of Nanwalek (aka English Bay)
Native Village of Napaimute
Native Village of Napakiak
Native Village of Napaskiak
Native Village of Nelson Lagoon
Native Village of Nightmute
Native Village of Nikolski
Native Village of Noatak
Native Village of Nuiqsut (aka Nooiksut)
Native Village of Nunam Iqua (previously listed as Native Village of Sheldon's Point)
Native Village of Nunapitchuk
Native Village of Ouzinkie
Native Village of Paimiut
Native Village of Perryville
Native Village of Pilot Point
Native Village of Point Hope
Native Village of Point Lay
Native Village of Port Graham
Native Village of Port Heiden
Native Village of Port Lions
Native Village of Ruby
Native Village of Saint Michael
Native Village of Savoonga
Native Village of Scammon Bay
Native Village of Selawik
Native Village of Shaktoolik
Native Village of Shishmaref
Native Village of Shungnak
Native Village of Stevens
Native Village of Tanacross
Native Village of Tanana
Native Village of Tatitlek
Native Village of Tazlina
Native Village of Teller
Native Village of Tetlin
Native Village of Tuntutuliak
Native Village of Tununak
Native Village of Tyonek
Native Village of Unalakleet
Native Village of Unga
Native Village of Venetie Tribal Government (Arctic Village and Village of Venetie)
Native Village of Wales
Native Village of White Mountain
Nenana Native Association
New Koliganek Village Council
New Stuyahok Village
Newhalen Village
Newtok Village
Nikolai Village
Ninilchik Village
Nome Eskimo Community
Nondalton Village
Noorvik Native Community
Northway Village
Nulato Village
Nunakauyarmiut Tribe
Organized Village of Grayling (aka Holikachuk)
Organized Village of Kake
Organized Village of Kasaan
Organized Village of Kwethluk
Organized Village of Saxman
Orutsararmiut Traditional Native Council (previously listed as Orutsararmuit Native Village (aka Bethel))
Oscarville Traditional Village
Pauloff Harbor Village
Pedro Bay Village
Petersburg Indian Association
Pilot Station Traditional Village
Pitka's Point Traditional Council (previously listed as Native Village of Pitka's Point)
Platinum Traditional Village
Portage Creek Village (aka Ohgsenakale)
Pribilof Islands Aleut Communities of St. Paul & St. George Islands
Qagan Tayagungin Tribe of Sand Point (previously listed as Qagan Tayagungin Tribe of Sand Point Village) Qawalangin Tribe of Unalaska
Rampart Village
Saint George Island (See Pribilof Islands Aleut Communities of St. Paul & St. George Islands)
Saint Paul Island (See Pribilof Islands Aleut Communities of St. Paul & St. George Islands)
Salamatof Tribe (previously listed as Village of Salamatoff)
Seldovia Village Tribe
Shageluk Native Village
Sitka Tribe of Alaska
Skagway Village
South Naknek Village
Stebbins Community Association
Sun'aq Tribe of Kodiak (previously listed as Shoonaq' Tribe of Kodiak)
Takotna Village
Tangirnaq Native Village (previously listed as Lesnoi Village (aka Woody Island))
Telida Village
Traditional Village of Togiak
Tuluksak Native Community
Twin Hills Village
Ugashik Village
Umkumiut Native Village (previously listed as Umkumiute Native Village)
Village of Alakanuk
Village of Anaktuvuk Pass
Village of Aniak
Village of Atmautluak
Village of Bill Moore's Slough
Village of Chefornak
Village of Clarks Point
Village of Crooked Creek
Village of Dot Lake
Village of Iliamna
Village of Kalskag
Village of Kaltag
Village of Kotlik
Village of Lower Kalskag
Village of Ohogamiut
Village of Red Devil
Village of Sleetmute
Village of Solomon
Village of Stony River
Village of Venetie (See Native Village of Venetie Tribal Government)
Village of Wainwright
Wrangell Cooperative Association
Yakutat Tlingit Tribe
Yupiit of Andreafski

[FR Doc. 2020–01707 Filed 1–29–20; 8:45 am]

BILLING CODE 4337–15–P

DEPARTMENT OF THE INTERIOR

Bureau of Indian Affairs

[210A2100DD/AAKC001030/A0A501010.999900]

Supplemental Environmental Impact Statement for the Arrow Canyon 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) and other agencies, intends to prepare a Supplemental Environmental Impact Statement (SEIS) that will evaluate the expansion of the previously approved Moapa Solar Energy Center (MSEC) Project on the Moapa River Indian Reservation (Reservation). This project is now referred to as the Arrow Canyon Solar Project (Project) and this notice announces the beginning of the scoping process to solicit public comments and identify potential issues related to the expansion. 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 SEIS.

DATES: Written comments on the scope of the Project or implementation of the proposal must arrive by Monday, March 2, 2020. 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* at least 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; email: *Chip.Lewis@bia.gov.*

FOR FURTHER INFORMATION CONTACT: Mr. Chip Lewis, BIA Western Regional Office; 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 an amendment of the solar energy ground lease and related agreements entered into by the Moapa Band with Moapa

Solar LLC allowing the expansion of the solar field previously approved for the MSEC Project. The agreements provide for construction, operation and maintenance (O&M), and decommissioning of a 200-megawatt (MW) alternating current solar photovoltaic (PV) electricity generation facility located entirely on the Reservation and specifically on Tribal lands held in trust by BIA for the Moapa Band. The MSEC Project was originally developed by Moapa Solar LLC and approved in 2014. It included an 850-acre solar site on the Reservation and associated rights-of-way (ROWs) on Bureau of Land Management (BLM)-managed lands for an access road, gen-tie line, and water pipeline. BIA and BLM issued Records of Decision (RODs) in May 2014 and BLM issued a ROW in August 2015 for the linear facilities. In March 2017, EDF Renewables Development, Inc. (EDFR) purchased the MSEC Project from the original owner and renamed the Project the Arrow Canyon Solar Project. EDFR subsequently transferred the project to Arrow Canyon Solar, LLC (Applicant). The Applicant currently plans to expand the solar field on the Reservation from 850 acres to 2,200 acres. This expansion would occur on Tribal lands identified by the Moapa Band adjacent to the originally approved MSEC site. The linear facilities (*i.e.* main access road, 230kV gen-tie line, and permanent buried water pipeline) previously approved by the BLM would remain part of the Project description and as previously evaluated; therefore, these facilities will not need to be reevaluated in the SEIS. The 2,200-acre solar site would be located in all or parts of Sections 28, 29, 30, 31, 32, and 33 in Township 16 South, Range 64 East; and part of Section 7 in Township 17 South, Range 64 East, Mount Diablo Meridian, Nevada. Access to the Project would be provided from I–15, US–93, and North Las Vegas Boulevard via the 2.5-mile access road previously approved by BLM. The solar project would interconnect to the regional grid via the previously approved 7.1-mile 230kV generation-tie transmission line on BLM-managed Federal lands that would connect the solar facility to NV Energy's Harry Allen 230kV substation. The Applicant is expected to operate the energy facility for up to 35 years under the terms of the solar lease with the Moapa Band. The Project is expected to be built in one phase of 200 MW to meet an existing Power Purchase Agreement (PPA) for the output of the Project. Major components of the solar site would include multiple blocks of solar PV panels mounted on tracking systems, H-beam or pad mounted inverters, transformers, collection lines, battery storage facilities, project substation, and O&M facilities. Construction of the Project is expected to take approximately 18 to 20 months. 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 up to two panel washings annually. The water supply required for the Project would be leased from the Moapa Band and delivered to the site via the previously approved water pipeline.

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) meet the terms of the existing PPA for the output of the Project; (3) help Nevada and neighboring States to meet their State renewable energy needs; and (4) 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 SEIS in cooperation with the Moapa Band, BLM, U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), and Nevada Department of Wildlife (NDOW). In addition, the National Park Service (NPS) will provide input on the analysis. The resulting SEIS 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 expansion of the solar field 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 SEIS will focus on the expansion of the solar field and analyze the proposed expansion and appurtenant features, viable alternatives, and the No Action alternative. Other alternatives may be identified in response to issues raised during the scoping process. The SEIS will provide a framework for BIA to make decisions and determine whether to amend the existing lease agreement to include the expanded Project footprint. 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). Tribal consultation 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 SEIS to make decisions under their authority and the Moapa Band may also use the SEIS to make decisions under their Tribal Environmental Policy Ordinance. USFWS will review the SEIS for consistency with the Endangered Species Act, as amended, and other implementing acts and may rely on the SEIS to support its decisions and opinions regarding the Project. Issues to be addressed in the SEIS 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.

Directions for Submission of Public Comments

Please include your name, return address, and the caption ''SEIS, Arrow Canyon 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 SEIS. 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 Assistant Secretary—Indian Affairs by part 209 of the Department Manual.

Dated: January 23, 2020.

Tara Sweeney,

Assistant Secretary—Indian Affairs.

[FR Doc. 2020–01708 Filed 1–29–20; 8:45 am]

BILLING CODE 4337–15–P

DEPARTMENT OF THE INTERIOR

National Park Service

[NPS–WASO–BSD–CONC–NPS0028088; PPWOBSADC0, PPMVSCS1Y.Y00000 (200); OMB Control Number 1024–0029]

Agency Information Collection Activities; Submission to the Office of Management and Budget for Review and Approval; National Park Service Concessions

AGENCY: National Park Service, Interior.

ACTION: Notice of information collection; request for comment.

SUMMARY: In accordance with the Paperwork Reduction Act of 1995, we, the National Park Service (NPS) are proposing to renew an information collection.

DATES: Interested persons are invited to submit comments on or before March 2, 2020.

ADDRESSES: Send written comments on this information collection request (ICR) to the Office of Management and Budget's (OMB) Desk Officer for the Department of the Interior by email at *OIRA_Submission@omb.eop.gov*; or by facsimile at 202–395–5806. Please provide a copy of your comments to Phadrea Ponds, Acting Information Collection Clearance Officer, National Park Service, 1201 Oakridge Drive, Fort Collins, CO 80525; or by email at *phadrea_ponds@nps.gov*. Please reference OMB Control Number 1024–0029 in the subject line of your comments.

FOR FURTHER INFORMATION CONTACT: To request additional information about this ICR, contact Kurt Rausch, Acting Chief, Commercial Services Program, National Park Service, 1849 C Street NW, Washington, DC 20240; or by email at *kurt_rausch@nps.gov*; or by telephone at 202–513–7202. Please reference OMB Control Number 1024–0029 in the subject line of your comments. You may also view the ICR *http://www.reginfo.gov/public/do/PRAMain*.

SUPPLEMENTARY INFORMATION: In accordance with the Paperwork Reduction Act of 1995, we provide the general public and other Federal agencies with an opportunity to comment on new, proposed, revised, and continuing collections of information. This helps us assess the impact of our information collection requirements and minimize the public's reporting burden. It also helps the public understand our information collection requirements and provide the requested data in the desired format.

On June 5, 2019, we published a **Federal Register** notice soliciting comments on this collection of information for 60 days, ending on August 5, 2019 (84 FR 26149). We did not receive any public comments on the notice.

We are again soliciting comments on the proposed ICR described below. We are especially interested in public comment addressing the following issues: (1) Is the collection necessary to the proper functions of the NPS; (2) will this information be processed and used in a timely manner; (3) is the estimate of burden accurate; (4) how might the NPS enhance the quality, utility, and clarity of the information to be collected; and (5) how might the NPS minimize the burden of this collection on the respondents, including through the use of information technology.

Comments that you submit in response to this notice are a matter of public record. We will include or summarize each comment in our request to OMB to approve this ICR. 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. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Abstract: Private businesses under contract to the NPS manage food, lodging, tours, whitewater rafting, boating, and many other recreational activities and amenities in more than 100 national parks. These services gross more than $1 billion every year and provide jobs for more than 25,000 people during peak season.

The regulations codified in 36 CFR part 51 primarily implement Title IV of the National Parks Omnibus Management Act of 1998 (54 U.S.C., 101911 *et seq.* also referred to as Pub. L. 105–391), which provides legislative authority, policies, and requirements for the solicitation, award, and administration of NPS concession contracts.

Furthermore, 54 U.S.C., 101911 *et seq.* provides that ''all proposed concession contracts shall be awarded by the Secretary to the person, corporation or other entity submitting the best proposal, as determined by the Secretary through a competitive selection process. Such competitive process shall include simplified procedures for small, individually-owned, concessions contracts.''

We collect the following information associated with the administration of concessions:

- Description of how respondent will conduct operations to minimize disturbance to wildlife; protect park resources; and provide visitors with a high quality, safe, and enjoyable visitor experience.
- Organizational structure and history and experience with similar operations.
- Details on violations or infractions and how they were handled.
- Financial information and demonstration that respondent has credible, proven track record of meeting obligations.

Concessioner Annual Financial Report (Forms 10–356, 10–356A, and 10–356B)

The Concessioner Annual Financial Report provides concessioner financial information as required by each concession contract. This information is necessary to comply with the requirements placed on the Secretary of the Interior by Congress. Title IV, Section 407 of the National Parks Omnibus Management Act of 1998 (Pub. L. 105–391) requires that ''a concessions contract shall provide for payment to the Government of a franchise fee or other such monetary consideration as determined by the Secretary, upon consideration of the probable value to the concessioner of the privileges granted by the particular contract involved. Such probable value shall be based upon a reasonable opportunity for net profit in relation to capital invested and the obligations of the contract.'' In accordance with 36 CFR part 51, subpart I concession contracts are required to ''provide for payment to the Government of a franchise fee or other monetary consideration as determined by the Director upon consideration of the probable value to the concessioner of the privileges granted by the contract involved.'' In order to verify the

Appendix B

Scoping Notifications and Mailing List

Appendix B – Scoping Notifications and Mailing List

In addition to the NOI, the public was informed 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 a Supplemental Environmental Impact Statement (SEIS) for the proposed Arrow Canyon Solar Project on the Moapa River Indian Reservation, Clark County, Nevada

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) and other agencies, intend to prepare a Supplemental Environmental Impact Statement (SEIS) that will evaluate the expansion of the photovoltaic (PV) solar field for the previously approved Moapa Solar Energy Center (MSEC) Project on the Moapa River Indian Reservation.

This notice announces the beginning of the scoping process to solicit public comments and identify potential issues related to the SEIS. 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 SEIS.

DATES: Written comments on the scope of the SEIS or implementation of the proposal must arrive by March 2, 2020. The public scoping meeting on the Moapa River Indian Reservation will be held on February 25, 2020, and the public scoping meeting at the BLM office in Las Vegas will be held on February 26, 2020.

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*. You can also provide comments via the project website at www.ArrowCanyonSolarSEIS.com .

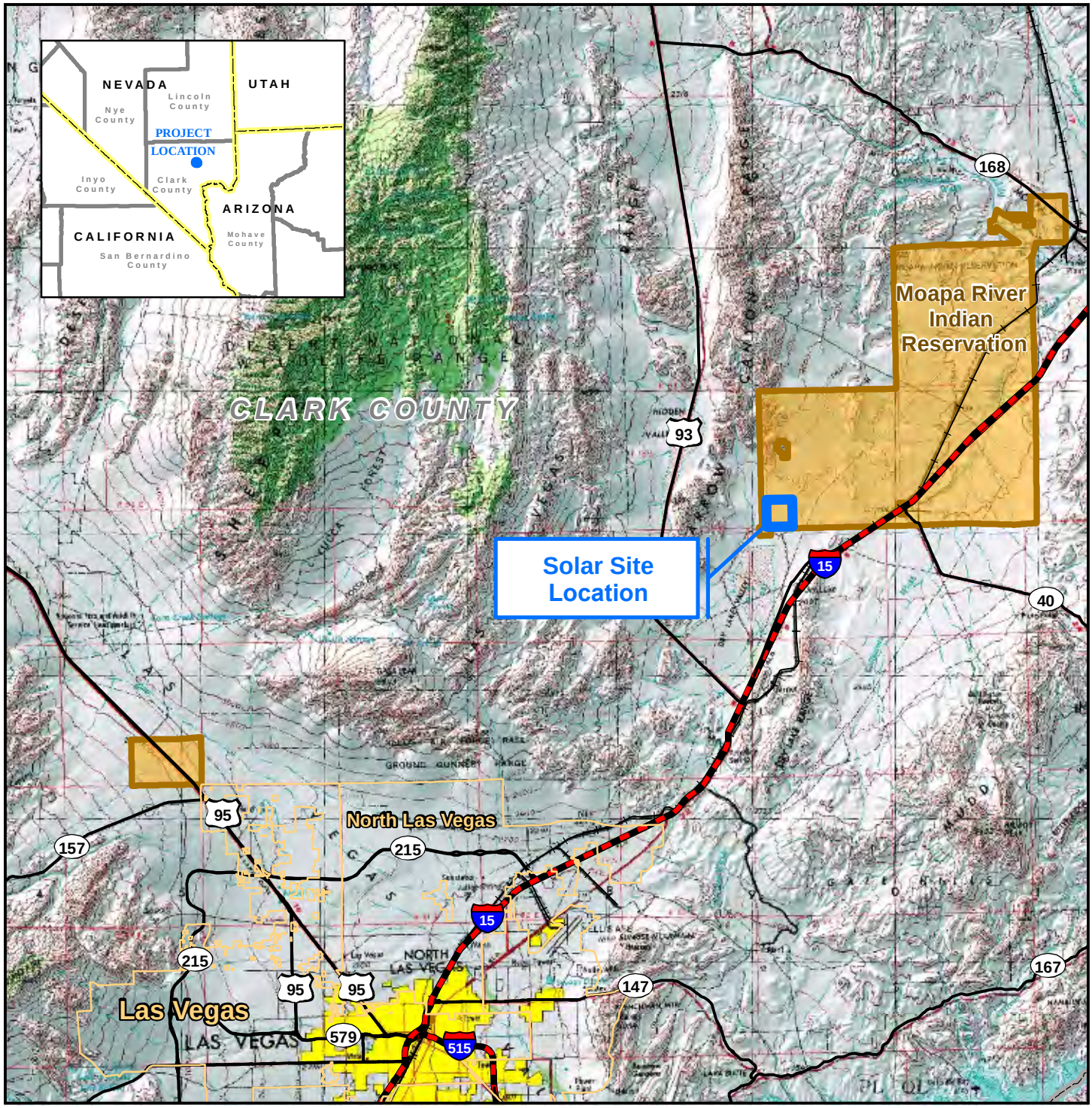
Both public meetings will be held from 5:30 to 7:00 pm. The February 25th public scoping meeting will be held in the Tribal Hall on the Moapa River Indian Reservation, One Lincoln Street, Moapa, NV 89025-0340. The February 26th public scoping meeting will be held at the U.S. Bureau of Land Management (BLM) Conference Room, 4701 N. Torrey Pines Dr., Las Vegas, NV 89130. Each meeting will have a brief presentation starting at 5:45 pm and light refreshments will be provided.

SUPPLEMENTARY INFORMATION: The proposed Federal action, taken under 25 U.S.C. 415, is BIA's approval of an amendment of the solar energy ground lease and related agreements entered into by the Moapa Band with Moapa Solar LLC allowing the expansion of the solar field previously approved for the MSEC Project. The agreements provide for construction, operation and maintenance (O&M), and decommissioning of a 200-megawatt (MW) alternating current PV solar electricity generation facility located entirely on the Reservation and specifically on tribal lands held in trust by BIA for the Moapa Band. The MSEC Project was originally developed by Moapa Solar LLC and approved in 2014. It included an 850-acre solar field on the Reservation and associated rights-of-way (ROWs) on BLM-managed lands for an access road, gen-tie line, and water pipeline (linear facilities). Records of Decision (RODs) were issued by the BIA and BLM in May 2014. The solar ground lease was approved by BIA in June 2014 and ROW for the linear facilities was issued by the BLM in August 2015. In March 2017, EDF Renewables Development, Inc. (EDFR) purchased the MSEC Project from the original owner and renamed the project the Arrow Canyon Solar Project. EDFR subsequently transferred the project to Arrow Canyon Solar, LLC (Applicant). The Applicant currently plans to expand the solar field on the Reservation from 850 acres to 2,200 acres. This expansion would occur on tribal lands identified by the Moapa Band adjacent to the originally approved MSEC site. The linear facilities previously approved by the BLM would remain part of the project description as previously evaluated; therefore, these facilities will not need to be reevaluated in the SEIS.

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.

Date: 1/31/20

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



Legend

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

Jurisdictional Land Ownership

- Indian Reservation

0 2 4 6 8 10

Miles

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

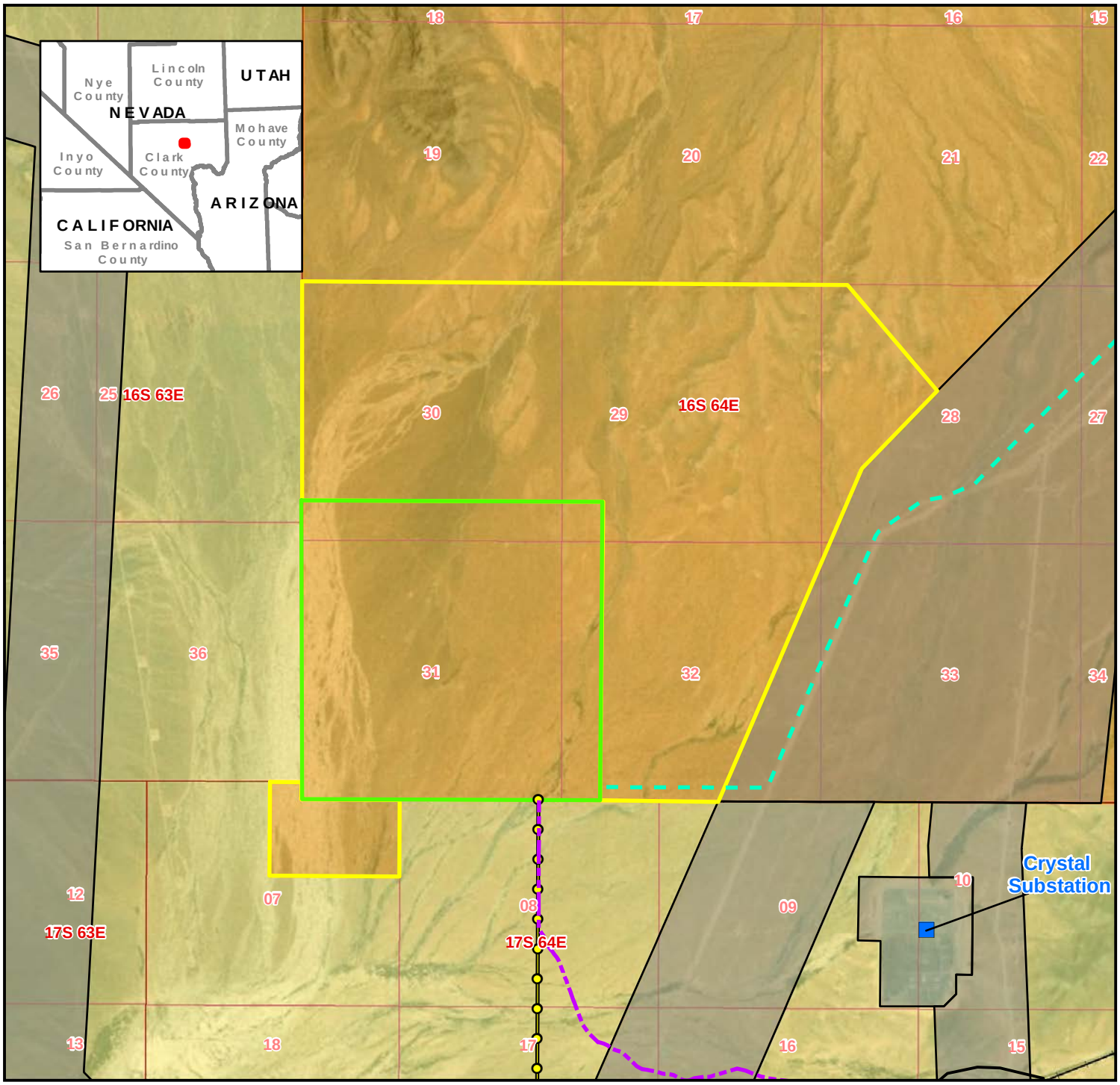
Arrow Canyon Solar Project

FIGURE 1
PROJECT LOCATION

Map Extent: Clark County, Nevada

Date: 06-07-13		Author: djb

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



Project Components

- Gen-Tie - Approved
- Access Road - Approved
- Water Pipeline - Approved
- Arrow Canyon Expansion Area
- Original MSEC Boundary - Approved

General Features

- Existing Substation
- Interstate
- Major Highway
- Railroad
- Stream or River
- Designated Utility Corridor
- Municipal Boundary
- Township / Range
- Section Line

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Land

0 0.25 0.5

Miles

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

ARROW CANYON SOLAR PROJECT

Project Components

Map Extent: Clark County, Nevada

Date: 02-17-20 | Author: rnc

Mailing List

	Last	Title	Organization/Affiliation	Address 1	Address 2	City	State	Zip
			Center for Biological Diversity	PO Box 710		Tucson	AZ	85702-0710
			Center for Energy Efficiency and Renewable Technologies	1100 11th Street, Suite 311		Sacramento	CA	95814
		Community Developme	City of Mesquite	10 E. Mesquite Blvd.		Mesquite	NV	89027
			Clark County Department of Comprehensive Planning	Clark County Government Center	500 South Grand Central Parkway	Las Vegas	NV	89155
			Clark County Regional Flood Control District	600 South Grand Central Parkway	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 Environmental Management	Clark County Desert Conservation Program	500 South Grand Central Parkway	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, ASW-520	2601 Meacham Blvd.	Fort Worth	TX	76137-0520
		President	Friends of Gold Butte	12 W. Mesquite Blvd. - Suite #106		Mesquite	NV	89027
			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	P.O. Box 207		Reno	NV	89504
			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	2755 East Cottonwood Parkway	Suite 300	Salt Lake City	UT	84121
		Attn: Real Estate Group	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
Charles	Holloway	Manager	Los Angeles Department of Water and Power	Environmental Planning and Assessment	111 N. Hope Street, Room 1044	Los Angeles	CA	90012
			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	755 N Roop St #202		Carson City	NV	89701
			Nevada Conservation League	2275 Renaissance Drive	Suite A	Las Vegas	NV	89128
			Nevada Department of Air Quality and Environmental Management	Clark County Government Center	500 South Grand Central Parkway	Las Vegas	NV	89156
			Nevada Department of Conservation and Natural Resources	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
D. Bradford	Hardenbrook	Supervisory Habitat Bio	Nevada Department of Wildlife	Southern Region	3373 Pepper Lane	Las Vegas	NV	89120
			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	901 S Stewart St		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	PO Box 33155	Las Vegas	NV	89133
			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 Committe	Red Rock Audubon Society	PO Box 96691		Las Vegas	NV	89193
Bella	Bakrania, EIT	Senior Engineer	Geosyntec Consultants, Inc	9480 South Eastern Ave, Suite 217		Las Vegas	NV	89123
			Sierra Club	3828 Meadows Lane		Las Vegas	NV	89107
			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	8329 West Sunset Road	Suite 200	Las Vegas	NV	89113
The Honorable Dina	Titus	Nevada District 1	U S HOUSE OF REPRESENTATIVES	495 South Main Street	3rd Floor	Las Vegas	NV	89101
The Honorable Steven	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	2464 Rayburn House Office Building		Washington	DC	20515
The Honorable Steven	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	522 Cannon House Office Buildig		Washington	DC	20515
The Honorable Mark	Amodei	Nevada District 2	U S HOUSE OF REPRESENTATIVES	104 Cannon House Office Building		Washington	DC	20515
			Union Pacific Railroad Company	1400 Douglas Street		Omaha	NE	68179

The Honorable Catherine Cortez	Masto	Senior Senator	UNITED STATES SENATE	333 Las Vegas Boulevard South	Suite 8016	Las Vegas	NV	89101
The Honorable Jacky	Rosen	Junior Senator	UNITED STATES SENATE	333 Las Vegas Boulevard South	Suite 8203	Las Vegas	NV	89101
The Honorable Catherine Cortez	Masto	Senior Senator	UNITED STATES SENATE	516 Hart Senate Office Building		Washington	DC	20510
The Honorable Jack	Rosen	Junior Senator	UNITED STATES SENATE	144 Russell 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	Email: ostamgr@gmail.com				
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 **0001090975**

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 02/09/2020 to 02/16/2020, on the following days:

02 / 09 / 20
02 / 16 / 20

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 Arrow Canyon Solar Project. The issues identified during the scoping process will be considered and addressed during preparation of a Supplemental Environmental Impact Statement (SEIS).

Please plan to attend one of the following meetings:

Tuesday, February 25, 2020
Moapa River Indian Reservation Tribal Hall
One Lincoln Street, Moapa, NV 89025-0340

Wednesday, February 26, 2020
U.S. Bureau of Land Management (BLM)
Conference Room
4701 N. Torrey Pines Dr.,
Las Vegas, NV 89130

Both meetings will be held between 5:30 pm and 7:00 pm with a brief presentation at 5:45 pm. Light refreshments will be served.

Arrow Canyon Solar, LLC (Applicant) plans to expand the photovoltaic (PV) solar field for the previously approved Moapa Solar Energy Center (MSEC) Project located on the Moapa River Indian Reservation in Clark County, approximately 30 miles northeast of Las Vegas. The project would also include a transmission line, access road, and water pipeline that would be utilized, as previously approved by the BLM. The SEIS will focus on the expansion of the PV solar field on the Reservation.

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: Feb. 9, 16, 2020
LV Review-Journal

/S/
LEGAL ADVERTISEMENT REPRESENTATIVE

Subscribed and sworn to before me on this 17th day of February, 2020

Notary

MARY A. LEE
Notary Public, State of Nevada
Appointment No. 09-8941-1
My Appt. Expires Dec 15, 2020

Eagle Scouts

Pictured l to r: Ethan Witter, Ryan McMurray, Anson Call, Iain McMurray, Trevor Witter, Brady Montierth.

Six boys from Boys Scouts of America Troop 162 have achieved the rank of Eagle Scout, the highest rank in scouting. Ethan Witter, Ryan McMurray, Anson Call, Iain McMurray, Trevor Witter, and Brady Montierth earned the award between April 2019 and December 2019 and were honored together in a Court of Honor held February 9, 2020.

They each received a certi cate from the Veterans of Foreign Wars and their of cial Eagle Scout insignia from the BSA.

Each boy had the opportunity to thank his parents and others that had helped him in scouting, and choose a mentor he felt had been particularly in uential in helping him achieve this goal.

Among those honored for their mentorship were Bill Belcher, Dick and Lorraine O'Dell, Greg Witter, David McMurray, Sean McMurray, and Sam Aikele.

Mini Drill

from page B4

"It is so much fun watching the VVettes choreograph and teach all these tiny dancers," assistant Drill Coach Denise Houston said. "It is so fun to see the excitement that is shown in all those cute smiles as they mom and dad in the crowd."

Parents also had a great time seeing their youngsters perform.

"I just loved watching my daughter dance," Michelle West said. "The VVettes did awesome. I am so proud."

Fellow parent Jodi Johnson said, "How fun that boys were included this year. It was so fun to watch!"

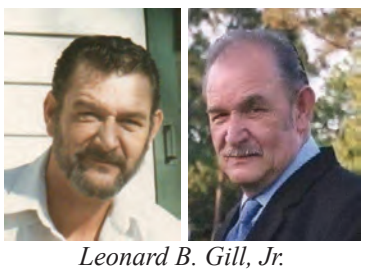
Fourth grader Destri Johnson participated in the routine. "It was scary because everyone is looking at you," she said. "But it is so fun."

Raia Davis added, "It feels like there is so much pressure but if you just go with what you know, it is mostly exciting."

Coach Erica Garrett said that the VVettes will take any opportunity they get to promote and teach about dancing.

"It is such a fun activity for the girls and we were so excited to have a boys group this year," she said.

Obituary



Leonard B. Gill, Jr.

Leonard "Benton" Gill Jr., 78, was born in Enid, Oklahoma on August 24, 1941 to Leonard Sr & Betty Gill and passed away on February 2nd, 2020 in Goodman, Missouri.

Benton Gill and his family were long time residents of Moapa Valley, and were best friends with the Burgess and Bow families.

He was Head Security at the Moapa Travel Plaza for many years. He enjoyed many things and had many adventures in his lifetime. He had a deep love for all of his family, classic cars, reading, crime dramas & Elvis.

He is survived by his wife Linda (Pierce-Porter) Gill and his children: Michele (Randy) Graves of Missouri, Andy (Lourdes) Porter of North Carolina, Jackie (Doug) Williams of Reno, Nevada, John (Lisa) Wiggins of Philadelphia, Jerri Gill of Missouri, Benton "Buddy" (Ella) Gill of New York, Janet (Francis) Daskowski of Connecticut, and Kenny (Matasha) Gill of Missouri; along with 28 grandchildren and 20 great-grandchildren; his brother Harry Bingamon Jr. of Nevada and two sisters: Ethel of Ohio and Belinda of Colorado.

He is preceded in death by his parents Leonard Sr & Betty Gill, his rst wife B.J. Gill, sisters Molly Hand & Ruth, daughter Jody & grandson Cody.

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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.*

Church Directory

Classifieds

Call Classifieds 702-397-6246 or email progress2@mvdsl.com

DEADLINE for classified ads is 11 a.m. MONDAY

Progress Hours: Mon 9am-4pm Tu-Fri 10am-4pm

Animals

Brown full grown Staffordshire Terrier for sale: Extremely gentle. Only to a stable home. 702-596-5870.

For Lease Office Space

Retail or office, central Overton location, private restroom, off street parking, outdoor signage. 289 S Moapa Valley Blvd. Please text Steve, 702-379-1031.

For Rent/Apts

Moapa Apartment: 2 Bedroom, $475/month. It has plush grass, includes water and trash. Call 702-812-1890. Leave a message. I will return your call.

Andersen St. Apartments: 1 Bdrm starting at $450/mo, 2 Bdrm starting at $550/mo. Nice, quiet neighborhood. No smoking or pets. For application call 702-397-8111.

1 & 2 Bedroom Apartments: Behind Post Office in Overton. Clean, Nice. 1 Bdrm/$550, 2 Bdrm/$650 per mo. plus deposits. Quiet lifestyle. No pets or smoking. Call 702-373-6102.

Employment / Help Wanted

Looking for person to clean small 2 bedroom house every 2 weeks. 702-279-3069.

Entry-Level Landfill Laborer

Contact Information
Kyle Taylor
Phone: 702-206-0034
More Information
Landfill Laborer:

Western Elite is seeking an entry-level Laborer to assist Tipper Drivers and customers as they dump waste materials, sort and manage waste materials, and maintain

Job duties include: manual labor (including organizing, cleaning, and shoveling waste materials), picking up trash, pulling weeds, and operating various equipment as required.
Position located 50 miles north of Las Vegas near Coyote Springs. Competitive pay, paid time-off, paid holidays, and excellent package. Contact Kyle at 702-206-0034 & send resumes to kylet@westernelite.com

For Rent/Hms

5 Bedroom, 2 Bath manufactured home on over an acre. $1250/month. 702-881-6178.

For Sale Office Building

Commercial Office Building, Downtown Overton: Next to Sugar's, across from McDonald's. $175,000 with seller - nancing. Contact Doug Barlow at Foremost Realty, 702-378-0926. Lic# BS.000035.

General

Do you keep bumping your toe on that old dog crate? Consider donating it to K9Heroes.org, a nonpro organization enriching the lives of people with disabilities. Leashes, collars, toys and treats needed. Please call Kerry 702-308-0609 or email mamasgoldens@gmail.com.

Need to buy, sell or trade? Call us today to get your ad in the next edition 702-397-6246

Real Estate

Bryner Ave, 0.88 acre building lot: Paved road. $19,000. Contact Doug Barlow at Foremost Realty, 702-378-0926. Lic# BS.000035.

.84 acre building lot: Zoned for livestock. All utilities, paved road, by high school. 2545 Ash St. $59,000. Tim 702-353-2555.

Services Available

Backhoe and grading work, trenching, driveways, arenas, clearing brush, general dirtwork. Call Jacob 702-378-9271.

Dog Training: Whether you have a young pup, older dog or a rescue, K9Heroes dog training classes can help them learn how to behave appropriately at home and on the go. K9Heroes trainers teach fun & effective group or private classes. Call for availability & times, 702-308-0609. If you're not 100% you can retake the class for FREE! Veterans & disabled 50% discount!

READY MIX CONCRETE. Call 702-306-5224 cell or 702-398-

Overton Self Storage: All sizes of units available. Indoor and outdoor storage. Easy Access. Close to downtown. Snow Birds welcome. 177 S. Whitmore. Call 702-397-8111.

Slabs, sidewalks, foundations, house slabs, block walls, pools. We can pour anything you want. Call Cell 702-306-5224 or 702-398-7625.

Certified Horticulturist will answer plant and landscape questions: Assist in landscape designs. Identify plants and advise with onsite issues. Questions? "Let's talk plants". Andrea Meckley–licensed and insured. 702-300-4148.

For Clean Quality Concrete work call 702-397-6540. 30+ years experience, 19 years local. References.

Going to Las Vegas for the day? Send your dog to boot camp! Training & exercise, & play and rest. 9am-9pm. Call K9 Heroes 702-308-0609, or email mamasgoldens@gmail.com. Check us out at K9Heroes.org.

Concrete Work: Driveways, patios, walks, slabs. 28 years in Moapa Valley. Call 702-206-0054.

TUTOR AVAILABLE: Does your child need homework help? I "get" this and provide support that can make a difference. First meeting free so we agree on what to expect. I can talk with child's teacher if needed because I'm a teacher (retired) too. Trial basis available. Nancy Grimes, M. Ed., (702) 439-2835.

MOBILE IMAGE WINDOW TINTING: Autos/homes/etc. 15+ years of exp., 100% guaranteed. Call for a quote & to make an appt. 702-596-6760.

Logandale Storage and U-Haul: 2 locations! Storage Units, U-Haul trucks and trailers, Car Haulers, Dolly's. Let us help make your move easier! **Call 702-398-3390.** 1595 Jensen and 3525 N. Moapa Valley Blvd. Logandale

ADD HIGHLIGHT TO YOUR AD FOR JUST $1 MORE!
CALL LAURA 702-397-6246 Moapa Valley PROGRESS

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
Scoping meeting - Arrow Canyon Solar
Ad placed by ENValue LLC

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

2/12/2020 and 2/19/2020

Signed before a Notary Public:

Signature: Laura R Robison Date: 2-19-2020

State of Nevada, County of Clark
This instrument was acknowledged before me Alisha A. Cooper (notary public)

On Feb 19, 2020 (date) by ~~Alisha~~ Laura R Robison (person signing document)
AC

Alisha A. Cooper
Notary Public Signature

ALISHA A. COOPER
NOTARY PUBLIC
STATE OF NEVADA
My Commission Expires: 07-10-23
Certificate No: 03-83419-1

Appendix C

Meeting Materials

Appendix C – Meeting Materials and Sign-In Sheets

Appendix C contains materials available at the public scoping meetings:

- Scoping Letter plus project map
- Comment forms
- Sign-In sheets from meetings:
    - Moapa River Indian Reservation, Nevada
    - BLM Office, Las Vegas, Nevada
- Display Boards
- Presentation

Project 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 a Supplemental Environmental Impact Statement (SEIS) for the proposed Arrow Canyon Solar Project on the Moapa River Indian Reservation, Clark County, Nevada

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) and other agencies, intend to prepare a Supplemental Environmental Impact Statement (SEIS) that will evaluate the expansion of the photovoltaic (PV) solar field for the previously approved Moapa Solar Energy Center (MSEC) Project on the Moapa River Indian Reservation.

This notice announces the beginning of the scoping process to solicit public comments and identify potential issues related to the SEIS. 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 SEIS.

DATES: Written comments on the scope of the SEIS or implementation of the proposal must arrive by March 2, 2020. The public scoping meeting on the Moapa River Indian Reservation will be held on February 25, 2020, and the public scoping meeting at the BLM office in Las Vegas will be held on February 26, 2020.

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*. You can also provide comments via the project website at www.ArrowCanyonSolarSEIS.com .

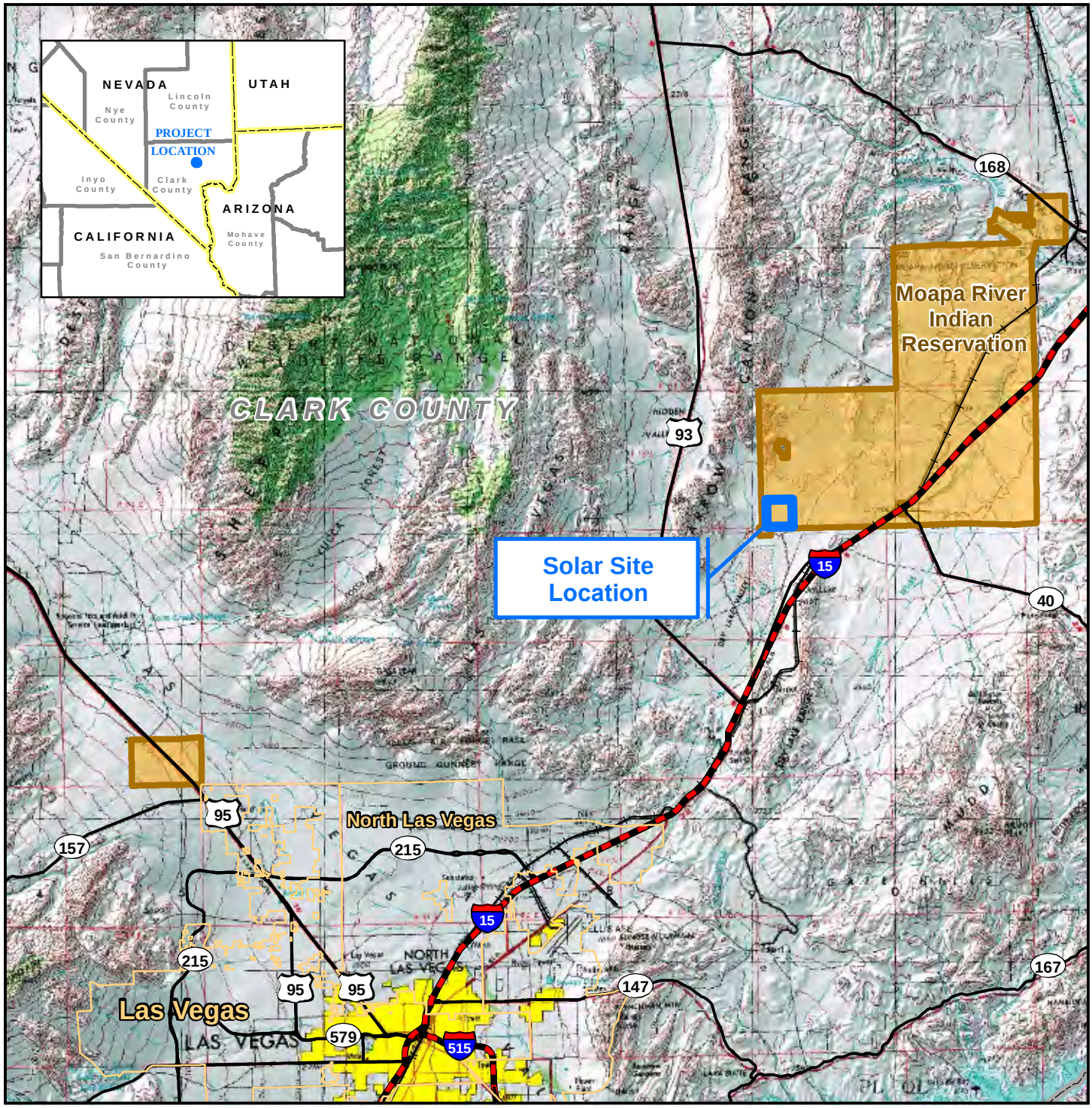
Both public meetings will be held from 5:30 to 7:00 pm. The February 25th public scoping meeting will be held in the Tribal Hall on the Moapa River Indian Reservation, One Lincoln Street, Moapa, NV 89025-0340. The February 26th public scoping meeting will be held at the U.S. Bureau of Land Management (BLM) Conference Room, 4701 N. Torrey Pines Dr., Las Vegas, NV 89130. Each meeting will have a brief presentation starting at 5:45 pm and light refreshments will be provided.

SUPPLEMENTARY INFORMATION: The proposed Federal action, taken under 25 U.S.C. 415, is BIA's approval of an amendment of the solar energy ground lease and related agreements entered into by the Moapa Band with Moapa Solar LLC allowing the expansion of the solar field previously approved for the MSEC Project. The agreements provide for construction, operation and maintenance (O&M), and decommissioning of a 200-megawatt (MW) alternating current PV solar electricity generation facility located entirely on the Reservation and specifically on tribal lands held in trust by BIA for the Moapa Band. The MSEC Project was originally developed by Moapa Solar LLC and approved in 2014. It included an 850-acre solar field on the Reservation and associated rights-of-way (ROWs) on BLM-managed lands for an access road, gen-tie line, and water pipeline (linear facilities). Records of Decision (RODs) were issued by the BIA and BLM in May 2014. The solar ground lease was approved by BIA in June 2014 and ROW for the linear facilities was issued by the BLM in August 2015. In March 2017, EDF Renewables Development, Inc. (EDFR) purchased the MSEC Project from the original owner and renamed the project the Arrow Canyon Solar Project. EDFR subsequently transferred the project to Arrow Canyon Solar, LLC (Applicant). The Applicant currently plans to expand the solar field on the Reservation from 850 acres to 2,200 acres. This expansion would occur on tribal lands identified by the Moapa Band adjacent to the originally approved MSEC site. The linear facilities previously approved by the BLM would remain part of the project description as previously evaluated; therefore, these facilities will not need to be reevaluated in the SEIS.

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.

Date: 1/31/20

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



Legend

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

Jurisdictional Land Ownership

- Indian Reservation

0 2 4 6 8 10

Miles

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

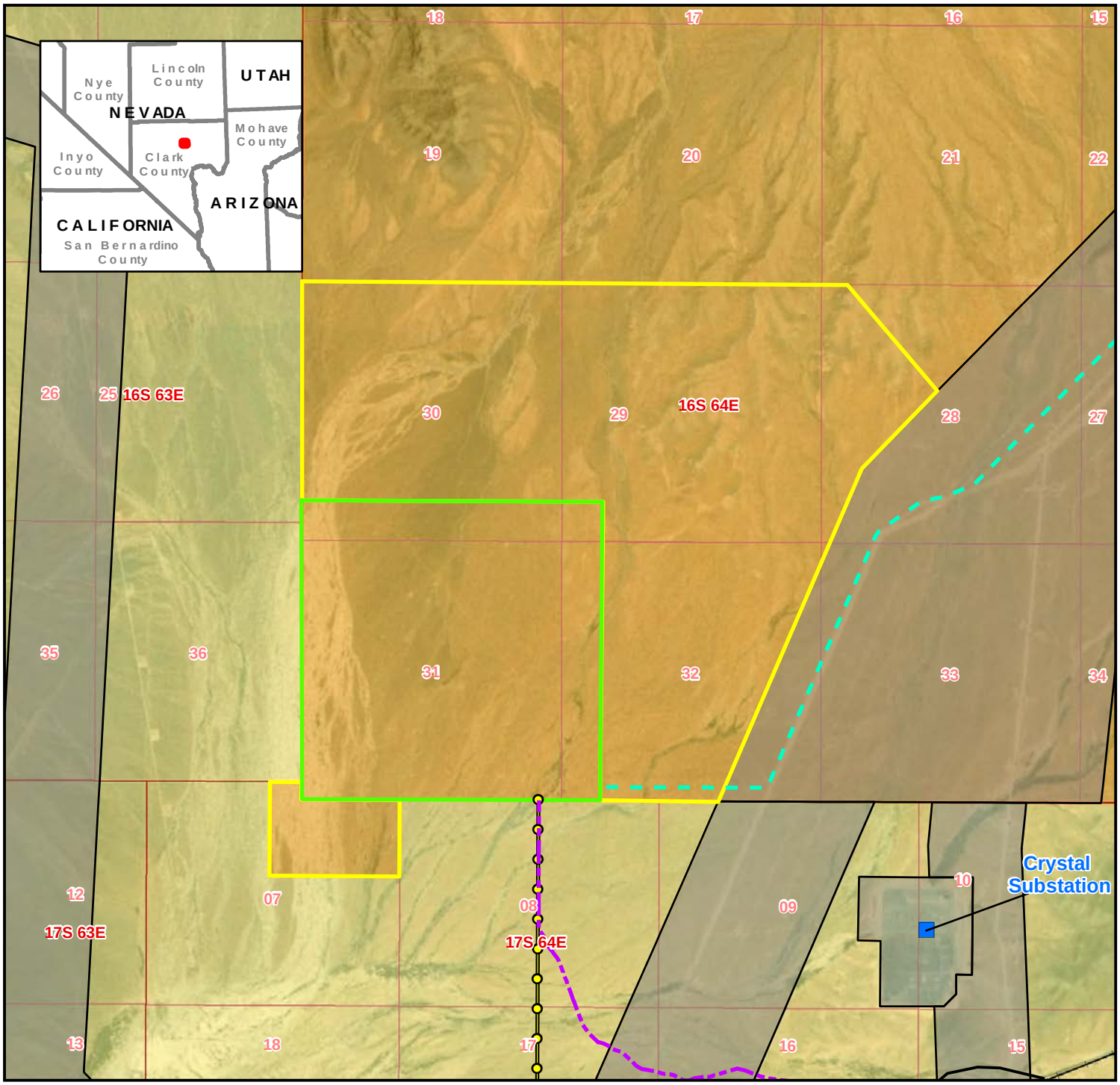
Arrow Canyon Solar Project

FIGURE 1
PROJECT LOCATION

Map Extent: Clark County, Nevada

Date: 06-07-13		Author: djb

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



Project Components

- Gen-Tie - Approved
- Access Road - Approved
- Water Pipeline - Approved
- Arrow Canyon Expansion Area
- Original MSEC Boundary - Approved

General Features

- Existing Substation
- Interstate
- Major Highway
- Railroad
- Stream or River
- Designated Utility Corridor
- Municipal Boundary
- Township / Range
- Section Line

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Land

0 0.25 0.5

Miles

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

ARROW CANYON SOLAR PROJECT

Project Components

Map Extent: Clark County, Nevada

Date: 02-17-20 | Author: rnc

Meeting Presentation

Arrow Canyon Solar Project
Supplemental Environmental Impact Statement (SEIS)

Scoping Meetings

February 25 and 26, 2020

Opening Remarks

Laura Watters

Chair – Tribal Council

Moapa Band of Paiutes

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:** Arrow Canyon Solar, LLC and Moapa Band
- **What is proposed:** Expanding the originally approved solar field and associated land lease on the Reservation for the Moapa Solar Energy Center (MSEC) Project from 850 acres to up to 2,200 acres. Originally approved ROWs for transmission gen-tie, access road, and water pipeline on BLM-managed lands would be remain unchanged.
- **Where:** Clark County, NV on Moapa River Indian Reservation
- **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.

Supplemental Environmental Impact Statement

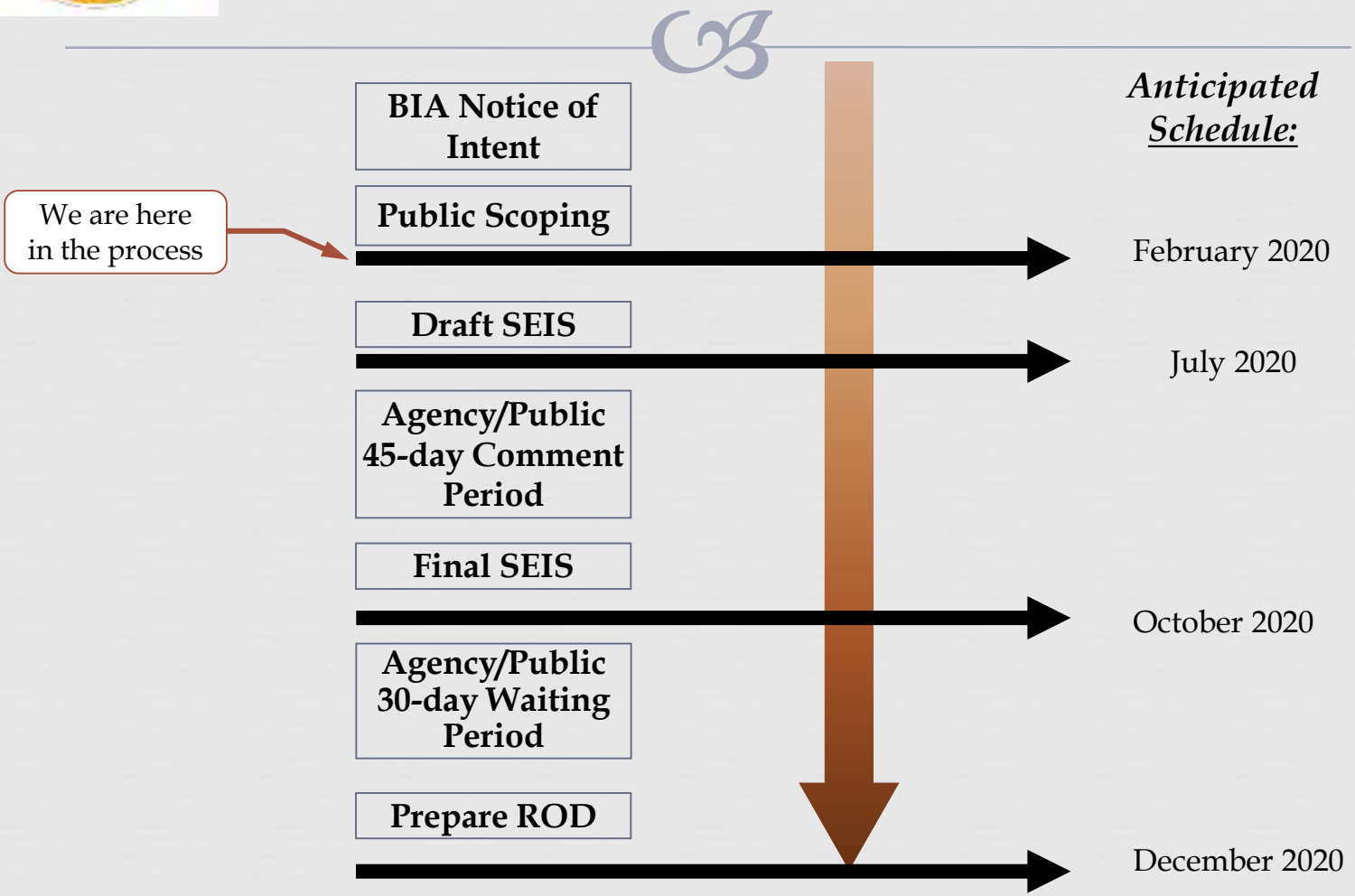
SEIS Process

Public input and documentation of environmental impacts that would result from implementation of the Proposed Action (the expansion of approved MSEC 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 Fish and Wildlife Service (USFWS)

EIS Process/Schedule



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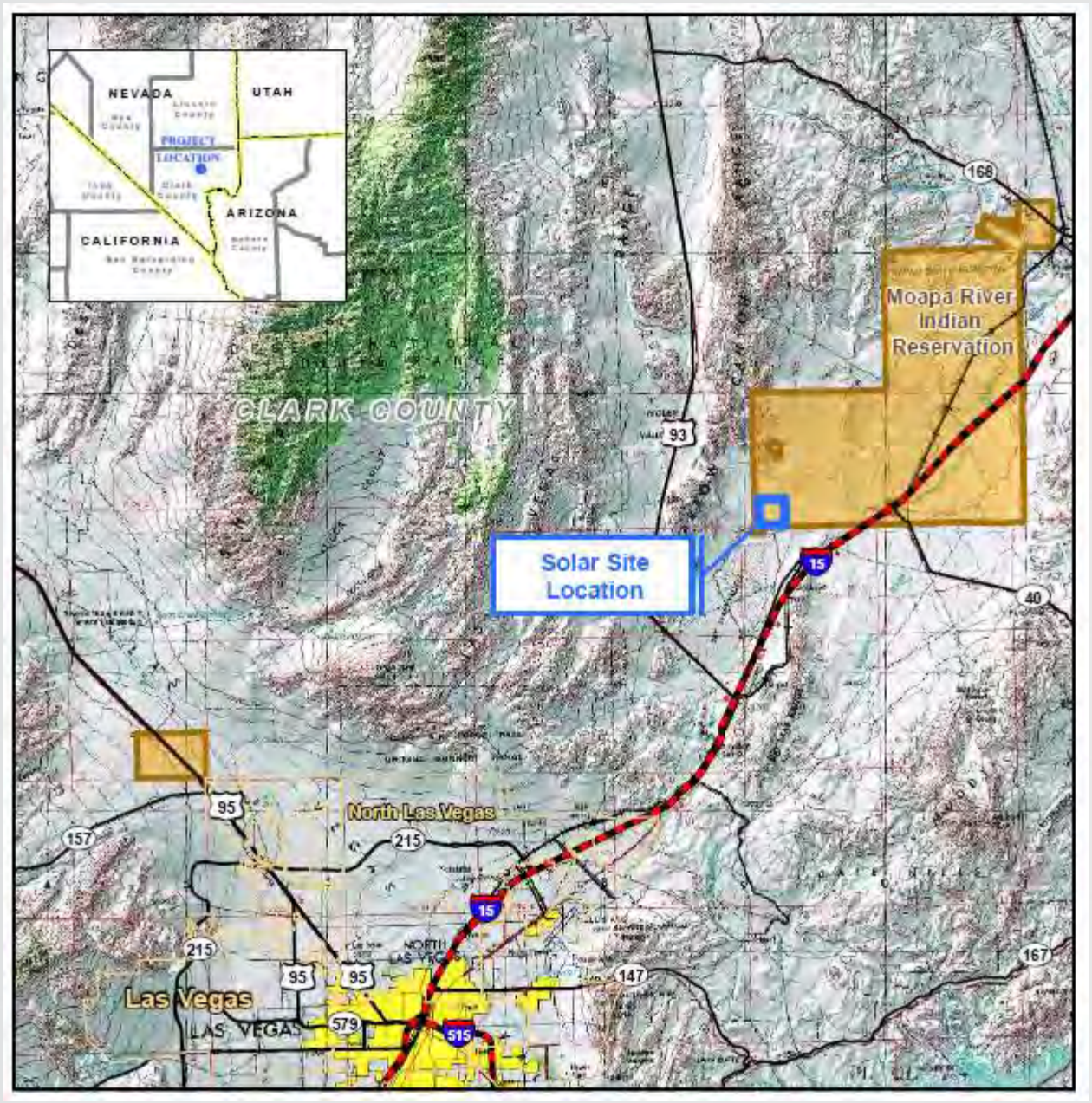
Project Description

Arrow Canyon Solar Project



Project Location

Clark County, Nevada

Approximately 30 miles northeast of Las Vegas

Arrow Canyon Solar Project
History

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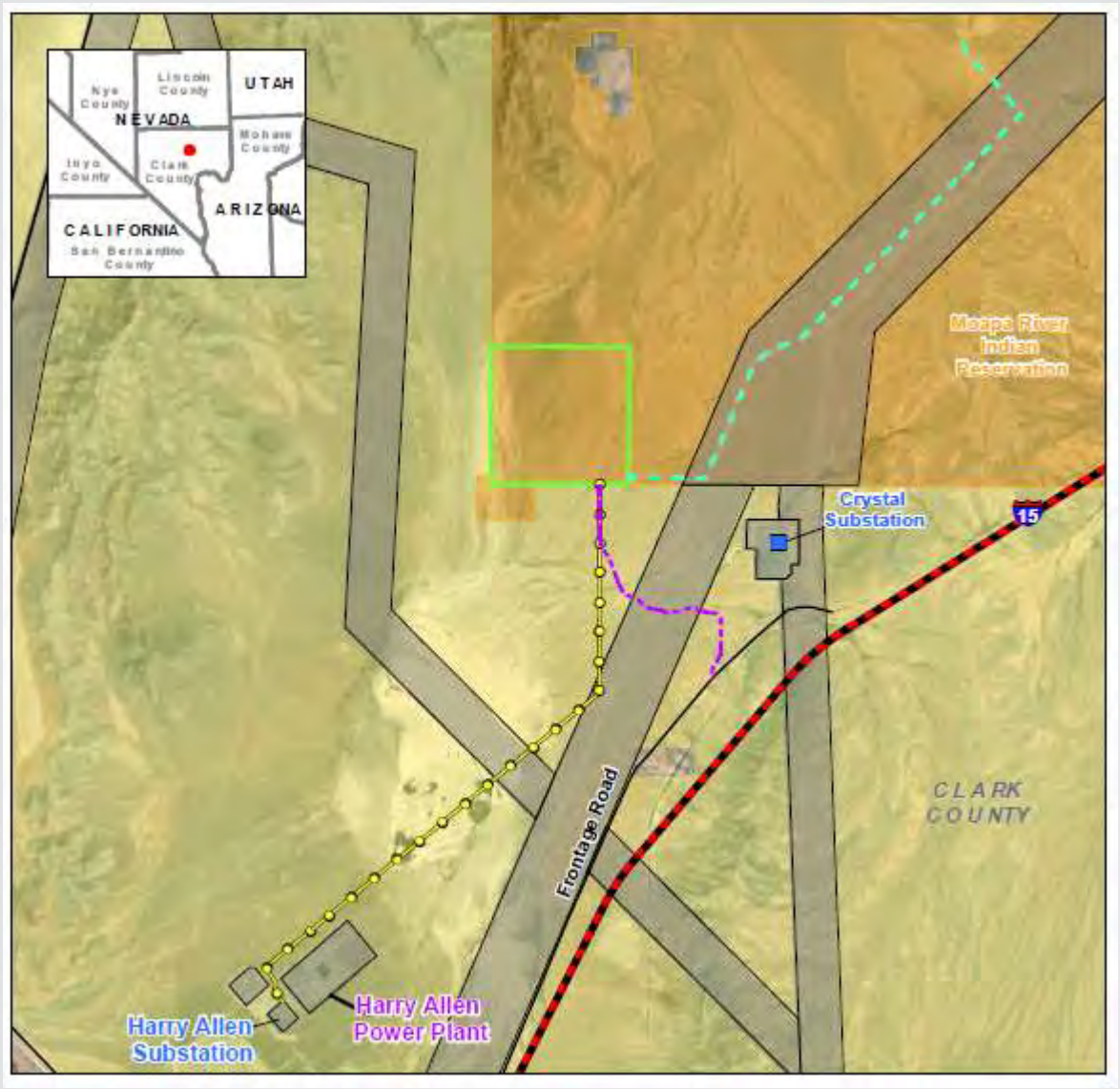

Project Components

- Gen-Tie - Approved
- Access Road - Approved
- Water Pipeline - Approved
- Arrow Canyon Expansion Area
- Original MSEC Boundary - Approved

Approved

May 2014

Originally Approved MSEC Project

Arrow Canyon Solar Project Description

- Expansion of solar field on Reservation approved for the MSEC Project from 850 acres to up to 2,200 acres
- Addition of Battery Energy Storage System (BESS)
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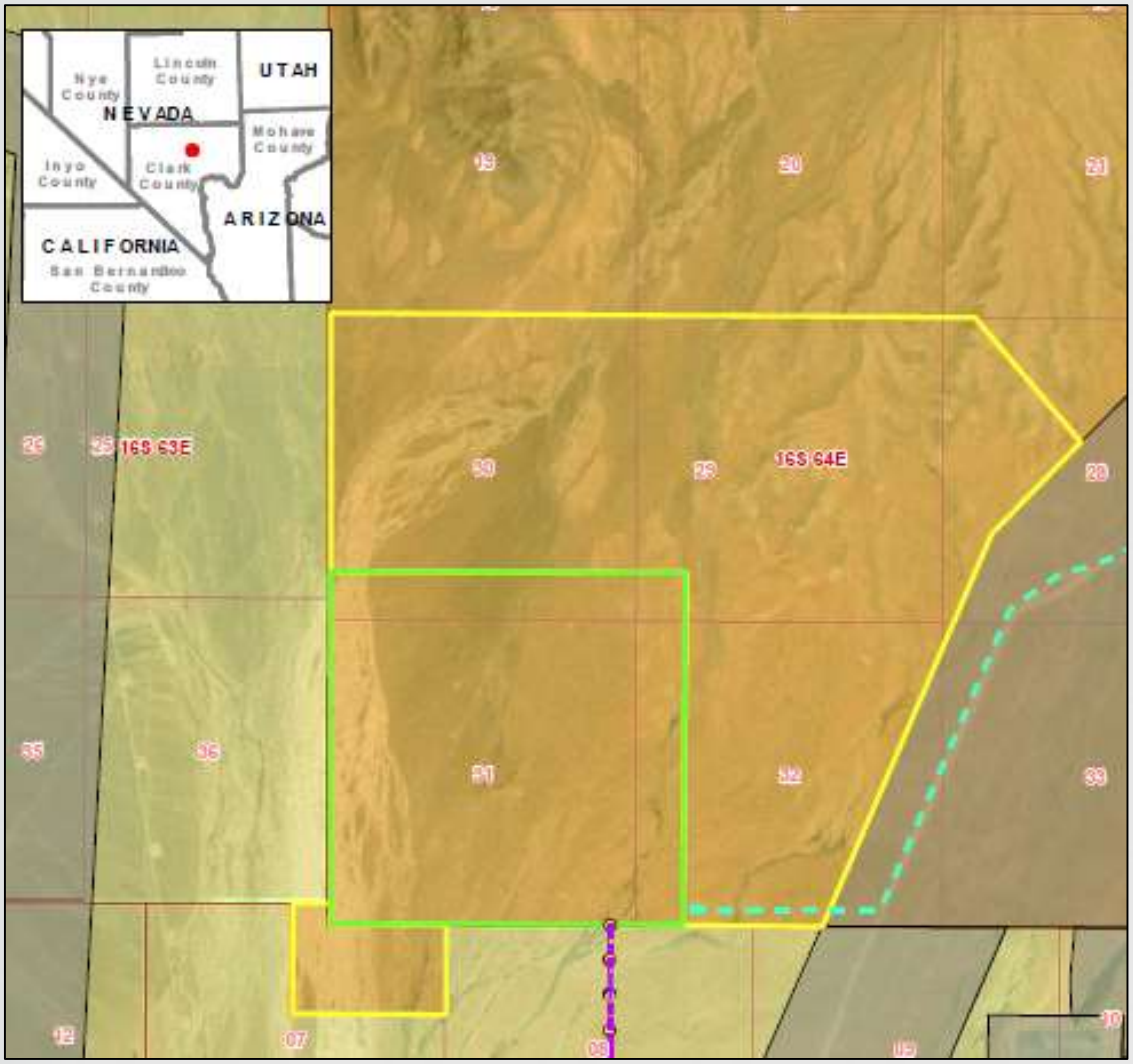

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SOLAR FIELD
Township, Range, Section
T16S, R64E
Sections **28, 29, 30, 31, 32, and 33**
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Arrow Canyon Solar Project
Approved ROWs

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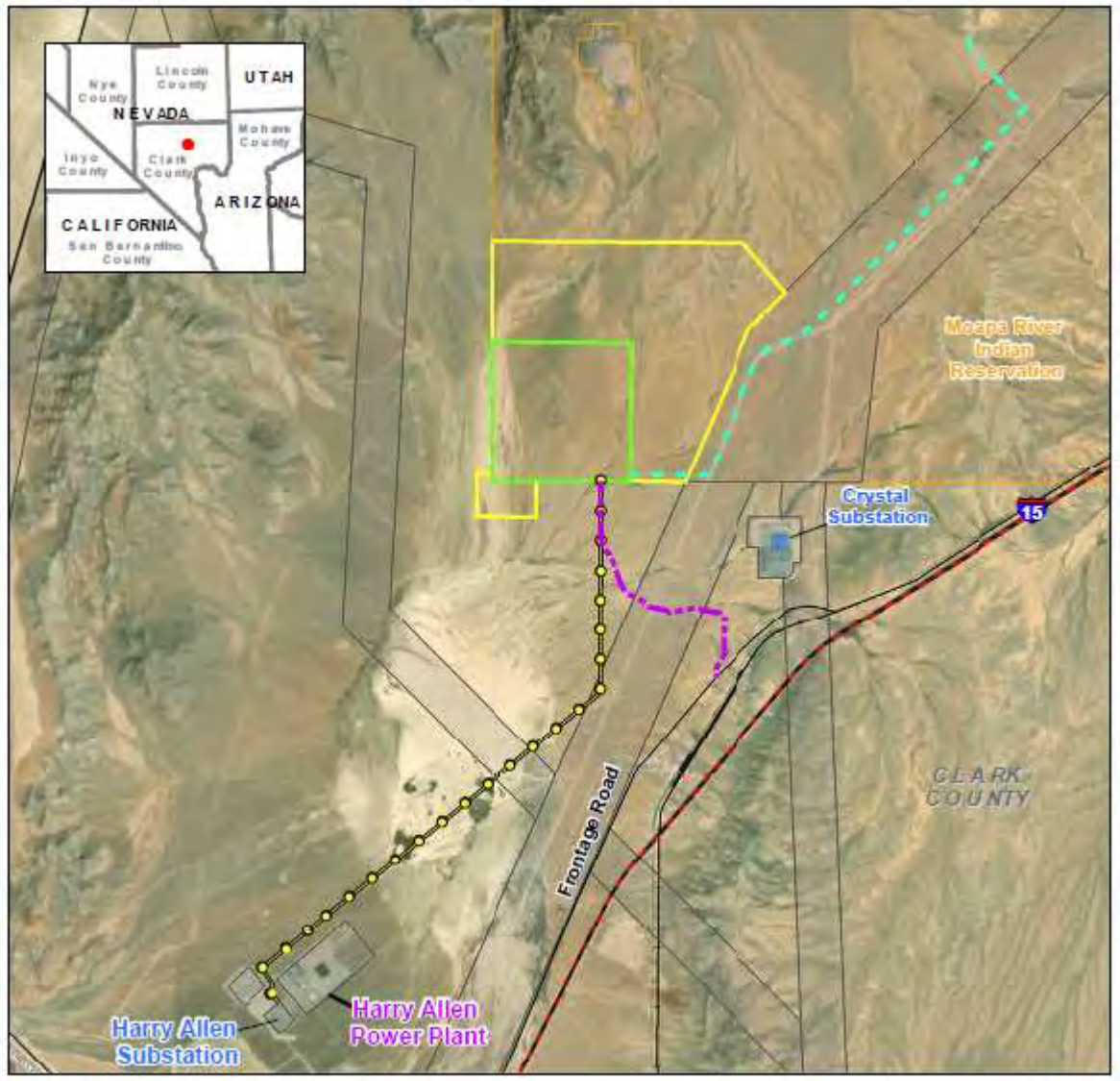

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Arrow Canyon Solar Project
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PV Solar Field Components

Arrow Canyon Solar Project SEIS Focus

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- 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.ArrowCanyonSolarSEIS.com

Public Comment Form

PUBLIC COMMENT FORM
Bureau of Indian Affairs

ARROW CANYON SOLAR PROJECT
SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT
www.ArrowCanyonSolarSEIS.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 Arrow Canyon Solar Project SEIS:

_____

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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)

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place
stamp
here

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

Meeting Posters

Arrow Canyon Solar Project
Supplemental Environmental Impact Statement (SEIS)

Scoping Meetings
February 25 and 26, 2020

Proposed Action

- **Who has proposed:** Arrow Canyon Solar, LLC and Moapa Band
- **What is proposed:** Expanding the originally approved solar field and associated land lease on the Reservation for the Moapa Solar Energy Center (MSEC) Project from 850 acres to up to 2,200 acres. Originally approved ROWs for transmission gen-tie, access road, and water pipeline on BLM-managed lands would be remain unchanged.
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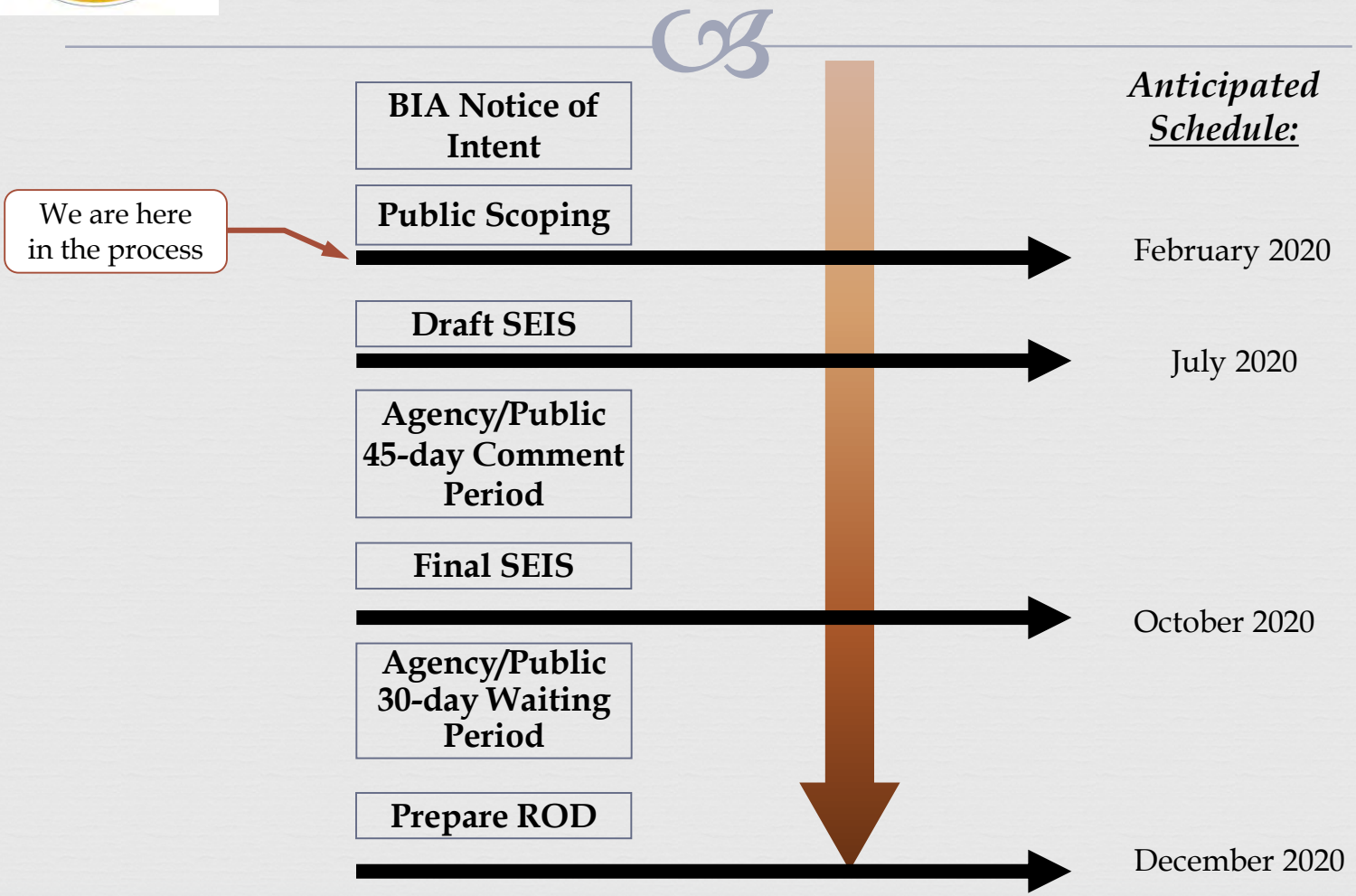

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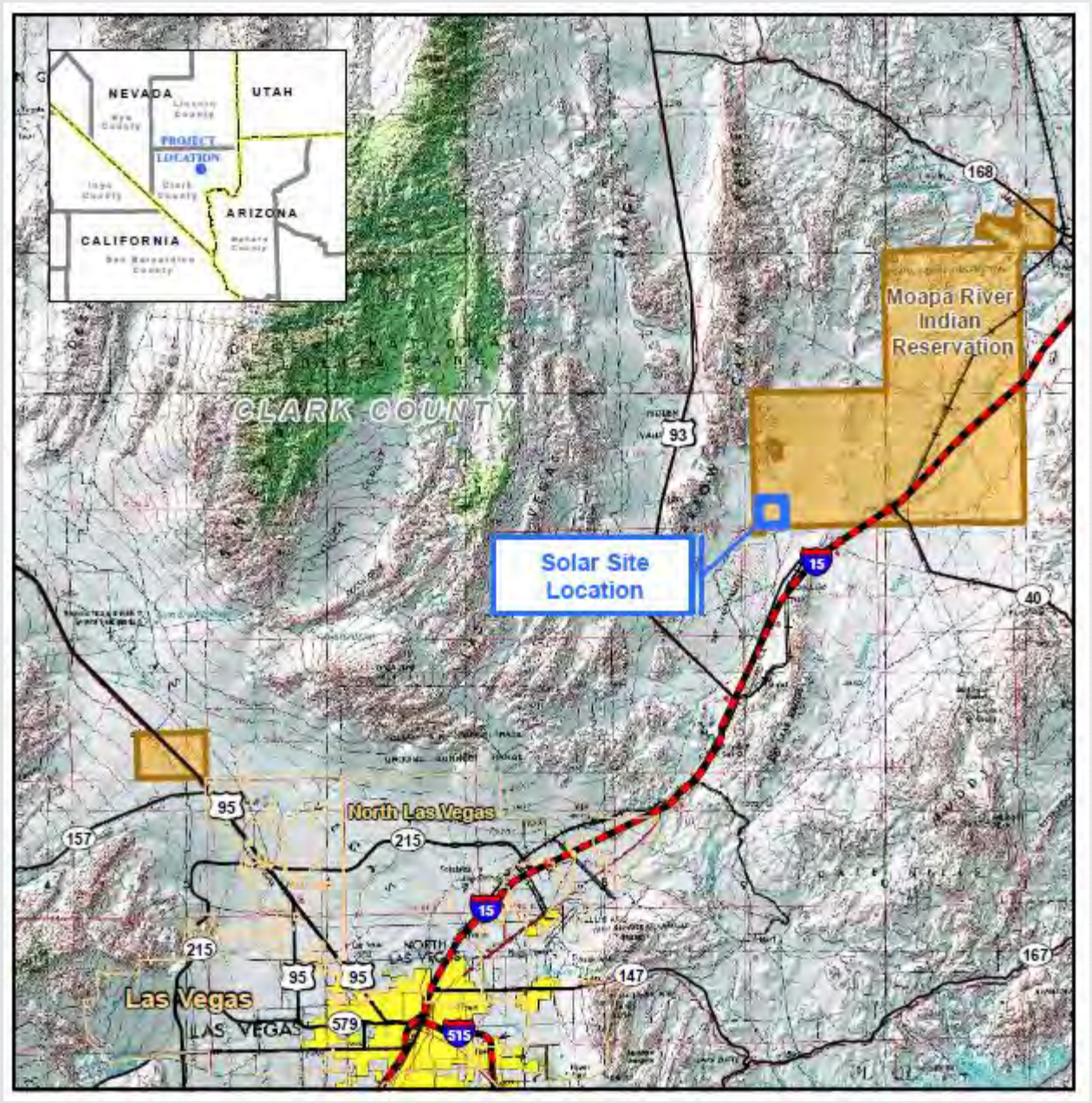

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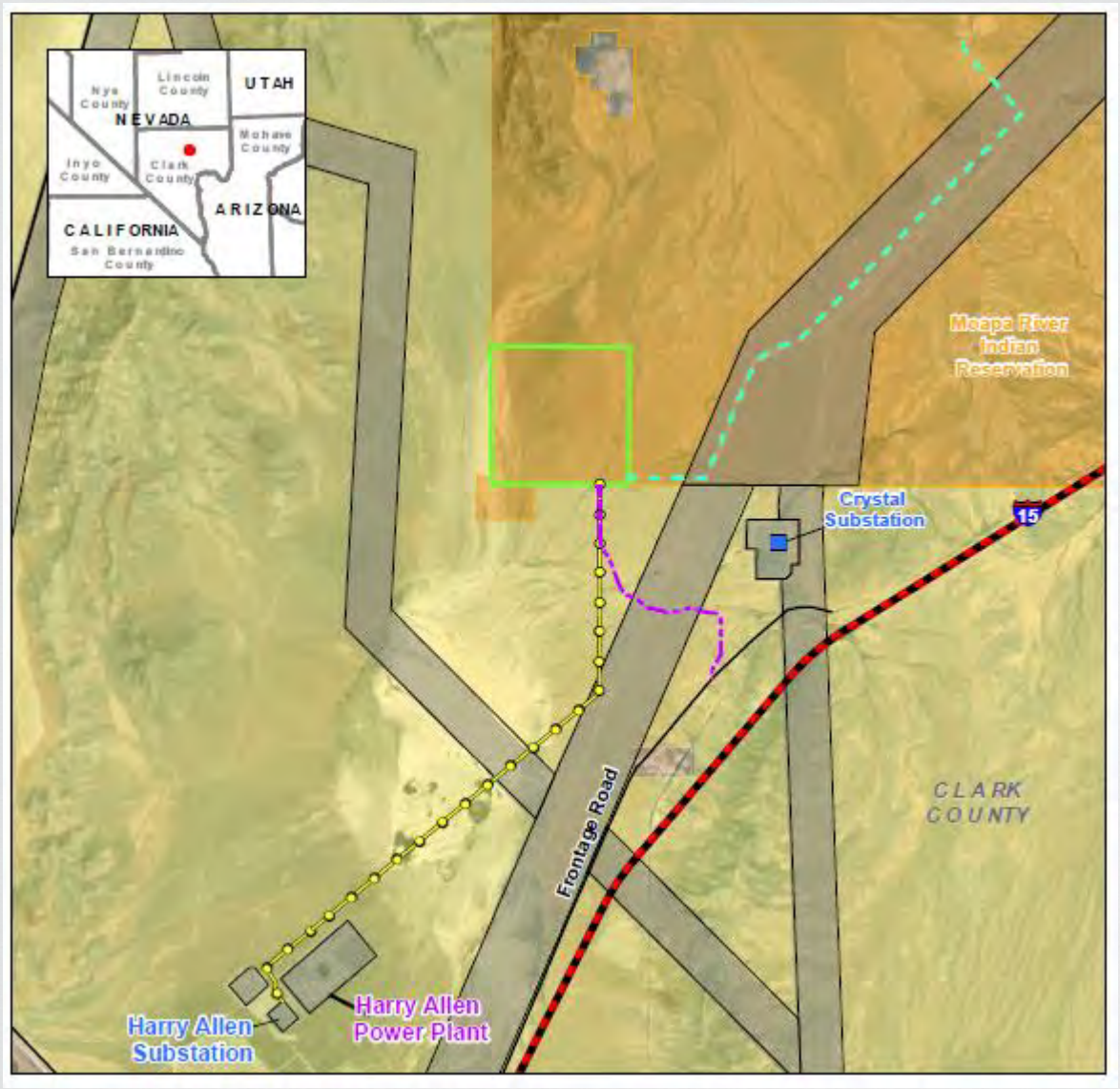

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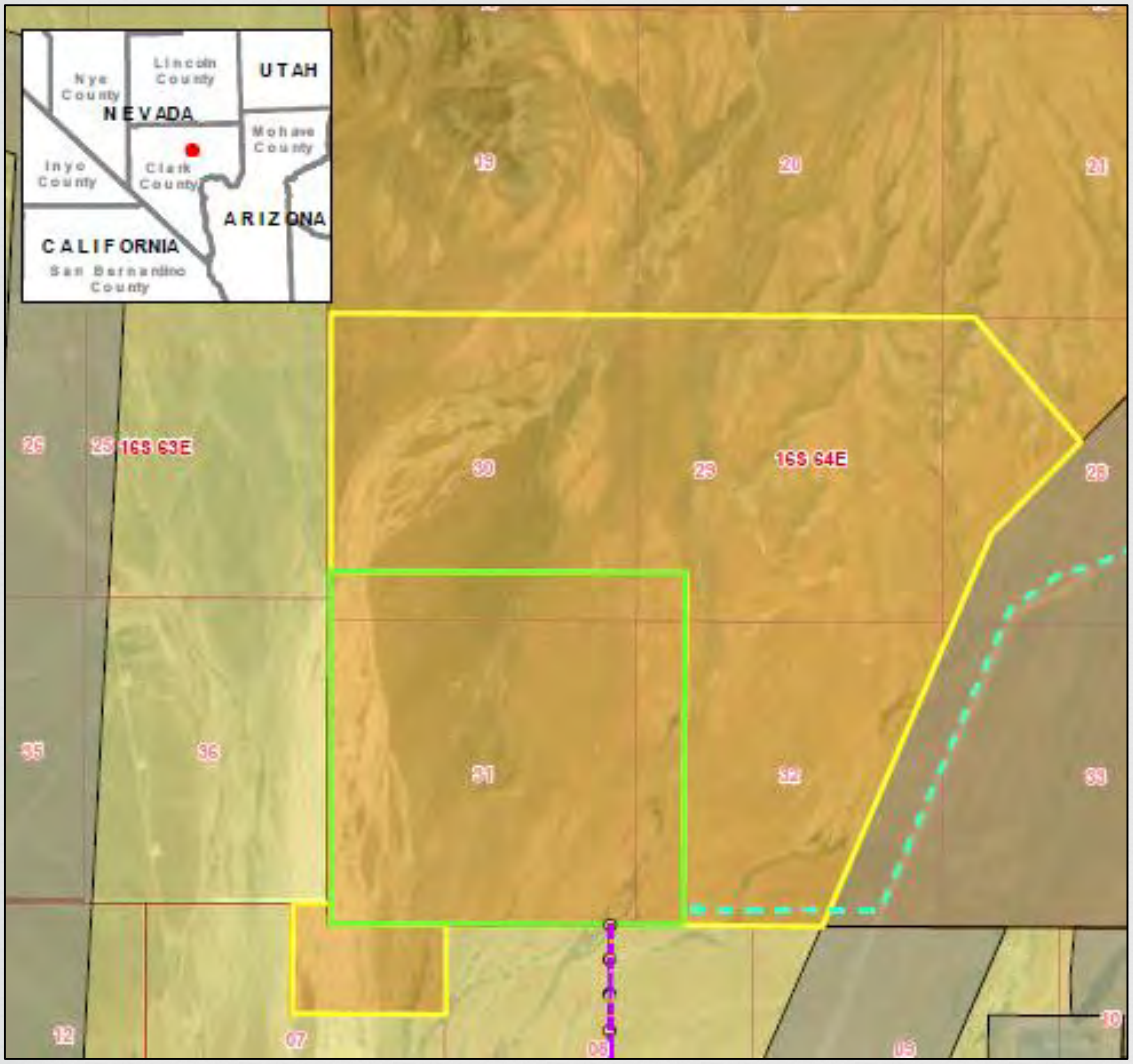

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Arrow Canyon Solar Project
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Public Scoping Meeting Sign-In Sheets

SIGN-IN SHEET: ARROW CANYON SOLAR PROJECT

Supplemental Environmental Impact Statement Public Scoping Meeting – February 25, 2020

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

Name/Organization	Mailing Address	Email
Bianca Rodriguez	P.O. Box 431	Redskinlngurl87@gmail.com
Lon Dalley/MVWD	PO Box 257, Logandale NV 89021	lon@moapawater.com
Sherryl Patterson	PO Box 427 Moapa	Sherryl@mvdsl.com
Terry Boh	PO Box 42 Overton, Nv.	terry.iterc@gmail.com
Tamera Dawes	2600 n. central Phx AZ 85004	tamera.dawes@bia.gov
KATIE KLUPLEVICH	1999 HARRISON ST, SUITE 675, OAKLAND, CA 94612	KATIE.KLUPLEVICH@EDF-RE.COM
Chip Lewis	2600 N. Central Ave 4th Floor Mail Phx AZ 85004	chip.lewis@bia.gov
VERNON LEE MOAPA BAND OF PAIUTES	PO Box 773 MOAPA, Nv. 89025	N/A

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Name/Organization	Mailing Address	Email
Bianca Rodriguez	P.O. Box 431	Redskindngurl8M@gmail.com
BIA Christina Varela	WRO Phoenix	Christina.Varela@bia.gov
AARON ESTES		aaron.estes@hollyenergy.com
VERNON ROBISON	Po Box 430 Overton, NV 89040	progress@mvdsl.com
Miguel Oropeza	P.O Box 732	migueloropeza726@yahoo.com
GREGORY TANNER SR	MOAPA NEV	southernbighorn@yahoo.com
Shane Tom	PO Box 547 Moapa NV 89025	
MIKAY MARQUEZ	Po Box 547 Moapa NV 89025	

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Name/Organization	Mailing Address	Email
Vickie Simmons	PO Box 93 Moapa NV 89025	VJSimmons.2018@yahoo.com
Norm Winstar Tom	Po Box 7047 Bunkerville N.V. 89007	
Sean Grayman	Moapa NV. POBox 248 84025	hippiebones43@gmail.com
Thomas K. Bush Tribal	POBOX 525 Moapa, NV 89025	thomas7bush@gmail.com
Laura Wiffes	P.O.BOX 72 Moapa NV 89025	Chair.mbod@moapatsand of Indians.org

SIGN-IN SHEET: ARROW CANYON SOLAR PROJECT

Supplemental Environmental Impact Statement Public Scoping Meeting – February 26, 2020

U.S. Bureau of Land Management (BLM) Conference Room, 4701 N. Torrey Pines Dr., Las Vegas, NV 89130

Name/Organization	Mailing Address	Email
BRAD HARDENBROOK NEVADA DEPT. OF WILDLIFE	3373 PEPPER LANE LAS VEGAS, NV 89120	bhrdnbrk@ndow.org
Bella Bakrania Geosyntec	9480 S Eastern Ave Las Vegas, NV 89123	bbakrania@geosyntec.com

Interagency Meeting

Meeting Presentation

Arrow Canyon Solar Project
Supplemental Environmental Impact Statement (SEIS)

Interagency Meeting

February 26, 2020

Introductions

Chip Lewis

Proposed Action

- **Who has proposed:** Arrow Canyon Solar, LLC and Moapa Band
- **What is proposed:** Expanding the originally approved solar field and associated land lease on the Reservation for the Moapa Solar Energy Center (MSEC) Project from 850 acres to up to 2,200 acres. Originally approved ROWs for transmission gen-tie, access road, and water pipeline on BLM-managed lands would be remain unchanged.
- **Where:** Clark County, NV on Moapa River Indian Reservation
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Supplemental Environmental Impact Statement

SEIS Process

Public input and documentation of environmental impacts that would result from implementation of the Proposed Action (the expansion of approved MSEC 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**
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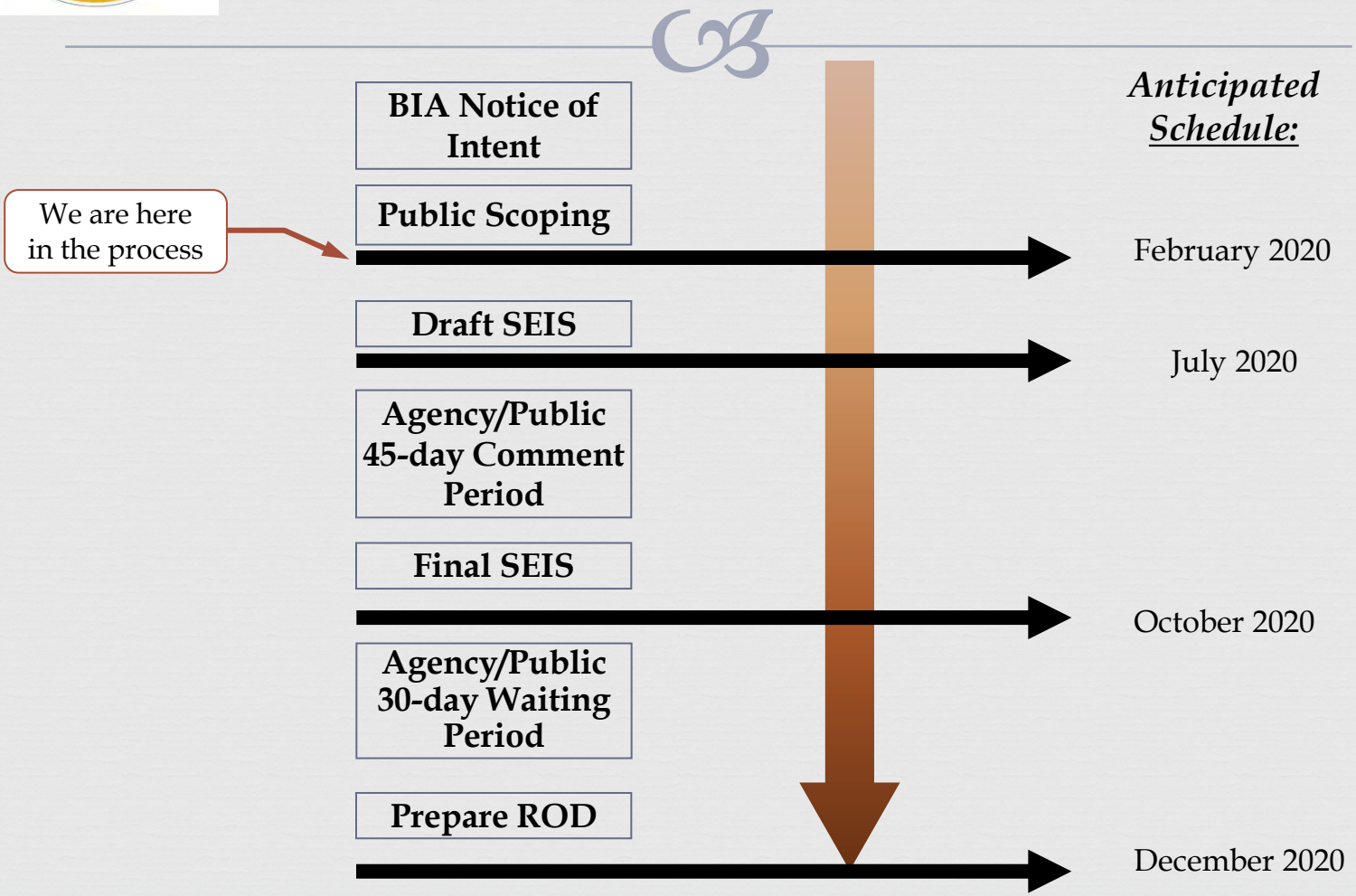
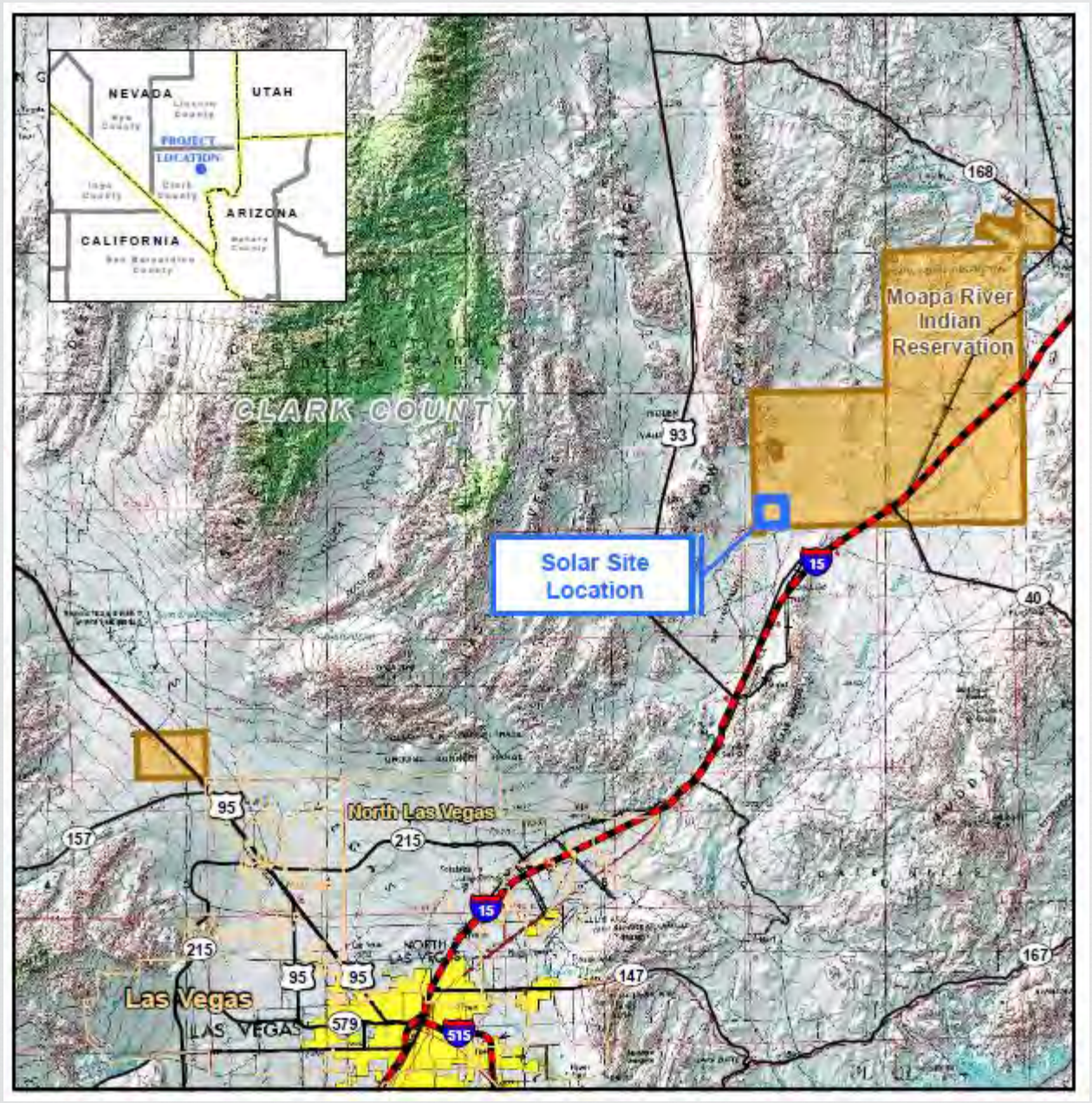


Project Description

Arrow Canyon Solar Project



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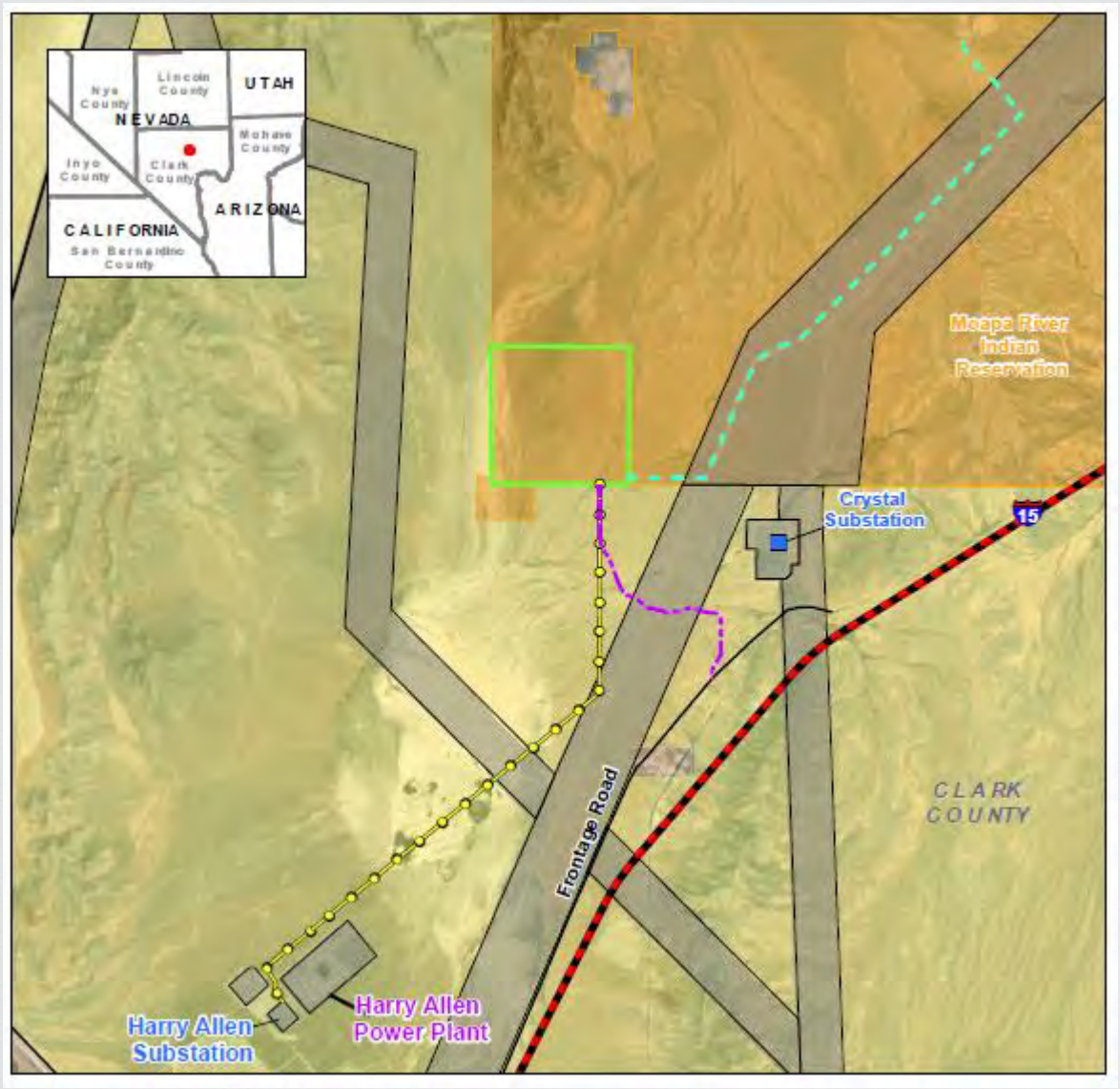

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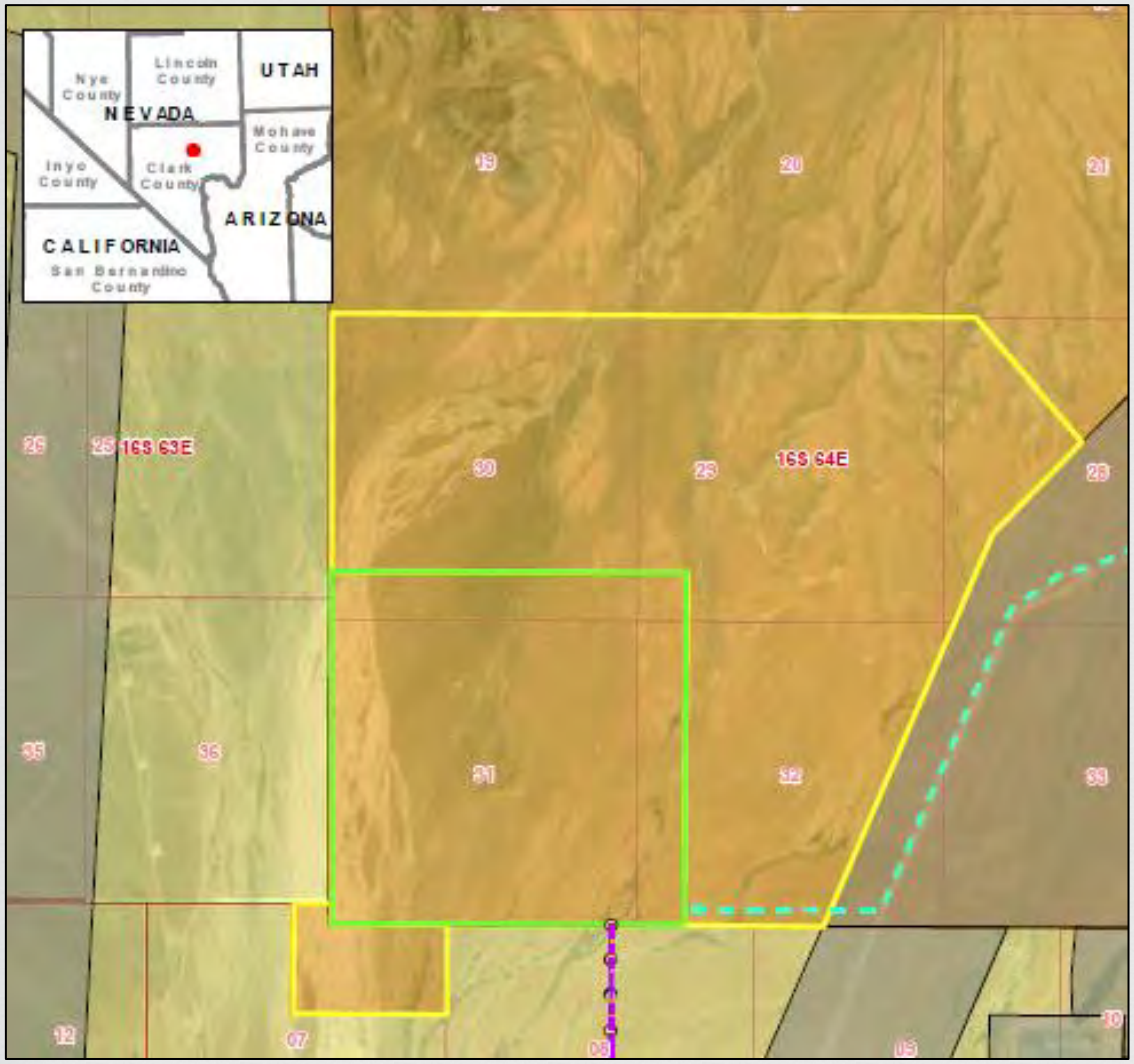

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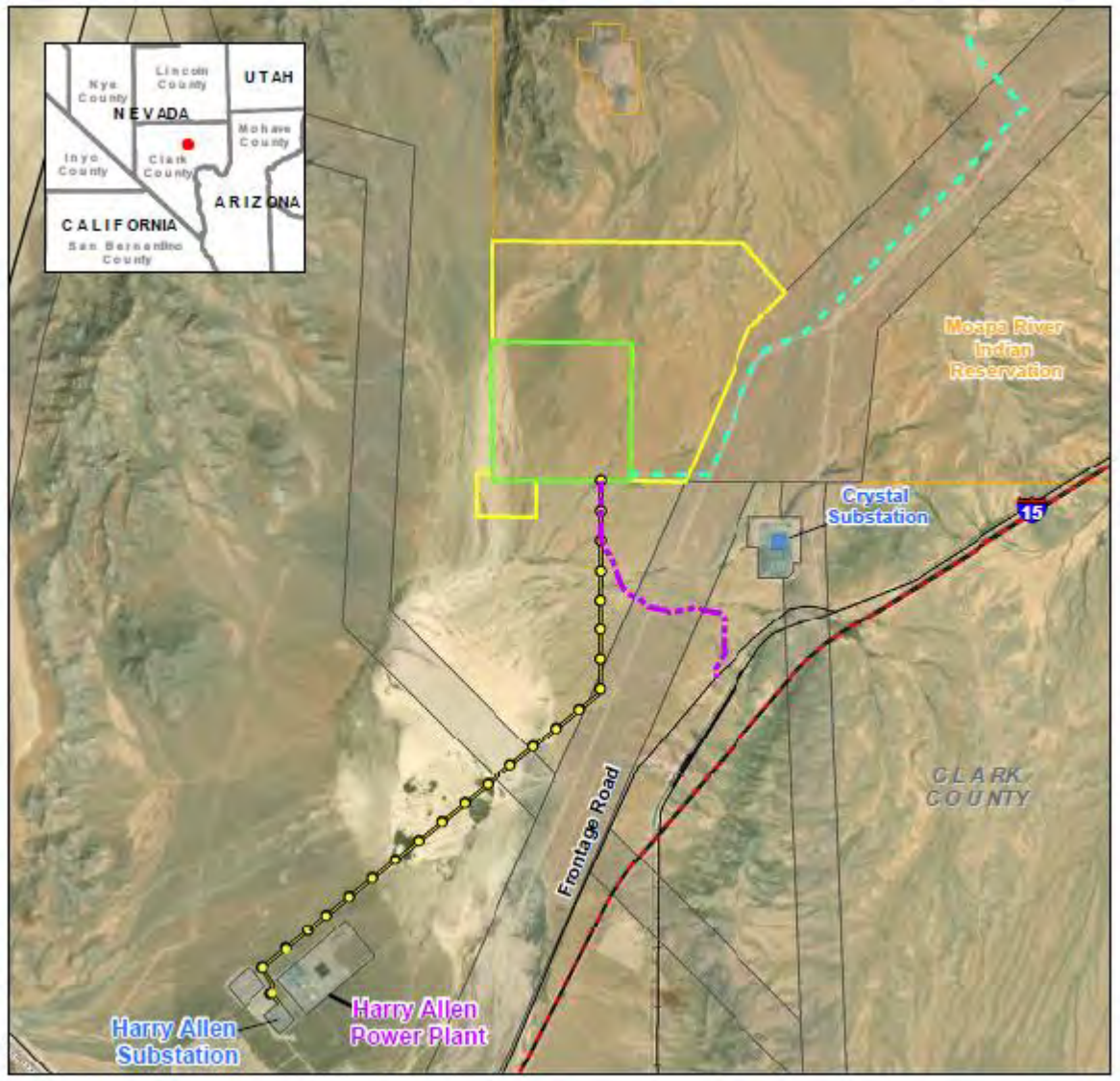

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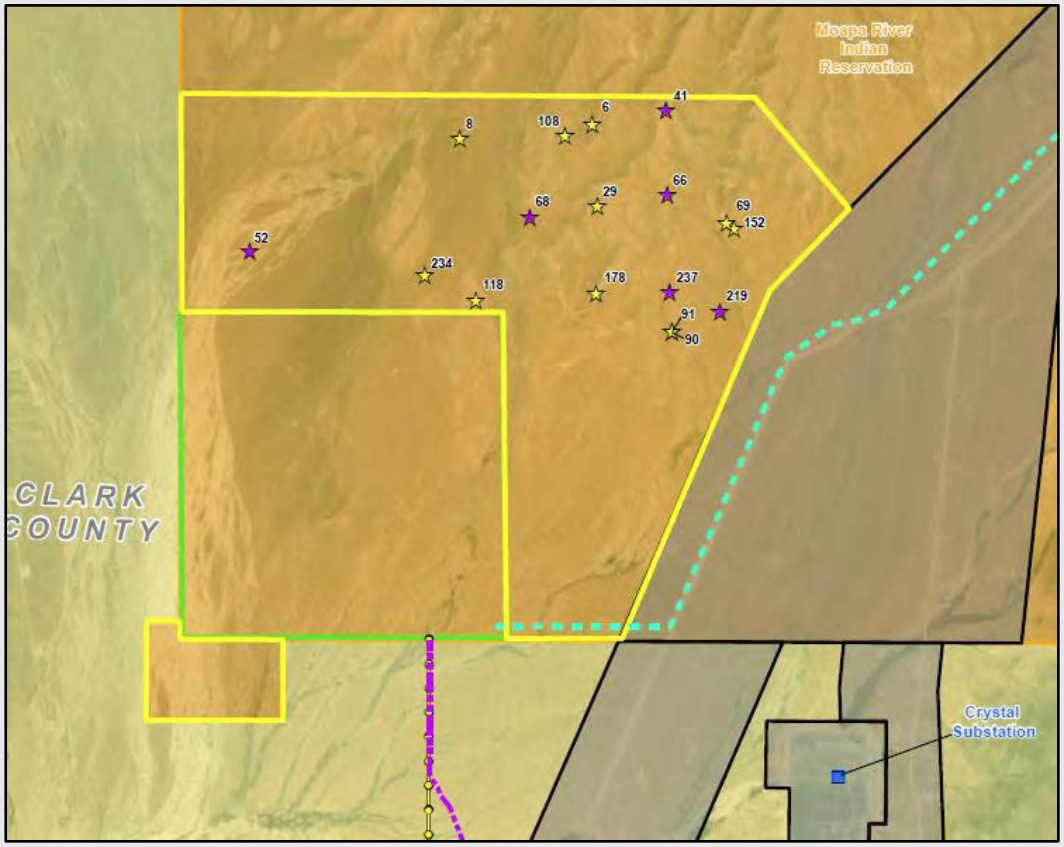
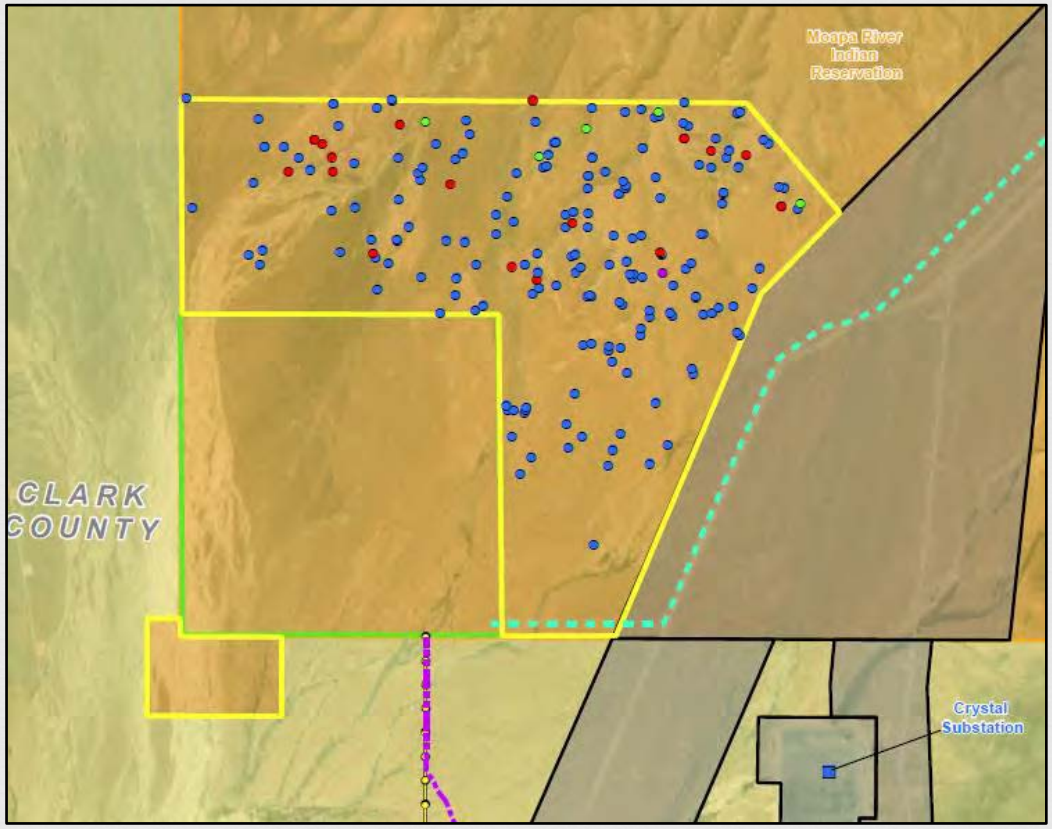
Desert Tortoise



Survey Results

- Live Desert Tortoise Observation - Adult
- Live Desert Tortoise Observation - Juvenile

Desert Tortoise



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Meeting Sign-In Sheets

SIGN-IN SHEET: ARROW CANYON SOLAR PROJECT

Supplemental Environmental Impact Statement – Agency Scoping Meeting – February 26, 2020

Name/Organization	Mailing Address	Email
Christina Varela BIA	WRO BIA Phoenix	Christina.varela@bia.gov
Tamera Dawes BIA	"	tamera.dawes@bia.gov
GARRY CANTLEY BIA	WRO EQS	Garry.Cantley@bia.gov
Mary Bourger		bourger@ecoatlas.com
Glen Knowles	FWS	Glen_knowles@fws.gov
Nicholas Pay	BLM SNPO	npay@blm.gov
Kim Mangum	BLM - Las Vegas	kmangum@blm.gov
Chip Lewis	BIA	chip.lewis@bia.gov

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Supplemental Environmental Impact Statement – Agency Scoping Meeting – February 26, 2020

Name/Organization	Mailing Address	Email
USFWS - Jessica Zahn	4701 N. Torrey Pines Dr., Las Vegas	jessica_zahn@fws.gov
CARLA WISE – USFWS	4701 N. TORREY PINES DR. LAS VEGAS, NV 89130	carla_wise@fws.gov
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Appendix D

Scoping Comments Received

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
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A

March 2, 2020

Mr. Chip Lewis
BIA Western Regional Office
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Phoenix, Arizona 85004

Subject: Scoping comments for the proposed Arrow Canyon Solar Project on the Moapa River Indian Reservation, Clark County, Nevada

Dear Mr. Lewis:

The U.S. Environmental Protection Agency has reviewed the Federal Register Notice published on January 30, 2020 requesting comments on the Bureau of Indian Affairs' decision to prepare a supplement to the Environmental Impact Statement for the subject project, formerly known as the Moapa Solar Energy Center. Our comments are provided 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. EPA is a NEPA cooperating agency on the project.

The amended project would still consist of a 200-megawatt (MW) alternating current solar photovoltaic (PV) electricity generation facility but the applicant currently plans to expand the solar field on the Reservation from 850 acres to 2,200 acres. The linear facilities previously evaluated and approved by the BLM (i.e. main access road, 230kV gen-tie line, and temporary water pipeline) would not be reevaluated in the SEIS.

The proposed Eagle Shadow Mountain Solar Project recently completed the NEPA process and appears to be very near to the Arrow Canyon project expansion area. If the BIA intends to "incorporate by reference" some analyses from this EIS or the others completed on the Reservation, we recommend that BIA 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 that will assist the reader in retrieving the analyses.

The Notice of Intent indicates that resources that may be evaluated include: water resources, biological resources, threatened and endangered species, cultural resources, Native American religious concerns, and aesthetics. We agree these resources are appropriate for evaluation. We have the following additional recommendations:

Impacts to ephemeral drainages and playas

The project site contains numerous ephemeral drainages or desert washes. We understand it is the intention of the developer to avoid large drainages by designing the project in separate fenced array blocks to be located outside drainage areas. We support this approach of drainage avoidance and

recommend this strategy be clearly identified in the project description. Identify specific 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.

It appears that most of the drainages on the site flow to a terminal lake or playa. We understand the BIA will be consulting with the Army Corps of Engineers regarding jurisdiction of these drainages under Section 404 of the Clean Water Act. Regardless of jurisdiction, it is important to minimize erosion and sedimentation to preserve the hydrological function and minimize disturbance of the playa since playas have wildlife values. According to the Nevada Department of Wildlife, *when watered and loaded with invertebrates during spring or late summer, Nevada's ephemeral playas may contribute significantly to supporting waterfowl and shorebird migration*[1]. The Western Snowy Plover is identified as the key priority species for this habitat type.

In addition to avoiding major drainages for the arrays, 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. Consider the impacts of changing precipitation patterns on the project. There may be design considerations needed to accommodate future stormwater flows resulting from increased intensity and severity of storms. We recommend upsizing stormwater infrastructure.

Ensure battery storage areas are not located in drainages or any areas subject to flooding. Because the project is on Tribal land where County requirements do not apply, we recommend against citing to local codes unless the project description identifies that the project will be designed and will voluntarily conform with local codes, such as the County floodplain requirements or dust control, for example.

We are aware that all linear facilities such as roads and transmission lines have been previously evaluated and approved; however, if any additional internal roads will be necessary due to solar field expansion, we recommend minimizing the number of road crossings over washes in order to minimize erosion, migration of channels, and scour. All road crossings should be designed to provide adequate flow-through during large storm events.

Topography/Geology

Grading alters soil stability and contributes to erosion. We understand that the applicant intends to minimize grading on the site. Identify the strategy for grading in the project description in the DSEIS. We recommend that grading be minimized to the greatest extend possible, since this will benefit several resources, including water quality, air quality, vegetation, and minimize the spread of invasive species.

Air quality/public health

The Moapa River Indian Reservation is located outside the ozone nonattainment area for Clark County. The project area is also in attainment for particulate matter 10 microns in diameter or smaller (PM10); however, fugitive dust is still a pollutant of concern that would be generated during construction and dust control Best Management Practices should be utilized. While Clark County does not have jurisdiction on tribal land, the BIA and Tribe could consider requiring contractors to attend a Dust

[1] Page 290, Nevada Wildlife Action Plan, Desert Playas & Ephemeral Pools. Available: http://www.ndow.org/uploadedFiles/ndoworg/Content/Nevada_Wildlife/Conservation/2013-NV-WAP-Marshes-Lakes-Playas-Dunes.pdf

Control Class, held twice monthly, by the Clark County Department of Air Quality, and utilizing the resources in their Dust Control Handbook.[2]

Dust control is important since 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 humans[3]. Ground disturbing activities could result in dispersal of *Coccidioides* spores. Measures should be identified to prevent or reduce the risk of exposure to workers, including training for workers and supervisors on the potential presence of Valley Fever spores, methods to minimize exposure, and how to recognize symptoms. Mitigation measures could include limiting 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.

Biological Resources

Vegetation Management - Discuss general locations of rare plants and describe how potential impacts will be minimized. Consider impacts from increase of shade on vegetation and species in the desert environment and impacts from fences. Indicate if any 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 - Ensure the Weed Management Plan includes the latest information regarding the effectiveness of existing control measures in the vicinity, including those utilized at the K-Road Solar project and in the utility corridor.

Desert Tortoise - Present the direct and cumulative impacts that this project, along with other solar projects proposed in the Mojave Desert, is expected to have on the threatened Mojave Desert tortoise. Discuss the potential long-term effects from fragmenting or isolating desert tortoise conservation areas and restricting gene flow. We understand the proposed design would utilize fencing that will allow tortoise to reenter the site upon completion. Ensure this is described in the project description. Include monitoring, reporting and adaptive management efforts to ensure species and habitat conservation effectiveness.

Impacts to Birds – Discuss impacts to birds from the "lake effect", where birds may mistake the PV panels for water resulting in unexpected deaths from collisions with the solar panels. State whether this phenomenon has occurred at the operational K-Road facility and describe measures to minimize potential impacts. We recommend that the Bird and Bat Conservation Strategies include avian mortality monitoring and adaptive management measures.

Cumulative impacts

Describe the methodology used to assess cumulative impacts. We recommend the BIA consider the methodology developed jointly by EPA, the Federal Highway Administration, and the California Department of Transportation. While this methodology was developed for transportation projects in California, the principles and steps in this guidance offer a systematic way to analyze cumulative impacts for any project.[4]

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[2] http://www.clarkcountynv.gov/airquality/compliance/Documents/DustControl/DustControlForms/DUST_CONTROL_HANDBOOK.pdf#search=dust%20control%20handbook

[3] See: http://www.cdc.gov/fungal/diseases/coccidioidomycosis/causes.html

[4] See: https://dot.ca.gov/programs/environmental-analysis/standard-environmental-reference-ser/cumulative-impact-analysis-approach#eight

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 appropriate as a focus in the cumulative impact assessment.

We appreciate the opportunity to provide comments on the preparation of the DSEIS. If you have any questions, please contact me at (415) 947-4178 or vitulano.karen@epa.gov.

Sincerely,

Karen Vitulano
Environmental Review Branch

B

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Via email only

28 February 2020

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RE: Arrow Canyon Solar Project on the Mojave River Indian Reservation, Clark County, Nevada

Dear Mr. Lewis,

The Desert Tortoise Council (Council) is a non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of desert tortoise species. Established in 1975 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council routinely provides information and other forms of assistance to individuals, organizations, and regulatory agencies on matters potentially affecting desert tortoises within their geographic ranges.

We appreciate this opportunity to provide scoping comments on the above-referenced project. Given the location of the proposed project in habitats likely occupied by Agassiz's desert tortoise (*Gopherus agassizii*) (synonymous with "Mojave desert tortoise"), our comments pertain to enhancing protection of this species during authorized activities.

In March 2014, the Council commented on the Final Environmental Impact Statement (Final EIS) for the Moapa Solar Energy Center (BIA 2014), which we recognize as the environmental document for the earlier project for which scoping comments are now being solicited for this interrelated project to be analyzed in the Supplemental EIS. Since the current proposal is expansion of the 850-acre existing project onto an additional 1,350 acres, to enable us to understand previous impacts and anticipated impacts associated with this expansion, we expect that the Supplemental EIS will include the following components:

1. In order to understand anticipated impacts, the Supplemental EIS must document the impacts of the 850-acre project on tortoises and occupied habitats, including the following information: (a) How many tortoises were displaced by the original project? (b) Assuming these tortoises were displaced into adjacent areas or distant translocation areas, please report on the results of those displacements. How long were translocated tortoises monitored? How many of those tortoises lived and died after translocation? (c) Were those translocation areas sufficiently isolated that displaced tortoises were protected by existing or enhanced land management? Here, we assume that if the tortoises were translocated to areas within the Moapa River Indian Reservation (Reservation) that they were more proactively protected compared to less-regulated adjacent areas where, for example, off-highway vehicles and other proposed development may occur.

2. We urge the BIA to include in the translocation plan, legal safeguards to protect the translocation areas from future development or disturbance. Because the translocation of tortoises to other sites is mitigation for the proposed action, the translocation sites should be protected, at a minimum, for as long as the action area is no longer able to support tortoises at the pre-project population level. Additionally, it is important to enlist qualified botanists or ecologists to determine whether sufficient low-potassium plants are present within the translocation area, such that existing or displaced tortoises would have better odds of surviving prolonged drought periods.

3. Pursuant to Section 1508.25 of the Council on Environmental Quality's (CEQ) regulations (40 CFR 1508.25), any environmental impact statement must cover the entire scope of a proposed action, considering all connected, cumulative, and similar actions in one document. Since some readers may not have access to or familiarity with the related Final EIS, we believe the Supplemental EIS needs to summarize previous findings. Pursuant to Section 1506.1(a) of these regulations, an agency action cannot "[l]imit the choice of reasonable alternatives" before reaching a final decision in a published [Record of Decision] (ROD). These regulations ensure agencies will prepare a complete environmental analysis providing a "hard look" at the environmental consequences of all proposed actions instead of segmenting environmental reviews (Novack 2015).

4. It is important that United Stated Fish and Wildlife Service (USFWS 2019) protocol-level surveys be performed throughout the 1,350-acre expansion area *and alternative areas*. These surveys, results of which would be published in the Supplemental EIS, must provide density estimates *for each alternative assessed in the Supplemental EIS*. This statement implies, as required by the National Environmental Policy Act (NEPA), that alternative sites will be assessed for the project. In fact, we believe it is incumbent on the BIA to perform an inventory of existing disturbed areas within a minimum radius around the proposed expansion location to identify where solar panels could be placed without destroying relatively pristine habitats.

5. To determine the full extent of impacts to tortoises and to facilitate compliance with the Federal Endangered Species Act (FESA), qualified biologist(s) should consult with the Las Vegas office of the USFWS to determine the action area for this project. The USFWS defines "action area" in 50 Code of Federal Regulations 402.2 and their Desert Tortoise Field Manual (USFWS 2009) as "all areas to be affected directly or indirectly by proposed development and not merely the immediate area involved in the action (50 CFR §402.02)."

6. We note that a federal appellate court has previously ruled that in its EIS a federal agency must evaluate a reasonable range of alternatives to the project including other sites, and must give adequate consideration to the public's needs and objectives in balancing ecological protection with the purpose of the proposed project, along with adequately addressing the proposed project's impacts on the desert's sensitive ecological system [National Parks & Conservation Association v. Bureau of Land Management, Ninth Cir. Dkt Nos. 05-56814 et seq. (11/10/09)].

7. It is our understanding that the BIA's description of its purpose and need should be broad enough to fairly evaluate reasonable solar energy alternatives, and not so arbitrarily narrow that the NEPA analysis is improperly limited. Therefore, the Council expects that the BIA will fully describe the purpose and need for this project and develop and analyze other viable alternatives, such as rooftop solar, which we contend constitutes "other reasonable courses of actions" (40 CFR 1508.25).

8. Too often, a single impact footprint is identified, all surveys are restricted to that site, and no alternative sites are assessed, as required by NEPA. We are concerned that this project has already pre-determined the project footprint and that, if protocol-level surveys reveal that there are areas of lower tortoise densities adjacent to the 850-acre existing site where impacts could be minimized, those areas would not be considered if the project footprint is predetermined before survey data are available. As such, we expect alternative sites to be surveyed and analyzed in the Supplemental EIS, and that the alternative with the fewest impacts to tortoises be adopted for development.

9. Based on the concerns given above and the expectation that tortoises will be displaced from 1,350 acres, please document how methods may need to be modified for this expansion compared to the existing 850-acre project. Specifically, will new tortoises be displaced into the same areas as the previous tortoises? How long will these new tortoises be monitored? Based on lessons learned from the project approved in 2014, is there any need to manage translocation areas differently to protect newly displaced tortoises?

10. Please fully document the current conditions of the proposed translocation area for this project. This includes, at a minimum, the quality of the habitat into which tortoises will be displaced. Are there any degraded habitats or barren areas that may impair success of the translocation? Are there incompatible human uses in the new translocation area that need to be eliminated or managed to protect newly-translocated tortoises?

11. Given the above concerns, we expect that in its alternatives analysis the Supplemental EIS will identify a range of alternatives for various translocation areas. Importantly, protocol-level surveys must be conducted, with planning input from the USFWS, that will result in density estimates for tortoises in the alternative translocation sites. Based on these comparisons and resulting field data that must be published in the Supplemental EIS, we expect that the environmental document(s) will identify a preferred alternative for the one translocation area that will facilitate successful translocation.

12. Based on these surveys and analyses, we expect that there will be a formal translocation plan developed for and attached to the Supplemental EIS. Even if the proponent plans to rely on USFWS guidance as it did for the first project [see page 4-57 in the original Final EIS (BIA 2014)], we fully expect that the proponent will develop a project-specific translocation plan based on current data that is responsive to lessons learned from the earlier translocation effort, and that the translocation plan will be available for review as part of the Supplemental EIS.

13. With recent tortoise translocation efforts from military bases (e.g., Fort Irwin and Twentynine Palms Marine Corps Base in California) and throughout southern Nevada by USFWS, we expect the Supplemental EIS to summarize the successes and failures of these translocation efforts and demonstrate how the current project will be planned to enhance translocation success. Specifically, how will the proponent minimize predation of translocated tortoises and avoid adverse climatic conditions, such as low winter rainfall conditions, that may exacerbate translocation success? We expect the Supplemental EIS to include a USFWS-approved monitoring plan that will accurately access these and other issues to minimize losses of translocated tortoises. Is it possible that given the proximity of these two projects that tortoises translocated the first time may need to be translocated again? It is our understanding that USFWS wants to avoid this exercise.

14. To reiterate our comments of 2014, we remain concerned that the health of tortoises may be jeopardized if tortoises are displaced during drought conditions, which is known to undermine translocation successes (Esque et al. 2010). If drought conditions are present at the time of project development, we request that the proponent confer with the USFWS immediately prior to displacing tortoises and seek input on ways to avoid loss of tortoises due to stressors associated with drought. One viable alternative if such adverse conditions exist is to postpone site development until which time conditions are favorable to enhance translocation success.

15. We request that the Supplemental EIR address the possible spread of weeds as a result of implementing the proposed action. As such, we recommend including an analysis of how the proposed action would contribute to the spread and proliferation of nonnative invasive plant species; how this spread/proliferation would affect the desert tortoise and its habitats (including the frequency and size of human-caused fires); and how the proposed action may affect the likelihood of human-caused fires. We strongly urge the proponent to develop and implement a management and monitoring plan using this analysis and other relevant data that would reduce the transport to and spread of nonnative seeds and other plant propagules within the project area and eliminate/reduce the likelihood of human-caused fires. The plan should integrate vegetation management with fire management and fire response.

16. With regards to cumulative effects, the Supplemental EIS must list and discuss all project impacts within the region since development of the 2014 project and include future state, federal, and private actions affecting listed species on state, federal, and private lands. Please ensure that the Council on Environmental Quality's (CEQ) "Considering Cumulative Effects under the National Environmental Policy Act" (1997) is followed, including the eight principles, when analyzing cumulative effects of the proposed action to the tortoise and its habitats. CEQ states, "Determining the cumulative environmental consequences of an action requires delineating the cause-and-effect relationships between the multiple actions and the resources, ecosystems, and human communities of concern. The range of actions that must be considered includes not only

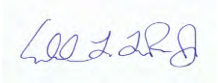
the project proposal but all connected and similar actions that could contribute to cumulative effects." The analysis "must describe the response of the resource to this environmental change." Cumulative impact analysis should "address the sustainability of resources, ecosystems, and human communities." For example, the Supplemental EIS should include data on the estimated number of acres of tortoise habitats and the numbers of tortoises that may be lost to growth-inducing impacts resulting from the proposed project in the affected region.

17. We also expect that the environmental documents will provide a detailed analysis of the "heat sink" effects of solar development on adjacent desert areas and particularly Agassiz's desert tortoise. Although we have not been provided maps that show how the existing footprint will be expanded, we fully expect the proponent to describe how this project will or will not impact the movement of tortoises relative to linkage corridors. Similarly, please document how this project may impact proximate conservation areas, such as Bureau of Land Management (BLM) designated Areas of Critical Environmental Concern (ACECs).

18. Finally, given that this project expansion is interrelated with the previous 850-acre project for which we provided comments on October 11, 2013 on the Draft EIS and March 20, 2014 on the Final EIS, we believe that the concerns expressed in those two previous letters also apply to the current project. As such, herein we resubmit those letters as new scoping comments addressing persisting concerns that we expect will be address for the current project expansion.

We appreciate this opportunity to provide our scoping comments and trust that our input will help protect tortoises during any authorized project activities. Herein, we ask that the Desert Tortoise Council be identified as an Affected Interest for this and all other BIA projects that may affect species of desert tortoises, and that the Supplemental EIS and related environmental documentation for this particular project (e.g., results of tortoise surveys) are provided to us at the contact information listed above.

Regards,



Edward L. LaRue, Jr., M.S.
Desert Tortoise Council, Ecosystems Advisory Committee, Chairperson

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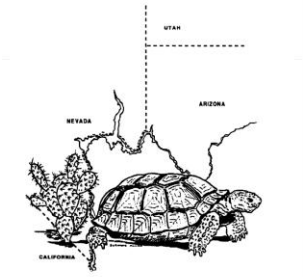

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11 October 2013

Via email only

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RE: Moapa Solar Energy Center, Environmental Impact Statement

Dear Mr. Schlafly, Ms. Heuslein,

The Desert Tortoise Council (Council) is a private, non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of this species. Established in 1976 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council regularly provides information to individuals, organizations and regulatory agencies on matters potentially affecting the desert tortoise within its historical range.

The Council appreciates this opportunity to comment on the Draft Environmental Impact Statement (DEIS) and supporting documents for the Moapa Solar Energy Center (Project). Whereas our comments should not be construed as endorsement for this project, we believe that useful suggestions follow that would predictably alleviate impacts to desert tortoises, their habitats, and other biological resources should the pertinent regulatory agencies grant the project proponent authorization to proceed with Project development.

Impacts Associated with Translocating Tortoises

We understand from various documents that, *within the project footprint*, this project may directly impact up to 34 adult tortoises, 178 juvenile tortoises, and 357 eggs based on calculations using U.S. Fish and Wildlife (USFWS) formulas and cited documents within the primary facility, and associated transmission lines, access road, and water pipeline. Unfortunately, the DEIS only vaguely refers to translocating tortoises onto other Reservation lands or lands managed by the Bureau of Land Management (BLM) without providing any specific locations, field studies, or data describing tortoise occurrence on those lands.

Translocating 34 adult and 178 juvenile tortoises into other areas is only part of the impact; how many acres of occupied habitats and how many resident tortoises will be affected on the lands where translocated tortoises would be introduced? The DEIS is deficient in providing this information.

The DEIS indicates that all other potential facility locations on the Reservation either have too many tortoises or other conflicting issues, so there appear to be no low density areas into which these translocated tortoises may be placed. If that is so, where are the potential BLM lands on which these tortoises could be translocated? We feel that the full impacts of this proposed project cannot be fully assessed until the recipient tortoise population and habitats have been surveyed and included in the impacts assessment. It is not sufficient to say this will be done later; the impact must be disclosed and assessed before the project can proceed.

Alternatives That May Minimize Impacts

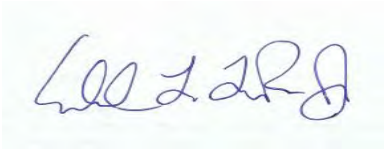
We see in various figures and maps that the proposed access road would take the shortest route to nearby Las Vegas Boulevard and/or Interstate 15. Is there any opportunity to co-locate one or both of the proposed transmission lines along this access road, and then follow the main transportation corridors? There are many documents reporting lower levels of tortoises alongside well-travelled roads such as these, and situating the transmission line(s) along the access road would concentrate direct impacts to a smaller area and predictably have fewer adverse effects to both tortoises and habitats. Similarly, we note in Figure 2 of Appendix M that the proposed water pipeline alignment is situated alongside a dirt road. Is it possible to relocate the pipeline to either within this road or on contiguous lands devoid of vegetation?

Minimization of Common Raven Impacts

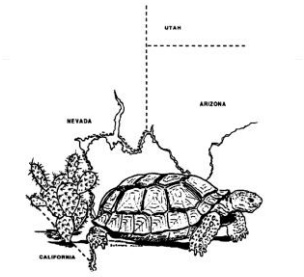
Has the proponent considered providing funds to the National Fish and Wildlife Foundation to implement regional management actions controlling common raven populations? We are not sure if this program is available in Nevada, but it is being implemented throughout California Deserts as mitigation for projects that may subsidize ravens, and may provide another opportunity for the proponent to mitigate impacts.

Again, thank you for this opportunity to comment. We see in Section 6.3.2. that the Council is already on your list of Non-Governmental Organizations to which you provide opportunities for comment. We look forward to any other materials you may have for our review.

Regards,



Edward L., LaRue, Jr., M.S.
Desert Tortoise Council, Ecosystems Advisory Council, Chairperson



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Via email only

20 March 2014

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RE: Moapa Solar Energy Center, Final Environmental Impact Statement

Dear Mr. Schlafly, Mr. Lewis,

The Desert Tortoise Council (Council) is a private, non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of this species. Established in 1976 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council regularly provides information to individuals, organizations and regulatory agencies on matters potentially affecting the desert tortoise within its historical range.

The Council provided comments on the Draft Environmental Impact Statement (DEIS) for this proposed project on 11 October 2013. We appreciate that most of our concerns were addressed in the Final Environmental Impact Statement (FEIS), as summarized in the Comment/Response Matrix portion of Appendix Q (Matrix). For example, the Matrix clarifies that both the proposed pipeline and two transmission lines would follow existing access roads and transmission corridors, which should help minimize impacts, and that mitigation fees would be used, as necessary, to minimize raven predation.

Another of our concerns with the DEIS was that a formal translocation plan was missing from the analysis. On page 4-57 of Volume 1 of the FEIS, you indicate the following: "Based on draft USFWS (or Service) guidance (USFWS 2012), the USFWS is not requiring the development of a desert tortoise translocation plan for this project." When we checked the References section on pages 8-5 and 8-6 of Volume 1 of the FEIS to review this guidance, we found that the reference is missing. Was this project-specific guidance from USFWS presented directly to the project proponent or is this a generalized policy statement that applies to both this and other projects? In the absence of this reference, we are not sure why a translocation plan is not required.

Following are a few recommendations with regards to the FEIS.

1. You indicate on page 4-54 of Volume 1 of the FEIS that, "Capturing, handling, and relocating desert tortoises from the Proposed Project after installation of the fencing would result in take and may also result in death or injury. This is particularly true if relocation methods are performed improperly, such as during extreme temperatures, or if tortoises void their bladders due to handling stress, leaving them susceptible to severe dehydration. Displaced tortoises that do not shelter from extreme temperatures may die from exposure." One other concern we have is displacing tortoises during drought conditions, which is known to undermine translocation successes (Esque et al. 2010). If drought conditions persist immediately prior to or during the time of project development, we suggest that you confer with the USFWS immediately prior to displacing tortoises and seek input on ways to avoid loss of tortoises due to stressors associated with drought.

2. It is not clear from the information presented on page 4-57 of Volume 1 of the FEIS how long you intend to monitor translocated tortoises. We assume that displaced tortoises will be fitted with radio transmitters and that you will track them, but the FEIS does not indicate for how long. We suggest that the individual tortoise disposition plans discussed in several places in Volume 1 (particularly on pages 4-57 and 5-12) identify how long tortoises are to be monitored. There should also be an adaptive management component to address mortality of displaced tortoises.

3. It is important that these tortoises be tracked a sufficient amount of time to assess health, allow them to establish a new home range, and document mortality. If a translocated tortoise does die, an evaluation must be performed as to the cause. It is important to determine whether they should be considered part of the authorized mortality limits given in Table 3, pages 43 and 44 of USFWS' biological opinion, which is included in Appendix R of Volume 2 of the FEIS. Although USFWS identifies Incidental Take Thresholds for tortoises inside and outside the fenced areas, they do not identify how these Thresholds would apply to translocated tortoises that die after they are displaced. Perhaps that can be clarified in the new matrix addressing comments on the FEIS and/or disposition plans?

4. Pages 4-58 and 5-11 of Volume 1 of the FEIS indicate, "Exclusionary fencing would be checked monthly and after any substantial rain event to ensure that they are effective barriers for desert tortoise." We strongly suggest that for at least the first year after installation the fences be checked more often, perhaps weekly, until the proponent determines that they are secure and not being undermined by canids, for example.

5. Page 5-10: 2.f. of Volume 1 of the FEIS states, "Desert tortoises that are determined to be sick or injured, will be transferred to an appropriate facility as directed by the Service. The Applicant is responsible for paying for care of desert tortoises taken to the Desert Tortoise Conservation Center [DTCC] or other facility." Note that the DTCC should not be considered as an option as it is due to close later this year.

6. Page 5-10: 3.a. of Volume 1 of the FEIS indicates, "A desert tortoise education program will be prepared and presented by an authorized desert tortoise biologist to all personnel onsite during construction activities." It is an industry standard to present annual refresher courses for

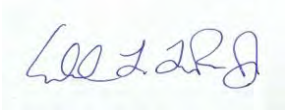
employees accessing project sites to minimize the likelihood of crushing tortoises along access roads and to discuss rescue measures for tortoises that are subsequently found inside tortoise-exclusionary fences once biological monitors vacate the sites. Will this standard be implemented for this project?

7. Page 5-11: 3.c. of Volume 1 of the FEIS indicates, "Authorized desert tortoise biologists, potentially assisted by project monitors, shall conduct a clearance survey." We highly recommend that only authorized desert tortoise biologists be allowed to conduct clearance surveys. Rarely would a biological monitor have the experience necessary to assist with a clearance survey. In order to gain experience, a biological monitor may be placed between two authorized biologists at a distance of five meters (rather than the protocol 10 meters) from each authorized biologist.

8. Page 5-11: 3.c. of Volume 1 of the FEIS indicates, "Burrows occupied by adult females will be examined thoroughly for nests and eggs during the months of May through October." We believe that **all** desert tortoise burrows should be thoroughly examined for nests and eggs from May through October. Male and female tortoises use multiple burrows each year and conceivably any of those burrows she uses may contain a nest, not just the burrow she happens to be using on a given day.

Again, we appreciate that our comments on the DEIS were addressed. We believe that impacts to tortoises and their habitats will be further minimized if the measures given above are implemented in a conscientious manner.

Regards,



Edward L., LaRue, Jr., M.S.
Desert Tortoise Council, Ecosystems Advisory Committee, Chairperson

Literature Cited

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.H. Heaton. 2010. Effects of subsidized predators, resource variability, and human population density on desert tortoise populations in the Mojave Desert, U.S.A. Endangered Species Research, Vol. 12-167-177, 2010, doi: 10.3354/esr00298.

C

The National Park Service (NPS) has reviewed the Notice of Intent for the “Supplemental Environmental Impact Statement for the Arrow Canyon Solar Project on the Moapa River Indian Reservation, Clark County, Nevada.” The Old Spanish National Historic Trail (NHT), which is co-administered by the NPS National Trails Program and the Bureau of Land Management (BLM), crosses in the vicinity of this proposed undertaking. Since this project is still in very preliminary stages, and potential impacts to the NHT have not yet been analyzed, the NPS does not have specific comments at this time. The NPS may have comments on the next steps of this project based on our special expertise and the potential for impacts to NHT resources. This could include exploring the potential for NPS to become a consulting party for any future consultations conducted under Section 106 of the National Historic Preservation Act.

We look forward to continued consultation with the Bureau of Indian Affairs (BIA) as planning proceeds and would like to be informed once additional information, details and public drafts become available. To request shape files for the NHT or to send information, please contact: Jill Jensen, Archeologist, National Trails Office, National Park Service, 50 W. Broadway, Suite 950, Salt Lake City, UT 84101; Phone: (801) 741-1012 Ext. 115; email: jill_jensen@nps.gov.

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700 • Las Vegas, NV 89106
MAILING ADDRESS: P.O. Box 99956 • Las Vegas, NV 89193-9956
(702) 862-3400 • snwa.com

D

Submitted electronically via Chip.Lewis@bia.gov

March 2, 2020

Mr. Chip Lewis, Regional Environmental Protection Officer
Bureau of Indian Affairs Western Regional Office
2600 North Central Avenue, 4th Floor Mail Room
Phoenix, AZ 85004-3008

SUBJECT: SCOPING COMMENTS, ARROW CANYON SOLAR PROJECT

Dear Mr. Lewis,

The Southern Nevada Water Authority (SNWA) appreciates the opportunity to provide comments on the scope of the Bureau of Indian Affairs' (BIA) Supplemental Environmental Impact Statement (SEIS) for the Arrow Canyon Solar Project (Project) (previously named Moapa Solar Energy Center [MSEC] Project). SNWA is supportive of efforts to help the region meet renewable energy needs and efforts by the Moapa Band of Paiute Indians (Moapa Band) to expand its economic opportunities.

The Federal Register notice states the water supply for the Project would be leased from the Moapa Band and delivered to the site via the previously approved water pipeline. The SEIS should identify the volume of water required, both for construction and operation of the Project, which is likely not the same volume analyzed in the previously approved 2014 MSEC Project Final EIS (FEIS). The MSEC Project FEIS identifies water supply for the Project, for both construction and operation, would be obtained from the Moapa Band's existing water rights, which include 2,500 acre-feet per year of groundwater rights (in California Wash) and 3,500 acre-feet per year of surface water from the Muddy River. The SEIS should identify that some of these water rights have been committed and utilized to date by other projects.

The SEIS should identify that Nevada State Engineer is currently conducting an administrative review of existing groundwater rights permitted in the Lower White River Flow System (LWRFS), of which California Wash is a part. Under Interim Order #1303, the Nevada State Engineer has been collecting information regarding sustainable groundwater development in the LWRFS. The Moapa Band submitted a hydrologic report and participated in hearings conducted in September 2019 by the Nevada State Engineer regarding information submitted in response to the Interim Order. The Nevada State Engineer has not yet issued an order regarding the long-term management of groundwater pumping that may occur in the LWRFS by existing water right holders. The Nevada State Engineer's decision on water availability and management in the LWRFS, including California Wash, could significantly reduce the amount of groundwater water rights available for use, including those identified for use by the Project.

The FEIS states the Moapa Band is acting as a municipality and does not need to change the permitted use of its existing rights from municipal to industrial use (FEIS, p. 3-14). This assertion is a matter of state law that would need to be addressed by the Nevada State Engineer. If change applications are necessary, such applications are currently held in abeyance under Interim Order #1303.

In addition, the Biological Opinion issued by the U.S. Fish and Wildlife Service for the MSEC Project states that incidental take of Moapa dace for all tiered actions under the 2006 Muddy River Memorandum of Agreement, including the Project, would be exceeded if "flows at the Warm Springs West gage decline to a flow below 2.7 cfs" (FEIS, Appendix R, p. 42). As noted in evidence and testimony presented to the Nevada State Engineer, reductions in spring flows in the Warm Springs area have occurred despite withdrawal of groundwater being below permitted levels, and these reductions could affect Moapa dace in ways not anticipated fully in previous modeling efforts. Therefore, the SEIS should address whether additional conservation measures associated with any additional groundwater uses may be necessary to protect the endangered Moapa dace.

The SEIS should acknowledge there is uncertainty regarding the quantity of groundwater that can be sustainably pumped within the LWRFS, and that existing groundwater rights, including those held by the Moapa Band in California Wash, may be subject to potential conjunctive management, curtailment, or other actions, in accordance with any future decisions issued by the Nevada State Engineer on the LWRFS. SNWA has a long history of working cooperatively with the Moapa Band on water supply issues in the region. We also support the Moapa Band's development efforts and look forward to continuing to engage cooperatively on finding long-term water management solutions that protect the Moapa dace and senior water rights on the Muddy River.

If you have any questions regarding these comments, please contact me at (702) 862-3713 or Lisa Luptowitz at lisa.luptowitz@snwa.com or (702) 862-3789.

Sincerely,

Zane L. Marshall
Director, Resources & Facilities

ZLM:LL:AR:sn

Scott Carey

From: NevadaClearinghouse
To: Brad Hardenbrook
Subject: RE: Nevada State Clearinghouse Notice E2020-177 (E2020-177 SEIS BIA Arrow Canyon Solar Project - Clark County)

From: Brad Hardenbrook <bhrdnbrk@ndow.org>
Sent: Friday, February 28, 2020 3:54 PM
To: NevadaClearinghouse <NevadaClearinghouse@lands.nv.gov>
Cc: Jasmine Kleiber <jkleiber@ndow.org>
Subject: RE: Nevada State Clearinghouse Notice E2020-177 (E2020-177 SEIS BIA Arrow Canyon 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: 02/10/2020

U.S. Bureau of Indian Affairs

Nevada State Clearinghouse Notice E2020-177

Project: E2020-177 SEIS BIA Arrow Canyon Solar Project - Clark County

The Bureau of Indian Affairs (BIA) is the lead federal agency preparing a Supplemental Environmental Impact Statement (SEIS) that will evaluate the expansion of the solar field for the previously approved Moapa Solar Energy Center (MSEC), a photovoltaic (PV) solar project on the Moapa River Indian Reservation (Reservation), Clark County, Nevada. This expanded project is referred to as the Arrow Canyon Solar Project (ACSP). The Moapa Band of Paiutes Indians (Moapa Band) and other agencies will be involved as cooperating agencies for the SEIS.

Written comments on the scope of the SEIS or implementation of the project must be received by March 2, 2020. The public scoping meeting on the Moapa River Indian Reservation in Moapa will be held on February 25, 2020, and the public scoping meeting at the BLM Offices in Las Vegas will be held on February 26, 2020. You may mail or email comments to Chip Lewis, BIA Western Regional Office, 2600 North Central Avenue, 4th Floor Mailroom, Phoenix, AZ 85004 or Chip.Lewis@bia.gov. Comments due March 2, 2020.

Follow the link below to find information concerning the above-mentioned project for your review and comment.

E2020-177 - http://clearinghouse.nv.gov/public/Notice/2020/E2020-177.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 Friday February 28th, 2020.**

Clearinghouse project archive

Questions? Scott Carey, Program Manager, (775) 684-2723 or nevadaclearinghouse@state.nv.us

____No comment on this project ____Proposal supported as written

AGENCY COMMENTS:

About the time the Notice of Intent was announced for the Supplemental EIS, the Bureau of Indian Affairs (BIA) invited the Nevada Department of Wildlife (NDOW) in becoming a cooperating agency during development of the Supplemental EIS. Because features of the proposed Arrow Canyon Project of greatest relevance to NDOW remain unchanged from those previously analyzed for the Moapa Solar Energy Center (e.g. best management practices for avoiding and minimizing affects to wildlife resources) are being carried forward to the Arrow Canyon Solar Project SEIS, we declined the opportunity for cooperating agency participation. We did attend the recent public scoping meeting in Las Vegas on February 26th and have followed-up by providing the BIA, EDF Renewables, and Heritage Environmental Consultants an updated version of NDOW's worksite protocols for encounters with the Gila monster (attached pdf). NDOW will continue to review and respond as needed to NEPA process documents as they become available, and will always be available to lend our expertise should questions arise during this effort.

Signature: D. Bradford Hardenbrook
Supervisory Habitat Biologist
NDOW – Southern Region
Date: 28 February 2020

NEVADA DEPARTMENT OF WILDLIFE
SOUTHERN REGION

3373 Pepper Lane, Las Vegas, Nevada 89120
Phone: 702-668-3839 or 702-486-5127; Fax: 702-486-5133

5 February 2020

GILA MONSTER STATUS, IDENTIFICATION AND REPORTING PROTOCOL FOR OBSERVATIONS

Status

- The **Gila monster (*Heloderma suspectum*) is** secretive, difficult to detect, and seemingly rare relative to other species. These attributes led the **State of Nevada** decades ago to classify the species as **Protected** (Nevada Administrative Code 503.080). Their populations are also vulnerable to poaching, the cumulative effects of habitat loss, fragmentation and degradation, and climate changes (Wildlife Action Plan Team 2012).

- Therefore, a person shall not hunt or take any protected wildlife, or possess any part thereof, without first obtaining the appropriate license, permit or written authorization from the Nevada Department of Wildlife (Nevada Administrative Codes 503.090 and 503.093).

- The USDI Bureau of Land Management has recognized this lizard as a sensitive species since 1978 and is to manage public lands in a manner to avoid the necessity of higher federal protections (BLM Manual 6840 – Special Status Species).

- In Clark County's Multiple Species Habitat Conservation Plan (MSHCP), the Gila monster is an *Evaluation Species*, meaning inadequate information exists to determine if mitigation from MSHCP implementation would demonstrably cover conservation actions necessary to ensure its persistence without additional protective intervention as provided under the federal Endangered Species Act.

- While the Gila monster is the only venomous lizard endemic to the United States, its behavioral disposition is somewhat docile and avoids confrontation. But it will readily defend itself if threatened. Most bites are considered *illegitimate*, not caused by Gila monster aggression, but resulting from human harassment or careless handling. Gila monsters are not dangerous unless molested or inappropriately handled and should never be harmed or killed.

- The Nevada Department of Wildlife (NDOW) has ongoing management studies for greatly improving our understanding specific to Nevada's banded Gila monster populations; hence, **additional sightings and descriptions for this species distribution, habitat, and biological information is of utmost interest**.

- In assistance to gathering additional information about Nevada's Gila monsters, **NDOW will be notified whenever a Gila monster is encountered or observed**, and under what circumstances (see Reporting Protocol below).

Identification

The banded Gila monster (*H. s. cinctum*) is the only wild subspecies occurring in Nevada, and is restricted to Clark, Lincoln, and Nye counties. Found mainly below 5,000 feet elevation, its geographic range approximates that of the desert tortoise (*Gopherus agassizii*) in Nevada. Gila monster habitat requirements center on complex rocky landscapes of upland desert scrub overlapping desert wash, spring, and riparian habitats, often characteristic of alluvial fans (bajadas) and adjacent rocky fields. Gila monster habitat overlaps that of both the desert tortoise and chuckwalla (*Sauromalus ater*).

Gila monsters are recognizable by a striking black and orange-pink coloration and bumpy, or beaded, skin. In keeping with its name, the banded Gila monster (shown left) retains a black chain-link, banded pattern into adulthood. Sometimes other non-venomous lizards are mistaken for the Gila monster. Of these, the western banded gecko (*Coleonyx variegatus*) and the chuckwalla are the most frequent. All three share similar habitats.

To untrained eyes, the color pattern and finely granular skin of the western banded gecko (right) may have the looks of a baby or juvenile Gila monster. But gecko heads are more pointed at the snout and the relatively large eyes have *vertical* pupils befitting their nighttime habits. Gila monsters may be both nocturnal and diurnal; the smallish eyes have *round* pupils. Snouts are bluntly rounded. Newly hatched Gila monsters vary in length at 5-7 inches with a vivid orange and black, banded pattern. Western banded geckos are generally smaller than 4 inches with cream to yellow background colors and brown to purple banded patterns.

Chuckwalla adults (left) and juveniles have a body shape somewhat suggestive of the Gila monster, but they lack the coarsely beaded skin and showy black and orange-pink body pattern. While juvenile chuckwallas can have orange and black banded tails, this colorful banding fades as chuckwallas mature. From nose to tail tip, adult chuckwallas may reach 17 inches long, rivaling that of the Gila monster. Chuckwallas are herbivorous. When alarmed, they are fast movers seeking cracks and crevices into which they can wedge themselves by inflating their bodies with air. Chuckwallas are diurnal and rock dwellers.

Reporting Protocol

Field workers (e.g. construction foremen, bio-monitors) must at least know how to: (1) identify a Gila monster by distinguishing it from other lizards like the chuckwalla and western banded gecko (see **Identification** above); (2) Report any Gila monster observation to the NDOW; (3) Be aware of the consequences of a Gila monster bite resulting from carelessness or unnecessary harassment; and, (4) Be advised of protective measures provided under state law and federal management policies.

1) Live Gila monsters found in harm's way in the construction site will be captured and then detained by the project biologist or equivalent personnel in a cool (≤85°F), shaded environment (air-conditioned vehicle or trailer is okay) until a NDOW biologist can arrive for biological documentation prior to its release Although a Gila monster is venomous and can inflict a serious bite, its relatively slow gate allows for it to be easily coaxed or carefully lifted into an open bucket or box using a long handled instrument like a snake hook, tongs, or shovel (*Note: it is not the intent to request unreasonable action to facilitate captures; additional coordination with NDOW will clarify logistical points*). For safe detainment, an unused or sterile 5-gallon plastic bucket with a secure, vented lid; an 18"x18"x4" plastic sweater box having a secure, vented lid; or, a tape-sealed cardboard box of similar dimension may be used. And, written information identifying the mapped capture location, Global Positioning System (GPS) coordinates in Universal Transverse Mercator (UTM) using North American Datum (NAD) 83 Zone 11 along with date, time, and circumstances (e.g. biological survey, construction monitoring) and habitat description (e.g. vegetation, slope, aspect, substrate) will also be provided to NDOW.

2) Injuries to Gila monsters may occur during excavation, blasting, road grading, or other construction activities. In the event a Gila monster is injured, it should be transferred to a veterinarian proficient in reptile medicine for evaluation of appropriate treatment. Therapy or euthanasia expenses will not be covered by NDOW. However, NDOW will be immediately notified of any injury to a Gila monster and which veterinarian is providing care for the animal. If an animal is killed or found dead, the carcass will be immediately frozen and transferred to NDOW with a complete written description of the discovery and circumstances, date, time, habitat, and mapped location (GPS coordinates in UTM using NAD 83 Z 11).

3) Should NDOW's assistance be delayed, biological or equivalent acting personnel on site should detain the Gila monster out of harms way until NDOW personnel can respond. **The Gila monster should be detained until NDOW biologists have responded**. Should NDOW not be immediately available to respond for photo-documentation, a digital camera (≥5 mega-pixels) will be used to take good quality images of the Gila monster *in situ* at the location of live encounter or dead salvage. The pictures will be provided to NDOW at the address above or the email address below along with specific location information including GPS coordinates in UTM using NAD 83 Z 11, date, time and habitat description. Pictures will show the following information: (1) Encounter location (landscape with Gila monster in clear view); (2) a clear overhead shot of the entire body with a ruler next to it for scale (Gila monster should fill camera's field of view and be in sharp focus); and, (3) a clear, overhead close-up of the head (head should fill camera's field of view and in sharp focus).

Please Remember: Gila monsters are considered sensitive species and sharing of observation information to sources outside of NDOW or other permitting agencies may result in adverse conservation or administrative consequences.

Contact NDOW Biologist Jason L. Jones at 702.668.3938 (office), 208-240-0194 (cell; leave message or text), 702.486.5127 (front desk) or by e-mail at jljones@ndow.org for additional information regarding these protocols.

NevadaClearinghouse

To: Sue Gaskill
Subject: RE: Nevada State Clearinghouse Notice E2020-177 (E2020-177 SEIS BIA Arrow Canyon Solar Project - Clark County)

From: Sue Gaskill
Sent: Wednesday, February 12, 2020 3:11 PM
To: Thomas Pyeatte <tpyeatte@water.nv.gov>; NevadaClearinghouse <NevadaClearinghouse@lands.nv.gov>
Subject: RE: Nevada State Clearinghouse Notice E2020-177 (E2020-177 SEIS BIA Arrow Canyon 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: 02/10/2020

U.S. Bureau of Indian Affairs

Nevada State Clearinghouse Notice E2020-177

Project: E2020-177 SEIS BIA Arrow Canyon Solar Project - Clark County

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Follow the link below to find information concerning the above-mentioned project
for your review and comment.
E2020-177 - http://clearinghouse.nv.gov/public/Notice/2020/E2020-177.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 Friday February 28th, 2020.**

Clearinghouse project archive

Questions? Scott Carey, Program Manager, (775) 684-2723 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: February 12, 2020
Division of Water Resources
Nevada SAI # E2020-177
Project: SEIS BIA Arrow Canyon 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.
The State Engineer must permit all water used on the described project.
Projects in the Lower White River Flow System are currently under Interim Order 1303. http://images.water.nv.gov/images/Orders/1303o.pdf
Water for Construction Projects
Ensure that any water used on a project for any use, including construction water for dust suppression, shall be provided by an established utility or under permit or temporary change application or waiver issued by the State Engineer's Office with a manner of use acceptable for suggested projects water needs.

Wells and Boreholes
Water wells must be permitted, Monitor wells require a Waiver from the State Engineer's Office, and boreholes must be plugged within sixty (60) days after being drilled as required by NAC 534.4371. For the plugging of boreholes, all boreholes require a 20-foot surface plug by placing concrete grout, cement grout or neat cement from 20 feet below the surface to the surface, in addition to all other plugging requirements mandated by NAC 534.4371.
Any drillholes (water or monitor wells or boreholes) that may be located on either acquired or transferred lands are ultimately the responsibility of the owner of the property and must be plugged and abandoned as required in Chapter 534 of the Nevada Administrative Code.

Abandoned wells need to be reported to the State Engineer's Office and must be plugged as required in NAC Chapter 534.
Any replacement wells must also comply with NAC 534.4351 NAC 534.300.
If artesian water is encountered in any well or borehole it shall be controlled as required in NRS § 534.060(3).

Effluent

Treated effluent is considered water as referred to in NRS Chapter 533, and is subjected to appropriation for beneficial use under procedures described in NRS Chapter 533, and specifically NRS § 533.440.

Scott Carey

From: NevadaClearinghouse
To: Jim Balderson
Subject: RE: Nevada State Clearinghouse Notice E2020-177 (E2020-177 SEIS BIA Arrow Canyon Solar Project - Clark County)

From: Jim Balderson <JBALDERSON@ndep.nv.gov>
Sent: Thursday, February 27, 2020 6:01 PM
To: NevadaClearinghouse <NevadaClearinghouse@lands.nv.gov>
Subject: RE: Nevada State Clearinghouse Notice E2020-177 (E2020-177 SEIS BIA Arrow Canyon 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: 02/10/2020

U.S. Bureau of Indian Affairs

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Project: E2020-177 SEIS BIA Arrow Canyon Solar Project - Clark County

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- **Please submit your comments no later than Friday February 28th, 2020.**

Clearinghouse project archive

Questions? Scott Carey, Program Manager, (775) 684-2723 or nevadaclearinghouse@state.nv.us

__X__No comment on this project ____Proposal supported as written

AGENCY COMMENTS:

Signature: Jim Balderson P.E.

Date: 02/27/2020

Scott Carey

From: NevadaClearinghouse
To: Rebecca Palmer
Subject: RE: Nevada State Clearinghouse Notice E2020-177 (E2020-177 SEIS BIA Arrow Canyon Solar Project - Clark County)

From: Rebecca Palmer <rlpalmer@shpo.nv.gov>
Sent: Friday, February 28, 2020 4:41 PM
To: NevadaClearinghouse <NevadaClearinghouse@lands.nv.gov>
Subject: RE: Nevada State Clearinghouse Notice E2020-177 (E2020-177 SEIS BIA Arrow Canyon Solar Project - Clark County)
Importance: High

The Nevada SHPO has reviewed the public scoping document and recommends that if the BIA intends this to use this scoping for the public consultation requirements of Section 106 of NHPA, there should be a statement to that effect in the letter or on the website.

Rebecca Lynn Palmer
Administrator/State Historic Preservation Officer
Nevada State Historic Preservation Office
(O): 775-684-3443
rlpalmer@shpo.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: 02/10/2020

U.S. Bureau of Indian Affairs

Nevada State Clearinghouse Notice E2020-177

Project: E2020-177 SEIS BIA Arrow Canyon Solar Project - Clark County

The Bureau of Indian Affairs (BIA) is the lead federal agency preparing a Supplemental Environmental Impact Statement (SEIS) that will evaluate the expansion of the solar field for the previously approved Moapa Solar Energy Center (MSEC), a photovoltaic (PV) solar project on the Moapa River Indian Reservation (Reservation), Clark County, Nevada. This expanded project is referred to as the Arrow Canyon Solar Project (ACSP). The Moapa Band of Paiutes Indians (Moapa Band) and other agencies will be involved as cooperating agencies for the SEIS.

Written comments on the scope of the SEIS or implementation of the project must be received by March 2, 2020. The public scoping meeting on the Moapa River Indian Reservation in Moapa will be held on February 25, 2020, and the public scoping meeting at the BLM Offices in Las Vegas will be held on February 26, 2020. You may mail or email comments to Chip Lewis, BIA Western Regional Office, 2600 North Central Avenue, 4th Floor Mailroom, Phoenix, AZ 85004 or Chip.Lewis@bia.gov. Comments due March 2, 2020.

Follow the link below to find information concerning the above-mentioned project
for your review and comment.

E2020-177 - http://clearinghouse.nv.gov/public/Notice/2020/E2020-177.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 Friday February 28th, 2020.**

Clearinghouse project archive

Questions? Scott Carey, Program Manager, (775) 684-2723 or nevadaclearinghouse@state.nv.us

____No comment on this project ____Proposal supported as written

AGENCY COMMENTS:

Interagency Meeting Summary

Arrow Canyon Solar

Final Meeting Summary

Info:	Final Meeting Summary	**Meeting No.:**	NA
Re:	Agency Scoping Meeting	**Meeting Date:**	February 26, 2020
Attachment:	Sign-in Sheet Meeting PowerPoint	**Meeting Time:**	2:00pm to 3:30pm (NV Time)
Location:	U.S. Fish and Wildlife Service and Bureau of Land Management Offices, Las Vegas, NV		

Attendees:

Present	Name	Agency/Organization	Phone	Email
Yes	Chip Lewis	Bureau of Indian Affairs	602.379.6750	chip.lewis@bia.gov
Yes	Garry Cantley	Bureau of Indian Affairs	602.379.6750	garry.cantley@bia.gov
Yes	Tamara Dawes	Bureau of Indian Affairs		tamara.dawes@bia.gov
Yes	Christina Varela	Bureau of Indian Affairs		christina.varela@bia.gov
Yes	Glen Knowles	U.S. Fish and Wildlife Service		glen_knowles@fws.gov
Yes	Carla Wise	U.S. Fish and Wildlife Service		carla_wise@fws.gov
Yes	Jessica Zehr	U.S. Fish and Wildlife Service		jessica.zehr@fws.gov
Yes	Nicholas Pay	Bureau of Land Management		npay@blm.gov
Yes	Kim Mangum	Bureau of Land Management		kmangum@blm.gov
Phone	Karen Vitulano	U.S. Environmental Protection Agency		vitulano.karen@epa.gov
Yes	Randy Schroeder	ENValue	303.819.3313	rschroeder@envalue.us
Yes	Pat Golden	Heritage Environmental	303.618.7910	pgolden@heritage-ec.com
Yes	Mary Barger	ENValue		barger@ecentral.com
Yes	Patricia McCabe	Logan Simpson	480.967.1343	pmccabe@logansimpson.com
Yes	Lauren Esposito	Logan Simpson	480.967.1343	lesposito@logansimpson.com
Yes	Katie Kuplevich	EDF Renewables, Inc.	510.457.2144	katie.kuplevich@edf-re.com
Yes	Devon Muto	EDF Renewables, Inc.	858.242.4857	devon.muto@edf-re.com
Yes	Nate Holderbein	EDF Renewables, Inc. (consultant)		nate@woodwingservices.com
Phone	Andrew Bell	The Law Office of Andrew C. Bell (consultant to EDF)	415.230.0599	andrew@andrewcbell.com

Summary:

Chip began the meeting by welcoming the agencies to the meeting. He started the PowerPoint presentation by introducing the proposed action, project location, and project history. The Arrow Canyon Solar Project (ACSP), located in the southwest corner of the Moapa River Indian Reservation (Reservation), was initially known as the Moapa Solar Energy Center (MSEC) Project. An Environmental Impact Statement (EIS) was prepared for the MSEC Project and a Record of Decision (ROD) issued. The BIA approved the lease for the MSEC Project, and the Bureau of Land Management (BLM) issued a rights-of-way (ROW) for the linear facilities of the project (transmission line, water pipeline, access road), which are located within

a designated utility corridor on tribal land managed by the BLM. There was no power purchase agreement (PPA) at the time. The MSEC Project was purchased by EDF Renewables (EDFR) and renamed the ACSP. After the project was purchased, the solar field was expanded from 850 acres to up to 2,200 acres due to changes in technology and site layout. BIA will prepare a Supplemental Environmental Impact Statement (SEIS) to address the expansion of the solar field. The ACSP will provide economic funding to the Moapa Band of Paiutes (Band) and help Nevada meet its renewable energy goals. The SEIS will be subject to streamlining requirements issued by the Department of the Interior (DOI) but does not meet the requirements of One Federal Decision (Executive Order 13807) or FAST-41. The DOI streamlining requirements state that the SEIS needs to be completed within 1 year from publication of the Notice of Intent (NOI). The cooperating agencies for the SEIS are the Band, the BLM, Environmental Protection Agency (EPA), and U.S. Fish and Wildlife Service (USFWS). The NOI was published on January 30, 2020, and the project is currently conducting public scoping.

Randy continued with the PowerPoint presentation and provided maps of the project location and expanded on the dates of the project history. The MSEC Final EIS was published in February 2014 and RODs were issued by the BIA and the BLM in May 2014. In August 2015, the BLM issued a ROW for the project's linear facilities. EDFR purchased the MSEC Project in March 2017, and the Band agreed to expand the solar field in May 2018.

The ACSP would produce 200 megawatts (MW) using solar photovoltaic (PV) technology mounted on single-axis tracking structures. The ACSP is proposing the addition of a battery energy storage system (BESS) and modifications to the design, layout, and construction. Even though the energy produced from the project would remain unchanged at 200 MW, it was determined by EDFR that the original layout was too condensed; the original site has geotechnical and hydrological issues that required the expansion. The additional of BESS also contributed to the expanded solar field. Devon stated that the solar field has different degrees of soil hardness and some areas are not economically feasible to penetrate. He also added that the industry standard has changed since the original project was approved, and 7 to 10 acres per MW is standard practice.

The maximum size of the solar field would be up to 2,200 acres, and it may or may not be that large. Chip added that at the time the original project was approved, a PPA was not in place and hydrology and geotechnical work had not been completed to confirm the feasibility of 200 MW on 850 acres. Randy stated that the study area for the SEIS would consist of 2,700 acres, which includes the 2,200 acre solar field. The border of ACSP is about 0.6 miles south of the Eagle Shadow Mountain Solar Project boundary. The previously approved ROW on BLM-managed lands would remain unchanged (generation transmission line, access road, and water pipeline) with the expansion of the solar field. The solar field includes solar arrays, inverters, BESS, electrical collection system, operation & maintenance building, and fencing around the solar arrays.

The SEIS will analyze impacts from the expansion of the solar field, increase in the height of the single-axis trackers, addition of BESS, increase in construction water use, addition of septic disposal system, and change is perimeter fencing. Karen stated that a permit could be required for the proposed septic system. The perimeter fencing for the project was originally proposed to be installed around the entire solar site.

The fencing is now proposed to be around groups of solar arrays and include a 6 to 8 inch opening at the bottom of the fence for tortoise movement. Changes that do not require analysis include the addition of bifacial panel technology and an increase in height of the operations & maintenance building by up to 2 feet. Karen asked why an analysis is not required for the bifacial panel technology. EDFR stated that there is no change in the site preparation with the change in technology, and vegetation can regrow underneath the panels. Randy stated that the resources that will be analyzed in the SEIS are: biological, cultural, visual, water, and socioeconomics.

Tortoise surveys were completed for the project in spring 2019; a total of 17 tortoises were found (adults and juveniles). The original MSEC Project site found 1 tortoise and numbers in that area have remained the same. Most of the tortoises identified were located in the northeast area of the expansion site. The project has already begun coordination with USFWS. Pat stated that he will start to prepare the Biological Assessment (BA) next month. Pat stated that he is planning to submit the BA to USFWS in June. Glen stated that in order for the project to stay on schedule, the translocation plan should be developed soon and the permit amended to complete the health assessment. Karen asked if tortoise relocations would occur on the Reservation. Pat stated that most relocations would be over the construction fence, similar to the Eagle Shadow Mountain Solar Project. He only anticipates a handful of tortoises to be kept in pens and re-released onsite following construction.

Karen asked if the drainages onsite all drain to the lakebed and are, therefore, not jurisdictional. Pat confirmed that they do not anticipate the Army Corps to take jurisdiction over any of the drainages in the project area, and there is a phone call scheduled for Monday to discuss.

Chip explained that this project proposes a different design feature compared with other solar projects on the Reservation, and the proposal is to fence the separate solar arrays rather than the entire site. The fencing would avoid the hydrological areas. Katie stated that EDFR has previously built projects in California that only fenced the solar arrays and that it does not pose additional security risks.

Karen asked if there have been any issues raised by the public at this point in the scoping process. Randy stated that a member of the tribe was concerned about the water pipeline not being located on the Reservation, and the Tribal member stated that if the water pipeline is permanent that its location should be moved to the Reservation. Randy has since confirmed that the water pipeline will be temporary and only be used during construction. It was proposed as permanent in the original EIS because of the option for concentrating solar power (CSP), which required a lot of operational water. However, the ACSP does not propose to use CSP.

Chip stated that BIA would be sending the SEIS chapters out to the cooperating agencies as they are completed rather than the entire document to avoid the burden of reviewing a large document at once. USFWS and the BLM stated that that would work for them.

Nate explained that the expanded solar area is covered under a new, separate lease, and the entire project would be covered under two separate leases with the Band. The original lease for the project has undergone five amendments; the last one was completed at the same time as the new lease was

completed with the Band. EDFR is not opposed to one lease; however, to keep the process moving forward and also to provide flexibility with the permitting process, it was decided that two leases would be better. The new lease will mirror the original lease and its amendments. Tamara stated that, if BIA needs to approve a new lease, all documentation will need to be submitted, and it would be best to submit a draft for BIA to review to ensure the terms of the lease are appropriate and meet regulatory standards, and BIA will provide comments to the tribal council, as needed. Chip stated that after the signing of the ROD, BIA will have 90 days to finalize the agency action according to new streamlining regulations, which is approval of the lease. Tamara added that BIA can only approve the lease if the complete package is submitted, including the lease, tribal resolution, and ROD.

Katie asked if EDFR would need to hold all construction until the lease is approved. Chip stated that the tortoise perimeter fence could be installed through a permission from BIA since it would not result in irretrievable or irreversible loss of resources, but any construction activities that cannot be "undone" could not be completed until the lease is approved.

Garry confirmed that there are only two ineligible cultural resource sites within the project area. Garry advised AJ to submit the cultural resources report to him for review.

Nick stated that the BLM will be focusing on the impacts that would occur to the tortoise, including cumulative impacts when combined with BLM projects nearby and issues with habitat connectivity.

Nick stated that EDFR could proceed with aspects of the project on BLM-issued ROW if they are issued a Notice to Proceed from a BLM realty specialist. Katie stated that the BLM ROW is set to expire before project construction is completed. EDFR was instructed that they could apply within 120 days of the expiration for an extension. Nick stated that EDFR should coordinate with Vivian Browny, the new BLM realty specialist for renewable energy projects.

The above meeting notes summarize the substantive items discussed or issues resolved at the referenced meeting. Participants are encouraged to review these notes and respond to Logan Simpson within five business days of the distribution date of these notes if any discrepancies exist. If no comments are received by this time, it will be assumed that these notes accurately reflect the substantive content of the meeting.

Public Meeting Transcripts

Environmental Impact Scoping Meeting

Arrow Canyon Solar Supplemental Environmental Impact Statement

02/25/2020

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ARROW CANYON SOLAR PROJECT
SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT
SCOPING MEETING

* * * * * *

Held on February 25, 2020
At 5:30 p.m.
At Moapa River Indian Reservation Tribal Hall
Moapa, Nevada

Reported by: Kimberly A. Farkas, RPR, CCR #741
Job No. 39023

MOAPA, NEVADA
Tuesday, February 25, 2020
5:30 p.m.
* * * * * *

MS. PERRY: Hello, everyone. Good evening. My name is Laura Perry, chairwoman for the Moapa Band of Paiutes. We'd like to welcome you to our reservation lands. We're proud to have EDF, our solar project, here with us, along with our representatives of BIA in support of our tribe. We'd like to thank you for being here tonight. We look forward to the conversation, and thank you. Good? Yeah.

MR. LEWIS: Thank you so much. Well, good evening, everyone. My name is Chip Lewis. I'm with the Bureau of Indian Affairs from the western regional office down in Phoenix. And I am BIA's environmental specialist that will be working on the supplemental environmental impact statement that we're here to kick off. We're having a scoping meeting here. It's our very first one. Get this project rolling, and go ahead and kind of go through a little PowerPoint slide presentation, introduce the project, tell you a little bit about the process of why we're here and what we're doing. And then really the whole point of why we're

here is to solicit information or feedback, comments, opportunities, concerns, anything you all have to say or want to say about the project. That's the key and part of our mandate is to have public involvement in this environmental process. So that's really why we're here is for you all here tonight.

So proposed, as the chairwoman said, a new solar project on the reservation being proposed by EDF Renewables. The project is called Arrow Canyon Solar Project. Randy here will go into it a little while later, the actual specifics, but it is an old project that started on the reservation some years ago called Res Americas, you might be familiar with that, and Moapa Solar Energy Center. It changed to that name. But we'll talk about that a little while later.

The real reason we're here is the original project was for 850 acres. Myself and pretty much all these folks came up then and we did the whole environmental process, and it came to its conclusion. But now it is having to be expanded to accommodate the solar panels that need to be built to achieve the goal of that project. So we have to go back then and revisit the environmental impact statement that we prepared for the project. And declare, you know, be honest to the public, say we're going to expand so we

need to revisit, come back, ask if you still have any concerns or anything anybody wants to say.

It is going from 850 acres to 2,200 acres. Otherwise, everything is about the same. But that does represent a new or different or larger impact and so that's why we're here to get feedback tonight.

The project is down in the southwest part of the reservation, which I know you're familiar with. And then, it's the same as before, to provide lease income to the tribe and employment opportunities. And then, secondarily, I'm sure it's to help the state of Nevada and any other of the states that have their renewable energy mandates. Everybody is wanting the renewable energy to get in the grid and this will help with that.

The process. Like I said, we did an environmental impact statement. So this now revisiting this project -- or this impact statement is called a Supplemental Environmental Impact Statement. So that's why it's SEIS.

Really it's the same exact process. We start from the beginning. We'll solicit input, try to identify the issues or different issues that we might not have done prior or that we're not thinking of now. We'll address any of those issues that were in the

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document that need to be updated, anything new that's discovered. Of course, something obvious, say, just for illustration, the size of the actual solar field is getting bigger so now there's new acres, new vegetation, new whatever that's being impacted. And so we'll take a look at those, analyze it, and put that in the document to declare what the impacts are.

There are other folks involved. BIA is the lead federal agency since BIA approves the lease between the tribe and EDF. And we just happen to have our lease expert, Ms. Tamara Dawes here. She's our realty officer, and Christina Varela, our other realty officer, who's even more local and knows about what's going on.

BLM is involved because they're a contiguous landowner. So you always want to involve who might be abutting up against to the project. Also, they had previously, when we got the clearances for the product issued, the rights of ways that is in the utility corridor that BLM administers. So they don't have an action before them or don't have anything in particular to do, but it is still part of the product that they had authorized in the past and we're right next-door to BLM land so they opted to be involved.

EPA, Environmental Protection Agency, is

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always involved because they have some review and publication authority to the document. Of course, the tribe is involved since they're the proponent that came to BIA and asked for us to undertake this effort. And then Fish and Wildlife Service is involved because of the threatened and endangered species that are in the area that could be impacted by the product. And as I'm sure you all know, the paramount on that front is the desert tortoise.

So where we're at in this whole process is functionally at the beginning, just right there at the public scoping. We did declare publicly that we're starting the process by publishing a notice in the Federal Register on, let's see, February -- January 30th. So that started the process and a clock for how long we have to do the project, or the environmental part of it anyway, when we have to have the meetings, get the draft documents out, get the final documents out, have the next series of meetings, and then finally publish the record of decision that ends the process and then allows the realty folks to go ahead and get their approvals.

So, as you can see, we're kind of just starting here now, and we'll probably be going, hoping to finish up about a year from now.

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So how to participate as a member of the public? Of course, you can talk here. We do have a court reporter. We're required to have that to get official public comment. It goes on the record. So we will have someone run the microphone around. If you can say your name and then ask your question or make your comment so that we can get it on the record. So that is part of our process that we're responsible for is the administrative record to show that we're engaging with the public. So she'll be taking down exactly what you say. So don't call me too many bad names.

You can talk to folks afterwards, when we're done. There's food back there. You can eat, do whatever you want. But we have the poster boards with the maps. And we have technical specialists here from the Bureau of Indian Affairs. We have Gary Handley, our regional archeologist. And he has another archeologist, Mary Harder. As I mentioned, Tamara Dawes and Christina Varela, our realty people. We have some other contract environmental folks helping me out to get this document prepared. And we also have the EDF folks who know about the project design and construction and they can answer any question. You can just have a private, sidebar conversation or go to the

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maps or illustrations and just speak to them and try and get your questions answered. You can submit to me via email or you can also go to the project's website and submit questions or comments or concerns if you're a little too shy to speak in the microphone.

So I'm going to hand it over to Randy Schroeder. He's the principal contractor that's preparing the document itself on behalf of BIA, and he'll run through the project for you.

MR. SCHROEDER: Thanks, Chip. Just very quickly, we'll start with the project location. Chip mentioned it's at the southern end of the reservation. It's actually in the very southwest corner of that south end of the reservation. And, as we mentioned before, this is the site of a previously-approved project that is now looking at expanding.

So this slide goes through a little bit of the project's history. Back in February of 2014, this project, as Chip mentioned, was referred to at that time was the Moapa Solar Energy Center. And the final EIS for that project was published in February 2014. And shortly thereafter, in May of 2014, records of decision were signed by each, the BLM and BIA, for the project. So that approved the project to go forward.

And then a subsequent step also in that

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approval process, in June of that year, the solar ground lease was approved by the BIA for that project that had an 850-acre solar site.

And then in August of 2015, BLM actually issued the right-of-way grants for the linear features associated with this project. And you'll see these discussed in more detail later. But this project has a gen-tie line, which is a transmission line, that interconnects it to the regional grid. That's on BLM land. BLM issued the right-of-way for that to be constructed.

There's also the main access road that comes off of Las Vegas Boulevard across BLM to the site itself. That right-of-way was issued by the BLM. And there's also a water pipeline that runs from the tribe's well that would provide water for the construction and operation of the project. And it's located within a designated utility corridor on the reservation, but that corridor is managed by the BLM, and they issued the right-of-way for that as well. So that was all done in August of 2015.

And then in March of 2017, EDF purchased the project from the original developer/owner, and they renamed it Arrow Canyon Solar Project. So it's, in part, the same project. And then they transferred it

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to a subsidiary called Arrow Canyon Solar, LLC.

And then in May of 2018, the Moapa Band and the applicant agreed that the applicant could expand the solar facility from the originally approved 850 acres to 2,200 acres. And then, as Chip mentioned, in January of this year, January 30th, a notice of intent was published in the Federal Register that initiated the supplemental EIS process.

So those are the steps that have occurred to get us here today. And then this kind of shows you what that original project looked like. So the original Moapa Solar Energy Center project was located on 850 acres, tucked in the extreme southwest corner of the reservation. Here is that approved access road that provides the main access off of Las Vegas Boulevard there. This is the gen-tie line or transmission line that would connect the project to the Harry Allen substation, so basically get the energy to the regional grid.

And then this is the location of the tribe's well on the reservation. And this is the water pipeline within that designated utility corridor, which are these grayed areas here, that provides the water service to the facility. So, again, as we mentioned, this was all approved back in May 2014.

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So the Arrow Canyon Project description, which is the expansion of that originally-approved Moapa Solar Energy Center, it involves these primary things. It involves expanding the lease area, as Chip said, from 850 to 2,200 acres, also, the addition of a battery energy storage system, and then also modifications to the project technical design and layout and construction methods and everything, which will all be the focus of the supplemental EIS.

So this is a closeup of what the expansion area looks like. As we said, all of these linear facilities are going to stay the same and are going to be developed as approved by the BLM. So nothing's going to change, no new approvals are needed there. And here, this farthest southwest corner, which is approximately 100 acres, would be added to the expansion area. This is part of the expansion area. This is another area north and east of the original site, all of which is on the reservation. And that's what the proposed expansion is going to -- proposed to occur. And then all of the development within this boundary, this expansion boundary, would equal up to 2,200 acres.

So just wanted to focus again on those previously approved rights-of-way. They were approved

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as part of the original project. Again, the gen-tie line, the access road water pipeline, they were all on BLM-managed land. Right-of-ways, not only were approvals granted through records of decision, but rights-of-way were actually issued for all of them. And, as I said, they'll be developed in part of the expanded project with no change to the original approvals. Greg.

GREG ANDERSON: Does that water pipeline have to go through the BLM corridor? Can't it stay on the tribal land? The well sits onto the west side. It would be a shorter thing. Otherwise, you're going all the way down to the -- to the right-of-way to the corridor and then going all the way back. So the well sits right above that, where that -- where that -- where it is right there. And then you got to come all the way down to the road and then back down this road. That would go straight through on tribal land.

What I'm thinking is that BLM is saying, well -- because if that's not going to be a permanent line, it can't be permanent unless the tribe okays it to be permanent. It has to be a temporary line if you're going to run a line above ground right there. Is that what your plan is?

MR. SCHROEDER: Right now I think that line

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could be temporary or permanent as far as I understand.
GREG ANDERSON: I don't understand the culture part on that. I mean, because it seems like, to me, that BLM is trying to take a cut from the tribe. The way I look at it, that's what I'm thinking. Because we don't have to go to this corridor. Why can't we stay on tribal land, stay out of the corridor. That way it's something temporary over the --
MR. SCHROEDER: I can explain part of that and there's part of it I can't explain. Number one, I don't know the full details of how that line was routed and agreed upon, that route. But, two things. I know one of the considerations was topography. Because once you get down here, this follows the existing road that goes to the well, like you said. And then this follows those existing pipelines and rights-of-way that are in that federal corridor. And that's real, real flat ground. And then this land up here has a little bit more topography in it. So I know that was part of the decision.
But the other part is it's my understanding, and maybe Tamara and Christina, you can correct me if I'm wrong here, but I believe any revenues from the rights-of-way within that corridor on the reservation go to the tribe, not to the BLM.

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GREG ANDERSON: I know, but the process of it. I mean, to me, it seems like, I don't know, didn't do nothing for the tribe by the process part of it. You know what I mean? You got to go clear down there. To me, I mean, if you know the terrain and you guys just look at a map like that, it goes flat all the way across and goes up on a hill. This one, you go down, all the way down it goes flat for probably a quarter of a mile. Then it goes up the hill, stays on top of the hill. Then it drops down on the other side and then continues down along that corridor. But the other way would be back over here, you'd hit right there on the yellow corner there for that corner that yellow, not the green, the yellow one, the second corner up. That comes right down to the wash right there.
MR. SCHROEDER: Right. We can take a look at some maps after this is over. Because, like I said, right now it is not expected that any of these rights-of-way would change because they've already been approved. But if that's an opinion and something you want to see considered, that's what we're here to find out.
GREG ANDERSON: I was just wondering why they did that like that.
MR. SCHROEDER: I think it was mostly

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topography.
GREG ANDERSON: I mean, when Res America, when they first initiated that, that was the whole talk of it, was to go straight down through and into their line. Now I see that coming down in the corridor. I was just wondering, but --
MR. SCHROEDER: Well, like I said, we can take a closer look at that. Yes, sir.
AUDIENCE MEMBER: I can tell you from a construction aspect, the fact is that that pipeline that they're following there, when originally it was constructed, even though it's a 50-foot-wide easement, originally when they constructed it was anywhere from 125 to 175 feet wide. That means that that area is cleared and flattened out. From a construction aspect, it's easier to come down, follow the existing clearing that's already been done, and go straight through. Because every foot that's already been cleared is a foot you don't have to pay for to level out. Because to do any kind of construction, you have to level out before laying any kind of pipe, including water pipeline.
GREG ANDERSON: They were saying they're supposed to run overtop of the ground and not be covered. So if you look at the process of that, have

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you ever seen them put the pipeline in out there? It's very hard ground. It's caliche. And I can tell you right now, that line would be hard to cut across that top because it's all caliche from that corner where you turn on and get on the main access road. You start caliche from there all the way to the top clear until you drop off down in the bottom down there. Then it goes into stops. Then it's all caliche.
AUDIENCE MEMBER: Most engineers take a look at an existing plan, and that's why they go that direction. Because you can see it's almost following the pipeline exactly from the one existing now. That would be my guess.
MR. SCHROEDER: Thank you.
Yes, sir.
AUDIENCE MEMBER: That was my concern, too. I guess the first question is is it temporary and how big of a line is it? I mean, really, it's dust control is what is necessary with the minimal amount after. But to Greg's point, you know, if you're going to put a pipeline in there, as far as the tribe is concerned, that pipeline becomes an asset. And if it was located out of the corridor, the tribe is pretty much, you can have access to it pretty much at will unless we're going to cross the right-of-way -- the power corridor.

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So it's almost like -- the tribe is taking a big loss there if that's a permanent line. And I don't know how big it is, six-inch, eight-inch, could be four-inch. But if that is a permanent line, then we are taking a major hit. Because it's hard for the tribe to -- well, it would be so much simpler for the tribe to just have clear access to it.

So, you know, I don't know if the tribe is involved with that part of where it was at or going to be located, but it really just, for future developments, it becomes an obstacle by being located inside the power corridor. So I don't know if it's temporary or not. I don't know how big it is.

MR. SCHROEDER: We can look this up after the meeting. I'll confirm it, but I think it's an eight to ten-inch line.

AUDIENCE MEMBER: Yeah, a major line.

MR. SCHROEDER: Yeah. As I said, it was described as being either above ground or below ground so temporary or permanent. Because when you go all the way back to the original Res America's project, that included multiple technologies, two of which were the concentrating solar technologies that were very water intensive. So that's why they had to look at the option of having a full-time, permanent line as well.

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So that's the way it was described as temporary or permanent.

AUDIENCE MEMBER: I'm sure that it would become tribal property, I'm pretty sure.

And where is that gentleman from? Is that the BLM person?

MR. SCHROEDER: You're talking about the person -- he's from one of the pipeline companies that has a line in the corridor.

AUDIENCE MEMBER: Well, we definitely have an interest in the location of that. I don't know. That's for the tribal council to address or however. But I think that's -- it's something that we'd like to see changed.

MR. SCHROEDER: Okay. All right. Thank you, guys, both, well, all three of you, for those comments.

So this provides an overview of what those previously approved rights-of-ways were. And, as I said, at this point in time, there was not a plan or a proposal to change any of those. They would all be used and developed as approved in the original project, which is in the locations in the way they're described here.

GREG ANDERSON: Back to your slide. You're talking on behalf of BIA or everybody else?

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MR. SCHROEDER: I'm helping BIA. I'm representing BIA, yeah.

GREG ANDERSON: I was just wondering.

MR. SCHROEDER: Yeah, and --

GREG ANDERSON: I had another -- just another question, is that, you know, the tribe has a lot of stuff going on in that area, you know, down the old I-15, that frontage road, that's the old highway where your pink lines are there. Well, that road needs some kind of a, I would say, upkeep on it because the road is so damaged as it is. I think you guys noticed it as you were driving out to your site today, how bad that road was. I mean, and the more trucks and stuff that we have, that we did with the first solar site, that road was pretty torn up. I mean, and all the tribal people are hitting the potholes and blowing tires. You know, so those are the things, I think, that as responsibility -- I don't know if that falls on you guys' hands or not, but I think we need to look at that because of the safety part. You know, when we have people going -- I mean, there's 300, 400 cars going down that road twice a day, plus the semis that are hauling equipment in. That seems like that's a battle with the state and the county and everybody is pushing or passing the buck on whose responsibility that is.

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MR. SCHROEDER: So that's something you want to make sure is analyzed in this document; right?

GREG ANDERSON: Okay.

MR. SCHROEDER: Yeah, okay. Okay.

So this kind of underscores what the original or the current plan is with the changes that we're talking about here or with the inclusion of the analysis we're talking about. But, again, the focus of this supplemental EIS was going to revolve around the expansion of the solar field, so 850 acres to 2,200 acres, 1,350 acres of additional solar development, the addition of battery energy storage on the site as well. And then also some of the layout and design features that are being discussed include things like the way the grading is going to occur, the site preparation, the fences. As far as having fences around individual arrays, the avoidance of major drainages, things like that.

Those are the major changes that will be the focus of the supplemental EIS. And, as I said, it was not the intent to include anything about the transmission gen-tie, the access road, the water pipeline, because those right-of-way agreements have already been issued.

AUDIENCE MEMBER: Well, I mean, we were just

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complaining about the location of the water line. And it says will not, underlined "not." Is that something that is still flexible or are they concrete about that?

MR. SCHROEDER: What I'm describing is what the plan was -- what the proposal is.

AUDIENCE MEMBER: Like I said, I mean, that water line, if it, in fact, is going to be a permanent line, eight-inch, that's a great value and it's an asset to the tribe. And to be locked up inside of the right-of-way, it's just a major obstacle for whatever we may want to do out there. If it was located on the reservation, out of the right-of-way, we have unfettered access. So it's really a problem.

MR. SCHROEDER: Right. And, again, perhaps you can -- we can discuss that further after the presentation when we're around some of the boards and with some of the folks that are here from EDF as well.

MR. LEWIS: I think also part of the point of that is with the "will not" was sort of a message from the BLM. We don't have to go back and redo everything that was already done. We're going to use the pipeline as it is, the road access and the pipeline. We already did it once and we're not going to change that. We don't have to do any new study or do anything, only for that new area that's being added. However, that's why

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we're having this meeting. If there's a need or a wish to explore any of those rights-of-ways, we can go ahead and take a look at that.

AUDIENCE MEMBER: I'm really surprised that that wasn't addressed a lot earlier, you know, by the tribal council, obviously. Because it's a major, a major, asset for the tribe.

MR. SCHROEDER: You're talking about when the original project was approved?

AUDIENCE MEMBER: Yeah. It's already been located. I'm surprised they didn't bring this issue up with tribal council. Res America was, what, 10 years ago was when it started, long time ago.

MR. SCHROEDER: And, I'm sorry. I apologize to our court reporter. Could you guys who did speak, could you give your names to the court reporter, please.

GREG ANDERSON: Greg Anderson.

AARON ESTES: Aaron Estes.

VERNON LEE: My name is Vernon Lee, tribal member.

MR. SCHROEDER: Thank you, guys.

This solar field is going to expand from 850 acres to 2,200 acres. On the field you guys very, very familiar with what they look like, the components

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they have. We kind of listed some of them here. You have the solar arrays, which are the panels and the mounting systems. The plan for this project is to have single-access tracking mounting system. Also, the inverters that transfer the D/C power generated by the panels to A/C current. And then you have a battery energy storage system, which could be spread through the solar field. At each one of the inverters, you could have a battery system there or you could have one centrally located battery system that's near the operation and maintenance facilities.

Then you have an electrical collection system, which takes that energy all throughout the site and collects it and delivers it to the onsite substation where it's then increased in voltage and then it goes on the gen-tie to the regional grid.

As I mentioned, an operation and maintenance building for the staff that will be there during the operational period. And we talked about the fencing around the solar arrays. In this particular case, groups of arrays will be individually fenced as opposed to the entire 2,200-acre site being fenced. That's because some of the more significant drainages, as I said, will be avoided. You don't want to fence the whole site and fence through those drainages as well.

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So that's one of the changes.

There is just a few pictures of the single access tracker, what that looks like, what the solar field looks like. That's an inverter there.

Okay. So here I'll start with the bottom first because we've already talked about some of these things that we say are not changing and we already have some suggestions that the water pipeline do change. So, again, these previously issued rights-of-way, there was an expectation that they wouldn't change and they would be developed as-is. Again, the same thing, generation-tie line, the access road, and the water pipeline. But, again, we've heard loud and clear that you guys want this water pipeline to be revisited.

So the primary changes to the solar field that's expanding, that's one of the biggest changes, is that additional acreage. The PV technology basically is the same. There's another, additional PV panel technology referred to as a bifacial panel that will be included in that mix, but there's no changes in what it does as far as impacts from the project. So it doesn't really require it to be reanalyzed.

Originally, the Moapa Solar Energy Center project was saying that the maximum height of the tilted panels on the single access trackers would be 6

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to 12 feet, and here we're saying it will be up to 18 feet, possibly, depending upon the panel configuration.

Battery energy storage system wasn't included in the Moapa Solar Energy Center project. Here it is being included. So that will be analyzed in the supplemental EIS.

The O and M building, originally it was going to be up to 18 feet. Here we're saying it could be up to 25 feet, but it really doesn't require any significant analysis. It's a small change.

Water use. So originally the water use for construction was 50-acre feet was the expectation and up to 30-acre feet for operation. And now the expectation is with more dust control being expected and an expanded site, that you would be looking at 100 to 300-acre feet per year, which is, again, over about a 20-month construction period, so less than two years, and then the same 30-acre feet for operations. So that will be analyzed in the supplemental EIS.

So for wastewater management, the original project had site evaporation ponds that they were planning to use. And, again, that was tied to not only the potentially for a PV project, but those other technologies required evaporation ponds. So they

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figured that they would use them for both types of technology. And so here, looking at developing a septic disposal system going forward for the project. So that will be analyzed in the document.

The onsite substation is basically the same so there's no change. Its location on the site will likely or possibly change. And then the perimeter fencing, originally in the Moapa Solar Energy Center project was going to be an 8-foot-long chain link fence with the entire site being fenced. Now the idea is to have perimeter fencing only around the groups of arrays, like I mentioned earlier. And then, in addition, the bottom six to eight inches of the fence would be left open so desert tortoise can move back onto the site after construction is complete and during operations.

So those are the primary changes. And that's going to be the focus of the analysis in the supplemental EIS. And but for this one component that you want to have revisited, the rest of these things are, I think, fairly straightforward.

Any questions on any of those changes?

VERNON LEE: The obvious to me is it was 850-acre and that was X amount of megawatts. Now it's substantially grown. What is the amount of megawatt

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for the 2,200-acre? Is that 250, 350 or what is it?

MR. SCHROEDER: Right now it's a 200-megawatt project.

VERNON LEE: With the 2,200-acre?

MR. SCHROEDER: With the 2,200 acres.

VERNON LEE: With the battery backup, is that good until after midnight or something or does it run 24?

MR. SCHROEDER: Can someone from the EDF describe the capacity of the battery energy storage system. How many megawatt hours, I don't have that off the top of my head.

AUDIENCE MEMBER: Without hard numbers on the battery capacity, it is to dispatch the power, you know, more in line with demand than when the generation. So sun goes down, they still need energy. Batteries kick in and continue to deliver power.

VERNON LEE: Kind of an incidental question is if technology changes where you get more efficient, better storage batteries, would they be changed out?

AUDIENCE MEMBER: It's unlikely that the batteries would be changed out once the facility is commissioned.

AUDIENCE MEMBER: And the battery storage piece is a 75-megawatt battery that runs in five-hour

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cycles. What that means as far as, like, how late into the night it runs, it really is up to the utility because they'll be dispatching the energy whenever they need it.

VERNON LEE: When you say that, you mean, it would be Nevada Power?

AUDIENCE MEMBER: Yes, Nevada.

MR. SCHROEDER: Okay. Any other questions about the components that will change with this expansion of the project? Yes, sir.

VERNON LEE: I just kind of want to reiterate what Greg had said about that road. You know, those trucks will tear it up. And with all the cars, it was a safety issue. And the county, like he said, we're butting heads about who -- it is the old state highway and they did maintain -- or it appears as though they have maintained it out, did some patching to a certain extent, but there is still -- I mean, it's pretty bad. You guys have been out there. There's a couple major chuck holes and it was washed out on the outer side.

Now, I don't know how that would be addressed, but, like he said, it's a safety issue. You get that many cars going and -- but anyway, that's a concern.

MR. SCHROEDER: So that's another issue that

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will be analyzed in this document.

So here are some of those resources that are going to be analyzed for all those changing components that we mentioned. Biological resources, we talked about all of that with the species of note out there, the desert tortoise. Cultural resources, surveys have been done out there. And those are being evaluated.

Visual resources, when the original project was developed, visual simulations were developed for this, the 850-acre footprint using the three different technologies that were being considered at the time. And so the expectation is right now that we would create new visual simulations for the expanded project from the same location so you can see what it was going to look like under the original approval, and then what it's going to look like when it's expanded.

And then water resources. We mentioned when we went through the slides, the change from 50-acre feet per year during construction to 100 to 300-acre feet per year. That will be analyzed.

And then under the broad term of socioeconomics, in addition to the benefits economically to the tribe and the potential jobs to the tribe, that's where you would look at the issues like the transportation and those things, is under that

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heading.

So that's pretty much the end of the presentation. Just want to open up to any questions or comments for not only Chip or myself or anyone else who's here.

VERNON LEE: I guess I got one. I'm sure they've done the studies, but you're going to have the fence up off the ground so the turtles can move freely. I think that's a great idea. I guess they've done the studies, and have support that that's not going to affect the turtles or natural whatever, how they wander.

MR. LEWIS: Right. And that's the point. If you have the big, huge hole blocks fence and they're trying to make it and they really want to go over here, it's an impediment. And if you start having all these solar projects that you know are happening on the reservation and on the BLM land in its collective whole, now there's lots of tortoises that aren't getting to migrate or go where they want to go, to disperse and have babies and all. So by just having it up, the hope is that they'll just move on through and get to go where they want.

EDF has worked on some projects in California, and that's proving to be successful with at

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least other animals, too; correct?

AUDIENCE MEMBER: We haven't had one where we have desert tortoise on the site. But we have a lot of other wildlife, like fox and jackrabbits and other animals. And so we've seen a lot of them moving back onto solar facilities once they're built.

AUDIENCE MEMBER: And that's a fence that has 7-by-7-inch portals, not raised up.

VERNON LEE: That was my next question. 7-inch?

AUDIENCE MEMBER: 6 to 8 is what the Fish and Wildlife Service recommends.

VERNON LEE: Okay. That's good stuff.

MR. SCHROEDER: That's actually Fish and Wildlife Service recommendation, actually.

VERNON LEE: Are you with Fish and Wildlife?

AUDIENCE MEMBER: No. I'm the lead biologist on the project.

MR. LEWIS: He's one guy I forgot to introduce. We do have a signup sheet in the back. Please, if everyone would remember to sign in to show that there was attendance and we have a record it. Make sure, you know, we're getting to as many of the public as we can.

If you just loved this so much and you're so

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excited, we'll be having another meeting doing the same thing down in Las Vegas at the BLM office tomorrow evening. So you're welcome to come to another meeting if you want. The same time, 5:30.

VERNON LEE: I'd just kind of like to say that, you know, the solar technology, now it seems to be the way to go. They're shutting down some of the metabolic mirrors type. They're shutting all those down. There's a bunch of those south of town. And the big wind turbines, I guess they're chopping a few birds out of the sky. The solar, you know, I think we've only had one duck, I think, tried to land on our glass out there. Because it does look blue and it could be mistaken for water.

But I do believe that is the wave of the future at least in the desert here, which would be great. It's just so -- I guess, you know, lack of better words, clean. Once you build it, you've got construction and dust. But after it's built, everything is pretty much fixed. You're going to have a single access, but ain't that gonna do -- it's just gonna turn. I think it's really great.

These solar panels are going to be tall. I think it's 18 feet, is that what that said? And I say that because the one we have now, you know, it's only

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about six feet and that's it. And the wind factor, you know, I hope they studied that, you know. Because all this extreme weather, we could get up to 80-mile-an-hour winds out there at times. They need to do their studies there.

MR. SCHROEDER: Yeah. And what that number represents is when the single access tracker is tilted at its maximum angle, it would be that distance then would vary from the 12 feet to the 18 feet.

VERNON LEE: Okay. All right.

MR. SCHROEDER: So it isn't the height off the ground or anything, it's just that maximum angle. But all of those things about the strength of the winds and all that stuff are factored into those decisions on how to size those panels and how many panels to put on the rack and so on.

VERNON LEE: I guess another incidental question, I didn't mean to butt in, is how many or how big are the panels and how many do they expect to -- is that too deep of a question? Are they going to have a million panels or a few million panels?

MR. SCHROEDER: Don't have an exact number. Like I said, that's all going to be determined by what panels are ultimately selected and how they mount them on the racks, if they do, like, two panels, three

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panels, four panels, whatever. So the total number has yet to be determined, but it's a lot of panels.

Sir, did you have a question back there?

AUDIENCE MEMBER: Yeah. Just one. I'm just wondering why the Fish and Wildlife has something to do with a solar project since it's on the reservation.

MR. SCHROEDER: I can answer that. I'll let Chip expand on it. But the Bureau of Land Management, again, if the pipeline doesn't change, the Bureau of Land Management would have nothing to do with this expansion project because they've already issued their approvals and so they wouldn't need to be involved. But, as Chip said earlier, because BLM land surrounds all of these other lands that are being considered for the project, so because they're an adjacent landowner, all of these lands here are all BLM, that's why they're included as a cooperating agency. If the pipeline doesn't change, if that right-of-way stays the way it is, the BLM doesn't have to issue a permit or anything on that. They're just being consulted for their input on what's --

AUDIENCE MEMBER: Are they getting paid for being here to -- on these comments and stuff?

MR. SCHROEDER: No. No, they're not getting paid. But they are --

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AUDIENCE MEMBER: Fish and Wildlife, now, what's that --

MR. SCHROEDER: The Fish and Wildlife Service, because BIA is a federal agency, they have to go through the National Environmental Policy Act. And because of that, they have to consult with the Fish and Wildlife Service.

AUDIENCE MEMBER: But we still got our own specialists in that field and stuff. And what I'm looking at is, you know, since we're in the solar and whatever or energy and stuff, is that we're trying to utilize the land and stuff, which a lot of the residents are trying to do for the reservation and stuff. And I see -- I hate to see holdbacks because of comments or environmentalists and this and that. Once they step in the door of our tribal land, they have a lot of say in what we can do and what we can't do. I seen it already.

In fact, I think they gone ahead and designated an area right up there by the Valley of Fire, right on the boundary of the reservation. We had a comment period there. It didn't matter. They gone ahead and did it anyway. That's our back door to the Valley of Fire State Park.

You know, like I say, you know, we're damned

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if we do, damned if we don't. I know what you guys are trying to do. I don't know how big this project, how much megawatts or whatever, it's going to produce and stuff.

MR. SCHROEDER: 200 megawatts.

AUDIENCE MEMBER: Okay.

MR. SCHROEDER: Do you want to respond to that?

MR. LEWIS: Yeah, sure. So in this case, as the project is proposed, BLM has nothing to say, not a yes or no, anything. They're just an interested party because of the land touching and because of things like the tortoises could move from BLM through the reservation onto BLM. So they would be concerned, you know, thinking, gee, we hope you put those little holes in the fence. So that would be a comment they would make, but they don't have anything to do with it in this case.

AUDIENCE MEMBER: I'm not here to regulate -- because, along the freeway and stuff they put the fence. And I'm sure you're good to do the same thing with this project and stuff. That's where I'm, you know, I'm puzzled about. The turtle is smart enough to go under, like, a pipeline through Alaska and stuff. Where do they find the caribou and wildlife, close to

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the pipe because it's warmer and stuff. Animals have their own behavior, but they're a little smarter than some of us humans and stuff.

MR. LEWIS: Your question as far as Fish and Wildlife Service goes, they're the regulatory agency or authority that's, even though we're BIA, BLM, everybody, is when it comes only to threatened endangered species. So if there weren't threatened endangered species right here where we're working, they wouldn't be involved. So they have to issue a permit basically that allows us to construct -- when we're out there constructing and there's a bulldozer out there that could run over one of these things, you know, we could get in trouble. So what they do is issue us a permit and say, we know you're going to do this, but, and you've taken everything into consideration.

AUDIENCE MEMBER: Control. You know, my people here, I come from the old -- I don't understand, you know, all this environmental stuff, but still our culture and stuff. Our experts would go in there and identify these, what do you call them, I'm not sure, but these areas where our peoples' bands and stuff. If we're going to remove them or if we're going to go ahead and let them build on top of them, you know.

MR. LEWIS: Right. And we do take that into

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consideration. We survey for, if there's any artifacts or anything there. If there are, then we meet with the tribe and say it's right in the way, there's nothing we can do about it. We have to -- so what would you like to do with it. You can collect them, put them in a museum case, give them to a university. Whatever it is we would like to do with them.

I think in this case though there isn't anything really here; right, Gary? This particular project right here, that's a nonissue.

AUDIENCE MEMBER: You know, the other thing, too, would be, like, education, if you guys got stuff thrown in there. The project, you know, you might have a summer job, if the council set something up for teen folks there. Because we do got some of our students and stuff that are -- right there at As and BS average in school and stuff. But, anyways, you guys can talk to the council on these things, on these concerns and stuff.

MR. LEWIS: Thank you, sir.

Any other comments?

VERNON LEE: You might go through the timeline.

MR. LEWIS: Sure.

MR. SCHROEDER: Okay. So Chip mentioned this

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timeline right now a little earlier in the presentation. So this notice of intent, which is a requirement to kick off an EIS process, that was published back at the end of January, January 30th. And we're right here at the public scoping meetings. So that's happening here this last week of February.

And then as the comments come in from the scoping process, we're developing the draft supplemental impact statement. And we expect to have a draft, a formal draft, published around July of this year. And then there are comment periods on that draft where you'll see us again coming back to see if anybody has comments on what's resulting in this draft document. And we'll come back out for some more public meetings then. And then we'll issue and develop the final EIS and issue that around October of this year with the BIA. They're the ones responsible for writing the decision on the project. They would prepare the record of decision. That's what ROD stands for, at the end of the year in December. So that's the currently anticipated schedule.

MR. LEWIS: So, Katie, maybe you can give the 30-second synopsis on what follows the schedule as far as when you expect to start construction and when it would be completed and in operation.

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MS. KUPLEVICH: Hi. I'm Katie Kuplevich. I'm the project developer with EDF Renewables for Arrow Canyon. So after the ROD is issued and the right-of-way grants are formalized with the BLM, then we anticipate trying to start construction very close thereafter. We want to hit the desert tortoise season, which starts in April, which means we'd like to start fencing and clearing the site of desert tortoises starting in April of 2021. Then we would continue construction effectively continuously until about July, June-July, of 2022, at which point we would start the commissioning process, where they go in and they effectively test all the different components of the project, the batteries, the tilt -- the trackers, the solar panels, all of the electrical. They start doing back-feed power to the grid, so allowing the back-feed power to make sure it's getting to the substation.

And then the project has a commercial operation date of December 1st, 2022, and that's with Nevada Energy. So we do have a power purchase agreement already in place. So that's sort of the very brief, 30-second, timeline.

VERNON LEE: I appreciate you doing that, but when will they actually start building access roads? In other words, when will they start the ramp up of

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hiring people? Would that be in, like --
MS. KUPLEVICH: So the ramp up will start probably in April. The first things we'll do are the fencing, but in order to get the fencing in, we have to start constructing at least the primary access road, which means that it will be widened, rolled, based, and up to the project site. And then we'll start doing the clearance surveys. So I would expect that it will be sometime starting in April to maybe May-June, you'll start seeing that ramp up. And then the real ramp up into construction is going to be later into the year.
Does anybody else have any questions? Yes, sir.
AUDIENCE MEMBER: I just -- can I ask, what's the lifespan of these panels?
MS. KUPLEVICH: 35 years.
AUDIENCE MEMBER: How many?
MS. KUPLEVICH: 35 for the panels. And the battery storage containers are a little bit less than that. I think they're 20 or 25.
AUDIENCE MEMBER: So what I'm thinking about, who are we going to bring back in after you guys bring them in? Are we going to look back at you guys or you guys going to turn your back on us?
MS. KUPLEVICH: No. Our plan after we

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construct the project is to continue to own and operate the project. So there will be an onsite operations and maintenance project. Up to 12 individuals, usually around 6, depending on the size of the facility and the amount of maintenance that actually is required. And then our power purchase agreement is for 25 years. So you'll be stuck with us for at least 25 years.
AUDIENCE MEMBER: Can I make one more comment. Not a comment, but something to my people and stuff. I was on the phone the other day a couple times with Washington, you know. And Mr. Trump, he said, we're moving the tribe with solar. So that's why I'm curious. I don't know too much about you all. I'm a cattle man. I'm not a millionaire. But, anyway, what I was going to say is that I'm with you guys. We got a lot of sunshine. Seem like it's been about 90 days without rain, it's been sunshine. That's a lot of generating power; okay. Last year during the, let's see, the -- it was -- I got 165 days without no rain, no clouds and stuff. Clouds would come over, it rained around it. We got a lot of sunshine.
MS. KUPLEVICH: That's why we like this project. That's why we like siting in this area. We've been talking to your tribal council and --
AUDIENCE MEMBER: President Trump has been

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pretty proud of this tribe right here. You guys might laugh and stuff, but really is. We have to survive on (inaudible) because of the way we operate because it takes people like --
MS. KUPLEVICH: We appreciate you saying that. Thank you.
You had a question?
VERNON LEE: I'm a little flabbergasted. I was going to say that Nevada Power being the off-taker, you know, it takes hundreds of millions of dollars to build these things. Is that money already in place via Nevada Power or have they got easy access to that or once the ROD is issued, do they got to go get the money or is that a problem? You know, it's Nevada Power; right?
MS. KUPLEVICH: Right. We have a contractual agreement with them that they have to pay us a certain rate for the power that's produced.
VERNON LEE: No, I'm not talking about construction money.
MS. KUPLEVICH: EDF balance sheet finances our construction. So we take that on as a company.
VERNON LEE: So the money is already there.
MS. KUPLEVICH: So the money is already there.

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VERNON LEE: Okay.
MS. KUPLEVICH: We found we actually just went through that with Nevada Power last week. It's a milestone in our power purchase agreement that says we have to prove that we can finance the construction of the facility. And so we were able to do that by showing them that we can balance sheet finance our project.
VERNON LEE: Yeah, that's good. That's good.
MR. LEWIS: Any others? Any final thoughts or words?
MS. PERRY: It's been a long time. 2014.
VERNON LEE: So next summer it will be going.
GREG ANDERSON: They already done an assessment. This is just a question. They already done an assessment from the U-turn off all the way to where the limestone quarry is. Why are we having to go through the whole process again when it's already been done?
VERNON LEE: Bureaucracy.
MR. LEWIS: Because that's old so we have to revisit it.
GREG ANDERSON: It might be old, but the tribe still stays in that same place.
MR. LEWIS: We're going to make this as short

and sweet as we possibly can, because we already did do it once for part of it already, so.

GREG ANDERSON: That's an easy question.

MR. LEWIS: Thank you, everyone. We appreciate it. We will be here for a while. If anybody has any or wants to look at the board or talk to our technical specialists, wildlife biologist, archeologist, and the solar folks, realty specialists, we'll be happy to answer your questions. Thank you.

MS. KUPLEVICH: And we have first-aid giveaways in the back for anyone who wants one.

(Meeting adjourned at 7:00 p.m.)

* * * * *

CERTIFICATE OF REPORTER

STATE OF NEVADA)
) ss:
COUNTY OF CLARK)

I, Kimberly A. Farkas, a Certified Court Reporter licensed by the State of Nevada, do hereby certify: That I reported the Environmental Impact Statement Scoping Meeting, February 25, 2020, at 5:30 p.m.

That I thereafter transcribed my said stenographic notes into written form, and that the typewritten transcript is a complete, true and accurate transcription of my said stenographic notes.

I further certify that I am not a relative, employee or independent contractor of counsel or of any of the parties involved in the proceeding; nor a person financially interested in the proceeding.

IN WITNESS WHEREOF, I have set my hand in my office in the County of Clark, State of Nevada, this 18th day of March, 2020.

Kimberly A. Farkas, CCR NO. 741

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Appendix C

Project Design Features / BMPs
and
Agency-Required Mitigation

APPENDIX C

APPLICANT-PROPOSED MITIGATION MEASURES

These are the mitigation measures from the MSEC ROD as modified for the ACSP.

Soils

The Proposed Project could result in adverse impacts to soils as a result of increased erosion rates and reduction of soil productivity from removal of vegetation and grading activities. The Applicant would implement the following mitigation measures to reduce overall impacts to soil resources:

- Grading on the solar site would be minimized to only those areas where necessary to meet the construction and operational requirements of the Project. Where no grading occurs, existing vegetation would be mowed to a height of approximately 18 inches and driven over / crushed during construction activities where feasible and where it does not pose a safety risk. Following construction, on-site vegetation will be allowed to return to those areas and will only be mowed to avoid conflicts with solar facility operation and as necessary for safety and fire prevention.
- Construction and operational activities will be conducted in compliance with a surface water protection plan (SWPP) that would include BMPs and other erosion-control measures designed to minimize soil erosion and limit sheet flow and downstream sedimentation. The SWPP would also incorporate adaptive management of actions if erosion and sedimentation control measures are found to be insufficient to control surface water at the site.
- To minimize wind erosion, all construction activities shall comply with the Fugitive Dust Control Plan that would be developed and implemented for the Proposed Project. Measures such as watering, application of dust palliatives, and ‘stop work’ periods during high winds would be incorporated into the plan.
- A Site Restoration and Revegetation Plan would be implemented to limit impacts to native, on-site vegetation as much as practicable. The Plan would define construction limits and BMP measures for soil restoration and re-planting and establish monitoring and success criteria as applicable.

Water Quality / Quantity

Potential adverse impacts to water are related to soil erosion and downstream sedimentation as well as water transport of hazardous material through soil erosion. As mentioned above, soil erosion would be managed via the SWPP and erosion controls within ephemeral washes to reduce velocity of flood flow and limit downstream sedimentation. The measures below would be implemented to reduce overall impacts to water quality:

- Grading on the solar site would be minimized to only those areas where necessary to meet the construction and operational requirements of the Project – such as where leveling is necessary, the driveways among the rows of panels, etc. The major existing drainage channels that traverse the site will be retained by the site design and scour protection along these drainages would be installed as needed. Ephemeral drainage of the site would sheet flow into the existing drainage channels.
- Final grading and drainage plans will be completed and submitted for approval prior to construction. The final drainage and grading plans would demonstrate that downstream flows would not be adversely impacted due to any proposed changes to natural washes resulting from proposed grading, drainage management measures or the addition of retention ponds.
- The paths for all stormwater flows would be identified and modeled as part of the final grading and drainage plan.
- The number of drainage crossings would be minimized to the extent possible and each would be designed to accommodate adequate flow.
- Adaptive management techniques will be implemented via the SWPP to maintain BMPs utilized to decrease sediment erosion and downstream transport of such during large rain events.
- Weekly and post-storm monitoring of erosion and sedimentation would be conducted during construction. If localized gullies were to develop or result in increased rates of erosion and sedimentation, repairs would be made and erosion and sedimentation control measures would be updated.
- Existing vegetative buffers would be maintained as much as practical along perimeter edges of major drainages.
- Placing Project solar facilities in major washes would be avoided by all alternatives to minimize direct and indirect impacts to the washes from erosion, migration of channels and local scour. All larger Project components will be located outside of drainages. Some roads and collector lines could be placed within ungraded drainages where technically feasible.
- Where fencing would be built across drainages, breakaway fencing would be installed and would be designed to avoid interference with flows through those drainages. Breakaway fencing would be inspected and repaired as needed within 48 hours of large flood events.
- A spill prevention counter-measure and control (SPCC) plan would be developed and implemented during construction and the operations phase of the Proposed Project. Adequately-sized secondary spill containment would be incorporated with all chemical storage vessels to ensure proper capture and control measures for potential spills. The Plan would also provide for hazardous material spill prevention and clean-up measures, were a spill to occur.

Air Quality

The primary impact upon air would occur during the construction and decommissioning periods from increased vehicle emissions and fugitive dust. The following mitigation measures would be

incorporated into construction contracts by the Proponent and would be implemented to reduce overall air impacts that would result from the Proposed Project:

- Grading on the solar site would be minimized to only those areas where necessary to meet the construction and operational requirements of the Project. Where no grading occurs, existing vegetation would be mowed to 18 inches and driven over / crushed during construction where feasible and where it does not pose a safety risk. Following construction, on-site vegetation will be allowed to return to those areas not directly disturbed by project components and will only be mowed to avoid conflicts with plant operation and as necessary for safety and fire prevention.
- Vehicular speeds on non-paved roads would be limited 25 miles per hour.
- When hauling material and operating non-earthmoving equipment, spillage would be prevented and speeds would be limited to 15 miles per hour and speed of earth-moving equipment to 10 mph.
- Grading operations would be phased where appropriate to limit the amount of disturbance at any one time, and water trucks would be used for stabilization of surfaces under windy conditions. Soil stabilizers and dust palliatives would be used where practical.
- Water would be applied to disturbed areas to control dust and to maintain moisture level at optimum levels for compaction, as needed. Water will be applied using water trucks and application rates would be monitored to prevent runoff and ponding.
- Exposed stockpiled material areas would be covered or stabilized using water or other feasible methods during windy conditions (forecast or actual wind conditions of approximately 25 miles per hour or greater).
- Dust control measures such as watering and the application of palliatives approved by the USFWS would be applied to access roads and other Project roads to adequately control fugitive dust.
- Excavation and grading would be suspended during periods of high winds over 25 miles per hour.
- 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 mud, dirt, or debris, as necessary. Gravel or other similar material would be used where non-paved access roads intersect paved roadways to prevent mud and dirt track-out.
- Air pollutant emissions from the emergency diesel generators and/or fire water pump engines would be minimized by an operating limitation of no more than 50 hours per year, per engine for routine testing and maintenance of these components. These engines would be compliant with current EPA tier emission performance criteria.
- In construction contracts, recommend that all contractors maintain and tune engines per manufacturer’s specifications to perform to EPA certification levels, where applicable.
- Any tampering with engines would be prohibited and continuing adherence to manufacturer's recommendations would be required.
- In construction contracts, recommend that contractors lease new, clean diesel burning equipment. In general, the best available emissions control technology would be used - Tier 4 engines should be used for project construction equipment to the maximum extent feasible.

- Limit unnecessary idling and perform periodic and unscheduled inspections to ensure that construction equipment is properly maintained.
- In construction contracts, recommend that contractors use EPA-registered particulate traps and other appropriate controls where suitable to reduce emissions of diesel particulate matter and other pollutions at the construction site.
- A traffic and parking management plan would be developed for the construction period to minimize traffic interference and maintain traffic flow.

Biological Resources

The following measures will minimize, reduce, and mitigate impacts to biological resources from implementation of the Proposed Project:

T&E Species Mitigation Measures

UPDATED MEASURES TO BE PROVIDED BY USFWS VIA NEW BO FOR THE ACSP

General Biological Mitigation Measures

- Preconstruction surveys will be conducted by qualified biologists according to the most current USFWS or other applicable protocols, where available, by species. These surveys would confirm the presence of special status plants, noxious weeds, and general and special status wildlife species, to help prevent direct loss of vegetation and wildlife and to prevent the spread of noxious plant species.
- Biological monitors will be assigned to the Proposed Project in areas of sensitive biological resources Biological monitors would be in place along the access road during construction and/or temporary fencing utilized during the construction period to minimize any impacts from vehicles during construction. The monitors will be responsible for ensuring that impacts to special status species, native vegetation, wildlife habitat, or unique resources would be avoided to the fullest extent possible. Where appropriate, monitors will flag the boundaries of areas where activities would need to be restricted to protect native plants and wildlife or special status species. Those restricted areas will be monitored to ensure their protection during construction.
- The Applicant will monitor establishment and functionality of sediment control devices as outlined in the SWPP. Placement of these devices may need to be adjusted and placed further from roads to minimize risk to tortoises using them for shade. Ensure that BMPs are in place and working properly on a weekly basis.
- The Applicant will implement controls at entry locations to facilitate weed management and invasive species control in order to minimize infestation to the Proposed Project site from an outside source. Trucks and other large equipment will be randomly checked before entering the site for any invasive species debris or seed.

- Any trenches or excavations should be covered if left overnight or have escape ramps to allow wildlife to safely exit.
- Monitoring for the presence of ravens and other potential human-subsidized predators of desert tortoises will be conducted and a Raven Control Plan will be implemented. BMPs to discourage the presence of ravens onsite include trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, removal of nesting material prior to an egg being laid, and active monitoring of the site for presence of ravens.
    - To minimize activities that attract prey and predators during construction and operations, garbage will be placed in approved containers with lids and removed promptly when full to avoid creating attractive nuisances for wildlife. Open containers that may collect rainwater will also be removed or stored in a secure or covered location to not attract birds.
- All work area boundaries will be conspicuously staked, flagged, or otherwise marked to minimize surface disturbance activities. All workers, equipment, vehicles, and construction materials shall remain within the site, existing roads, and designated areas.
- 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 *Reducing Avian Collisions with Power Lines* by the U.S. Fish and Wildlife Service and the APLIC (APLIC 2012)Vegetation clearing and ground-disturbing activities would be conducted outside the migratory bird nesting season when practical. If ground-disturbing activities cannot be avoided during this time period, a qualified biological monitor will conduct pre-construction nest surveys.
    - For all bird species, surveys would cover all potential nesting habitat in and within 300 feet of the area to be disturbed (as landowner access allows). Any disturbance or harm to active nests would be reported within 24 hours to the USFWS. The biological monitor would halt work if it is determined that active nests are being disturbed by construction activities and the appropriate agencies would be consulted.
    - Qualified biologists would relocate or destroy bird nests only after young have fledged and perform any mitigation measures necessary to reduce or eliminate negative effects to birds inhabiting the construction area.
- A qualified biologist will conduct pre-construction surveys within 30 days prior to construction for Western Burrowing Owls within suitable habitat during the breeding season (February 1 through August 31). All areas within 250 feet of the Proposed Project

would be surveyed (if landowner access allows), per USFWS 2007 Burrowing Owl guidance (USFWS 2007).

  - If an active nest is identified, there would be no construction activities within 250 feet of the Burrowing Owl nest location to prevent disturbance until the chicks have fledged or the nest has been abandoned, as determined by a qualified biologist. Buffers may be increased or reduced as needed with the approval of the USFWS.
  - The occurrence and location of any Western Burrowing Owls would be documented by biological monitors in daily reports and submitted to the authorized biologist on a daily basis. The authorized biologist will report all incidents of disturbance or harm to Burrowing Owls within 24 hours to the USFWS.

- Lighting will be designed to provide the minimum illumination needed to achieve O&M objectives and not emit excessive light to the night sky by installing light absorbing shields on top of all light fixtures, and focusing desired light in a downward direction (Reed et al. 1985). This would reduce the visibility of the lights to migratory birds traveling through the area. Downward facing lights would also reduce the number of insects attracted to lights resulting in a decrease of potential concentrated feeding areas for bats. Any additional lighting needed to perform activities such as repairs would be kept to a minimum and only used when these actions are in progress.
- A Worker Environmental Awareness Program (WEAP) will be prepared. All on-site personnel will be required to participate in WEAP training prior to starting work on the Proposed Project. The WEAP training will include a review of the special status species and other sensitive resources that could exist in the Proposed Project, the locations of sensitive biological resources and their legal status and protections, and measures to be implemented for avoidance of these sensitive resources. A record of all trained personnel will be maintained.

  Construction vehicles and equipment will be cleaned of soil and plant material prior to entering and leaving the work site to minimize the introduction and spread of weeds.

- The following measures are intended to mitigate potential impacts to Gila monsters:
  - Field workers and personnel will know how to: (1) identify Gila monsters and be able to distinguish it from other lizards such as chuckwallas and western banded geckos; (2) report any observations of Gila monsters to the NDOW; (3) be aware of the consequences of a Gila monster bite resulting from carelessness or unnecessary harassment; and (4) be aware of protective measures provided under state law and federal management policies.
  - Live Gila monsters found in harm's way on the SPGF site will be captured and then detained in a cool (<85°F), shaded environment (air-conditioned vehicle or trailer is okay) by the project biologist or equivalent personnel until a NDOW biologist can arrive for biological documentation prior to releasing. Although a Gila monster is venomous and can inflict a serious bite, its relatively slow gate allows for it to be easily coaxed or carefully lifted into an open bucket or box

using a long-handled instrument like a snake hook, tongs or shovel (*Note: it is not the intent to request unreasonable action to facilitate captures; additional coordination with NDOW will clarify logistics*). For safe detainment, an unused or sterile 5- gallon plastic bucket with a secure, vented lid; an 18"x18"x4" plastic sweater box with a secure, vented lid; or, a tape-sealed cardboard box of similar dimension may be used for safe containment. Additionally, written information identifying the mapped capture location, GPS coordinates in Universal Transverse Mercator (UTM) using the North American Datum (NAD) 83 Zone 11. Date, time, and circumstances (e.g. biological survey or construction) and habitat description (vegetation, slope, aspect, substrate) will also be provided to NDOW.

- Injuries to Gila monsters may occur during excavation, road grading, or other construction activities. In the event a Gila monster is injured, it should be transferred to a veterinarian proficient in reptile medicine for evaluation and appropriate treatment. Rehabilitation or euthanasia expenses will be covered by the Applicant. NDOW will be immediately notified of any injury to a Gila monster and which veterinarian is providing care for the animal. If an animal is killed or found dead, the carcass will be immediately frozen and transferred to NDOW with a complete written description of the discovery and circumstances, date, time, habitat, and mapped location (GPS coordinates in UTM using NAD 83 Zone 11).
- Should NDOW's assistance be delayed, biological or equivalent acting personnel on site should detain the Gila monster out of harm's way until NDOW personnel can respond. The Gila monster should be detained until NDOW biologists have responded. Should NDOW not be immediately available to respond for photo-documentation, a digital camera will be used to take good quality images of the Gila monster in situ at the location of live encounter or dead salvage. The pictures will be provided to NDOW with specific location information including GPS coordinates, date, time and habitat description. Pictures will show the following information: (1) Encounter location (landscape with Gila monster in clear view; (2) a clear overhead shot of the entire body with a ruler next to it for scale (Gila monster should fill camera's field of view and be in sharp focus); and (3) a clear, overhead close-up of the head (head should fill camera's field of view and in sharp focus.

- A Facility Decommissioning Plan would be developed and provided to the Tribe and BLM addressing the Project facilities under their respective management. This plan would be submitted for approval at least six months prior to commencement of site closure activities.
- Potential closure activities could include re-grading and restoration of original site contours and re-vegetation of areas disturbed by closure activities in accordance with the Site Restoration Plan. Revegetation seed mixes will be composed of native plant species.
- Any and all additional measures identified in the Biological Opinion to mitigate impacts to sensitive species will be implemented as prescribed.

Cultural Resources

The following mitigation measure would be implemented as needed:

- Should any unrecorded and unanticipated cultural resources be discovered during construction, all activities within the immediate area of discovery shall cease. The Chairman of the Moapa Tribal Council and the BIA Regional Archeologist shall be notified immediately and, consulting with BLM and SHPO as appropriate, they will make arrangements to assess the nature of discovered cultural resources and mitigate any effects resulting from the unanticipated discovery.

Transportation

The short-term impacts to traffic during construction would be reduced by implementing the following mitigation:

- A Traffic Management Plan for the construction period would be finalized that identifies BMPs to minimize construction-related traffic impacts. A draft of this plan is available in **Appendix L** of the DEIS.
- Deliveries of materials would be scheduled for off-peak hours, when practical, to reduce effects during periods of peak traffic. Delivery personnel would be provided with an abbreviated WEAP tailored to their limited access to the Project Site.
- Truck traffic would be phased throughout construction, as much as practical.
- Carpooling or mass transportation options for construction workers would be encouraged.
- If required, before construction, the Applicant and agency representatives will document the pre-construction condition of the approximately 3 miles of access route (N Las Vegas Blvd), noting any existing damage, with the Applicant responsible for its fair-share of costs to perform the assessment. After construction, the Applicant shall pay its fair-share of estimated costs to restore the access route to its pre-construction condition, as determined by the agency representatives, and subject to adjustment after actual costs are incurred. “Fair-share” in this context means that portion of repair costs attributable to damage to the road caused by activities conducted by or on behalf of the Applicant, as opposed to damage caused by the activities of other users of the same road.

Public Health & Safety

The potential for exposure to hazards exists during transportation of materials, direct handling of substances, inadvertent release of hazardous material to the soil and groundwater, and general fire and electrical hazards. In addition to the previously discussed SPCC Plan, the Applicant would implement the following measures to reduce significant impact to public health and safety:

- General Design and Construction Standards - The Project would be designed in accordance with all applicable engineering and construction standards and guidelines.
- Health and Safety Program - All employees and contractors would be required to adhere to appropriate health and safety plans and emergency response plans. All contractors

would be required to maintain and carry health and safety materials including the material safety data sheets (MSDSs) of hazardous materials used on site.

- Emergency Response Plan - An Emergency Response Plan would be developed and implemented based on the results of a comprehensive facility hazard analysis.
- Waste Management Plan - A waste management plan would be developed describe the storage, transportation, and handling of wastes and emphasize the recycling of construction wastes where possible.
- The Project would coordinate with the holders of all existing ROWs that would be crossed or paralleled by the Project ROWs (transmission lines, access roads, water pipeline) to minimize encroachment conflicts and possible effects to existing transmission lines and pipelines.

APPENDIX C-1
Additional Agency-Required Mitigation
ARROW CANYON 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 ACSP and would be required to be implemented:

Construction Minimization Measures

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 that could result in take 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 and the Service.
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 (Translocation Plan, Appendix).

6. Desert tortoise clearance surveys and translocation. After installation of tortoise fencing around the perimeter of the solar facility and prior to the commencement of activities described in the construction phases that follow fencing, as listed above, 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.

The Service will approve the Translocation Plan following the 2020 guidance (U.S. Fish and Wildlife Service 2020) prior to the start of construction. 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 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:

- 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.

- Study area translocation: 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).

- Any samples collected during desert tortoise health assessments that are not used for tests would be archived with UCLA. Appropriate fees, assessed as $3,000 as of the date of this biological opinion, would be paid to UCLA by the Applicant.

- 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 translocated tortoises 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 translocation review package/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 follow 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.

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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. Internal Site Access roads. Construction access will be limited to the project area and established access roads to the extent practicable, and vehicle traffic off established internal site access roads will be minimized as much as practicable.

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

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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. Surface Water Protection Plan. The applicant will oversee the establishment and functionality of sediment control devices as outlined in this 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 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 $923/acre (subject to change annually on March 1). Fees are based on the current $923/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.

During the construction period, as part of the installation of the tortoise exclusion fence, the Project will install shade structures at intervals along the outside of the exclusion fencing to minimize the potential for overheating of tortoises.

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

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• 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.

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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 ACSP and would be required to be implemented:

Construction Minimization Measures

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 that could result in take 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 and the Service.
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 (Translocation Plan, Appendix).

6. Desert tortoise clearance surveys and translocation. After installation of tortoise fencing around the perimeter of the solar facility and prior to the commencement of activities described in the construction phases that follow fencing, as listed above, 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.

The Service will approve the Translocation Plan following the 2020 guidance (U.S. Fish and Wildlife Service 2020) prior to the start of construction. 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 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:

- 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.

- Study area translocation: 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).

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- 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 translocated tortoises 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 translocation review package/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 follow the reporting requirements of the biological opinion.

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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 $923/acre (subject to change annually on March 1). Fees are based on the current $923/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.

During the construction period, as part of the installation of the tortoise exclusion fence, the Project will install shade structures at intervals along the outside of the exclusion fencing to minimize the potential for overheating of tortoises.

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

APPENDIX C-1 Additional Agency-Required Mitigation ARROW CANYON SOLAR PROJECT
• 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

Decommissioning Plan

CONCEPTUAL DECOMMISSIONING PLAN

Arrow Canyon Solar Project

July 2020

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Acronyms Used in the Report

ACSP or Project	Arrow Canyon Solar Project
BESS	Battery Energy Storage System
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
NEPA	National Environmental Policy Act
O&M	Operations and Maintenance
MSEC	Moapa Solar Energy Center Project
PV	Photovoltaic
PPA	Power Purchase Agreement
RCRA	Resource Conservation and Recovery Act
Reservation	Moapa River Indian Reservation
SPGF	Solar Power Generation Facility
TSCA	Toxic Substances Control Act

1.0 INTRODUCTION

Arrow Canyon Solar, LLC (Applicant), a wholly owned subsidiary of EDF Renewables Development, Inc. (EDFR) plans to expand the solar field for the previously approved Moapa Solar Energy Center (MSEC) Project located on the Moapa River Indian Reservation in Clark County, Nevada. The expanded project is now referred to as the Arrow Canyon Solar Project (ACSP or Project). The Bureau of Indian Affairs (BIA), as lead agency in cooperation with the Moapa Band of Paiute Indians (Moapa Band), and other agencies, intend to prepare a Supplemental Environmental Impact Statement (SEIS) that will evaluate the expansion of the photovoltaic (PV) solar energy generation project.

The Applicant currently plans to expand the previously approved solar field on the Reservation from 850 acres to up to 2,200 acres. This expansion would occur on tribal lands identified by the Moapa Band adjacent to the originally approved site. The 2,200-acre solar site would be located in all or parts of Sections 28, 29, 30, 31, 32, and 33 in Township 16 South, Range 64 East; and part of Section 7 in Township 17 South, Range 64 East, Mount Diablo Meridian, Nevada (**Figure 1** shows the Project location and **Figure 2** shows the proposed Project facilities).

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 Project. The previously approved MSEC Project's linear features, including a temporary water pipeline, access road, and generation tie (gen-tie) lines will not be discussed in this report and any information on these features can be found in the previous Decommissioning Plan that was prepared and approved for the MSEC FEIS by the BIA and BLM. The actual actions implemented in the facility closure would be determined by 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 its lease with the Tribe (30 years) and the term of its Power Purchase Agreement (PPA) or other energy contracts. It is possible, because much of the needed electrical infrastructure will have been developed, the Solar Power Generation Facility (SPGF) would continue to be upgraded and used to generate solar energy even beyond the term of the initial lease and energy purchase agreements. Therefore, it is possible that the SPGF site would remain 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 road, electrical transmission lines, Operations and Maintenance (O&M) building, and others could be used to support other future uses on this site.

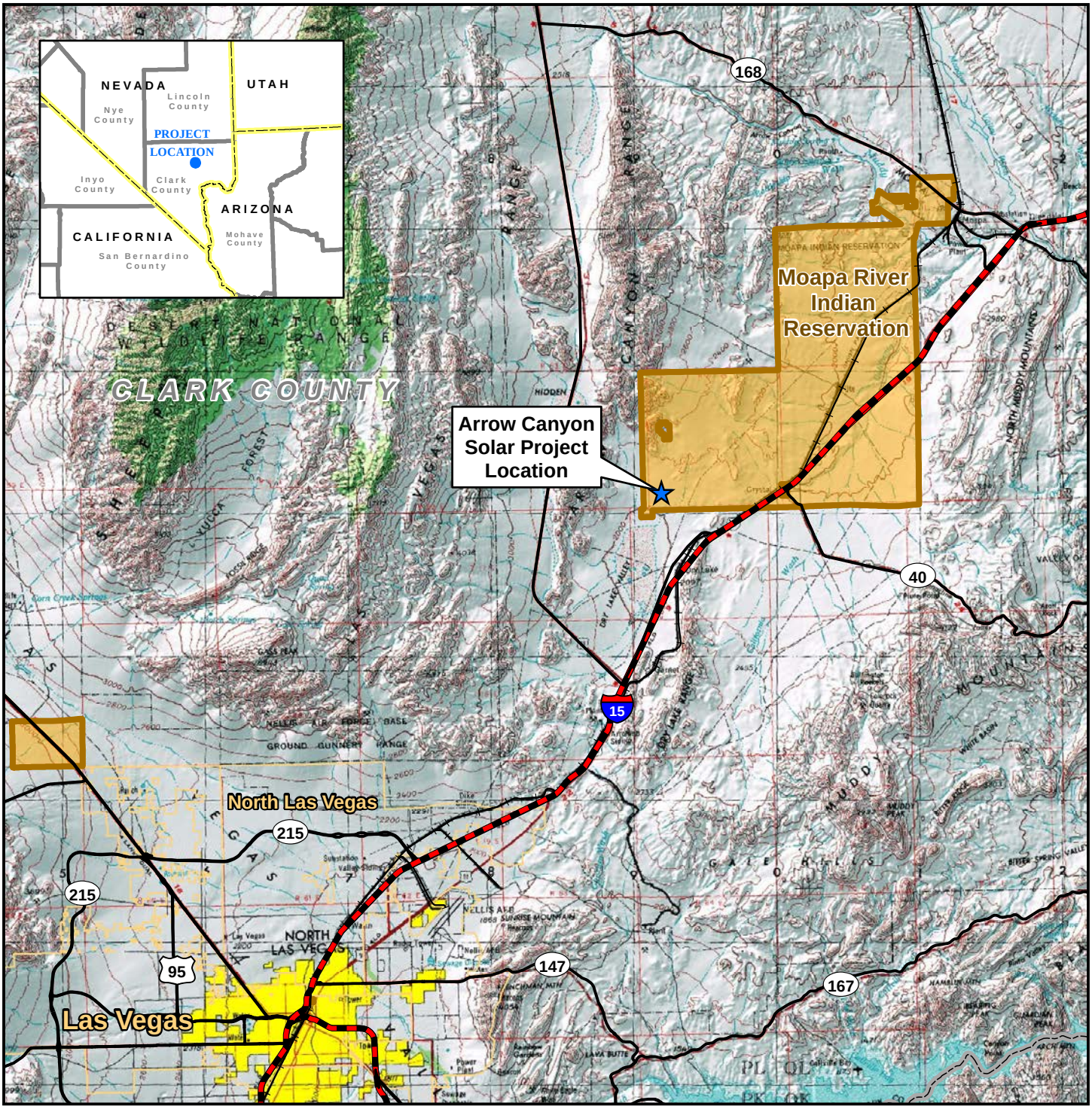
For purposes of developing this plan, it is assumed that if and when the Project is decommissioned, all project structures and electrical equipment would be removed from the ACSP site and associated rights-of way (ROWs) and the disturbed areas would be reclaimed in accordance with the Restoration and Revegetation Plan(s).

1.2 Organization of the 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 earlier, because this document addresses Project actions that would occur well in the future, it will be updated and finalized in the months prior to any scheduled decommissioning to ensure that the final plan addresses the proposed future land use of the site and the applicable rules and regulations in place at that time.



Legend

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

0 2 4 6 8 10

Miles

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

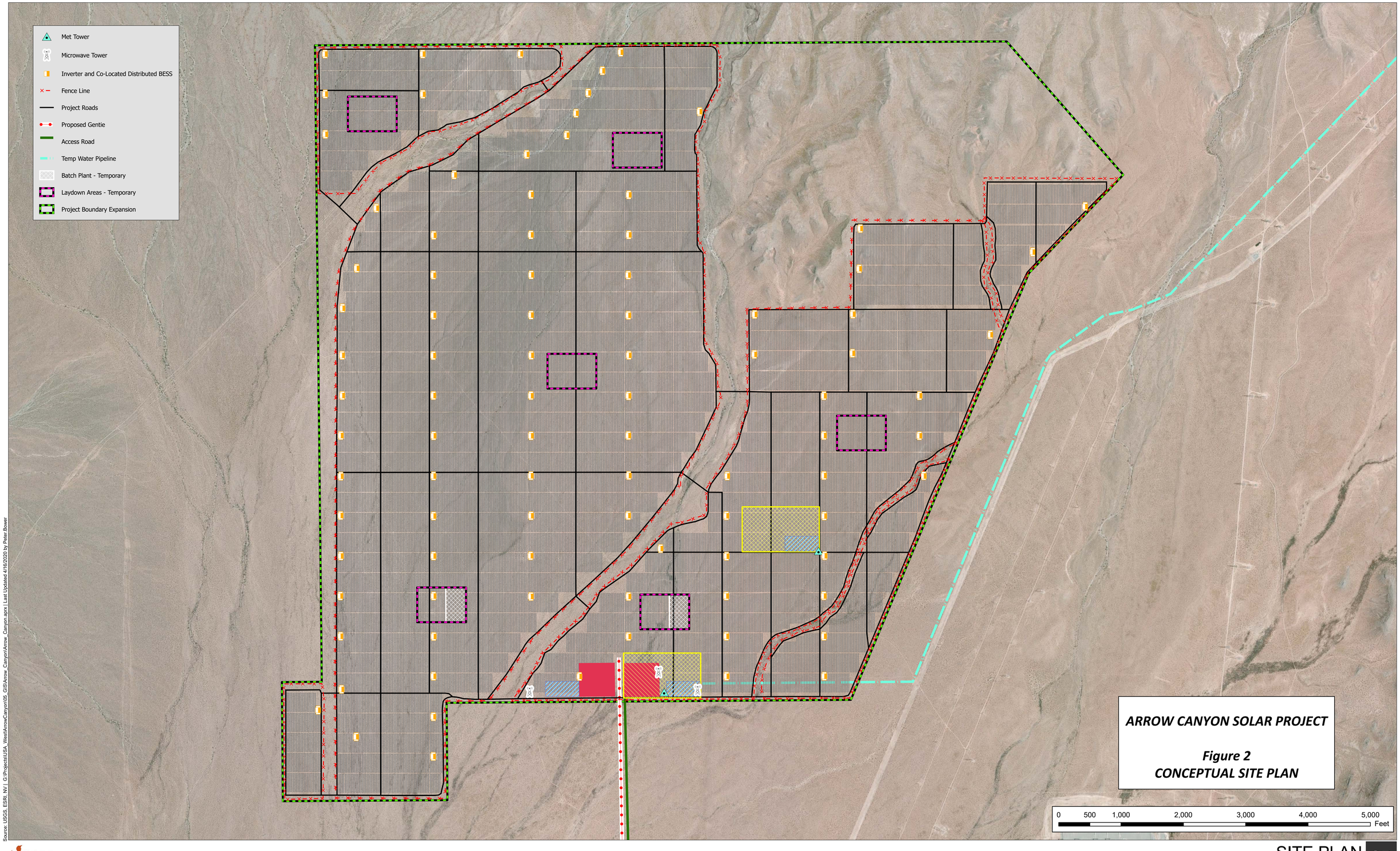
Arrow Canyon Solar Project

FIGURE 1
General Location

Map Extent: Clark County, Nevada

Date: 10-15-19		Author: rnc

G:\Eagle Shadow Mountain Solar Project/MXD's/Project Location 8.5x11 101519.mxd



ARROW CANYON SOLAR PROJECT

Figure 2
CONCEPTUAL SITE PLAN

Source: USGS, ESRI, NV | C:\Projects\USA - West\ArrowCanyon\05_GIS\Arrow_Canyon\Arrow_Canyon.aprx | Last Updated 4/16/2020 by Peter Bower

EDF renewable energy

SITE PLAN SP

Arrow Canyon Solar Project | Clark County, Nevada

2.0 PROJECT DESCRIPTION

This section provides an overview of the proposed ACSP2,200-acre SPGF area. The originally permitted MSEC gen-tie lines, temporary water pipeline, and access road are discussed in the Decommissioning Plan in the FEIS for MSEC and will not be discussed further in this report. Construction is anticipated to begin in 2021 and will occur over approximately 20 months.

2.1 SPGF

The Solar Power Generation Facility (SPGF) would be located wholly on lands within the Reservation. It would utilize photovoltaic (PV) technology and would generate up to 200 Megawatts (MWs) of solar energy (**Figure 2**). It is expected to disturb up to the entire 2,200-acre SPGF site.

The proposed PV project would utilize crystalline silicon, bifacial, or thin-film PV panels that would be mounted on single-axis trackers. Using single-axis trackers, the panels would be oriented in north-south rows with the panels moving to track the sun as it moves across the sky during the day. The output of the PV modules is collected through one or more combiner boxes and directed to an inverter. The inverter converts the DC power to AC power, which flows to a transformer where it is stepped up to distribution level voltage. Multiple transformers are connected in parallel via low voltage collector lines to the Project substation.

The Project site would be fenced and would also include a battery energy storage system (BESS), substation, O&M building and parking.

3.0 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 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 and Revegetation 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 2019a). The Resource Conservation and Recovery Act (RCRA) (42 U.S.C. §6901) gives the EPA the authority to control hazardous waste from its generation till disposal, also including transportation, treatment, and storage (EPA 2019b).

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.

4.0 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 plans to incorporate the sale of some of the facility components via the used equipment market and recycling of components where feasible. Decommissioning will be conducted in accordance with a Final Decommissioning Plan that will be developed in the months prior to decommissioning being initiated.

This decommissioning plan assumes that all equipment and facilities within and associated with the SPGF would be removed.

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, itemizing relevant NEPA and Biological Opinion (BO) requirements, 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 SPGF 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, pipelines, 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 can take a year or more. Therefore, access roads, fencing, electrical power, and raw/sanitary water facilities will remain in place for use by the decommissioning and restoration workers until no longer needed; these components would be the last to be removed prior to site rehabilitation, unless otherwise requested to maintain by the Band.

SPGF Above- and Below-Ground Facilities

Structures to be dismantled during decommissioning include the on-site substation, on-site O&M area, perimeter fence, solar field, BESS, water storage tanks, septic system, underground cabling, transformers and inverters. These structures will be dismantled and moved to designated areas for either recycling, disposal at an approved landfill, or other disposition (e.g., resale).

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 pipelines, electrical lines and conduits, gas lines, concrete slabs.

Roads

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. Following removal, on-site roads will be restored to approximate preconstruction conditions in accordance with the Restoration and Revegetation Plan.

4.3 Debris Management, Disposal, and Recycling

All removed material and demolition debris will be placed in designated locations within the SPGF-site. 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 in 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 pre-decommissioning ESA described in **Section 4.1**. 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

After all removal of existing structures of the SPGF and ancillary facilities, the Project area will be restored to conditions similar to pre-construction. Then, revegetation and reclamation activities required to return the disturbed areas to a as near to a pre-construction state as possible will be conducted in accordance with the plans prepared as part of the Project. These plans include:

- Restoration and Revegetation Plan

- Noxious Weed Management Plan

The objectives of these plans include the following:

- Restore and reduce potential for erosion
- Restore habitat suitable to support desert fauna
- Implement the weed management program that minimizes the need for non-native species eradication.

5.0 PROJECT DECOMMISSIONING COSTS AND BONDING

Prior to the issuance of Project notice to proceed, the Applicant will be required to 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 (access roads and other features as described in the original MSEC Decommissioning Plan). 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.

6.0 REFERENCES

United States Environmental Protection Agency (EPA). 2019a. Summary of the Toxic Substances Control Act. https://www.epa.gov/laws-regulations/summary-toxic-substances-control-act

United States Environmental Protection Agency (EPA). 2019b. Summary of the Resource Conservation and Recovery Act. https://www.epa.gov/laws-regulations/summary-resource-conservation-and-recovery-act

Appendix E

Site Revegetation / Restoration Plan

Restoration and Revegetation Plan

ARROW CANYON SOLAR PROJECT

July 2020

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Appendix A - Plant Species Observed on Proposed Project Site

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TABLE 1-1 – PROCEDURES AND TASK MATRIX 2

Acronyms and Abbreviations

ACSP	Arrow Canyon Solar Project
BESS	Battery Energy Storage System
BIA	Bureau of Indian Affairs
BMP	Best Management Practice
BLM	Bureau of Land Management
EDFR	EDF Renewables Development, Inc.
MSEC	Moapa Solar Energy Center
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
SRRP	Site Restoration and Revegetation Plan
ROW	Right-of-Way
SEIS	Supplemental Environmental Impact Statement
SPGF	Solar Power Generating Facility

1 Introduction

Arrow Canyon Solar, LLC (Applicant), a wholly owned subsidiary of EDF Renewables Development, Inc. (EDFR) plans to expand the solar field for the previously approved Moapa Solar Energy Center (MSEC) Project located on the Moapa River Indian Reservation in Clark County, Nevada. The expanded project is now referred to as the Arrow Canyon Solar Project (ACSP or Project). The Bureau of Indian Affairs (BIA), as lead agency in cooperation with the Moapa Band of Paiute Indians (Moapa Band), and other agencies, intend to prepare a Supplemental Environmental Impact Statement (SEIS) that will evaluate the expansion of the solar photovoltaic (PV) solar energy generation project.

The Applicant currently plans to expand the solar field on the Reservation from 850 acres to 2,200 acres. This expansion would occur on tribal lands identified by the Moapa Band adjacent to the originally approved site. The 2,200-acre solar site would be located in all or parts of Sections 28, 29, 30, 31, 32, and 33 in Township 16 South, Range 64 East; and part of Section 7 in Township 17 South, Range 64 East, Mount Diablo Meridian, Nevada. **Figure 1** shows the proposed general location for the Project.

1.1 Purpose

The purpose of this Site Restoration and Revegetation Plan (SRRP) is to describe the proposed Arrow Canyon Solar Project, update the restoration and revegetation plans developed for the original MSEC Project, and identify the various factors and methods to be applied toward restoring the site following construction.

The goal of this SRRP 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 conditions.

The Supplemental Environmental Impact Statement (SEIS), Appendix C – Applicant Proposed Mitigation and Best Management Practices (BMPs) – Soils / Erosion and Biological Resources, states the following:

- Grading on the solar site would be minimized to only those areas where necessary to meet the construction and operational requirements of the Project. Where no grading occurs, existing vegetation would be mowed to a height of approximately 18 inches and driven over / crushed during construction activities where feasible and where it does not pose a safety risk. Following construction, on-site vegetation will be allowed to return to those areas and will only be mowed to avoid conflicts with solar facility operation and as necessary for safety and fire prevention.
- A Site Restoration and Revegetation Plan would be implemented to limit impacts to native, on-site vegetation as much as practicable. The Plan would define construction limits and

BMP measures for soil restoration and re-planting and establish monitoring and success criteria as applicable; 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 and Revegetation Plan. Revegetation seed mixes will be composed of native plant species.

The objectives of this SRRP include:

- Minimize initial disturbance to habitats within the proposed project area;
- Preserve site-specific materials for use in the restoration/revegetation phase, including top-soil, plants, and seeds, where practicable;
- Use native, agency-approved (BIA) plant species to revegetate disturbed areas;
- Implement revegetation practices in a timely manner, thereby reducing secondary effects including soil erosion and establishment of noxious plant species; and
- Return the project site to conditions similar to those that existed prior to project-initiation by restoring soils, topography, plant species and their densities and distribution.

The following procedure and task matrix (**Table 1-1**) identifies the specific 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.

Table 1-1 Procedures and Task Matrix		
BMP #	**Site Procedure(s)**	**Task Assignment and Schedule**
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 SRRP and will be responsible for implementing aspects of this Plan. 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 areas temporarily disturbed by construction to conditions similar to those that existed prior to Project-initiation, 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 Applicant currently plans to expand the solar field on the Reservation from 850 acres to 2,200 acres. This expansion would occur on tribal lands identified by the Moapa Band adjacent to the originally approved site. The 2,200-acre solar site would be located in all or parts of Sections 28, 29, 30, 31, 32, and 33 in Township 16 South, Range 64 East; and part of Section 7 in Township 17 South, Range 64 East, Mount Diablo Meridian, Nevada (**Figure 1** shows the Project location and **Figure 2** shows the proposed Project 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 ACSP Draft Environmental Impact Statement (EIS) for the Project design details (subject to minor design changes).

The Proposed Project would consist of a 200 megawatt (MW) AC PV solar power generation facility (SPGF), which includes the 850-acre SPGF that was approved by the BIA and the BLM in 2014 and the proposed 1,350 acre expansion SPGF to total 2,200 acres sited within in a lease study area of 2,683 acres. This expansion would be entirely located on the Moapa River Indian Reservation. Major onsite facilities include a 200MW AC solar field comprised of multiple blocks of PV solar panels mounted on single-axis tracking systems, associated inverter and transformer equipment, a battery energy storage system (BESS), a project substation, and O&M facilities.

The Project would include the following onsite key elements located within the up to 2,200-acre solar lease boundary. Onsite facilities would impact only a portion of the 2,200-acre lease area and would include:

- Solar Field
- Battery Energy Storage System (BESS)
- 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
- Meteorological station

Permanent disturbance areas would include piles, inverters/transformers, O&M area, substation, BESS, solar site roads within and between solar arrays, and drainage features. Temporary disturbance areas would include those portions of the solar field that are not graded, mowed to 18 inches and crushed, graded but not permanently occupied, and laydown areas.

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 Nevada ephedra (*Ephedra nevadensis*), Shockley's goldenhead (*Acamptopappus shockleyi*), Anderson's wolfberry (*Lycium andersonii*), range ratany (*Krameria parvifolia*), Mojave yucca (*Yucca schidigera*), California joint fir (*Ephedra funerea*), spiny hopsage (*Grayia spinosa*), and winterfat (*Krascheninnikovia lanata*). Other associated species are desert senna (*Cassia armata*) 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 (*Dasyochloa pulchella*), 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; xeroriparian, Mojave yucca scrub and disturbed habitat types are also present in smaller quantities. Cactus and yucca species observed during the biological surveys were the Mojave yucca (*Yucca schidigera*), beavertail cactus (*Opuntia basilaris*), buckhorn cholla (*Cylindropuntia acanthocarpa*), golden cholla (*Cylindropuntia echinocarpa*), pencil cholla (*Cylindropuntia ramosssissima*), cottontop cactus (*Echinocactus polycephalus*), Engelmann's hedgehog cactus (*Echinocereus engelmannii*), desert barrel cactus (*Ferocactus cylindraceus*), and common fishhook cactus (*Mammillaria tetrancistra*). 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

On March 19, 2020, a list of species that may occur within the Project area was obtained from the USFWS website Information for Planning and Consultation System (IPaC) (USFWS 2020). No

plant species listed as candidate, threatened or endangered species have the potential to occur within the Project area.

5 Restoration Actions

5.1 Construction Tasks

As previously described, the proposed Project occurs on Tribal lands within the Moapa River Indian Reservation. Prior to the initiation of Project construction, the SPGF site would be surveyed and staked. Preconstruction survey work would consist of locating the site and ROW boundaries, the locations of proposed facilities, and the centerlines of linear features.

Vegetation would be permanently cleared from roadways, access ways, and at inverter equipment, substation, BESS locations, 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. Prior to construction, vegetation within the solar arrays would be mowed to a height of 18 inches leaving the roots intact to facilitate regrowth during operations and reduce the invasion of invasive species. Construction equipment would drive over and crush the vegetation during installation of the arrays.

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, temporary roads, and 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, graded areas could be recontoured and soils would be decompacted. The soil surface would then be textured. Seeding with local and weed-free seed mixes recommended by the Band and BIA 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

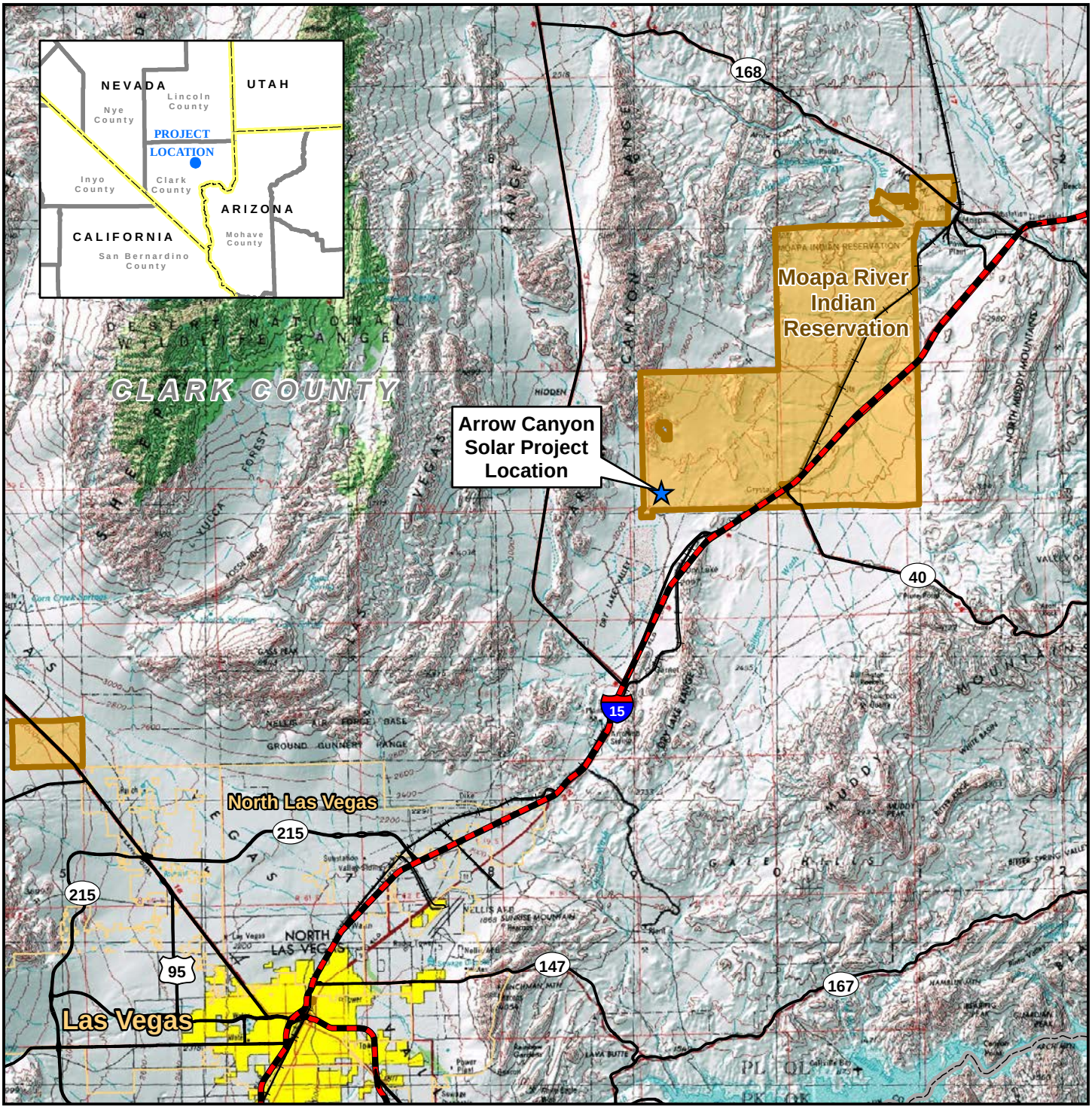
Post-construction restoration activities focus on areas that have been temporarily disturbed and will not experience additional surface disturbing activities (e.g. service roads required during construction, equipment and material laydown areas, etc.). The restoration areas do not include areas where 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. Successful revegetation will decrease the potential for soil erosion, preserving suitable conditions for plant growth, as well as maintaining structural support and foundation for the installed solar modules.

6.2 Post-Decommissioning

Post-decommissioning restoration efforts will focus on all areas within the solar facility. 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 SEIS).



Legend

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

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Miles

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

Arrow Canyon Solar Project

FIGURE 1
General Location

Map Extent: Clark County, Nevada

Date: 10-15-19		Author: rnc

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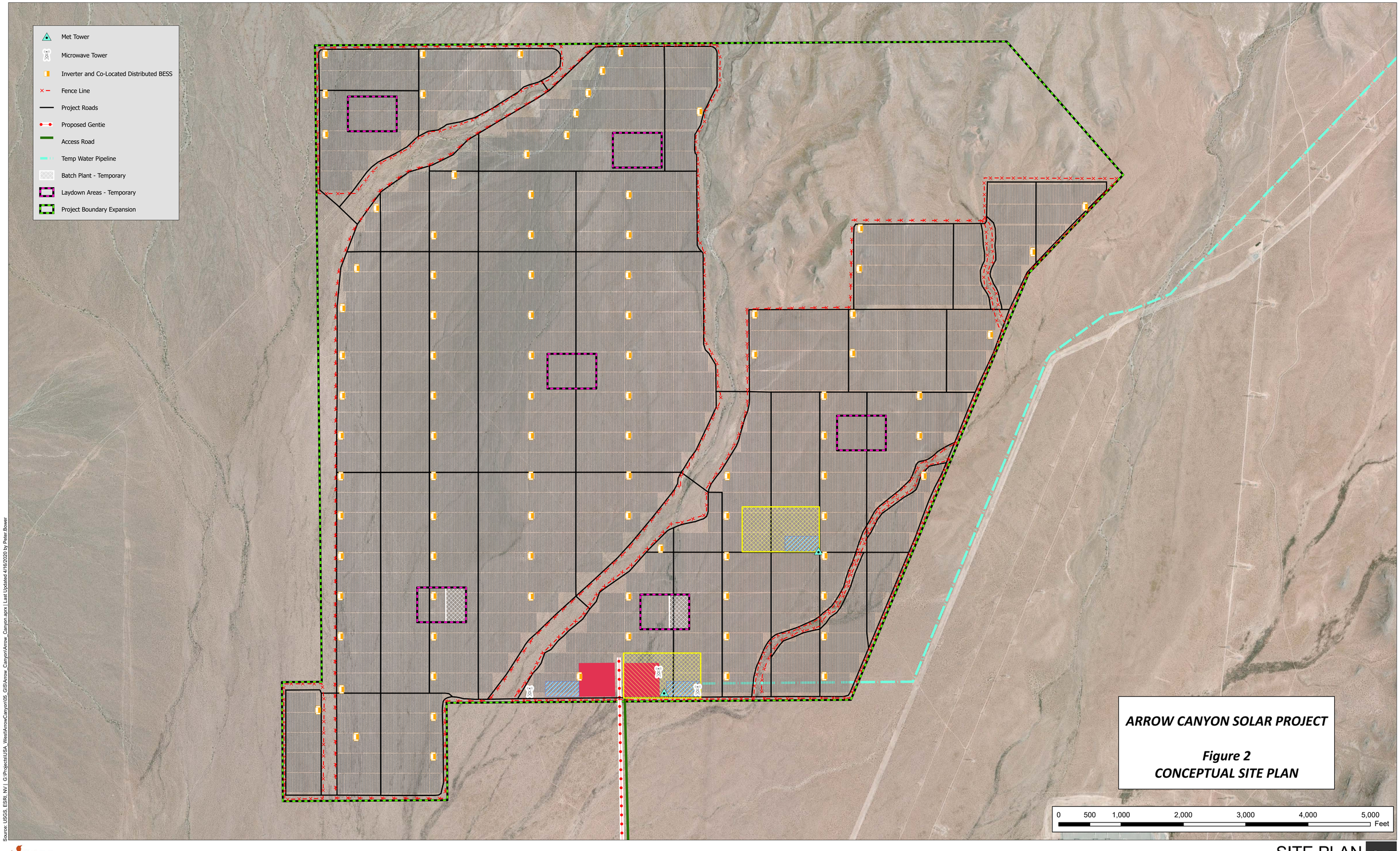

ARROW CANYON SOLAR PROJECT

Figure 2
CONCEPTUAL SITE PLAN

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APPENDIX A

Plant Species Observed on Proposed Project Site

Plant Species Observed in the Project Area	
Common Name	**Scientific Name**
Creosote bush	*Larrea tridentata*
White bursage	*Ambrosia dumosa*
Desert senna	*Senna armata*
Desert trumpet	*Eriogonum inflatum*
Big galleta	*Pleuraphis rigida*
Devil's spineflower	*Chorizanthe rigida*
Desert globemallow	*Sphaeralcea ambigua*
Catclaw acacia	*Senegalia greggii*
Spiny menodora	*Menodora spinescens*
Rough joint fir	*Ephedra nevadensis*
Compact brome	*Bromus madritensis*
Mediterranean grass	*Schismus barbatus*
Three awn	*Aristida purpurea*
Desert marigold	*Baileya multiradiata*
Wingnut cryptantha	*Cryptantha pterocarya*
Cleftleaf phacelia	*Phacelia crenulata*
Red brome	*Bromus tectorum*
Russian thistle	*Salsola tragus*
Gilia	*Gilia sp.*
Buckwheat	*Eriogonum sp.*
Threadleaf snakeweed	*Gutierrezia microcephala*
Cottontop cactus	*Echinocactus polycephalus*
Mojave yucca	*Yucca schidigera*
Golden cholla	*Cylindropuntia echinocarpa*
Common fishhook cactus	*Mammillaria tetrancistra*
Desert barrel cactus	*Ferocactus cylindraceus*
Beavertail cactus	*Opuntia basilaris*
Buckhorn cholla	*Cylindropuntia acanthocarpa*

Plant Species Observed in the Project Area	
Common Name	**Scientific Name**
Pencil cholla	*Cylindropuntia ramosissima*
Grizzlybear prickly pear	*Opuntia polyacantha var. erinacea*
Pincushion flower	*Chaenactis fremontii*
Brownplume wirelettuce	*Stephanomeria pauciflora*
Four o'clock	*Mirabilis sp.*
Desert indianwheat	*Plantago ovata*
Desert needlegrass	*Achnatherum speciosum*
Indian ricegrass	*Achnatherum hymenoides*
Low woollygrass	*Dasyochloa pulchella*
Four-winged salt brush	*Atriplex canescens*
Cheesebush	*Hymenoclea salsola*
Broom snakeweed	*Gutierrezia sarothrae*
Mormon tea	*Ephedra nevadensis*
*Heritage 2013, BIA 2014	

Appendix F

Weed Management Plan

Weed Management Plan

Arrow Canyon Solar Project

July 2020

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1.0 INTRODUCTION

Arrow Canyon Solar, LLC (Applicant), a wholly-owned subsidiary of EDF Renewables Development, Inc. (EDFR) plans to expand the solar field for the previously approved Moapa Solar Energy Center (MSEC) Project located on the Moapa River Indian Reservation in Clark County, Nevada. The expanded Project is now referred to as the Arrow Canyon Solar Project (ACSP or Project). The Bureau of Indian Affairs (BIA), as lead agency in cooperation with the Moapa Band of Paiute Indians (Moapa Band), and other agencies, intend to prepare a Supplemental Environmental Impact Statement (SEIS) that will evaluate the expansion of the photovoltaic (PV) solar energy generation Project.

The Applicant currently plans to expand the previously approved solar field on the Reservation from 850 acres to 2,200 acres. This expansion would occur on tribal lands identified by the Moapa Band adjacent to the originally approved site.

Invasive, non-native plants, often referred to as "weeds," are considered undesirable and warrant effective management and control for a variety of reasons including competition with native and agricultural plant species, impacts to habitat function and capability, degradation of the aesthetic qualities and values of viewsheds and landscapes, and more. In the Nevada Revised Statutes (NRS 555.005) a noxious plant is defined as "any species of plant which, is, or is likely to be, detrimental or destructive and difficult to control or eradicate." As human presence and activity increases, the potential for spreading and establishing noxious and invasive plants increases.

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.

Appendix A of this report includes a list of the state-listed noxious and invasive plant species that are relevant to the proposed ACSP in Clark County, Nevada and the focus of this Weed Management Plan (WMP).

1.1 Purpose and Goals of this Plan

The purpose and goal of this plan is to describe methods to prevent, mitigate, and control the spread and establishment of weeds during the implementation of the Project. The Project proponent and its approved contractors would be responsible for implementing this plan working with relevant agencies to control weeds in the Project area, 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 WMP is applicable to the construction, operations, and decommissioning of the proposed Project.

1.2 Project Description

1.2.1 Project Area

The proposed Project would be located approximately 30 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1**). The main Project site, including the Solar Power Generating Facility (SPGF), would be located on up to 2,200 leased acres within the Reservation in Mount Diablo Meridian, Township 16 South, Range 64 East, Sections 28, 29, 30, 31, 32, and 33 and part of Section 7 in Township 17 South, Range 64 East, Mount Diablo Base Meridian. **Figure 2** shows the location of the Proposed Project and associated facilities. The previously approved MSEC Project's linear features, including a temporary water pipeline, access road, and generation tie (gen-tie) lines will not be discussed in this report since a previous WMP was prepared and approved for the MSEC FEIS by the BIA. Additional information on these features can be found in that document.

The proposed Project would occur in the Basin and Range physiographic province in a part of the Mojave Desert. This physiographic province is characterized by the hundreds of long, narrow, and nearly parallel mountain ranges that are separated by deep valleys. These features are visible at the proposed Project site, with nearly parallel mountain ranges situated generally in a north-south direction that are located to the north, west, and southeast of the Project, while a majority of the Project site occurs in a sloping valley. The northeast portion of the site exhibits many gentle hills with sloping valleys between. The proposed Project site occurs in the Mojave Desert Scrub biome and is dominated by plants common to this biome including creosote bush (*Larrea tridentata*), and white bursage (*Ambrosia dumosa*).

1.2.2 Proposed Project

The following describes the major features of the proposed Project. For a comprehensive description of the proposed Project, refer to the associated ACSP Draft Environmental Impact Statement (EIS) for the Project design details (subject to minor design changes).

The Proposed Project would consist of a 200 megawatt (MW) AC PV solar power generation facility (SPGF), which includes the 850-acre SPGF that was approved by the BIA and the BLM in 2014 and the proposed 1,350 acre expansion SPGF to total 2,200 acres sited within in a lease study area of 2,683 acres. This expansion would be entirely located on the Moapa River Indian Reservation. Major onsite facilities include a 200MW AC solar field comprised of multiple blocks of PV solar panels mounted on single-axis tracking systems, associated inverter and transformer equipment, a battery energy storage system (BESS), a project substation, and O&M facilities.

The Project would include the following onsite key elements located within the up to 2,200-acre solar lease boundary. Onsite facilities would impact only a portion of the 2,200-acre lease area and would include:

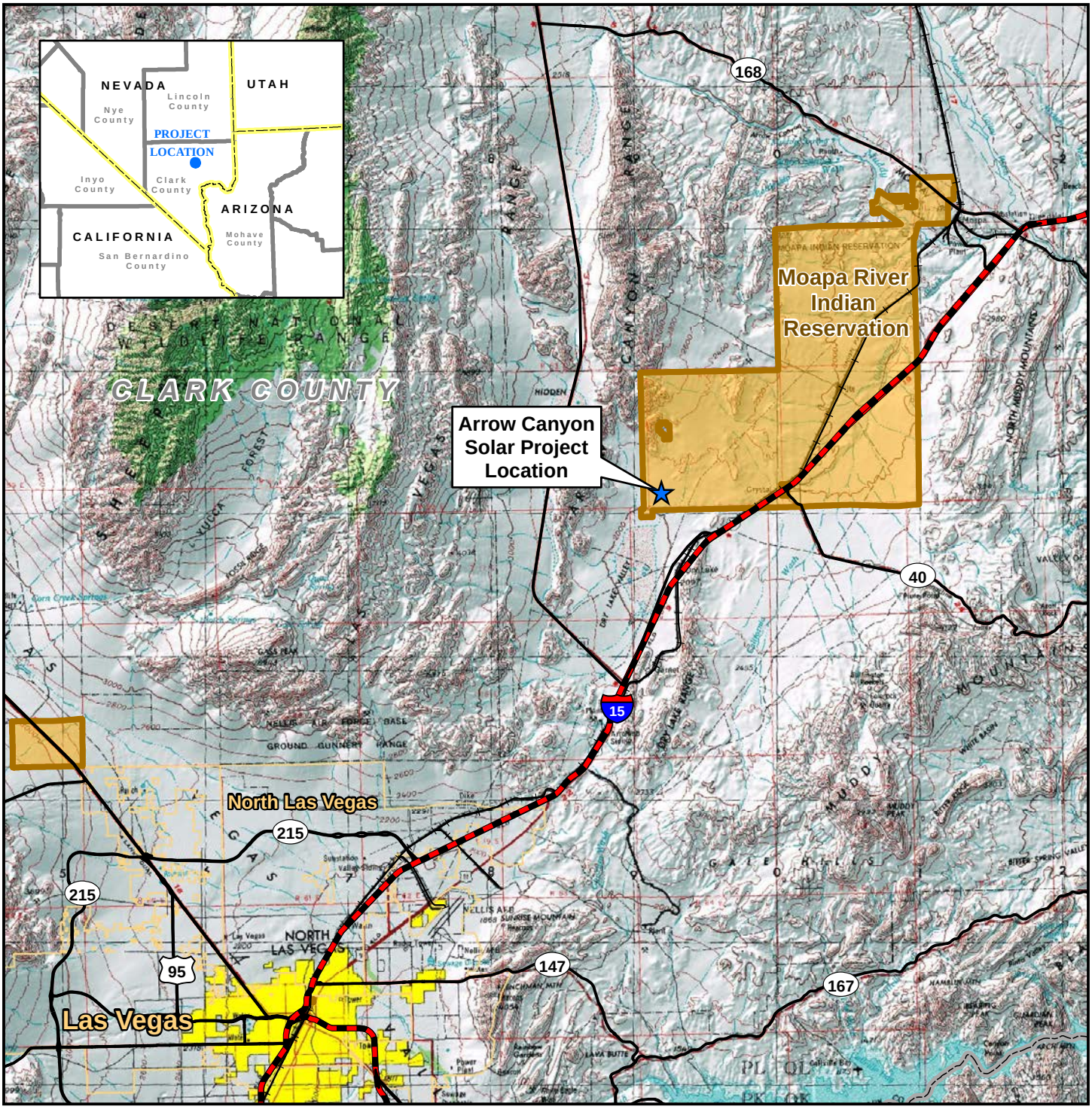
- Solar Field
- Internal Project Roads

- Battery Energy Storage System (BESS)
- Onsite Electrical Collection System and Substation
- Site Security and Fencing
- Communication Systems Infrastructure
- Operations and Maintenance Area
- Lighting
- Water Supply
- Wastewater Treatment
- Waste and Hazardous Materials Management
- Fire Protection
- Meteorological station

Permanent disturbance areas would include piles, inverters/transformers, O&M area, substation, BESS, solar site roads within and between solar arrays and drainage features. Temporary disturbance areas would include those portions of the solar field that are mowed to 18 inches and drive and crushed; not graded and laydown areas.

Fire Prevention

The Project's fire protection water system would be supplied from up to three (3) above-ground raw water storage tanks located on the plant site holding up to 12,000 gallons each. In addition, each BESS container would have its own fire detection system.



Legend

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FIGURE 1
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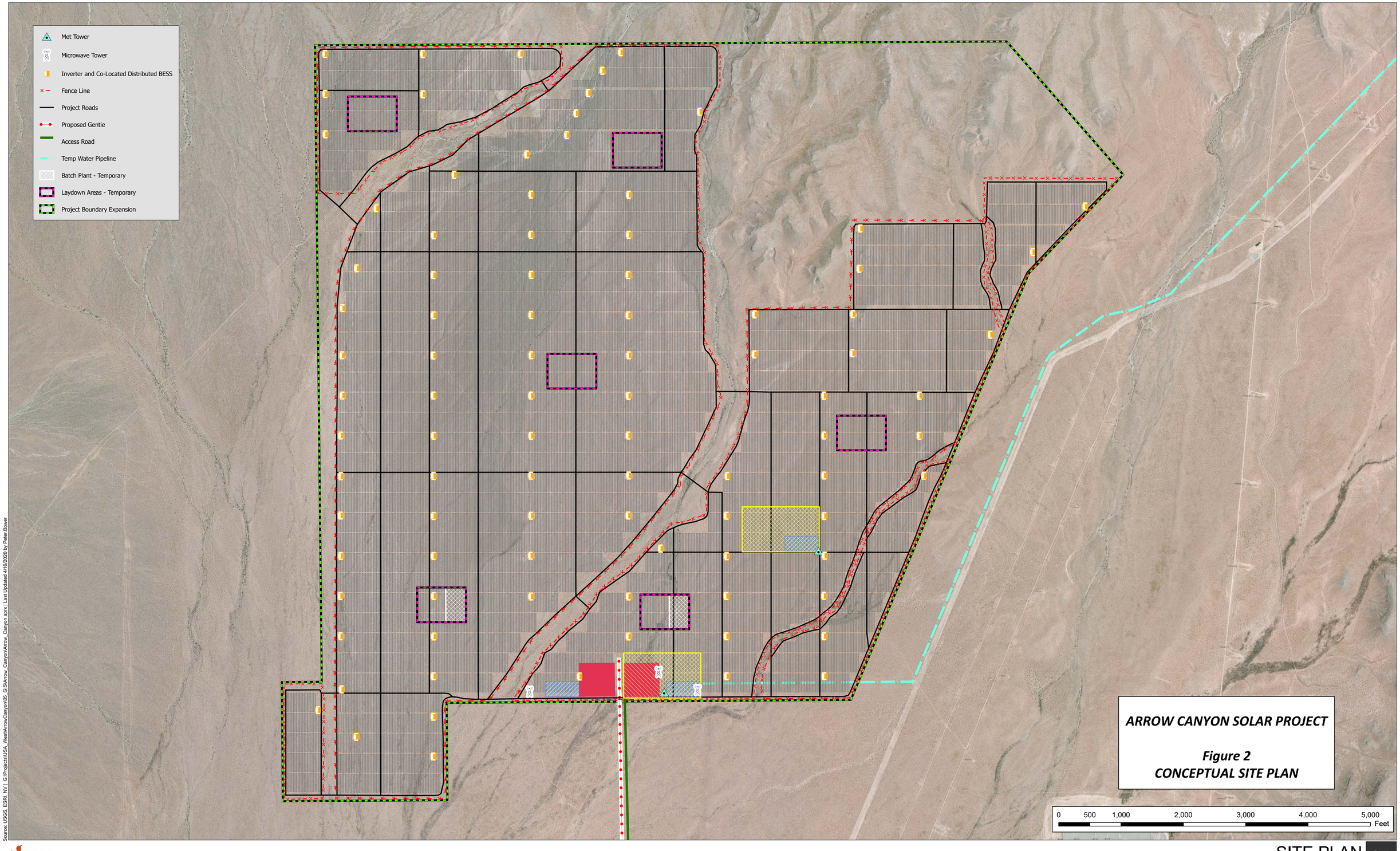

ARROW CANYON SOLAR PROJECT

Figure 2
CONCEPTUAL SITE PLAN

Source: USGS, ESRI, NV | C:\Projects\USA - West\ArrowCanyon\05_GIS\Arrow_Canyon\Arrow_Canyon.aprx | Last Updated 4/16/2020 by Peter Bower

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Arrow Canyon Solar Project | Clark County, Nevada

2.0 WEED SURVEYS

A weed survey of the Project site will be conducted prior to conducting surface disturbing activities. This survey will be focused on identifying and mapping occurrences of noxious weed species described in the Nevada Revised Statues (NRS Chapter 555.010, Appendix A). Occurrences of cheatgrass (*Bromus tectorum*), red brome (*Bromus rubens*), halogeton (*Halogeton glomeratus*), Russian thistle (*Salsola kali*), ravennagrass (*Saccharum ravennae*), ripgut brome (*Bromus diandrus*), and Mediterranean grass (*Schismus spp.)* will also be identified and described, although these species are not listed as noxious weeds by the State of Nevada. 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 indicating to construction personnel that such areas are to be avoided until appropriately treated.

3.0 WEED MANAGEMENT

Weed management at the proposed ACSP 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.

3.1 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 and equipment to be used on site will be washed with water or high-pressure air to remove residual soils or plant materials prior to gaining entry and before leaving the site (if not trucked off site). Vehicle washing efforts will concentrate on areas that are most likely to be in contact with the ground and or likely to transport weed seeds including vehicle tracks, feet, tires; vehicle under carriage, steps, running boards, bumpers, and brush guards. Washing will occur off site at existing car washes with appropriate containment facilities. Each piece of equipment will have a vehicle wash log stating the location, date and time, type of equipment used, and methods used to wash the vehicle. These logs will be verified by the environmental site monitor before vehicles enter the site.
- Vehicle cabs will be subject to cleaning in an effort to remove refuse, soil, or other materials susceptible to transporting weed seeds or other plant structures. The use of compressed air is recommended for cleaning vehicle cabs immediately prior to arriving at and departing from the site.
- All materials used during site reclamation, revegetation, and installation of stormwater/erosion control measures will be certified as weed free.
- Vehicle travel in the proposed Project area will be restricted to designated roads and established overland travel routes.

3.2 Treatment Methods

Treatment methods are necessary to control and eradicate known weed occurrences. Treatment methods include a variety of approaches such as mechanical, chemical, and biological controls. The most appropriate and effective weed treatment measures will be determined following the assessment of existing weed populations on the proposed Project site. The Project site occurs within suitable and occupied desert tortoise habitat. Treatment methods on Tribal lands will utilize the BLM's *Chemical Pest Control Manual* as a guideline for weed control.

Mechanical treatments include the use of physical means to remove plants, reproductive parts, or propagules. These treatments may entail manual methods (pulling weed 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. 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 possible use of herbicides as a treatment method is described in additional detail in Section 5 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 and other factors, biological controls are not expected to be a viable or appropriate alternative for treating weed occurrences at the proposed site.

3.3 Agency Specific Requirements

3.3.1 Nevada Revised Statute (NRS): The Nevada Control of Insects, Pests, and Noxious Weed Act

The following section applies to federal 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.”*

4.0 WEED MONITORING

Monitoring is the repeated collection and assessment of information with the purpose of evaluating attainment of a resource management object. If management objectives are not being met, weed control measures should be scrutinized and modified to improve their effectiveness. Effective monitoring will increase the likelihood of timely detection and control of weed occurrences on the Project site.

Weed monitoring will be conducted by qualified biologists and appropriately trained personnel. All portions of the Project area that are proposed for surface disturbance will be monitored for weeds before construction begins and weed infestations will be mapped. Monitoring will occur when weed species are most likely to be detected and can be easily identified. New or previously unidentified weed infestations identified during monitoring will be described, their locations recorded using a hand-held GPS unit, and reported to the BIA.

4.1 Ongoing Monitoring

Weed monitoring will occur on an ongoing basis during implementation of the proposed Project. Qualified and 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.

4.2 Post Construction

Weed monitoring will begin immediately following each completed activity that includes surface disturbance. Weed monitoring will occur at all disturbed sites at least twice a year (March and September) for an estimated three years or until restoration efforts are deemed complete by the Tribe and BIA. The goal of weed monitoring is to ensure no net increase in weed species or overall weed cover compared to the baseline conditions that will be mapped before construction begins. 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 submitted to the BIA following monitoring on an annual basis for three years. 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 and could include extended weed control and monitoring past three years.

4.3 Monitoring of Known Infestation Areas

As previously mentioned, known occurrences of weed infestations will be evaluated on a regular basis. Evaluations will determine if noteworthy changes have occurred at each infestation, particularly if the number or area covered by an infestation has changed dramatically. At a minimum, annual monitoring is recommended for each known infestation. A brief summary will be prepared for each annual monitoring effort and will include sufficient detail to allow for an evaluation of the effectiveness of the weed management program, including weed infestation identification, weed monitoring, and weed control.

5.0 HERBICIDE APPLICATION, HANDLING, SPILLS, AND CLEANUP

5.1 Herbicide Application

Weed management contractors/personnel that are 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. In general, guidelines BLM's Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007). Permits may include terms and conditions that are not included in this WMP. 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. If faced with any of the following scenarios, herbicide application shall be suspended until such conditions no longer exist:

- Wind velocities in excess of 6 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.

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 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:

- No herbicides will be stored onsite.
- 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 that prevents 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 conducted at an offsite location or within a controlled space in the Operations and Management Area that is designated onsite. 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 of in accordance with instructions provided on the label.

5.2 Herbicide Spills and Cleanup

All spills and inadvertent releases of herbicides will be addressed immediately upon detection. Spill response kits approved for the correct spill size will be readily available in herbicide contractor vehicles and in daily onsite 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:

- Notify appropriate onsite personnel and agencies of a spill.
- Secure the affected area by barring pedestrian and vehicle traffic.
- All spill response personnel shall don 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.

5.3 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 material safety data sheets (MSDSs) and labels onsite. All herbicide spills and inadvertent releases shall be reported in accordance with all applicable laws and regulations.

6.0 REFERENCES

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&currentPageId=103592.

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Appendix A –Nevada Designated Noxious Weed Species

Table A-1: Designated Noxious Weed Species of the State of Nevada

Common Name	Scientific *Name*	State of Nevada Category
African rue	*Peganum harmala*	A
Austrian fieldcress	*Rorippa austriaca*	A
Black henbane	*Hyoscyamus niger*	A
Camelthorn	*Alhagi psedualhagi*	A
Common crupina	*Crupina vulgaris*	A
Common St. Johnswort	*Hypericum perforatum*	A
Crimson fountaingrass	*Pennisetum setaceum*	A
Dalmation toadflax	*Linaria dalmatica*	A
Dyer's woad	*Isatis tinctoria*	A
Eurasian water-milfoil	*Myriophyllum spicatum*	A
Giant reed	*Arundo donax*	A
Giant salvinia	*Salvinia molesta*	A
Goatsrue	*Galega officinalis*	A
Houndstongue	*Cynoglossum officinale*	A
Hydrilla	*Hydrilla verticillata*	A
Iberian starthistle	*Centaurea iberica*	A
Malta starthistle	*Centaurea melitensis*	A
Mayweed chamomile	*Anthemis cotula*	A
Mediterranean sage	*Salvia aethiopis*	A
Purple loosestrife	*Lythrum salicaria, L. virgatum*	A
Purple starthistle	*Centaurea calcitrapa*	A
Rush skeletonweed	*Chondrilla juncea*	A
Sow thistle	*Sonchus arvensis*	A
Spotted knapweed	*Centaurea masculosa*	A
Squarrose knapweed	*Centaurea virgate var. squarrosa*	A
Sulfur cinquefoil	*Potentilla recta*	A
Swainsonpea	*Sphaerophysa salsula*	A
Syrian bean caper	*Zygophyllum fabago*	A
Yellow starthistle	*Centaurea solstiltialis*	A
Yellow toadflax	*Linaria vulgaris*	A
Horsenettle	*Solanum carolinense*	B
Diffuse knapweed	*Centaurea diffusa*	B
Leafy spurge	*Euphorbia esula*	B
Medusahead	*Taeniatherum caput-medusae*	B
Musk thistle	*Carduus nutans*	B
Russian knapweed	*Acroptilon repens*	B
African mustard	*Brassica tournefortii*	B
Scotch thistle	*Onopordum acanthium*	B
Silverleaf nightshade	*Solanum elaegnifolium*	B
Canada thistle	*Cirsium arvense*	C
Hoary cress	*Cardaria draba*	C

Common Name	Scientific *Name*	State of Nevada Category
Johnson grass	*Sorghum halepense*	C
Perennial pepperweed	*Lepidium latifolium*	C
Poison-hemlock	*Conium maculatum*	C
Puncture vine	*Tribulus terrestris*	C
Salt cedar (tamarisk)	*Tamarix spp.*	C
Spotted water hemlock	*Cicuta maculate*	C

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 Office.

Appendix G

Biological Assessment

Biological Assessment
Arrow Canyon Solar Project

Prepared for:

Bureau of Indian Affairs Western Regional Office
2600 N. Central Avenue
Phoenix, AZ 85004-3050

October 2020

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1 INTRODUCTION

The purpose of this Biological Assessment (BA) is to review the Arrow Canyon Solar Project (ACSP 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).

Arrow Canyon Solar, LLC (Applicant), a subsidiary of EDF Renewables Development, Inc. (EDFR), has entered into an agreement with the Moapa Band of Paiute Indians (Band) to expand the solar field lease area for the previously approved Moapa Solar Energy Center (MSEC) Project located on the Moapa River Indian Reservation (Reservation) in Clark County, Nevada. The solar field ground lease would be expanded from the previously approved 850 acres to up to 2,200 acres for constructing, operating and maintaining, and decommissioning a 200-megawatt (MW) solar energy generating facility using photovoltaic (PV) technology. The expanded solar project and associated facilities are now referred to as the Arrow Canyon Solar Project.

The proposed ACSP solar generating facility would be constructed entirely within the Reservation on a "lease study area" of approximately 2,683 acres of tribal trust land (**Figure 1-1**). These lands are all located within the Reservation in an area set aside by the Band exclusively for the ACSP solar project.

1.1 Project Background

The original MSEC Project, was analyzed under the National Environmental Policy Act (NEPA) via a Final Environmental Impact Statement (EIS) which was published in February 2014 by the Bureau of Indian Affairs (BIA) as lead agency and the Bureau of Land Management (BLM), the Moapa Band, and others as cooperating agencies (BIA 2014). A Record of Decision (ROD) was executed by the BIA in May 2014 that approved the lease for an 850-acre solar site located on the Reservation. A ROD was executed by BLM in May 2014 approving the linear facilities associated with the Project that crossed BLM-administered lands including: 1) the Project's main access road from North Las Vegas Boulevard crossing approximately 2.5 miles of federal lands to the Project boundary on the Reservation; 2) a 230-kV generation-tie (gen-tie) line crossing approximately 7.1 miles of federal land from the Project site to the NV Energy-owned Harry Allen Substation; and 3) a water pipeline between an existing water well located on the Reservation and the Project Site located on the Reservation but within a designated utility corridor managed by the BLM. The solar ground lease was approved by BIA in June 2014 and a ROW was issued by the BLM for the linear facilities in August 2015 (ROW N-88870).

The previously approved linear ancillary facilities, (i.e. main access road, 230kV gen-tie line, and water pipeline) would remain a part of the ACSP project description. They would be unchanged and would be developed as analyzed in the previous EIS and as described in the ROD and ROW issued by the BLM. These features have been assessed and approved in the 2013 BA for the Moapa Solar Energy Center (MSEC) (Heritage 2013). This BA is a reinitiation request; even though the original 850-acre solar project was analyzed in the 2013 BA, the entire solar project, excluding the linear features, have been redesigned. The original 850 acres plus the proposed expansion area were surveyed for

Mojave desert tortoise in 2019; therefore, this BA analyzes the entire "Lease Study Area" (approximately 2,683 acres). The already approved linear (ROWs) will not be analyzed in this BA.

1.2 Project Location

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 Project would be located on the Reservation in Township 16 South, Range 64 East, Sections 28, 29, 30, 31, 32, and 33; and part of section 7 in Township 17 South, Range 64 East, Mount Diablo Base Meridian.

1.3 Project Overview

The expanded solar power generating facility (SPGF) would be located wholly on lands within the Reservation. It would be developed using PV solar technology to generate up to 200 MWs of solar energy and would include a Battery Energy Storage System (BESS). The SPGF would disturb up to 2,200 acres within a larger 2,683-acre lease study area. Onsite facilities would include:

- Solar field, including internal access roads
- BESS
- Onsite substation
- Operation and maintenance (O&M) facilities
- Electric distribution and communication lines
- Temporary construction facilities including staging areas.

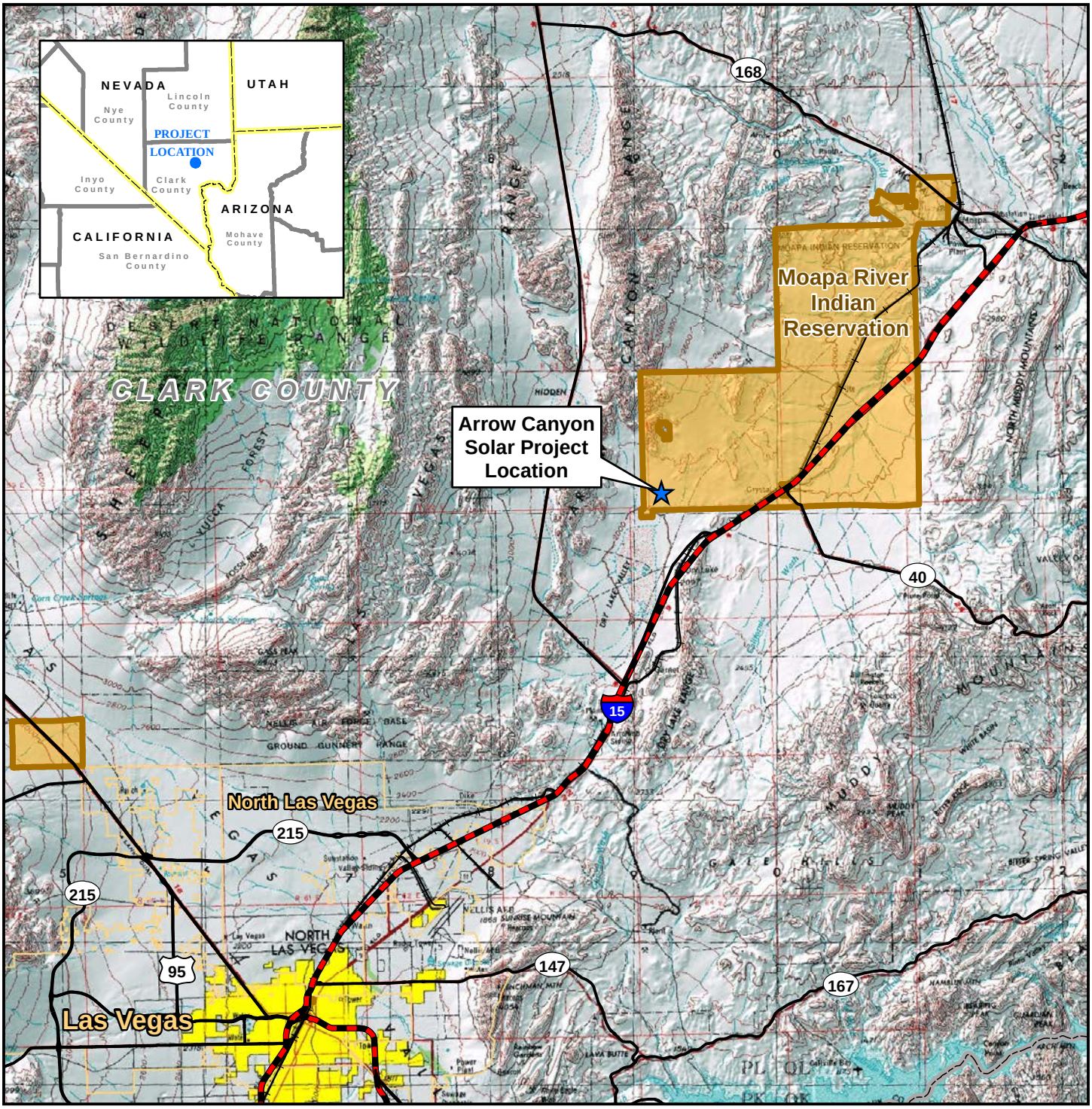
A complete Project description is presented in Section 2 of this BA.

1.4 Consultation History

The Biological Opinion (BO) for the MSEC Project was signed on January 21, 2014 (File No 84320-2013-F-0301). On March 19, 2020, a list of species that may occur within the Project area was obtained from the USFWS website Information for Planning and Consultation System (IPaC)(Consultation code 08ENVS00-2020-SLI-0087)(**Appendix A**)(USFWS 2020). **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 December 11, 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 Glen Knowles (USFWS), Carla Wise (USFWS), Roy Averill-Murray (USFWS), Chip Lewis (BIA), Patrick Golden (Heritage Environmental Consultants), Randy Schroeder (ENValue), Devon Muto (EDFR), Katie Kuplevich (EDFR), Nate Holderbein (EDFR), Levi Cox (EDFR – via phone), Patricia McCabe (Logan Simpson), Lauren Esposito (Logan Simpson) and Andrew Bell (ACB – via phone). A site visit was also conducted on February 25, 2020. Attendees included Glen Knowles (USFWS), Carla Wise (USFWS), Jessica Zehr (USFWS), Chip Lewis (BIA), Tamara Dawes (BIA), Christina Varela (BIA), Garry Cantley (BIA), Mary Barger (BIA), Patrick Golden (Heritage), Randy Schroeder (ENValue), Devon Muto (EDFR), Katie Kuplevich

(EDFR), Nate Holderbein (EDFR), Patricia McCabe (Logan Simpson) and Lauren Esposito (Logan Simpson).



Legend

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

0 2 4 6 8 10

Miles

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

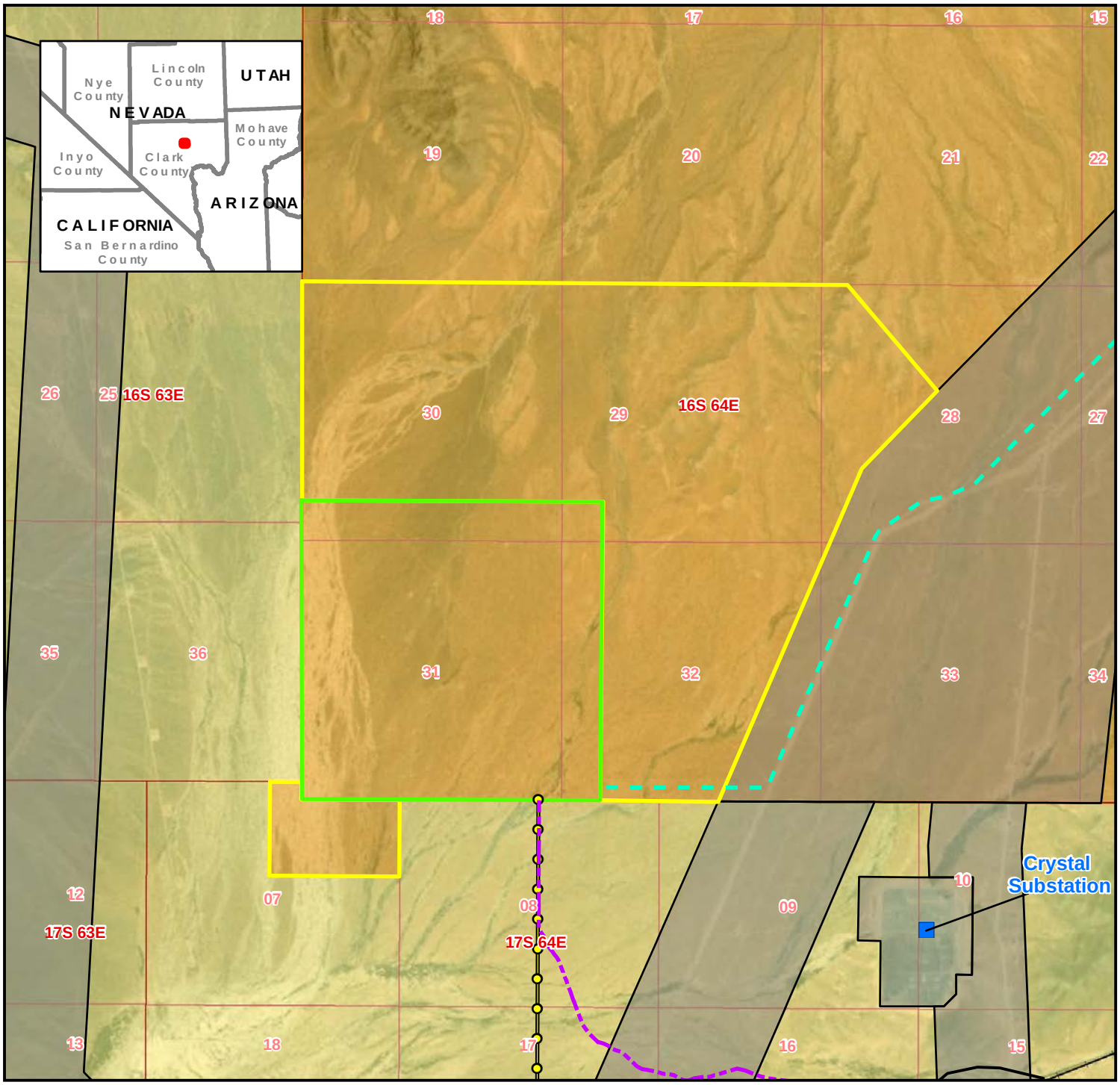
Arrow Canyon Solar Project

FIGURE 1-1
General Location

Map Extent: Clark County, Nevada

Date: 10-15-19		Author: rnc

G:\Eagle Shadow Mountain Solar Project/MXD's/Project Location 8.5x11 101519.mxd



Project Components

- Gen-Tie - Approved
- Access Road - Approved
- Water Pipeline - Approved
- Arrow Canyon Expansion Area
- Original MSEC Boundary - Approved

General Features

- Existing Substation
- Interstate
- Major Highway
- Railroad
- Stream or River
- Designated Utility Corridor
- Municipal Boundary
- Township / Range
- Section Line

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Land

0 0.25 0.5

Miles

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

ARROW CANYON SOLAR PROJECT

Figure 1-2
Project Acreages

Map Extent: Clark County, Nevada

Date: 02-17-20 | Author: rnc

Table 1-1 LISTED SPECIES CONSIDERED			
Species	**Status**	**Critical Habitat/Location**	**Recommended Determination of Effects**
Birds			
Yellow-billed cuckoo (*Coccyzus americanus*) Population: Western U.S. Distinct Population Unit	Threatened	No USFWS Designated Critical Habitat	*May affect, not likely to adversely affect* *No effect to proposed critical habitat*
Yuma clapper (Ridgway's) rail (*Rallus longirostris yumanensis*) Population: U.S. only	Endangered	No USFWS Designated Critical Habitat	*May affect, not likely to adversely affect*
Southwestern willow flycatcher (*Empidonax trailii extimus*)	Endangered	USFWS Designated Critical Habitat approximately 20 miles east of the Project area	*May affect, not likely to adversely affect* *No effect to designated critical habitat*
Reptiles			
Mojave desert tortoise (*Gopherus agassizii*)	Threatened	USFWS designated Critical Habitat approximately 10 miles west of the Project area	*May affect, likely to adversely affect* *No effect to designated critical habitat*
Fish*			
Moapa dace (*Moapa coriacea*)	Endangered	No USFWS Designated Critical Habitat	*May affect, likely to adversely affect*

* Moapa dace was not included in the USFWS official species letter but is addressed in this BA due to the anticipated groundwater withdrawals for construction and operation of the Project.

2 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 Proposed Project would consist of a PV solar power generation facility (SPGF), which includes the 850-acre SPGF that was approved by the BIA and the BLM in 2014 and the proposed 1,350 acre expansion SPGF to total of up to 2,200 acres sited within in a lease study area of 2,683 acres. This expansion would be entirely located on the Moapa River Indian Reservation. Major onsite facilities include a 200MW AC solar field comprised of multiple blocks of PV solar panels mounted on single-axis tracking systems, associated inverter and transformer equipment, a battery energy storage system (BESS), a project substation, and O&M facilities.

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 up to 2,200 acres.

- Solar Field
- Battery Energy Storage System
- Onsite Electrical Collection System and Substation
- Site Security and Fencing
- Communication Systems Infrastructure
- Operations and Maintenance Area
- Erosion Control and Stormwater Drainage
- Internal Project Roads, including roads between and within solar arrays
- Lighting
- Water Supply
- Wastewater Treatment
- Waste and Hazardous Materials Management
- Fire Protection

The total acreage of temporary and permanent disturbance associated with the ACSP facilities is summarized in **Table 2-1**. Temporary facilities that would be removed at the end of construction include laydown and construction areas and water storage tanks.

Table 2-1 TEMPORARY AND PERMANENT DISTURBANCE		
Project Component	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Solar Field and Ancillary Facilities		
Piles	0	10
Inverters / Transformers	0	10
O&M Area	0	3
Substation	0	7
Battery Energy Storage System (BESS)	0	20.5
Solar Site Roads (within solar arrays)	0	73.1
Solar Site Roads (between solar fields)	0	1.8
Drainage Features	0	61.2
Solar Facility – within Fenced Areas	1,936.6	0
Total	**1,936.6**[1]	**186.6**[2]

[1] The solar field includes all facilities within its boundary including solar arrays, internal site roads, substation, O&M facility, temporary laydown areas, and all associated components. 5.8 acres of the 1,936.6 are previously disturbed.

[2] These acres would be graded and kept free of vegetation for the duration of operations. Grading would be limited on the remainder of the site to only those areas were necessary and vegetation would be allowed to regrow following completion of construction so long as it does not cause safety or operational issues. In areas where grading is not needed, vegetation would be mowed and crushed during construction and allowed to return following construction.

2.1 Onsite Project Facilities

2.1.1 Solar Field

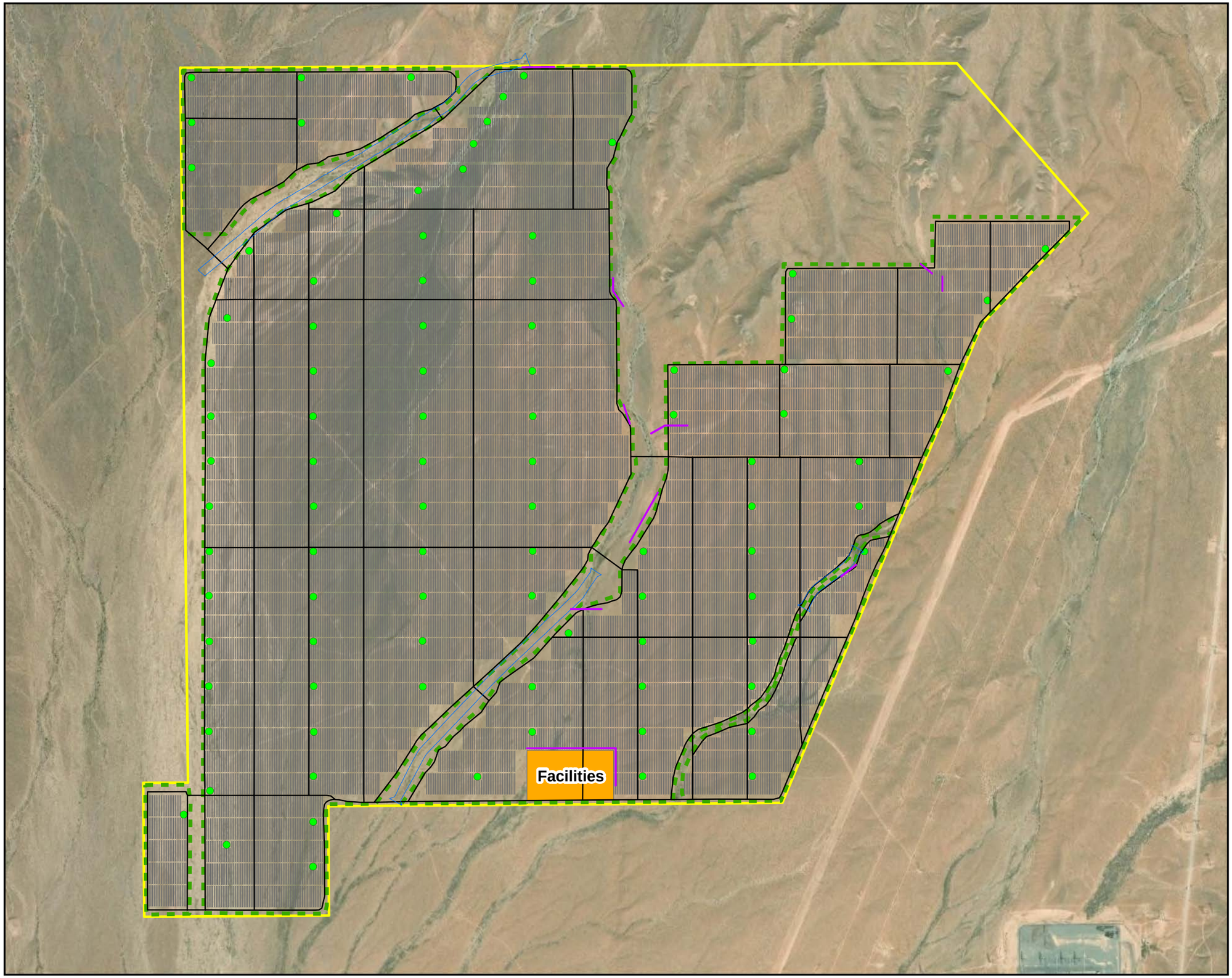
The proposed PV solar field would utilize crystalline silicon, bifacial, or thin-film PV panels that would be mounted on single-axis trackers. Using single-axis trackers, the panels would be oriented in north-south rows with the panels moving to track the sun as it moves across the sky during the day.

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

The DC from the array is collected at inverters where the DC is converted to alternating current (AC). The voltage of the electricity is increased by a transformer at each inverter. Medium voltage electric lines (underground and/or overhead) are used to collect the electricity from each transformer and transmit it to the facility substation, where the voltage is further increased by a high voltage transformer to be transmitted to the electric grid. Multiple transformers would be connected in parallel via low voltage (12.5-kV or 34.5-kV) below-ground collector lines to the Project substation, where the power is stepped up for delivery to the grid via the gen-tie line. **Figure 2-1** shows the proposed conceptual site plan for the full PV project layout.

The PV modules, inverters, and transformers would be grouped into array blocks of up to 4.4 MW each occupying approximately 23 acres. Inverter and transformer sizes would be

selected based on cost and market availability prior to construction. A typical panel layout depicting the arrangement of a block of solar arrays for a single-axis tracker configuration is shown on **Figure 2-2**.



Project Components

- Inverter/Battery Storage
- Access Road
- Arrow Canyon Project Area
- Panel Layout
- Potential Channel
- Berm
- Facilities
- Fence

0 0.25 0.5

Miles

North American Datum 1983
State Plane Nevada East Feet

Arrow Canyon Solar Project

FIGURE 2-1
CONCEPTUAL SITE PLAN

Map Extent: Clark County, Nevada

Date: 07-20-20		Author: rnc

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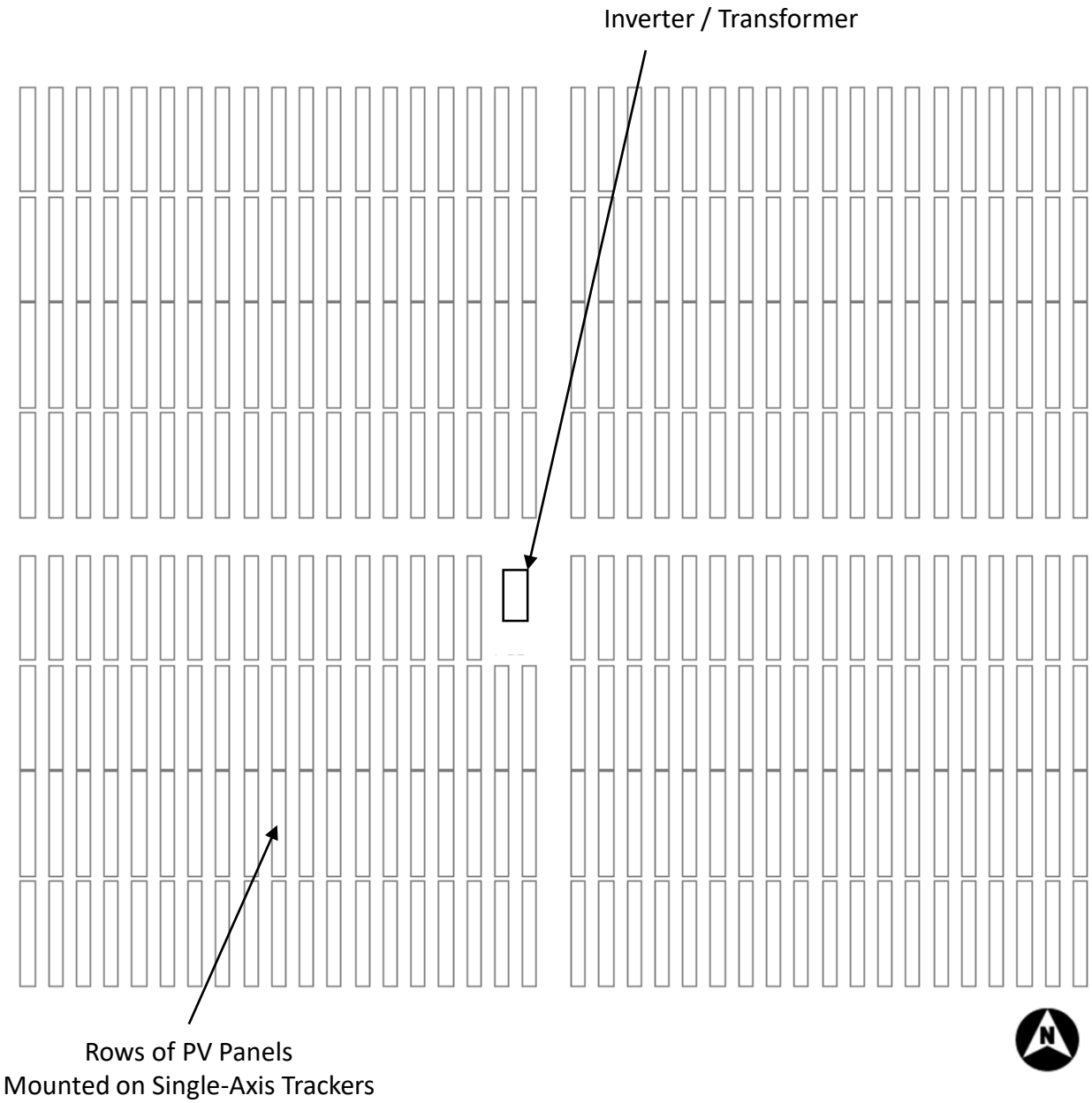

Figure 2-2
Typical Single-Axis Tracker Array Layout

The highest point on the single axis-trackers would be up to 18 feet, occurring during the morning and evening hours when the panels are tilted to face the rising or setting sun**.** The degree of tilt would change over the course of each day for the single-axis trackers. The PV units would be mounted on driven H-pile foundations or pre-drilled H-Pile foundations to support the panel mounting system. Site specific soil tests would validate the preliminary engineering and if additional tests or installations conclude that further foundations are required, the vertical steel beams would be attached to concrete ballasts. The electrical equipment (inverters and transformers) would be in enclosures or covered by shade structures approximately 8 to 10 feet high.

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

2.1.2 Battery Energy Storage System (BESS)

The most likely BESS technology would be either lithium-ion (Li-ion) or redox flow battery. The BESS could be integrated into the Project in two primary configurations - the BESS facilities would be distributed throughout the solar field at each array or the BESS facilities would be centrally located near the project substation or O&M facilities. Most of the BESS would be installed initially during construction. The remainder would be added to the project site later during the project life as needed to increase the BESS capacity as the system capacity degrades over time. This would be done as part of regular O&M activities.

Each BESS container would have its own fire detection system. In the case of BESS located in buildings, the building would comply with the local fire code and contain equipment at multiple sections of the building for fire detection, suppression and necessary alarms to alert the local fire authorities. The BESS containers or building would also be located such that it is readily accessible by the fire department.

Distributed BESS

In this configuration, Li-ion batteries would be in BESS containers that would be distributed throughout the Project site with each solar block having up to two BESS containers placed adjacent to the solar inverters and the converters. Containers would be up to 13 feet tall, 70 feet long, and 12 feet wide. The total area on the solar site attributed to the BESS facilities would be approximately 8.5 acres (0.085 acres per solar block).

The BESS containers could be made of steel or concrete. In addition to the battery modules, the containers would also contain a fire detection system, alarms and monitoring system, HVAC system, data collection and control system, and other electrical wiring and auxiliary systems. Distributed BESS containers would be located within the solar arrays and would not be fenced to exclude desert tortoise because the containers themselves are closed.

Centrally Located BESS

In this configuration, all the BESS facilities would be located on the site at the Project substation or the O&M area and the system would use either Li-ion or redox flow technology. If Li-ion batteries, they would be in BESS containers (up to 13 feet tall, 70 feet long, and 12 feet wide) at this location or in a warehouse-type building. The total land

disturbance on the solar site attributed to the BESS facilities under this scenario would be 10 acres at this one location.

If redox flow technology is used, all battery equipment would be placed in one warehouse-type building or the batteries would be placed in multiple containers at this location. Redox flow battery modules are batteries that contain a reversible cell in which electrochemical components are dissolved in electrolyte fluids separated by a membrane. In addition to the battery modules, the building or containers would also have storage tanks for redox flow battery electrolytes, spill containment, plumbing, fire detection system, alarms and monitoring system, HVAC units, data collection and control system, and other electrical wiring and auxiliary systems. The building would be similar to the O&M building described below and the BESS inverter pads or transformers would be located outside and adjacent to the building. The electrolyte storage tanks could also be located outside the building rather than being inside depending on the system design. The total disturbance for this BESS configuration would be 20.5 acres. This would be the maximum total disturbance for the three BESS options and this acreage was used in **Table 2-1**. The centrally located BESS would be located at the substation or the O&M area, therefore it would be fenced to exclude desert tortoise.

2.1.3 Operations and Maintenance Area

An Operations and Maintenance (O&M) building would be developed on the site that would contain administrative offices, parts storage, a maintenance shop, plant security systems, and plant monitoring equipment with adjacent worker parking. The O&M building would likely consist of one single story building of approximately 6,000 square feet with a maximum height of approximately 25 feet. The building would have exterior lighting on motion sensors, fire and security alarms, and would comply with all applicable laws and regulations (including applicable Operational Safety and Health Act [OSHA] requirements). The total disturbance would be 3 acres and this area would be fenced to exclude tortoises.

2.1.4 Water Use

During construction, the Project would use between 100 and 300 acre-feet per year (afy), primarily for dust control. This is an increase from the 50 afy analyzed in the MSEC BO. Operations of the Project would require up to 30 afy of water needed for panel washing, potable and sanitary uses, and other operational uses, such as dust control. This is the same as the 30 afy analyzed in the MSEC BO.

Water would be provided to the Project by the Tribe from an existing groundwater well located about 5.4 miles northeast of the SPGF site. It would be delivered to the SPGF site via the previously approved temporary water pipeline during construction. Water would be stored in covered above-ground water tanks located on site. During construction potable water would be provided via bottled water.

During operations, water would be trucked to the site when needed. The estimated non-potable water supply requirement for the O&M facility would be 3.4 gallons per minute for an annual requirement of 3.6 million gallons or 11 AF. This is based on an estimate of 12 full-time employees at the facility. Bottled drinking water supplied to the Project site from commercial vendors would be provided for potable water demand.

2.1.5 Wastewater Management

The Project could generate wastewater during operations from bathroom and shower facilities located within the O&M building. This wastewater would be treated and disposed at the site using a septic disposal system consisting of septic tanks and a leach field. Evaporation ponds, as analyzed in the original MSEC BO, will not be used for the ACSP.

2.1.6 Project Support Systems

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

Site Substation

A substation with medium voltage (34.5-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 would be located on the site. The relative location of the site substation is shown on the site layout plan for the Project. The substation would be fenced for safety in accordance with applicable codes and one or more structures may be outside the fence for meters and control equipment. The communication system for the substation may include above-ground fiber optic cable or a microwave tower. If a fiber optic line is used, it would be mounted on the gen-tie line structures as one of the shield-wires. The project would be interconnected to the regional transmission system from this on-site substation/switchyard via the previously approved gen-tie interconnection described in the subsection below detailing the previously approved ROWs. The total disturbance would be 7 acres and this area would be fenced to exclude tortoises.

Fencing

The perimeter of each solar field area would be secured with a minimum 6-foot tall, chain link metal-fabric security fencing with 2-foot barbed wire or razor wire on top. Controlled access gates would be located at the site entrance to each area. Temporary desert tortoise exclusion fencing would be installed and kept in place during construction. The permanent perimeter fence around the solar arrays would be installed to leave a 6 to 8-inch opening at the bottom of the fence to allow for the movement of desert tortoises and other wildlife across and through the site once the construction of the facility is complete.

Internal Site Roads

Internal project roads would be developed within the solar site to provide access to and within solar arrays and to the project facilities area that would include the O&M building, substation, and BESS facilities.

Fire Protection System

The Project's fire protection water system would be supplied from up to three above-ground raw water storage tanks located on the plant site holding up to 12,000 gallons each. Fire protection pump flowrates would be in accordance with applicable standards. All fire protection system pumps must be shut off manually.

The piping network would be configured in a loop so that a piping failure can be isolated with shutoff valves without interrupting the supply of water to a majority of the loop. Portable fire extinguishers of appropriate sizes and types would be located throughout the plant site.

In addition, each BESS container would have its own fire detection system. Whether the BESS is located in containers or buildings, the structures would comply with the local and federal fire code and contain equipment at multiple sections of the building for fire detection and necessary alarms to alert the local fire authorities. The BESS containers or building would also be located such that it is readily accessible by the fire department.

A Fire Prevention Plan would be prepared prior to construction that would cover the construction, operation, and decommissioning of the facility. The plan would include measures to safeguard human life, prevent personnel injury, preserve property, and minimize downtime due to fire or explosion. Fire protection measures would include prevention methods using fire-safe construction, reduction of ignition sources, control of fuel sources, availability of water, and proper maintenance of fire-fighting systems. The plan would be coordinated with the BIA, Band, BLM, and Clark County.

Security

As mentioned above, the SPGF site would be fenced with a chain-link security fence open at the bottom to facilitate desert tortoise and other wildlife movement (except for the substation, O&M area and centralized BESS). Lights, triggered by motion sensors and powered by station power with backup battery power, would also be installed at each entry gate.

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

Lighting

The Project’s lighting system would provide operation and maintenance personnel with illumination for both normal and emergency conditions near the main entrance and the Project substation and at the BESS facilities. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be downward facing and shielded to focus illumination on the desired areas only. There would be no lighting in the solar field except for emergency lighting at the BESS facilities. 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.

Erosion Control and Stormwater Drainage

There are three main drainage paths that convey stormwater runoff through the Project site from the north to the Dry Lake playa located to the south. These primary drainages are located on the western, central, and eastern portions of the site and would be avoided by the solar field. Stormwater flows from upstream of the site would flow through the site via these ephemeral drainages with the overall drainage patterns maintained. Most of these drainages would be left in their natural condition but improvements including armored channelization and/or berms would be incorporated as needed to direct and maintain flow within the primary drainage paths and away from the solar arrays (**Figure 2-1**). It is expected that pre-construction stormwater flows and velocities traversing the site would be generally unchanged. Detention basins or other design features could also be incorporated into the final solar field design to manage flows.

Most of the site would continue to be drained by sheet flow to on- and off-site drainages. Areas of the facility that have the potential for release of contaminants due to vehicles and human activities, such as the O&M building, substation, BESS facilities, delivery areas, and paved roads would be addressed through source control best management practices (BMPs) and designed to accommodate runoff from the 100-year storm event at a minimum.

On-site erosion would be controlled through the implementation of BMPs detailed in erosion and sediment control plans developed by the contractor for the construction and operational phases of the Project.

Spill Prevention / Containment

Local area containments would be provided around certain locations, such as oil-filled transformers and chemical storage areas, in order to prevent water that could come in contact with oil or chemicals from leaving the site. A spill prevention control and countermeasure plan (SPCC) would be prepared to meet the requirements of the regulations administered by the EPA.

2.2 Proposed Project Construction

2.2.1 SPGF Construction

Grading / Site Preparation

Prior to the initiation of Project construction, the SPGF site would be surveyed and staked. Preconstruction survey work would consist of locating the site and ROW boundaries, the locations of proposed facilities, and the centerlines of linear features. Clearance surveys will be conducted by authorized desert tortoise biologists prior to construction to translocate any desert tortoise on site. These surveys would be initiated following installation of the temporary tortoise exclusion fencing. Prior to the initiation of any preconstruction surveys, the necessary permits for rights-of-entry would be obtained.

Vegetation would be permanently cleared from roadways, access ways, and at inverter equipment, substations, BESS locations, 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. Prior to construction, vegetation within the solar arrays would be mowed to a height of 18 inches leaving the roots intact to facilitate regrowth during operations. Construction equipment would drive over and crush the vegetation during installation of the arrays.

The cuts and fills associated with all earthwork required on the site are planned to be balanced on-site to the extent practicable. Within the solar field, some grading would be required for the project substation, O&M area, battery storage area (s), perimeter roads around the solar arrays, electrical equipment pads and 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.

Excavation could be required for trenches for electrically connecting some of the equipment on site. Following construction, all underground trenches would be filled with native fines and compacted.

Construction Workforce

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

The ACSP Project is expected to create a peak of up to 500 and an average of 400 temporary construction jobs for the construction period.

Construction Sequencing

Construction of the SPGF would be expected to take 20 months. This schedule is designed to meet the December 2022 commercial operations date (COD) for delivery of 200 MWs of energy required by the Project's approved Power Purchase Agreement (PPA).

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

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

- **Fencing** - Temporary desert tortoise exclusion fencing would be installed and kept in place during construction. Permanent fencing would be installed around solar arrays as a part of overall site development with an 8-inch opening at the bottom to provide access for tortoises and other wildlife.
- **Clearing**—Vegetation removal for installation of the SPGF facilities would be completed only as necessary to advance ahead of equipment installation but conducted to minimize the amount of disturbed ground surface at any one time.
- **Parking and Laydown**—Parking areas for construction workers and laydown areas for construction materials would be prepared inside the Project area. Potential locations for these facilities have been developed and included in the conceptual site plan and the final location of the laydown and parking areas within the Project would be developed after a contractor is hired to construct the facility.
- **Site Roads**— The internal site roads would be constructed and maintained.
- **Site Grading**—Because of the relatively flat topography at the site, relatively minimal volumes of soil would be moved as a result of grading.
- **Foundation Construction** – foundations for the substation, inverters and/or BESS containers (if necessary) would be constructed and may require some earthen fill.
- **Array Installation** - The solar arrays are installed first by driving piles (including pre-drilling if required by site soil conditions). The tracker is then attached to the piles and then the PV modules (panels) are attached to the tracker. Generally, at the same time the substation equipment, inverters and BESS are installed. This also includes running cables between all equipment. Cables between the PV panels and inverter are commonly routed through hangers or trays. Cables from the inverters to the substation would be underground (installed by trenching, laying the cable, and backfilling).

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

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

- Full-length trailer offices or equivalent
- Generators
- Portable toilets
- Parking for construction vehicles
- Tool sheds/containers
- Parking construction equipment
- Construction material laydown area
- Solar field equipment laydown area
- Batch plant (if needed, may be located within one of the temporary laydown areas)

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

Site Access and Traffic

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

Truck deliveries of equipment and materials would occur from the initial construction notice to proceed through the entire duration of the Project. Initial truck deliveries would include haul trucks for importing construction equipment, as required, followed by concrete trucks for installation of major foundations. Array materials for the PV array (piles, cables and tracker assembly) would be delivered to Project site early in the construction period corresponding to approximately the time frame for foundation array installation. Deliveries of larger equipment such as inverters, BESS equipment, and substation components would commence at about midpoint of the construction period.

The batteries for the BESS facilities would be delivered last as they require back feed power prior to installation.

On-site roads would be left surfaced with the native soil and treated with water and/or a dust palliative approved by USFWS as needed; areas that tortoises can access will not use palliatives. The roads that are expected to be heavily used would be surfaced.

There is currently little traffic on any of the roads bordering or in the immediate vicinity of the Project. The use on these roads is primarily associated with the energy infrastructure in the area.

Construction of the Project is expected to take up to 20 months. Daily trips during construction of the project would be generated by delivery of equipment and supplies and the commuting of the construction workforce. The number of workers expected on the site during construction of the Project would vary over the construction period and is expected to average up to approximately 400 with a peak of 500 workers each day, generating an average of about 800 up to a peak of 1,000 daily trips. Also, up to 100 trips per day (50 trips to the site and 50 trips leaving the site) would occur as a result of delivery of construction equipment and materials to the site. Combined, these would result in an average increase of 900 vehicle trips (or 450 roundtrips) per day during construction. All project related parking would be onsite during construction.

Geotechnical Testing

Geotechnical investigations are needed to determine the site soil conditions and to provide geotechnical engineering data for the foundation design of the proposed gen-tie lines. These investigations have already been completed for the Project under informal consultation with the Service.

Prior to final design, additional analysis of soil borings may be conducted. If needed the following parameters would be utilized. The testing process begins with field survey staking of each test location. This would be done from a standard light-duty pickup truck and a one or two-person survey crew. Test locations would be marked with wooden stakes and flagged. Once marked, a two or three-person drilling crew would collect samples via a truck-mounted drill rig at various depths along the boring. Samples collected from the borings would be analyzed to determine soil classification, moisture content, density, depth to groundwater and other characteristics. Each boring would be approximately 6 inches in diameter and 50 feet deep.

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

2.2.2 Proposed Operation and Maintenance

Operation and maintenance activities associated with the PV Project are minimal. The ACSP is expected to require up to 12 personnel during operations. Daily operation of the plant begins when there is sufficient sunlight to begin operation of the solar trackers. The panels would be facing east in the morning and rotate on the single axis to follow the sun throughout the day. In the evening, the trackers would be rotated back to the east using

power from the electrical grid so that the panels are once again in position to receive the morning sun.

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

Long-term maintenance schedules would be developed to include periodic maintenance and equipment replacement in accordance with manufacturer recommendations. Solar panels are designed for a 35-year life. Solar panels and BESS components would be replaced as needed. Moving parts, such as motors and tracking module drive equipment would be serviced on a regular basis, and unscheduled maintenance would be conducted as necessary.

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

Operation of the site would be expected to generate only up to 10 to 15 round trips per day from maintenance and security personnel. Trips for water trucks to deliver water to the site to clean the panels could also occur but would be relatively infrequent as the panels could be cleaned only periodically. If panel washing were to occur, each event would generate up to 33 water truck trips There could also be other deliveries of supplies or equipment that could occur to support operations and maintenance. This would result in a maximum of up to 34 daily round trips (during washing events) and more commonly less than one daily round trip during the operational phase of the Project. Potable water would be stored in a 15,000-gallon storage tank.

2.2.3 Proposed Project Decommissioning

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

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

A restoration plan would include the following information:

- Goals and objectives of the plan
- Methods to be used to achieve site restoration
- Criteria to be used to determine the success or failure of the restoration
- Monitoring and maintenance of the site during and periodically after restoration
- What facilities and access routes would be removed, reclaimed and/or restored

- How facilities and access routes would be removed, and the disturbed areas restored
- The time of year the facilities and access routes would be removed and restored
- Noxious weed control during rehabilitation
- Stabilization and reclamation techniques to be used during restoration
- Annual reporting procedures
- Restoration implementation and monitoring schedule

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

2.3 Management Plans, Minimization Measures, and Compensatory Mitigation

2.3.1 Management Plans

The Applicant would be prepared the following management plans, which would be submitted to the Moapa Band of Paiutes, BIA, and USFWS (as appropriate) for approval:

- Weed Management Plan
- Raven Control Plan
- Decommissioning Plan
- Restoration and Revegetation Plan
- Dust Abatement Plan
- Spill Prevention Control and Countermeasure Plan
- Health and Safety Program
- Fire Management Plan
- Hazardous Materials and Waste Management Plan
- Surface Water Protection Plan
- Site Drainage Plan
- Traffic Management Plan
- Worker Environmental Awareness Program
- Bird and Bat Conservation Strategy

2.3.2 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.

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.

   During the tortoise activity 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 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, 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 and USFWS.

5. **Biological monitoring.** Under supervision of an authorized biologist, biological monitors will be present at all active construction locations until the SPGF 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 surveys find no live tortoises, following the guidance outlined in the translocation plan is implemented. 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. All obvious tortoise burrows will be scoped for presence and possible extraction but will not be excavated sine that has been shown to be ineffective and inefficient. 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 2019 guidance will be approved by the USFWS prior to the start of construction (USFWS 2019a). The plan will identify 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 2,683-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:

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.

- **Short-distance Relocations:** Tortoises found within 500 meters of the solar site fenceline would be relocated 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 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.
- **Study Area Translocation:** Tortoises found in the interior of the solar site fenceline (>500 meters from the exclusion fence) would be moved to a temporary holding pen, located near the Project and held during construction. Because vegetation would be crushed and/or trimmed where feasible during construction, these tortoises may be returned to the interior of the completed 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.

- 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 that the tortoise can be retrieved and handled as directed by USFWS if the results of blood work indicate that a tortoise is infected with URTD.
- 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. **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, 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 entering 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 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. **Internal Site Access roads.** Construction access will be limited to the Project area and established internal site access roads. Vehicle travel off established internal site access roads will be minimized as practicable.
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 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 within 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. Measures to reduce the subsidy of ravens and other avian predators/scavenger are discussed in greater detail in the Raven Control Plan **Appendix J** of the DEIS.
12. **Raptor control.** The applicant will inspect utility structures annually for nesting ravens and other predatory birds and report observations of nests to the USFWS and BIA. 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.

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 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. This penning is not the same as the temporary penning described in the blasting measure.
16. **Surface Water Protection Plan.** The applicant will oversee the establishment and functionality of sediment control devices as outlined in the surface water protection 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 area if a desert tortoise is 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 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.
20. **Speed Limits** 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.

2.3.3 Compensatory Mitigation

The applicant will pay the following required compensatory mitigation requirement:

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 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 $923/acre (subject to change annually on March 1).

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 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 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 Area is defined as 1) the up to 2,200 acres of direct impacts within the larger 2,683-acre lease study area, and 2) the area of indirect impacts, or recipient areas for short- and long-distance tortoise translocations (2,683 acres less the final areas of direct impacts, plus a 1.5 km buffer).

The Action Area is located within the Mojave Desert approximately 30 miles northeast of Las Vegas, Nevada, 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 receives less than 13 inches (254 mm) of rain a year and is generally between 3,000 and 6,000 feet (910 and 1,800 m) in elevation. The Mojave Desert is an area with temperature extremes and four distinct seasons. Winter months bring temperatures dipping to below 20°F (-7°C) on valley floors, and below 0°F (-18°C) at higher elevations. Storms moving from the Pacific Northwest can bring rain and snow across the region — more often, the rain shadow created by the Sierra Nevada as well as mountain ranges within the desert such as the Spring Mountains result in storms that bring only clouds and wind. In longer periods between storm systems, winter temperatures in valleys can approach 80°F (27°C).

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 and 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 ACSP biological surveys/site visits and biological surveys for the original MSEC project.

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."

Table 3-1 Plant Species Observed in the Project Area	
Common Name	**Scientific Name**
Creosote bush	*Larrea tridentata*
White bursage	*Ambrosia dumosa*
Desert senna	*Senna armata*
Desert trumpet	*Eriogonum inflatum*
Big galleta	*Pleuraphis rigida*
Devil's spineflower	*Chorizanthe rigida*
Desert globemallow	*Sphaeralcea ambigua*
Catclaw acacia	*Acacia greggii*
Spiny Menodora	*Menodora spinescens*
Rough joint fir	*Ephedra nevadensis*
Compact brome	*Bromus madritensis*
Mediterranean grass	*Schismus barbatus*
Three awn	*Aristida purpurea*
Desert marigold	*Baileya multiradiata*
Wingnut cryptanth	*Cryptantha pterocarya*
Cleftleaf phacelia	*Phacelia crenulata*
Red brome	*Bromus tectorum*
Russian thistle	*Salsola tragus*
Gilia	*Gilia sp.*
Buckwheat	*Eriogonum sp.*
Threadleaf snakeweed	*Gutierrezia microcephala*
Cottontop cactus	*Echinocactus polycephalus*
Mojave yucca	*Yucca schidigera*
Golden Cholla	*Cylindropuntia echinocarpa*
Common fishhook cactus	*Mammillaria tetrancistra*
Desert barrel cactus	*Ferocactus cylindraceus*
Beavertail cactus	*Opuntia basilaris*
Buckhorn cholla	*Cylindropuntia acanthocarpa*
Pencil cholla	*Cylindropuntia ramosissima*
Grizzlybear prickly pear	*Opuntia polyacantha var. erinacea),*
Pincushion flower	*Chaenactis fremontii*
Brownplume wirelettuce	*Stephanomeria pauciflora*
Four o'clock	*Mirabilis sp.*
Desert indianwheat	*Plantago ovata*
Desert needlegrass	*Achnatherum speciosum*
Indian ricegrass	*Achnatherum hymenoides*
Low woollygrass	*Erioneuron pulchella*
Four-winged salt brush	*Atriplex canescens*
Cheesebush	*Hymenoclea salsola*
Broom snakeweed	*Gutierrezia sarothrae*

Table 3-1 Plant Species Observed in the Project Area	
Common Name	**Scientific Name**
Mormon tea	*Ephedra nevadensis*

Table 3-2 lists the acreages of the various vegetative cover types occurring within the lease study area.

Table 3-2 Vegetative Covertypes within the Lease Study Area		
Project Component	**Vegetation Covertype**	**Acreage**
SPGF	Creosotebush-White Bursage	1,880
	Xeroriparian	432
	Mojave Yucca Scrub	365
	Disturbed	6
	PROJECT AREA TOTAL	**2,683**

3.2.1 Creosotebush-White Bursage

This community is dominated by creosotebush shrubs and white bursage, 0.5-3m tall, widely spaced, usually with bare ground between. Many species of ephemeral herbs may flower in late March and April with sufficient winter rains. This plant community is usually found on well drained secondary soils with very low water-holding capacity on slopes, fans, and valleys (CNPS 2009). Other, less numerous species of annuals appear following summer thundershowers. This creosote bush scrub is typical of the Mojave Desert. Nearly the entire SPGF is covered by this vegetation community.

3.2.2 Xeroriparian

Xeroriparian habitats are associated with ephemeral wash features that cross the project area. The xeroriparian covertype varied across the entire project area and is composed of three sub-groups:

1. **Creosotebush-white bursage**: This habitat had a higher overall density of vegetation than upland creosotebush-white bursage habitats but similar species composition. This habitat has a greater abundance of big galleta grass (*Pleuraphis rigida)* but lacked catclaw acacia (*Acacia greggii*; which was present in other xeroriparian habitats). Other species included cholla (*Cylindropuntia spp.*), cheesebush (*Hymenoclea salsola*) and ephedra (*Ephedra sp.).*
2. **Catclaw acacia:** This habitat was found associated with ephemeral washes in the project area. Soils associated with this habitat are typically coarse, well-drained, gravelly sands and loams, and moderately acidic to slightly saline (CNPS 2009). Catclaw acacia is dominant or co-dominant in this habitat. Other common species

include white bursage, mojave yucca (*Yucca schidigera)*, ephedra and big galleta. Creosotebush is less abundant in this xeroriparian habitats.

3. **Big galleta:** Big galleta is dominant in this xeroriparian habitat with little or no presence of creosote, white bursage, or catclaw acacia. Big galleta habitat is more abundant in the xeroriparian corridors of the southern half of the project area. Other common species include indian ricegrass (*Achnatherum hymenoides)* and desert needlegrass (*Achnatherum speciosum)*.

3.2.3 Mojave Yucca Scrub

This habitat type is typically found in alluvial fans, rocky slopes, and upper bajadas. Soils are typically well-drained, sandy loams (CNPS 2009). Mojave yucca is characteristically present in this shrub community along with creosote-white bursage. This covertype is found in the higher elevations (approximately 2100-ft and higher) in the northwest portion of the project.

3.2.4 Disturbed

Disturbed habitats include all areas with little or no native vegetation as a result of anthropogenic disturbance. Disturbed areas, both within and adjacent to the Action Area, are associated with multiple dirt roads and less impacted off-road vehicle trails, adjacent railroad and interstate highway (to the east) and adjacent transmission line and natural gas line corridors (to the north and west) and the Crystal substation to the southeast.

3.3 Wildlife

Species observed in or adjacent to the Action Area during ACSP biological surveys, site visits and MSEC biological surveys were typical of the Mojave desert and included several species of birds, mammals, and 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*) and red tailed-hawk (*Buteo jamaicensis*). 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*), great basin gopher snake (*Pituophis catenifer deserticola*), sidewinder (*Crotalus cerastes*), 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 (Mifflin and Associates 2001). Seven groundwater management basins are superimposed on the Arrow Canyon Range Cell. 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 (BIA 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 (BIA 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; BIA 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 DESCRIPTION OF SPECIES

Only one federally listed species under the ESA was documented within or near the Project: the Mojave desert tortoise. **Section 4.2** lists details of the site-specific survey protocols and the results. 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 3 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). Critical habitat has not yet been designated. The yellow-billed cuckoo has always been rare in Nevada. There are still small areas of suitable habitat within the state, with documented breeding occurring very rarely I Southern Nevada. 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 Pahranagat) are the last places in Southern 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 15 miles northeast of the Action Area and along the Virgin River in 2019. While two individual cuckoos were detected during 2019 surveys at Warm Springs Natural Area, there is no suitable habitat for the species in the Action Area.

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 recovery 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 than males. 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., *Puchea sericea*, and *Baccaris* 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, approximately 20 miles east of the Action Area. There is no suitable habitat for the species in the Action Area.

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 approximately 20 miles east of the Project, above its confluence with the Muddy River (FR 70: 60886-61 009).

For nesting, southwestern willow flycatchers require dense riparian habitat. Saturated soils, standing water, or nearby streams, pools, or cienegas increase the suitability of the microclimate and density of vegetation. No suitable riparian habitat or associated microclimates exist within the Action Area. The closest known breeding habitat for this species is located along the Muddy River, at Warm Springs Ranch, approximately 15 miles northeast of the Action Area. During 2019 surveys, eight southwestern willow flycatchers were identified, including two confirmed pairs, three unpaired residents and one non-resident. There is no suitable habitat for the species in the Action Area.

4.2 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.

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 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).

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).

Critical Habitat

There is no designated critical habitat for the Moapa dace.

4.3 Desert Tortoise

Desert tortoise were listed as threatened under the ESA on April 2, 1990 (USFWS 1990). A total of 6.4 million acres of Critical Habitat were designated in 1994 (USFWS 1994). The 1994 Recovery Plan described a strategy for recovering the desert tortoise, which included the identification of six recovery units, recommendations for a system of Desert Wildlife Management Areas within the recovery units, and development and implementation of specific recovery actions. Within those six recovery units, Desert Wildlife Management Areas (DWMAs) 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 2019c). Desert tortoise also feed on cacti, perennial grasses, and

herbaceous perennials. Desert tortoises dig burrows (usually located under shrubs) and den in caliche caves in bajadas, washes, or caves in sandstone rock outcrops) for winter hibernation and summer estivation (USFWS 2011, USFWS 2019c).

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.

4.3.1 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 May 2019. 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 lease study area was surveyed in accordance with current USFWS protocols (USFWS 2019b). Biologists walked 10-meter (33-foot) wide parallel pedestrian transects. USFWS refers to this methodology as "100 percent coverage." The lease study area was 2,683 acres in size. 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 2019b).

Observations of tortoise sign (live tortoises, carcasses, shell, bones, scutes, scat, burrows, pallets, tracks, egg shell fragments, etc.) were recorded in the field.

Field Survey Results

Data collected within the survey area were analyzed using the USFWS 2019 Protocol equation to estimate the 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 (Eq. 1). Calculations of desert tortoise populations are based only on the number of adult tortoises (≥180 mm MCL) observed during surveys.

$$\left(\begin{array}{c}\text{Estimated number of tortoises}\\ \text{within action area}\end{array}\right) = \frac{\left(\begin{array}{c}\text{Number of tortoises}\\ \text{observed above ground}\end{array}\right)}{\left(\begin{array}{c}\text{Probability that}\\ \text{a tortoise is}\\ \text{above ground } (P_a)\end{array}\right)\left(\begin{array}{c}\text{Probability of}\\ \text{detecting a tortoise,}\\ \text{if above ground } (P_d)\end{array}\right)}\left(\frac{\text{Size of action area}}{\text{Size of area surveyed}}\right)$$

A total of 377 east-west transects of differing lengths were walked over the course of the survey to achieve 100% coverage of the survey area, totaling approximately 1,088 kilometers of transect length. Desert tortoise and desert tortoise sign were observed. A total of 13 adult desert tortoises (≥180 mm MCL) and 6 juveniles were observed over the course of the surveys, primarily in the northern portions of the survey area (**Table 4-1** and **Figure 4-1**). Desert tortoise sign (scat, carcasses/shell fragments, tracks and burrows) were observed throughout the survey area, with higher numbers in the northern portions where the live tortoises were discovered. The estimated number of adult tortoises within the Action Area was calculated to be 24, with a 95% confidence interval of 13 to 46 adult tortoises during the 2019 surveys. Desert tortoise health assessments were conducted within the Action Area in the spring of 2020 (Heritage 2020). More tortoises were found during health assessments (43 adults and 8 juveniles) resulting from different survey methods and more time spent surveying (**Figure 4-2**).

Moapa River Indian Reservation

CLARK COUNTY

41
6
8
108
66
29
68
69
152
52
234
118
178
237
219
91
90
96
97

Crystal Substation

Frontage Road

15

Project Components

- Arrow Canyon Expansion Area
- Original MSEC Boundary - Approved

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

Spring 2019 Survey Results

- Live Desert Tortoise Observation - Adult
- Live Desert Tortoise Observation - Juvenile

0 0.5 1
Miles

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

Arrow Canyon Solar Project - BIA

FIGURE 4-1
Desert Tortoise Observations - Spring 2019

Map Extent: Clark County, Nevada

Date: 04-15-20 | Author: rnc

G:\MXD's/Project Location_041520.mxd

Moapa River Indian Reservation

CLARK COUNTY

Crystal Substation

Frontage Road

15

238 221 288 280 274 237 235 268 270 211 236 261 251 142 230 286 268 240 229 140 185 116 266 260 266 253 269 153 190 265 144 134 298 233 142 87 240 262 272 269 255 260 195 259 246 254 254 227 251

Project Components

- Arrow Canyon Expansion Area
- Original MSEC Boundary - Approved

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

Spring 2020 Survey Results

- Live Desert Tortoise Observation - Adult
- Live Desert Tortoise Observation - Juvenile

0 0.5 1
Miles

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

Arrow Canyon Solar Project - BIA

FIGURE 4-2
Desert Tortoise Observations - Spring 2020

Map Extent: Clark County, Nevada

Date: 07-23-20 | Author: rnc

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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	**15**	**76**	**73**	**22**	**1**	187
Carcass	**0**	**2**	**3**	**3**	**10**	18
Scat	**0**	**5**	**1**	**0**	**0**	6

Source: Heritage 2020

[1] Burrow Class Definitions: 1. currently active, with tortoise or recent tortoise sign. 2. good condition, definitely tortoise; no evidence of recent use. 3. deteriorated condition; definitely tortoise. 4. good condition; possibly tortoise. 5. deteriorated condition; possibly tortoise.

[2] Shell Remains: 1. fresh or putrid. 2. normal color; scutes adhere to bone. 3. scutes peeling off bone. 4. shell bone is falling apart; growth rings on scutes are peeling. 5. disarticulated and scattered.

[3] Scat: 1. wet (not from rain or dew) or freshly dried; obvious odor. 2. dried with glaze; some odor; dark brown. 3. dried; no glaze or odor; signs of bleaching (light brown), tightly packed material. 4. dried; light brown to pale yellow, loose material; scaly appearance. 5. bleached, or consisting only of plant fiber.

These results are generally consistent with recent USFWS 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 wherein tortoise abundance increased from 2004 through 2014 (Allison and McLuckie 2018).

4.3.2 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.

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 severe on younger age classes of desert tortoise. The Breeding Bird Survey (BBS) data from 1968 to 2004 indicated increases in the raven populations of more than 700 percent in the west Mojave Desert and more than 70 percent in the East Mojave Desert (DOI 2008). 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. Within or near the Project area, previous disturbance from OHV travel, weeds and ground disturbance from multiple linear facilities such as a substation, 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 is maintained between 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.

4.3.3 Desert Tortoise Designated Critical Habitat

In 1990, USFWS listed the desert tortoise as threatened in over 30 percent of its geographic range. In response to this listing, the Desert Tortoise (Mojave Population) Recovery Plan (USFWS 2011) 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 DWMAs 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 DWMAs, 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: 1) sufficient space to support viable populations within each of the five Recovery Units and to provide for movement, dispersal, and gene flow; 2) sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species; 3) suitable substrates for burrowing, nesting, and overwintering; 4) burrows, caliche caves, and other shelter sites; 5) sufficient vegetation for shelter from temperature extremes and predators; and, 6) habitat protected from disturbance and human-caused mortality (USFWS 2011).

The Project area is not located within USFWS desert tortoise DCH (USFWS 2019c). **Figure 4-3** depicts the nearest DCH, which is approximately 4 miles to the west of the proposed Project.

Reid Gardner Substation

Moapa River Indian Reservation

Crystal Substation

CLARK COUNTY

93

78

15

40

Project Components

- Arrow Canyon Expansion Area
- Original MSEC Boundary - Approved

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
- Fish and Wildlife Service
- Department of Defence
- State Lands
- National Park Service

Critical Habitat

- Desert tortoise

0 0.5 1
Miles

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

Arrow Canyon Solar Project

FIGURE 4-3
DT Designated Critical Habitat

Map Extent: Clark County, Nevada

Date: 04-17-20		Author: rnc

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5 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 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 Yuma clapper rail, southwestern willow flycatcher and Moapa dace.

5.1 Federally Listed Bird Species

5.1.1 Yellow-billed Cuckoo

There is no suitable habitat in the Action Area, and no habitat would be removed or affected by the Proposed Action. Suitable habitat occurs approximately 15 miles northeast of the Project area near the Warm Springs Ranch, and individuals were observed there in 2019 (SNWA 2019). Suitable habitat also occurs east of the Action Area along the Virgin River. While few yellow-billed cuckoos are known to occur in these areas, they may use the Muddy and Virgin Rivers 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.

5.1.2 Yuma (Ridgway's) Clapper Rail

There is no suitable Yuma clapper rail habitat in the Action Area. Therefore, the potential for direct mortality to this species is low. This species is known to occur along the Muddy River within the Overton Wildlife Management Area. Critical habitat has not been designated for this species. While the nearest suitable habitat is approximately 20 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).

There have been two isolated incidents involving Yuma 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. In this instance too, 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 ACSP Project, that project area did not include aquatic habitat for Yuma clapper rail and was not located in a flight path that would connect aquatic features. A portion of U.S. breeding populations is known to migrate annually to wintering grounds in northwest Mexico (Harrity and Conway 2020). However, we do not have information about and cannot predict the paths migrating (or dispersing) individuals may take and there is no evidence to indicate that dispersal of these species would occur in the action area.

The low number of known recorded mortalities, lack of habitat in the action area and the long distance from any known occurrences suggests the low potential for direct mortality to listed birds related to the Project. Potential direct and indirect effects posed by the Project are negligible.

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 or its habitat (e.g., riparian vegetation)(see analysis in Section 5.3).

Determination

Due to the low number of Yuma clapper rail mortalities at PV solar facilities and the lack of habitat in or near 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 in the Action Area. Therefore, the potential for direct mortality to this species is negligible. There is no designated critical habitat in the Action Area. Suitable habitat occurs approximately 15 miles northeast of the Action Area near the Warm Springs Ranch and potential breeding was observed there in 2019 (SNWA 2019).

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

An estimated 24 desert tortoises are expected to occupy the Action Area (95% CI: 12.91 – 45.64 (based on 2019 USFWS protocol calculations). Therefore, construction of the Proposed Action may result in impacts to up to 24 adult desert tortoises through injury or direct mortality of desert tortoise. Such injury or mortality could occur from vehicle strikes or other adverse interactions with project-related equipment. However, translocation of tortoises and the implementation of avoidance and minimization measures are expected to avoid all or most of these potential injuries or mortalities.

Beside the initial construction, O&M activities inside and outside the solar site could represent a source of ongoing mortality. As such, direct take of desert tortoises resulting from these activities is expected to be very low.

5.2.2 Relocation, Translocation, 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.

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 and would remain permeable to tortoise movements. Exclusion fencing would be removed after construction, allowing tortoises to move onto and through the site during operations, except around the substation, O&M area and central BESS (if chosen), where the exclusion fencing would remain intact.

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 as needed, preserving the integrity of root balls and up to 18 inches of photosynthetic material, 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 186.6 acres of occupied desert tortoise habitat would be permanently disturbed and up to approximately 1,930.8 acres (1,936.6 minus 5.8 acres of disturbed habitat) would be temporarily disturbed as a result of Project implementation.

Construction equipment would not operate beyond the fenced boundary. Roads outside of the Project area 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.

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.

The Project activities would not have direct or indirect effects on the physical characteristics of designated critical habitat that are required to support the recovery of the species

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. 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 solar array sites.

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.

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 onsite roads and micro-grading sites, 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 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 at significant distance beyond the source because as vibrations travel through the ground, they decrease with distance from the source due to the attenuating / dampening effect of the soils.. Construction taking place near the perimeter edge of the exclusion fence is limited and tortoises would not experience impacts from vibration unless the source of the vibration (construction equipment) and the tortoise both were close to the same location at the project perimeter at the same time. 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.

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 and intermittent in nature and is expected to last approximately 20 months. Construction activities would use 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 (dB).

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. 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 sound pressure level) 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. Desert tortoises 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. During the O&M phase of the project, effects of noise are expected to be insignificant because the amount of noise would not represent a significant change from the current ambient levels.

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 a 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 weed management plan (Appendix F 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 tortoise 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 BESS, 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 would be developed before construction begins. 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. 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 F of the DEIS) and implemented. The herbicides that may be used in mowed areas, 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 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 and Sazaki 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, 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 J 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 by 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 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. These springs represent the primary water source for the Muddy River to which the Moapa dace is endemic. The Proposed Action would include water withdrawal of 100-300 afy for construction (an increase from the 50 afy analyzed in the original MSEP) and up to 30 afy for operation. 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), the 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 afy 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 300 AF (construction) and 30 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 40 afy during operations (BIA 2012); the Moapa Solar Energy Center has not been built and water allocations (100 AF for construction and up to 30 afy during operations, BIA 2014)) would not be used as that will now become part of the ACSP; the Eagle Shadow Mountain project has not been built but is permitted to use 200 AF during construction and up to 20 afy during operations (BIA 2019). Total water use from the Muddy River system for all these projects, combined with the Proposed Action, would be up to 500 afy during construction (which would not occur at the same time) and up to 90 afy during operations, well under the allotted 2,500 afy for the Tribe. The use of the 300

AF and 30 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 (300 AF during construction and 30 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 Southern Bighorn Solar and Storage Center (300 MW and 135 MW storage system) were recently approved and would located on the Moapa River Indian Reservation. The Gemini Solar and Battery Storage Project (690 MW and 380 MW storage system) was recently approved and would be located on BLM land southeast of the Reservation. Since the action areas are managed by BIA and BLM, Section 7 consultation would be required.

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Appendix A. USFWS IPaC 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: March 19, 2020
Consultation Code: 08ENVS00-2020-SLI-0087
Event Code: 08ENVS00-2020-E-00143
Project Name: Arrow Canyon Solar

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: 08ENVS00-2020-SLI-0087

Event Code: 08ENVS00-2020-E-00143

Project Name: Arrow Canyon Solar

Project Type: POWER GENERATION

Project Description: Solar Facility

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/36.53422138974962N114.82014797562105W

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 Fisheries[1], 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.

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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 *Empidonax traillii extimus* 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 *Rallus longirostris yumanensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3505	Endangered

Reptiles

NAME	STATUS
Desert Tortoise *Gopherus agassizii* 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 Act[1] and the Bald and Golden Eagle Protection Act[2].

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 *Toxostoma bendirei* 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 *Athene cunicularia* 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

NAME	BREEDING SEASON
Golden Eagle *Aquila chrysaetos* 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/1680	Breeds Dec 1 to Aug 31
Green-tailed Towhee *Pipilo chlorurus* 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/9444	Breeds May 1 to Aug 10
Sagebrush Sparrow *Artemisiospiza nevadensis* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 15 to Jul 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.

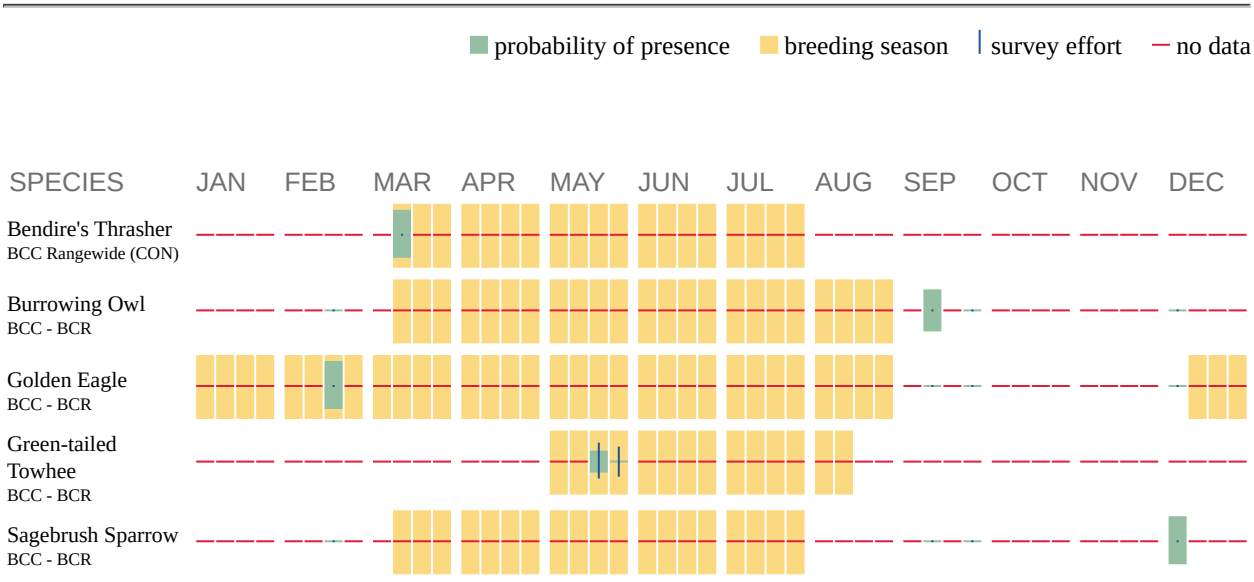
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

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

- Palustrine

RIVERINE

- Riverine

Appendix H

Bird and Bat Conservation Strategy

Arrow Canyon Solar Project

Bird and Bat Conservation Strategy

October 2020

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Appendices

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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 Arrow Canyon Solar Project (ACSP or 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 to outline Project- specific practices and measures for reducing avian and bat impacts potentially resulting from operation of the Proposed Project. Two of the greatest concerns with respect to the Project are the potential for avian and, to a lesser degree, bat collision with Project components such as solar panels or utility 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, operation and maintenance of the Proposed 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 utility 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 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 and operations.

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) where the Proposed Project is located.

2.1 Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (16 US Code [U.S.C.] §§ 703-712) is administered by the USFWS (USFWS 1998a) 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 U.S.C. § 703). The list of species protected by the Act was revised in 2013 and includes almost all bird species that are native to the U.S. An updated memorandum to the MBTA (M-37050) and a guidance memorandum (issued January 10, 2017 and April 11, 2018, respectively [USFWS 2017, 2018]) concluded 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 as: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct (16 U.S.C. § 1532(19)). "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 1998b). 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" (16 U.S. Code § 668c). Disturb is defined in USFWS regulations 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" (50 C.F.R. § 22.3). 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

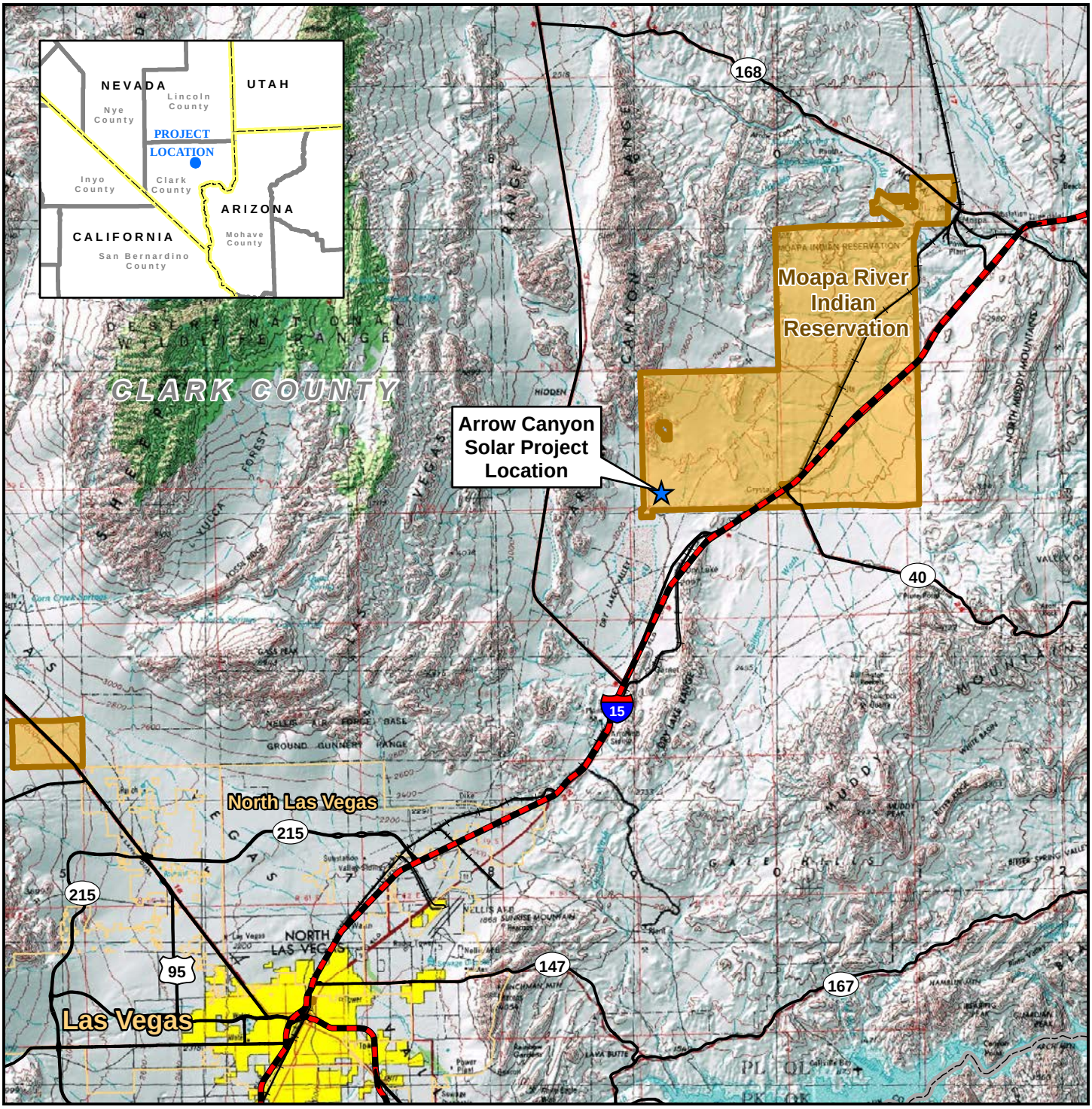
Arrow Canyon Solar, LLC (Applicant), a wholly-owned subsidiary of EDF Renewables, Inc. (EDFR), has entered into an agreement with the Moapa Band of Paiute Indians (Tribe) to lease land, up to 30 years, on the Moapa River Indian Reservation (Reservation) for the purposes of constructing, operating, and maintaining the Arrow Canyon Solar Project (ACSP), a 200-megawatt (MW) AC solar generating facility using photovoltaic (PV) technology and associated infrastructure (the Proposed Project or Project). The proposed solar power generating facility (SPGF) would be constructed on up to 2,200 acres within a study area of approximately 2,683 acres of tribal trust land within the Reservation.

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 previously approved access road for the solar site on BLM land south of the Reservation. This access road, along with the other linear features including the gen-tie line and water pipeline, are discussed in more detail in the previously approved Moapa Solar Energy Center (MSEC) BBCS and Final Environmental Impact Report (FEIR, BIA 2014). 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.

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 northern Dry Lake Valley. The site consists primarily of low-profile bajada slopes and ephemeral washes, which drain to Dry Lake, a closed basin playa.

The general ecological setting of the Project is Mojave Desert scrub. The area is dominated by open stands of creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) with other associated species. Xeroriparian habitats are characterized by three sub-groups: creosote-white bursage, catclaw acacia (*Acacia greggii*) and big galleta grass (*Pleuraphis rigida*). Mojave yucca scrub and disturbed habitats are also present. A more detailed description of the Project Area can be found in the Draft Supplemental Environmental Impact Statement (SEIS) for the Project.

The Project facilities are anticipated to disturb up to 2,200 acres on Reservation land. Most of the Project Area will be mowed to a height of approximately 18 inches and drive and crush construction techniques would be implemented in order to retain as much native vegetation as possible. All disturbance would occur on the Reservation. The Project location allows efficient connection of the energy from solar resources to existing transmission infrastructure.



Legend

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

0 2 4 6 8 10

Miles

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

Arrow Canyon Solar Project

FIGURE 1-1
General Location

Map Extent: Clark County, Nevada

Date: 10-15-19		Author: rnc

G:\Eagle Shadow Mountain Solar Project/MXD's/Project Location 8.5x11 101519.mxd

3.2 Project Components

The Project's SPGF would include the following main components. Only the components that pose potential risks to birds and bats are discussed further below. **Figure 1-2** shows the ACSP components. The linear rights-of-way (ROWs), including the gen-tie line, water pipeline, and site access road, were already permitted, approved and ROWs were issued; these are all discussed in further detail in the MSEC BBCS (Heritage 2014).

3.2.1 Solar Field

The solar field would utilize crystalline silicon, bi-facial, or thin-film PV panels that would be mounted on single-axis trackers and would cover approximately up to 2,200 acres on the Reservation. The PV modules, inverters, and transformers would be grouped into up to 4.4 megawatts of alternating current (MWac) blocks. Other onsite facilities include:

- 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
- Battery Energy Storage System (BESS)
- Lighting
- Water Supply
- Wastewater Treatment
- Drainage and Stormwater Controls
- Waste and Hazardous Materials Management
- Fire Protection

3.2.2 Substation

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) to high voltage (230-kV/500-kV) step-up transformer(s) with mineral oil, breakers, buswork, protective relaying, supervisory control and data acquisition (SCADA), and associated substation equipment.

Facilities

Project Components

- Inverter/Battery Storage
- Access Road
- Arrow Canyon Solar Lease Study Area
- Panel Layout
- Facilities
- Fence

0 0.25 0.5

Miles

North American Datum 1983
State Plane Nevada East Feet

Arrow Canyon Solar Project

FIGURE 1-2
PROJECT COMPONENTS / LAYOUT

Map Extent: Clark County, Nevada

Date: 06-23-20 | Author: rnc

G:\MXD's/Project Location_062320.mxd

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, the Project substation, and at the BESS facilities. 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 except for emergency lighting at the BESS facilities. 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.

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. Species observed in or adjacent to the Project Area during ACSP biological surveys, site visits and MSEC biological surveys were typical of the Mojave desert and included several species of birds. Commonly observed avian species include: horned lark (*Erimophila alpestris*), 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 cuniclaria*) and red tailed-hawk (*Buteo jamaicensis*). The following section describes the known and predicted occurrences of sensitive avian and bat resources in and around the Proposed Project site.

4.1 Bat Species

No bats are currently listed by the USFWS as threatened or endangered in Clark County, Nevada (USFWS 2020a). One species of bat is listed as threatened by the Nevada Natural Heritage Program as threatened in Clark County, Nevada (NNHP 2020). Twelve species of bat could occur within the Proposed Project site, and the Nevada Natural Heritage Program (NNHP) has designated nine as sensitive, protected, or threatened 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 original MSEC site and the proposed expansion area, 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	*Macrotus californicus*	NS[1]	Caves, mines and rock shelters mostly in lower elevation creosote bush scrub habitat in proximity to riparian habitat. Forages in open areas over flats and washes near roosting sites.	Low potential to occur. Occurs at lower elevations and near riparian habitats, which are not present in the Project Area.
Townsend's big-eared bat	*Corynorhinus townsendii*	NS	Use a variety of habitats from arid desert scrub to pine forests, but always near roosting areas which are in caves/mines. Forages along riparian areas	Low potential to occur. Mine and cave obligates and none are present in the Project Area. Foraging habitat not present within the Project Area.

Common Name	Scientific Name	Status	Habitat	Potential to Occur
			and generally prefers mesic habitats.	
Western red bat	*Lasiurus blossevillii*	NS	Found primarily in wooded habitats including mesquite bosque and cottonwood/willow riparian areas. Typically roosts in trees.	Low potential to occur. No suitable woodland or riparian habitat in the vicinity of the Project Area.
Fringed myotis	*Myotis thysanodes*	NP[2]	Roosts in caves, mines and is mainly found in woodlands/pine forests at higher elevations, but will sometimes occupy desert scrub.	Low potential to occur. No caves or mines are present in the Project Area.
Pallid bat	*Antrozous pallidus*	NP	Arid regions with rocky outcroppings, roosting in caves/mines, deep canyon crevices, under bridges and human structures. Forages over open areas near roosting locations.	Low potential to occur, no roosting habitat present in the Project area.
Spotted bat	*Euderma maculatum*	NT[3]	Occurs primarily in arid or ponderosa pine forests and marshlands. Sometimes in deserts and grasslands Prefers to roost in rock crevices on vertical cliffs and open canyons. Associated with rocky cliffs. Forages in canyons, in open areas, and over riparian vegetation.	Low potential to occur, no cliff or canyon roosting or foraging habitat present in the Project Area.

Common Name	Scientific Name	Status	Habitat	Potential to Occur
Allen's big-eared bat	*Idionycteris phyllotis*	NP	Inhabits mountainous areas and uses a variety of habitats, including desert scrub, coniferous forests, and riparian woodlands. Roosts in rocks, snags, and cliffs, but most roosts are found in mines.	Low potential to occur, no suitable roosting habitat is present in the vicinity of the Project area.
Mexican free-tailed bat	*Tadarida brasiliensis*	NP	Roosts in caves, trees and man-made structures, typically near water sources where foraging primarily occurs, but will also forage over open areas. Found from low desert to high mountains.	Low potential to occur, no water sources nearby and no roosting habitat.
Western mastiff bat	*Eumops perotis*	NS	Roosts in deep rock crevices or crevices in man-made structures high above the ground. Found in open areas in a variety of habitats with abundant roost locations.	Low potential to occur, reliance on significant rock features for roosting which are not present in the Project Area.

NNHP 2020, Bradley et al. 2006
[1] NS Nevada State Sensitive Species protected under NRS 501, NAC 503.
[2] NP Nevada State Protected Species protected under NRS 501, NAC 503.
[3] NT Nevada State Threatened Species protected under NRS 501, NAC 503.

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 C.F.R. parts 13 and 22), as well as the MBTA. Periodic helicopter surveys by the Nevada Department of Wildlife (NDOW) indicate that suitable nesting and remnant nests occur approximately 4.4 to 6.6 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 4.4 miles from the Project Area. The construction, operation, and maintenance of the Project is not expected to result in take of golden eagles. However, the potential for collision with project infrastructure 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, ESA, and MBTA, the State of Nevada has 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	*Aquila chrysaetos*	BGEPA [9], BCC[8], NW[5]	Rolling foothills and mountain terrain as well as wide arid plateaus, open desert and scrubland. Uses cliffs, rock outcroppings and tall trees for nesting.	Moderate likelihood to occur. See in depth discussion in Section 4.2.1.
Yellow-billed cuckoo	*Coccyzus americanus occidentalis*	LT[7], NS[2]	Open woodland, parks, deciduous riparian woodland; nests in tall cottonwood and willow riparian woodland.	Low likelihood to occur. No suitable riparian woodland habitat present, but may occur flying over the Project area during migration periods.
Western burrowing owl	*Athene cunicularia hypugaea*	BCC, NW	Open grasslands, desert scrub, agricultural lands and open stages of pinyon-juniper habitat. Utilizes abandoned burrows for nesting purposes.	High likelihood to occur. May forage or nest in the Project Area. None detected during biological surveys but sign was observed on two burrows and burrowing owl have been seen incidentally on nearby properties during surveys and monitoring activities.
Ferruginous hawk	*Buteo regalis*	NW	Breeds in open grasslands, sagebrush flats, low foothills, sparse riparian areas, canyons, and fingers of pinyon-juniper and other forest types. Winters in open terrain from grassland to desert, especially in areas where small mammals are abundant.	Moderate likelihood to occur during winter months for foraging. No likelihood to occur during breeding season. No suitable breeding habitat present.
Swainson's	*Buteo*	NW	Nests in agricultural	Low likelihood to occur.

Common Name	Scientific Name	Status	Habitat	Potential to Occur
hawk	*swainsoni*		valleys or open grasslands with scattered trees for nesting. Forages near nesting area in grasslands or agricultural fields. Migrates to S. America during winter.	No suitable habitats for foraging or nesting present, but may occur flying over the Project Area during migration.
Western snowy plover	*Charadrius nivosus nivosus*	NW	Beaches, dry mud or salt flats, sandy shores of rivers, lakes, and ponds are used for foraging and nesting purposes. Some populations migrate from inland regions to the coast during winter.	Low likelihood to occur. No suitable nesting or foraging habitat present, but may occur flying over the Project Area during migration.
Southwestern willow flycatcher	*Empidonax traillii extimus*	LE[6], NE[4]	Thickets, scrubby and brushy areas, open second growth, swamps, and open woodland near running water.	Low likelihood to occur. No suitable riparian habitat present for breeding and foraging, but may occur flying over the Project Area between water sources or during migration.
Peregrine falcon	*Falco peregrinus*	NE	Utilizes various open environments including open water, desert shrub, and marshes usually in close association with suitable nesting cliffs; also, mountains, open forested regions, and human population centers.	Low likelihood to occur. No suitable cliff nesting habitat and little potentially suitable foraging habitat present.
Pinyon jay	*Gymnorhinus cyanocephalus*	NW	Pinyon-juniper woodland, less frequently pine, also occurs in scrub oak and sagebrush. Forages in woodlands and grasslands.	No likelihood to occur. No suitable habitat present.
Loggerhead shrike	*Lanius ludovicanus*	NS	Open country with scattered trees and shrubs, grassland or pastureland, savanna, and desert scrub.	High likelihood to occur. May forage within the Project Area. Individuals have been observed during biological surveys.
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	LE, NE	Freshwater marshes dominated by emergent plant species such as cattails and bulrushes.	Low likelihood to occur. No suitable freshwater marsh breeding or foraging habitat present,

Common Name	Scientific Name	Status	Habitat	Potential to Occur
				but may occur flying over the Project Area between water sources and/or during migration.
LeConte's thrasher	*Toxostoma lecontei*	NP[1]	Habitat consists of sparsely vegetated desert flats, dunes, alluvial fans, or gently rolling hills. Typically nests in spiny shrubs and trees or cacti.	High likelihood to occur. Suitable habitat present.
Brewer's sparrow	*Spizella breweri*	NS	Strongly associated with big sagebrush in areas with scattered shrubs and short grass, especially during breeding season. During the winter, open creosote bush scrub is used as well.	Low likelihood to occur. No suitable sagebrush habitat present for breeding, but may use the area during winter months.
Bald eagle	*Hailiaeetus leucocephalus*	BGEPA, NE	Large bodies of water for foraging. Mature trees along a habitat edge near a water source are preferred for roosting.	No likelihood to occur. No suitable water habitat present.
Bendire's thrasher	*Toxostoma bendirei*	BCC, NP	Variety of desert habitats with fairly large shrubs or cacti and open ground, or open woodland with scattered shrubs and trees. Very rare species.	Low likelihood to occur. Suitable desert habitat present, but species is very rare.
Green-tailed Towhee	*Piplio chlorurus*	BCC	Dense, shrubby habitat, sometimes with scattered trees or cacti. In winter they move to dry washes, arroyos, mesquite thickets, creosote bush, and desert grasslands	Moderate likelihood to occur during winter months. Suitable wintering habitat present.
Sagebrush Sparrow	*Artemisiospiza nevadensis*	BCC	Breeds in shrub-steppe habitats with tall shrubs such as sagebrush, saltbush and rabbitbrush. Winters in dry shrublands or grasslands, including creosote and saltbush-dominated desert scrub.	Moderate likelihood to occur during winter months. Suitable wintering habitat present.

NatureServe 2020, NNHP 2020, USFWS 2020b.
[1] NP Nevada State Protected Species protected under NRS 501.
[2] NS Nevada State Sensitive Species protected under NRS 501.
[3] NT Nevada State Threatened Species protected under NRS 501.
[4] NE Nevada State Endangered Species protected under NRS 501.

[5] NW Nevada NNHP Watch-List Species
[6] LE USFWS Listed Endangered
[7] LT USFWS Listed Threatened
[8] BCC USFWS Bird of Conservation Concern.
[9] 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. Based on the Project location and details and results of the wildlife surveys completed for the Project, potential Project related risks associated with the construction and operation would include collision with overhead utility lines (including the substation), solar panels and other SPGF features, electrocution, territory abandonment and nest disturbance, loss of foraging habitat and habitat fragmentation, artificial lighting 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, solar facility and collector line design, and placement of components on the landscape. 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). Bird collision with PV panels has been documented and studied for a relatively short period of time, and there are a small number of peer-reviewed publications documenting fatality risks to birds associated with PV panels.

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). Structures associated with the SPGF, PV panels, overhead collector lines, or the onsite substation could present a collision risk. This risk should be minimal due to the relatively low height of these structures (up to 18 feet). Given that the Project is located adjacent to an existing utility corridor that is currently occupied by seven electric transmission lines ranging in size from 230-kV to 500-kV, the addition of the SPGF on the west side of the existing utility corridor is unlikely to have an appreciable cumulative effect on in-air collisions. Transmission lines are the Project components that present the greatest risk of avian collision. The existing lines have been in place for many years and foraging flight patterns of resident birds have most likely modified their behavior due to the vast size and locations 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 any collector or other electric lines on the

SPGF will minimize electrocution risk. The 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 and Bureau of Indian Affairs (BIA) 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 (EPA 1974). 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 (in this case, EPA standards).

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 in Section 3.7 of the DSEIS, 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 4.4 to 6.6 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. 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 186.6 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 1,936.6 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 186.6 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 ACSP site 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 and the majority of the construction would take place during the day time, with the potential for limited night work, the potential for Project-related construction or operations impacts on bats is limited.

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 ACSP 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 designing all lights to provide the minimum illumination needed to achieve safety and security objectives and by facing all lights downward and shielding them to focus illumination on the desired areas only. 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 for 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 Electrocution

All utility 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, and transformers would be constructed utilizing avian-safe practices as suggested by APLIC using industry standards (APLIC 2006). Any potential electrocution caused mortality to a bird or bat would be reported to the USFWS (**Appendix A**).

6.2 Anti-Perching and Nesting

To reduce perching along segments of the overhead collector lines or substation, 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. Perch deterrents are expected to be used primarily to eliminate 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 overhead collector lines or on the substation towers would be conducted monthly during the breeding season (February 15 to August 31st) for the first 3 years of operation. Unoccupied nests with no eggs or chicks 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 unoccupied nests with no eggs or chicks 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 SPGF would have temporary and permanent impacts on vegetation, but the temporary impact areas would be allowed to re-vegetate, and wildlife species would be able to utilize them for habitat and foraging. Grading and vegetation removal would be minimized to the extent practicable for the Project. Where feasible, site preparation activities would first implement mowing existing vegetation to a height of approximately 18 inches with the remaining standing vegetation flattened by the construction equipment using drive and crush techniques to minimize impacts to the roots of plants. Grading would be implemented for internal access roads, the substation, the O&M area, BESS locations, etc. and in areas within the solar arrays only where necessary. Where grading is not necessary, panels will be mounted at a height sufficient to avoid contact with vegetation and vegetation will only be trimmed as needed to allow for safe installation and maintenance of the PV tracking system. Since much of the vegetation within the Project will be allowed to re-colonize after construction is complete, it is anticipated that certain bat and bird species would use the site to some extent during operations.

A Weed Management Plan (WMP) will be prepared and submitted to the BIA 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 ACSP 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 in the immediate vicinity 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 14 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 lead 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 Trash 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, in compliance with the Raven Control Plan. Open containers

that may collect rainwater will also be removed or stored in a secure or covered location to not attract birds. Litter from the Proposed Project may also attract opportunistic scavengers such as common ravens, which have been known to predate juvenile desert tortoises. The above measures would help minimize common raven attraction to the Project site. For additional information on reducing the impacts of common raven predation see the Raven Control Plan for the Project.

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 ACSP (3.3 miles to the east-northeast). Moapa Solar (K-Road) 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 ACSP because the current data from the nearby existing project suggests limited avian mortalities at this location and within these habitat types. Following construction, O&M staff would be required to take the Worker Environmental Awareness Program (WEAP) training described below which would include a reporting protocol if avian mortalities are incidentally found during regular O&M activities. A Special Purpose Utility Permit (SPUT Permit) would be obtained by the owner to allow for handling, collection and transport of dead or injured birds.

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 Worker Environmental Awareness Program

A 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.

7.5 Injured Birds and Rehabilitation Centers

If any injured birds or bats are discovered during the course of construction activities, biological monitoring, or operations, they would be safely captured and transported to a NDOW licensed wildlife rehabilitator. A mortality reporting data form will be completed for the injured individual for reporting purposes. Rehabilitators would provide guidance on transportation of the injured animal to their locations.

- Wild Wing Project
  4232 Tuffer Lane
  Las Vegas, NV 89130
  Primary Contact: Lisa Ross
  (702) 338-4382

- Animal Kingdom Veterinary Hospital
  1325 Vegas Valley Drive
  Las Vegas, NV 89109
  Primary Contact: Joanne Stefanatos
  (702) 735-7184

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, Tribe and USFWS to comply with legal requirements as well as the requirements contained within this BBCS.

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ARROW CANYON 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 CARCASS[1] (*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):

_____

_____

_____

_____

PHOTOGRAPHS[2]:

Close Up: Photo 1 _____ Photo 2 _____

Landscape: Photo 3 _____ Photo 4 _____

PHOTO NOTES:_____

_____

NOTIFICATION[3]:

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.

ARROW CANYON 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:

_____

_____

PHOTOGRAPHS[1]:

Close Up: Photo 1 _____ Photo 2_____

Landscape: Photo 3 _____ Photo 4_____

PHOTO NOTES:_____

_____

NOTIFICATION[2]:

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 I

Gila Monster Guidance

NEVADA DEPARTMENT OF WILDLIFE
SOUTHERN REGION

3373 Pepper Lane, Las Vegas, Nevada 89120
Phone: 702-668-3839 or 702-486-5127; Fax: 702-486-5133

5 February 2020

GILA MONSTER STATUS, IDENTIFICATION AND REPORTING PROTOCOL FOR OBSERVATIONS

Status

- The **Gila monster (*Heloderma suspectum*) is** secretive, difficult to detect, and seemingly rare relative to other species. These attributes led the **State of Nevada** decades ago to classify the species as **Protected** (Nevada Administrative Code 503.080). Their populations are also vulnerable to poaching, the cumulative effects of habitat loss, fragmentation and degradation, and climate changes (Wildlife Action Plan Team 2012).

- Therefore, a person shall not hunt or take any protected wildlife, or possess any part thereof, without first obtaining the appropriate license, permit or written authorization from the Nevada Department of Wildlife (Nevada Administrative Codes 503.090 and 503.093).

- The USDI Bureau of Land Management has recognized this lizard as a sensitive species since 1978 and is to manage public lands in a manner to avoid the necessity of higher federal protections (BLM Manual 6840 – Special Status Species).

- In Clark County's Multiple Species Habitat Conservation Plan (MSHCP), the Gila monster is an *Evaluation Species*, meaning inadequate information exists to determine if mitigation from MSHCP implementation would demonstrably cover conservation actions necessary to ensure its persistence without additional protective intervention as provided under the federal Endangered Species Act.

- While the Gila monster is the only venomous lizard endemic to the United States, its behavioral disposition is somewhat docile and avoids confrontation. But it will readily defend itself if threatened. Most bites are considered *illegitimate*, not caused by Gila monster aggression, but resulting from human harassment or careless handling. Gila monsters are not dangerous unless molested or inappropriately handled and should never be harmed or killed.

- The Nevada Department of Wildlife (NDOW) has ongoing management studies for greatly improving our understanding specific to Nevada's banded Gila monster populations; hence, **additional sightings and descriptions for this species distribution, habitat, and biological information is of utmost interest**.

- In assistance to gathering additional information about Nevada's Gila monsters, **NDOW will be notified whenever a Gila monster is encountered or observed**, and under what circumstances (see Reporting Protocol below).

Identification

The banded Gila monster (*H. s. cinctum*) is the only wild subspecies occurring in Nevada, and is restricted to Clark, Lincoln, and Nye counties. Found mainly below 5,000 feet elevation, its geographic range approximates that of the desert tortoise (*Gopherus agassizii*) in Nevada. Gila monster habitat requirements center on complex rocky landscapes of upland desert scrub overlapping desert wash, spring, and riparian habitats, often characteristic of alluvial fans (bajadas) and adjacent rocky fields. Gila monster habitat overlaps that of both the desert tortoise and chuckwalla (*Sauromalus ater*).

Gila monsters are recognizable by a striking black and orange-pink coloration and bumpy, or beaded, skin. In keeping with its name, the banded Gila monster (shown left) retains a black chain-link, banded pattern into adulthood. Sometimes other non-venomous lizards are mistaken for the Gila monster. Of these, the western banded gecko (*Coleonyx variegatus*) and the chuckwalla are the most frequent. All three share similar habitats.

To untrained eyes, the color pattern and finely granular skin of the western banded gecko (right) may have the looks of a baby or juvenile Gila monster. But gecko heads are more pointed at the snout and the relatively large eyes have *vertical* pupils befitting their nighttime habits. Gila monsters may be both nocturnal and diurnal; the smallish eyes have *round* pupils. Snouts are bluntly rounded. Newly hatched Gila monsters vary in length at 5-7 inches with a vivid orange and black, banded pattern. Western banded geckos are generally smaller than 4 inches with cream to yellow background colors and brown to purple banded patterns.

Chuckwalla adults (left) and juveniles have a body shape somewhat suggestive of the Gila monster, but they lack the coarsely beaded skin and showy black and orange-pink body pattern. While juvenile chuckwallas can have orange and black banded tails, this colorful banding fades as chuckwallas mature. From nose to tail tip, adult chuckwallas may reach 17 inches long, rivaling that of the Gila monster. Chuckwallas are herbivorous. When alarmed, they are fast movers seeking cracks and crevices into which they can wedge themselves by inflating their bodies with air. Chuckwallas are diurnal and rock dwellers.

Reporting Protocol

Field workers (e.g. construction foremen, bio-monitors) must at least know how to: (1) identify a Gila monster by distinguishing it from other lizards like the chuckwalla and western banded gecko (see **Identification** above); (2) Report any Gila monster observation to the NDOW; (3) Be aware of the consequences of a Gila monster bite resulting from carelessness or unnecessary harassment; and, (4) Be advised of protective measures provided under state law and federal management policies.

1) Live Gila monsters found in harm's way in the construction site will be captured and then detained by the project biologist or equivalent personnel in a cool (≤85°F), shaded environment (air-conditioned vehicle or trailer is okay) until a NDOW biologist can arrive for biological documentation prior to its release Although a Gila monster is venomous and can inflict a serious bite, its relatively slow gate allows for it to be easily coaxed or carefully lifted into an open bucket or box using a long handled instrument like a snake hook, tongs, or shovel (*Note: it is not the intent to request unreasonable action to facilitate captures; additional coordination with NDOW will clarify logistical points*). For safe detainment, an unused or sterile 5-gallon plastic bucket with a secure, vented lid; an 18"x18"x4" plastic sweater box having a secure, vented lid; or, a tape-sealed cardboard box of similar dimension may be used. And, written information identifying the mapped capture location, Global Positioning System (GPS) coordinates in Universal Transverse Mercator (UTM) using North American Datum (NAD) 83 Zone 11 along with date, time, and circumstances (e.g. biological survey, construction monitoring) and habitat description (e.g. vegetation, slope, aspect, substrate) will also be provided to NDOW.

2) Injuries to Gila monsters may occur during excavation, blasting, road grading, or other construction activities. In the event a Gila monster is injured, it should be transferred to a veterinarian proficient in reptile medicine for evaluation of appropriate treatment. Therapy or euthanasia expenses will not be covered by NDOW. However, NDOW will be immediately notified of any injury to a Gila monster and which veterinarian is providing care for the animal. If an animal is killed or found dead, the carcass will be immediately frozen and transferred to NDOW with a complete written description of the discovery and circumstances, date, time, habitat, and mapped location (GPS coordinates in UTM using NAD 83 Z 11).

3) Should NDOW's assistance be delayed, biological or equivalent acting personnel on site should detain the Gila monster out of harms way until NDOW personnel can respond. **The Gila monster should be detained until NDOW biologists have responded**. Should NDOW not be immediately available to respond for photo-documentation, a digital camera (≥5 mega-pixels) will be used to take good quality images of the Gila monster *in situ* at the location of live encounter or dead salvage. The pictures will be provided to NDOW at the address above or the email address below along with specific location information including GPS coordinates in UTM using NAD 83 Z 11, date, time and habitat description. Pictures will show the following information: (1) Encounter location (landscape with Gila monster in clear view); (2) a clear overhead shot of the entire body with a ruler next to it for scale (Gila monster should fill camera's field of view and be in sharp focus); and, (3) a clear, overhead close-up of the head (head should fill camera's field of view and in sharp focus).

Please Remember: Gila monsters are considered sensitive species and sharing of observation information to sources outside of NDOW or other permitting agencies may result in adverse conservation or administrative consequences.

Contact NDOW Biologist Jason L. Jones at 702.668.3938 (office), 208-240-0194 (cell; leave message or text), 702.486.5127 (front desk) or by e-mail at jljones@ndow.org for additional information regarding these protocols.

Appendix J

Raven Control Plan

Raven Control Plan

Arrow Canyon Solar Project

October 2020

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List of Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
ACSP	Arrow Canyon Solar Project
APLIC	Avian Power Line Interaction Committee
BIA	Bureau of Indian Affairs
CORA	Common Raven
EDFR	EDF Renewables Development, Inc.
EIS	Environmental Impact Statement
I-15	Interstate 15
kV	Kilovolt
MBTA	Migratory Bird Treaty Act
Mph	Miles per Hour
MSEC	Moapa Solar Energy Center
MW	Megawatt
PV	Photovoltaic
RCP	Raven Control Plan
ROD	Record of Decision
ROW	Right of way
SPGP	Solar Power Generation Plant
USFWS	U.S. Fish and Wildlife Service

1. Introduction

1.1 Background

Arrow Canyon Solar, LLC (Applicant), a wholly-owned subsidiary of EDF Renewables Development, Inc. (EDFR) plans to expand the solar power generating facility (SPGF) for the previously approved Moapa Solar Energy Center (MSEC) Project located on the Moapa River Indian Reservation in Clark County, Nevada. The solar field ground lease would be expanded from the previously approved 850 acres to up to 2,200 acres for constructing, operating and maintaining, and decommissioning a 200-megawatt (MW) solar energy generating facility using solar photovoltaic (PV) technology. The expanded project is now referred to as the Arrow Canyon Solar Project (ACSP or Project). The Bureau of Indian Affairs (BIA), as lead agency in cooperation with the Moapa Band of Paiute Indians (Moapa Band), and other agencies, have prepared a Supplemental Environmental Impact Statement (SEIS) that evaluates the expansion of the PV solar energy generation project. The linear ancillary facilities that will be part of the ACSP (gen-tie line, access road, and temporary water pipeline) were analyzed in the MSEC Final Environmental Impact Statement **(**FEIS**)** and approved by the BLM ROD. In addition, the BLM issued a ROW for these facilities. Because these project components would be constructed, operated, maintained, and decommissioned as described in the previously approved analysis, decision, and ROW, the BLM does not need to take a federal action or make a decision for the proposed solar field expansion proposed by the ACSP.

This Raven Control Plan (RCP) lists procedures the Project will follow for the protection of wildlife species, such as the desert tortoise, from predation by other species that may be attracted to the Project as a result of construction or operation activities. The RCP is being submitted to the United States Fish and Wildlife Service (USFWS) and Bureau of Indian Affairs (BIA) for approval prior to implementation. Once approved, the Applicant will be responsible for implementing the plan for the entire Project. This RCP addresses activities that will occur during construction and operation of the Project regarding control of ravens as a nuisance species.

The desert tortoise (*Gopherus agassizii*) is a federally-listed threatened species known to occur in and around the project area. The proposed project area is not located in designated Critical Habitat for the desert tortoise. This RCP has been developed as a mitigation measure to reduce the effects of common raven (*Corvus corax*; CORA) and other avian 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 structures, increased availability of water sources and facility operation.

Avian predators such as CORA, loggerhead shrikes (*Lanius ludovicianus*), and American kestrels (*Falco sparverius*) may be drawn to the Project area due to the increase in refuse (e.g. food sources) such as garbage cans and an increase in nesting/perching areas such as the site perimeter fence. The solar generating facility site provides suitable habitat for the desert tortoise. Avian predators drawn to the Project site may forage nearby. An increase in avian predators within a project area is a known secondary negative project effect on the desert tortoise. Implementing this RCP is intended to reduce this potential impact.

1.2 Purpose of this Plan

The purpose of this RCP is to offset direct and indirect environmental impacts to the desert tortoise and other species of wildlife from Project development by implementing specific measures designed to limit wildlife attractions and discourage avian and other scavengers that may prey on wildlife (including sensitive species) in and around the Project area. This includes, but is not limited to, collecting and disposing of all litter and trash found or produced at the site, as well as limiting the availability of water. All employees will be familiar with the RCP, and littering will not be permitted. The project proponent and its approved contractors would be responsible for implementing aspects of this RCP. This RCP is applicable to the construction and operation of the proposed Project.

1.3 Project Description

1.3.1 Project Area

The Applicant currently plans to expand the solar field from 850 acres to up to 2,200 acres within a larger 2,683-acre lease study area. This expansion would occur on tribal lands identified by the Moapa Band adjacent to the originally approved site. The Project would be located on the Reservation in Township 16 South, Range 64 East, Sections 28, 29, 30, 31, 32, and 33; and part of Section 7 in Township 17 South, Range 64 East, Mount Diablo Base Meridian (**Figure 1**).

The proposed project would occur in the Basin and Range physiographic province in a part of the Mojave Desert. This physiographic province is characterized by the hundreds of long, narrow, and nearly parallel mountain ranges that are separated by deep valleys. These features of the province are visible at the proposed project site, with nearly parallel mountain ranges on the western and eastern sides of the site and a broad and gently sloping valley between. The proposed project site occurs in the Mojave Desert Scrub biome and is dominated by plants common to this biome including creosote bush (*Larrea tridentata*), and white bursage (*Ambrosia dumosa*).

1.3.2 Proposed Project

The following sections describe the major features of the proposed project. For a comprehensive description of the proposed project, refer to the associated Environmental Impact Statement (EIS). **Figure 2** shows the proposed conceptual site plan for the full PV project layout.

Solar Power Generation Facility

The SPGF would be located wholly on lands within the Reservation. It would be developed using solar photovoltaic (PV) technology and would generate up to 200 Megawatts (MWs) of energy.

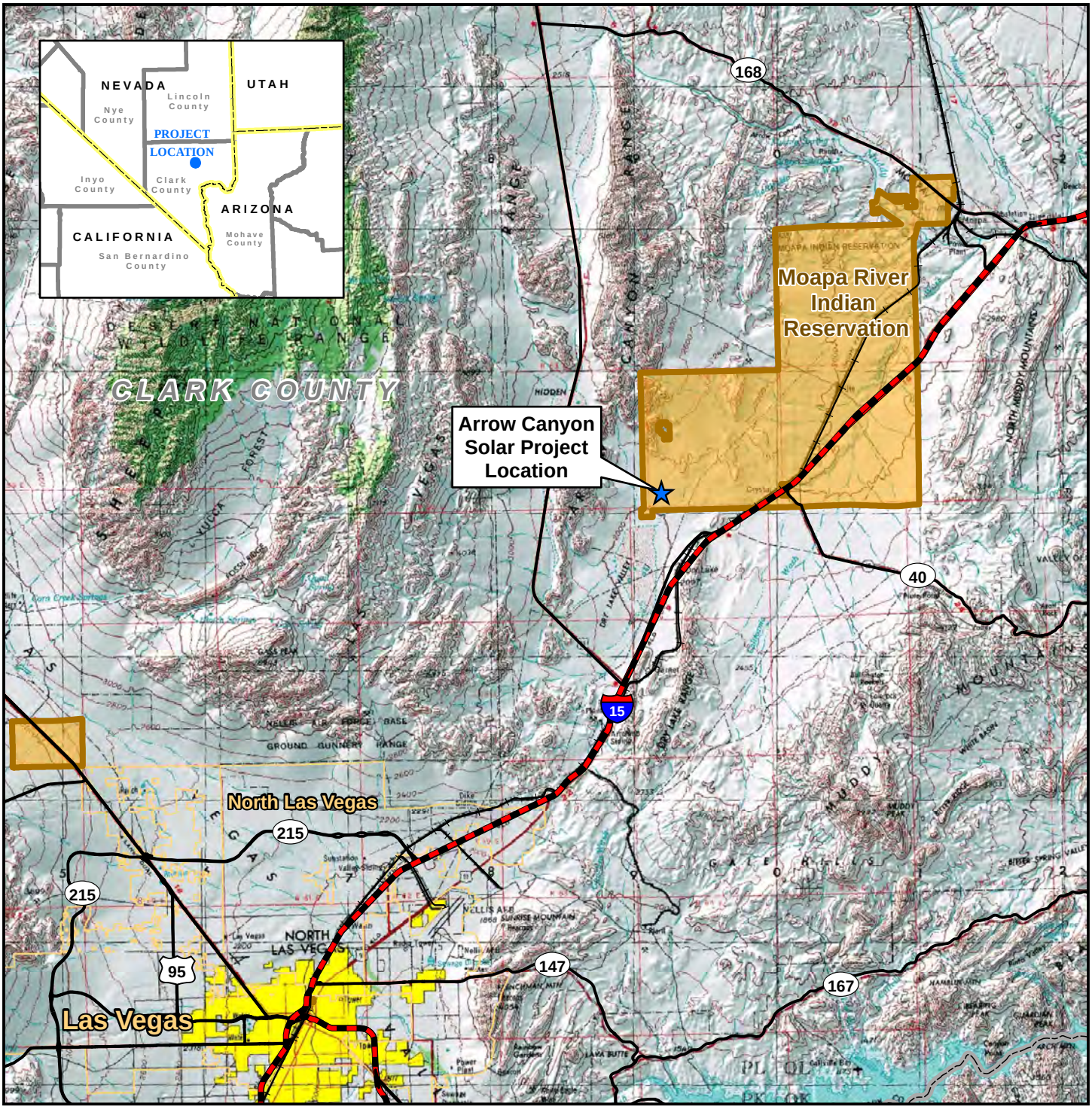
Onsite Substation

A substation with medium voltage (12.5-kV or 34.5-kV) to high voltage (230-kV/500-kV) step-up transformer(s) with mineral oil, breakers, buswork, protective relaying, supervisory control and data acquisition (SCADA), and associated substation equipment would be located on the SPGF. The substation will be fenced for safety per codes, and one or more structures may be outside the fence for meters and control equipment.

The communication system for the substation may include above or below ground fiber optic cable and/or microwave tower. The Project will be interconnected to the regional transmission system from this on-site substation/switchyard via the generation tie (Gen-tie) line to Harry Allen Substation.

Fire Prevention

The Project's fire protection water system would be supplied from up to three above-ground raw water storage tanks located on the plant site holding up to 12,000 gallons each.



Legend

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

0 2 4 6 8 10

Miles

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

Arrow Canyon Solar Project

FIGURE 1
General Location

Map Extent: Clark County, Nevada

Date: 10-15-19		Author: rnc

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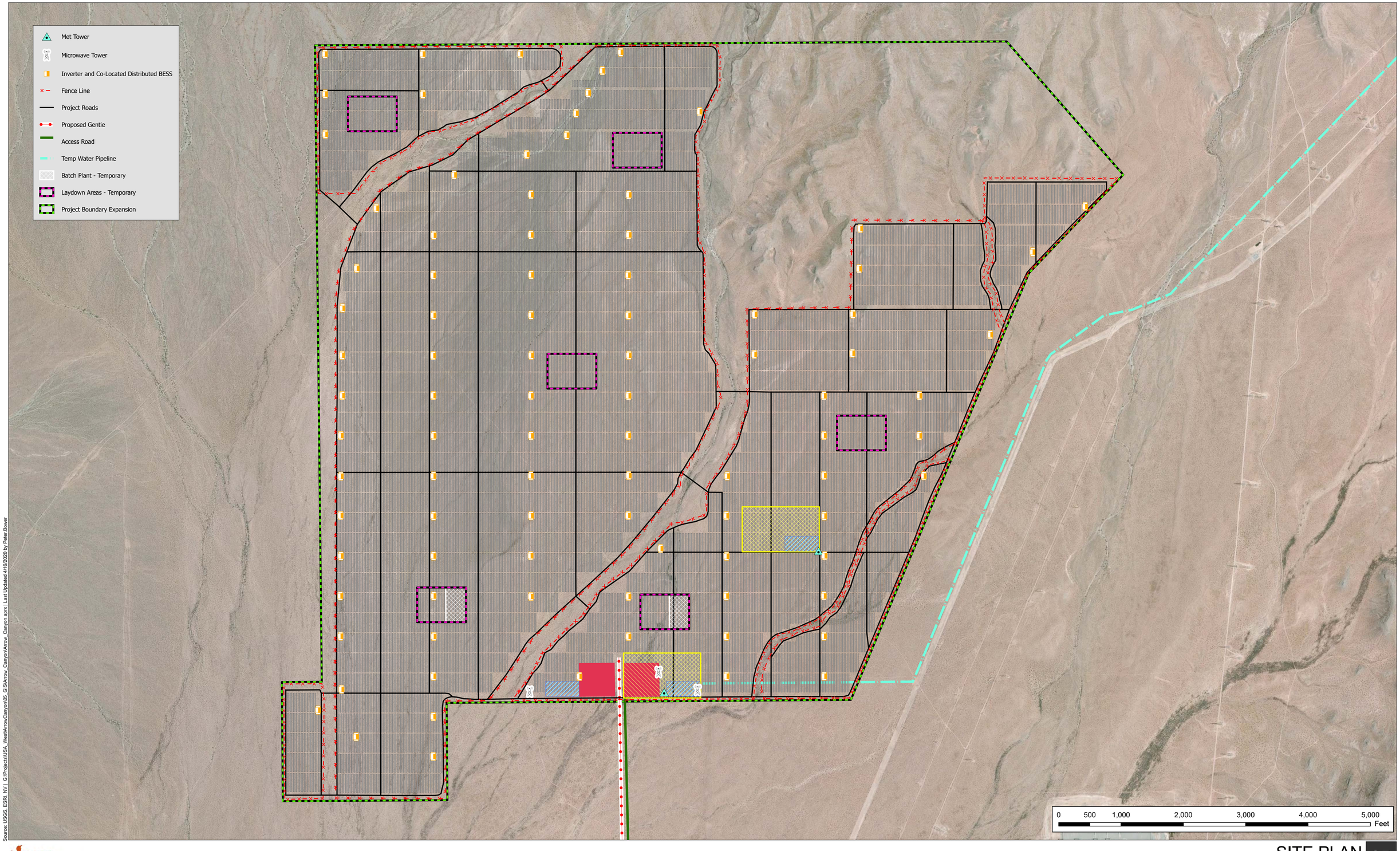


Source: USGS, ESRI, NV | G:\Projects\USA_WestArrowCanyon\05_GIS\Arrow_Canyon\Arrow_Canyon.aprx | Last Updated 4/16/2020 by Peter Bower

edf renewable energy

SITE PLAN SP

Arrow Canyon Solar Project | Clark County, Nevada

2. Raven Management

2.1 Introduction

The raven management measures provided in this section were designed to discourage the presence of common ravens and other avian scavengers by limiting the availability of anthropogenic (human-caused) food and water resources, as well as roost and nest site opportunities on the Arrow Canyon SPGF. Implementing the raven management measures will be the responsibility of the Project owner. Responsible parties, including Field Contact Representatives, biological monitors, etc. would be determined with agency approval prior to operation of the Project. References to "ravens" or "CORA" in this RCP should be interpreted to mean ravens and other avian scavengers.

2.2 Prevent Access to Anthropogenic Food and Water Resources

Ravens are opportunistic feeders with a varied diet and are known to make long-distance daily flights of up to 65 kilometers in a single day and several hundred kilometers over multiple days in search of food and water (Engel and Young, 1992; Boarman, 2003). Currently, garbage associated with existing land uses in the nearby city of Las Vegas provides a consistent local source of food for ravens.

Project construction activities are likely to attract ravens. To prevent the addition of food and water subsidies, as well as to avoid attracting ravens to the Project site, the Applicant will implement the following measures:

2.2.1 Garbage Management

All garbage associated with the Project during construction and operation will be contained in secure receptacles to prevent the introduction of food resources that could potentially attract or support ravens, coyotes, and other predators or scavengers. Secure, wildlife-proof self-closing waste bins will be used during construction for all organic waste. To reduce the possibility of ravens or other scavengers, such as coyotes, from ripping into bags and exposing the garbage, plastic bags containing garbage will not be left out for pickup. All such waste material must be in secure waste bins or dumpsters at all times.

2.2.2 Prohibitions on Intentionally Feeding Ravens

Project personnel will be prohibited from intentionally feeding ravens and other wildlife on and in the vicinity of the Project site. The Worker Environmental Awareness Program (WEAP) will inform project personnel that they are prohibited from intentionally feeding ravens and will explain why feeding wildlife is detrimental to wildlife, including sensitive species, in and around the Project site.

2.2.3 Limit Availability of Water

Water is a valuable resource in the desert and limited during the late spring and summer. Unnatural water sources such as retention basins have the potential to facilitate a higher raven population by providing water during the driest times of the year. In order to ensure that Project activities do not create an unnatural water source during construction, operation, maintenance, and decommissioning, water will be used in a manner that does not result in ponding or puddling, excluding evaporation ponds and storm water detention/retention basins, which will be designed to eliminate standing water within the basins within several days after even the worst expected storm events. Truck cleaning areas will be kept free of standing water during construction. Water used for dust suppression during construction will be applied at a rate that does not result in ponding or puddling. If PV module washing is necessary, it will be conducted in a

manner that avoids ponding or puddling of water during times that ravens are active (early morning and late afternoon). During construction and operations and maintenance, project personnel will immediately remove areas of ponding or puddling water.

2.3 Prevent Nesting

To prevent nesting on Project structures, the Applicant will implement the following measures:

1. **Limiting Raptor Enhancement Measures.** Utility pole construction will include raptor-friendly designs or retrofits (outlined in the Avian Power Line Interaction Committee guidelines [APLIC 2006]) that are intended to discourage or eliminate the potential for raptor nests that could also be used by ravens.

2. **Utility and building structures.** Acquire a MBTA Depredation Permit in order to remove any raven nests that are found on project infrastructure. Nest removal will be at the direction of the Project's Designated Biologist, in cooperation with U.S. Fish and Wildlife Service (USFWS).

3. **Hazing**. Focus on limiting raven attractants rather than hazing. Unless implemented properly, hazing could have unintended consequences. Therefore, hazing will be implemented only under the direction of USFWS in situations where it is considered the best course of action.

4. **Structure removal following decommission.** Elevated structures including utility poles will be removed when decommissioned and dormant.

5. **Perch deterrents.** To reduce perching along segments of the onsite collector line, perch deterrents may be installed during construction. Anti-perching and nesting devices are important tools for reducing the risk of avian electrocution and keeping the entire electrical system running smoothly. These deterrents also eliminate the use of transmission lines and transmission line towers as hunting perches for raptor species, limiting the predation of other avian species or animals that use surrounding vegetation for foraging and nesting. Exact locations of perch deterrent poles would be determined in consultation with wildlife agencies prior to construction of the collector line.

6. **Annual inspections.** Inspections of utility lines and other areas where raptors or corvids (crows and ravens) might nest would be conducted annually during the breeding season. 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 permissions via USFWS would be obtained. Nests would be removed for the life of the project.

2.4 Discourage Roosting

Power poles associated with utility line structures or substations can provide roosting opportunities in areas where roosting opportunities are otherwise limited. Elevated roost locations offer ravens a view of their surroundings and prey below. If ravens are strongly attracted to the Project site by available food and/or water sources, it will be difficult to eliminate or control perching on Project structures or other nearby structures, such as existing transmission line towers. Ravens can be very persistent, and even if Project design features effectively discourage perching on the Project site, ravens attracted to the area will likely find other perching opportunities immediately adjacent to the Project site. Anti-perching activities, therefore, are more focused on preventing activities that will attract ravens to the Project vicinity (Boarman 2002), which include:

- **Roost prevention as a contingency.** To avoid the introduction of new roost and nest locations for ravens (and consequently non-target avian species), the Applicant will ensure perch enhancements are not installed. The SPGF will be monitored to identify frequently used locations. Contingency measures will be implemented on a case-by-case basis, in consultation with BIA, when it becomes apparent that a particular location is favorable for daytime perches or evening roosting. This could include, for example, installation of triangles, plastic owls, and/or spikes to discourage nesting, per the APLIC Guidelines (APLIC 2006).
- **Structure removal following decommissioning.** All Project-related elevated structures will be removed when the Project is decommissioned.
- **Limit speed limits to under 25 mph.** This would reduce the potential for roadkill, which attracts birds and increases roosting.

3. Raven Monitoring and Reporting

3.1 Monitoring

Raven monitoring will be conducted following the construction of the SPGF. The objective of the surveys will be to characterize raven presence in the Project vicinity and to monitor abundance and behavior in those areas over time. The purpose of the surveys will be to identify the local sources of human-created resources and raven activity relative to the Project. The investigation will consist of driving surveys.

The roads will be driven slowly (10 mph). Binoculars and spotting scopes will be used to observe raven activity within two kilometers of the site. All raven observations will be documented, including date, time, location, habitat, number of individuals, and behavior, as well as locations of occupied and potential nests. Survey visits will occur once monthly during the breeding season (February to August) the year following completion of construction for a total of 3 years and once annually thereafter for the duration of facility operations. Each survey visit will last two days. Each day the survey route will be driven once in the early morning (starting 30 minutes prior to sunrise), a second time in the midday (starting between noon and 2 p.m.), and a third time in the evening (completed within one hour following sunset).

If a raven or other avian scavenger nest is located, it will be monitored for signs of desert tortoise predation, if accessible. The desert tortoise mortality monitoring will cover a 30-meter radius from the nest location. This area will be walked with 10-meter belt-transects. The location of all desert tortoise carcasses or other sign of predation will be mapped and photographed and reported to the USFWS within 48 hours if dead tortoises are found. Transects will be walked twice per month for as long as the nest remains active.

Incidental reporting of raven or nest sightings will also occur by biologists on the Project site conducting clearance surveys, monitoring construction activity, monitoring environmental compliance, translocating desert tortoise, and monitoring translocated desert tortoise. Biologists will be instructed to document raven observations during those surveys. Incidental raven or desert tortoise observations will be included in the monitoring reports.

3.2 Reporting

The Applicant will submit monitoring summary reports to the BIA and USFWS on an annual basis. The report will include:

- The number and behavior of observed ravens
- Raven nest and perch locations
- Results of the management techniques
- The observed effectiveness of the techniques in minimizing raven presence
- Suggestions for improving raven management
- Wildlife mortality attributed to predators

Observations of raven predation of desert tortoise (including sign) and occupied raven nests will be reported to the designated contacts at the BIA and USFWS by an electronic mail message within two days of the observation.

3.3 Adaptive Management

The agencies will review the results of raven control efforts and in cooperation with the Project owner will determine if changes in the plan are warranted following the first year of commercial operation of the Project. If the agencies determine that the raven management program is effective, and the potential for ravens to adversely affect the local wildlife population is less than significant, then the raven surveying and reporting requirement may be discontinued. Components of the Raven Control Plan, such as preventing access to anthropogenic food and water resources, preventing nesting, and discouraging roosting will remain effective throughout the lifetime of the Project.

4. References

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. 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. 2003. Managing a subsidized predator population: reducing common raven predation on desert tortoises. *Environmental Management*. 32:205-217.

Engel, K. A. and L. S. Young. 1992. Movements and habitat use by Common Ravens from roost sites in southwestern Idaho. *Journal of Wildlife Management* 56: 596-602.

Appendix K

Cultural Resources Consultation Letters

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

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 accompanying 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, per 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 for the Arrow Canyon Solar Project (Project No. 2019-109)**, on the Moapa River Indian Reservation.

The project includes and expands upon a previous project for which we successfully completed the consultation process with your office, RES Americas Moapa Solar Energy Center ([RES Americas], [SHPO Undertaking #2013-2452]). That solar project was not built. The current undertaking, proposed by Arrow Canyon Solar, LLC (ACS), a subsidiary of EDF Renewables Development, Inc., seeks to expand the original 850-acre lease to encumber a lease study area of approximately 2,683 acres. Up to 2,200 acres would be used for constructing, maintaining, and ultimately decommissioning a 200-megawatt solar energy generating facility using photovoltaic technology and battery storage.

The proposed, expanded undertaking is referred to as the Arrow Canyon Solar Project (ACSP). The previously-approved main access road, 230-kilovolt generation tie-in line, and water pipeline would remain a part of the ACSP project. These would be unchanged and would be developed as analyzed in the previous Environmental Impact Statement (EIS), documented in the extant Record of Decision (ROD), and described in the Bureau of Land Management (BLM) right-of-way agreements. Since the rights-of-way for these linear corridors were approved by the BLM as part of the previous RES Americas project, there is no action before BLM for the ACSP: the only federal action is BIA approval of a lease.

The expansion of the solar facility lease from 850 to 2,200 acres would result in "substantial changes to the proposed action that are relevant to environmental concerns," pursuant to 40 CFR 1502.9(c)(1)(i). Because the proposed expansion could result in additional environmental effects, beyond the range of effects analyzed in the initial EIS, a Supplemental EIS is being developed to evaluate the proposed expansion.

Pursuant to 36 CFR 800.3, we wish to initiate the consultation process for the above-described undertaking with the Nevada State Historic Preservation Office (SHPO). We are writing to request your views, and to consult regarding the following prescribed steps:

Involving the public pursuant to 36 CFR 800.3(e): The BIA published a Notice of Intent to prepare the Supplemental EIS for the undertaking in the *Federal Register* on January 30, 2020. In addition, notices were placed in local newspapers, and two public scoping meetings were held for the Project: one on the Moapa River Indian Reservation, on February 25, 2020, and the other in Las Vegas, Nevada, on February 26, 2020. We plan to facilitate continued public involvement, as appropriate, while developing the Supplemental EIS. As part of the National Environmental Policy Act review process, we will employ BIA 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): Aside from 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), the project applicant ACS, the BLM (Las Vegas Field Office), and the National Park Service (NPS). Pursuant to 36 CFR 800.2(c)(2)(ii), we presently are approaching other Native American tribes in the region that may attach religious and cultural significance to historic properties that may be affected by the proposed undertaking or the project area. Pursuant to 36 CFR 800.2(c)(5), we also shall approach the Old Spanish Trail Association.

Determining the Area of Potential Effects (APE) pursuant to 36 CFR 800.4(a)(1): We presently consider the direct APE to include the parcel of approximately 2,200 contiguous acres, within a 2,683-acre lease study area, for the proposed lease. As noted in the enclosures, we propose an indirect APE that extends 5 miles from the proposed solar field or the visual horizon, whichever is closer.

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 prepare and submit an archaeological survey report for your review that covers the proposed lease area and indirect APE. We have enclosed a map that will be used to identify areas in the indirect APE from which the undertaking may be visible.

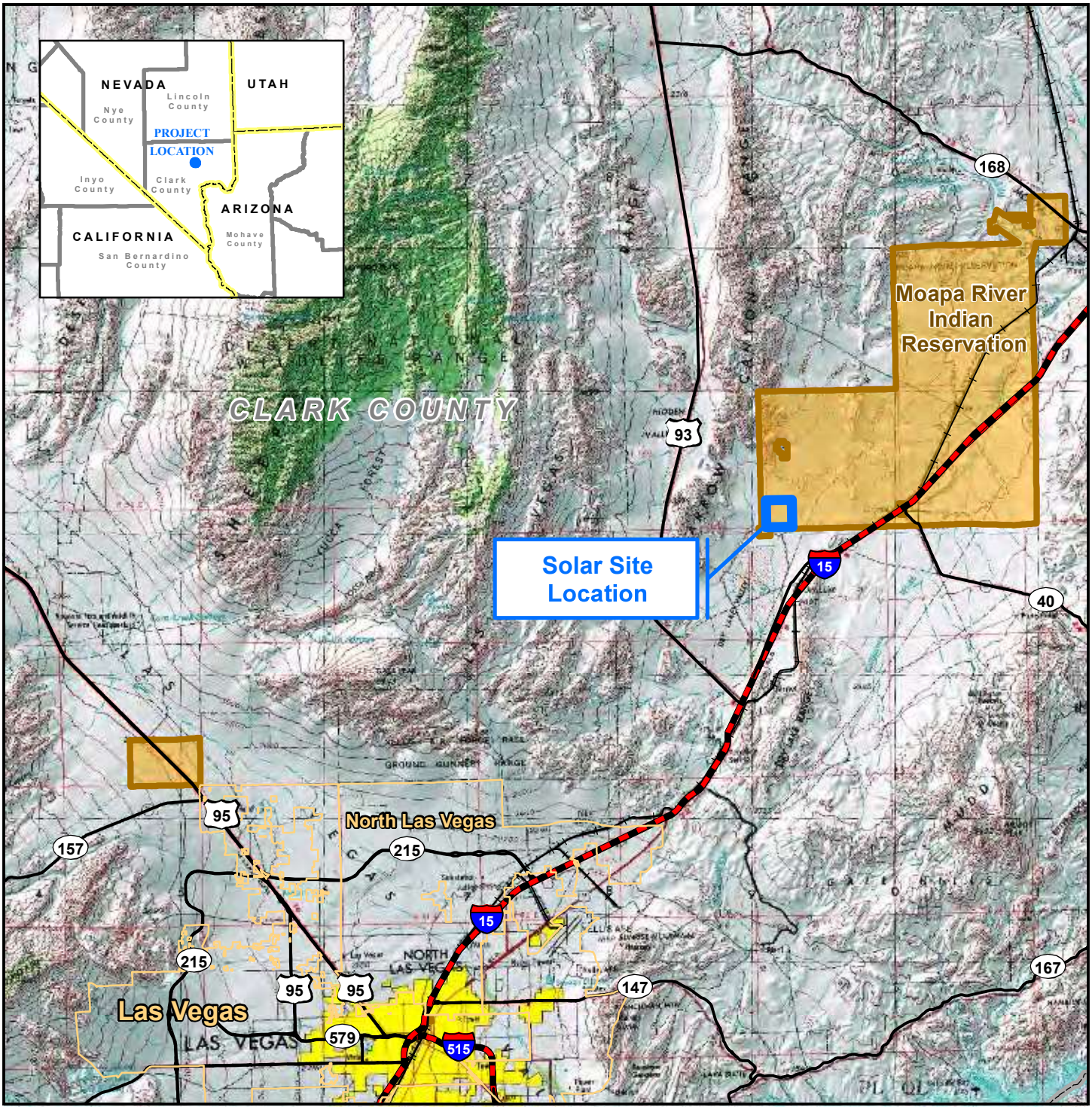
We look forward to your views on these steps and additional efforts we may employ to satisfy our responsibilities as prescribed by the NHPA. If there are any questions, please contact Mr. Garry J. Cantley, Regional Archeologist, at (602) 379-6750, extension 1256, or by email at Garry.Cantley@bia.gov.

Sincerely,

Rodney McVey
Deputy Regional Director - Trust Services

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 Spec., Nat'l Trails System-Intermtn. Reg., NPS (w/enc)
Director, Solar Development, EDF Renewables (w/enc)
Regional Realty Officer, WRO (w/enc)



Legend

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

Jurisdictional Land Ownership

- Indian Reservation

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Miles

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

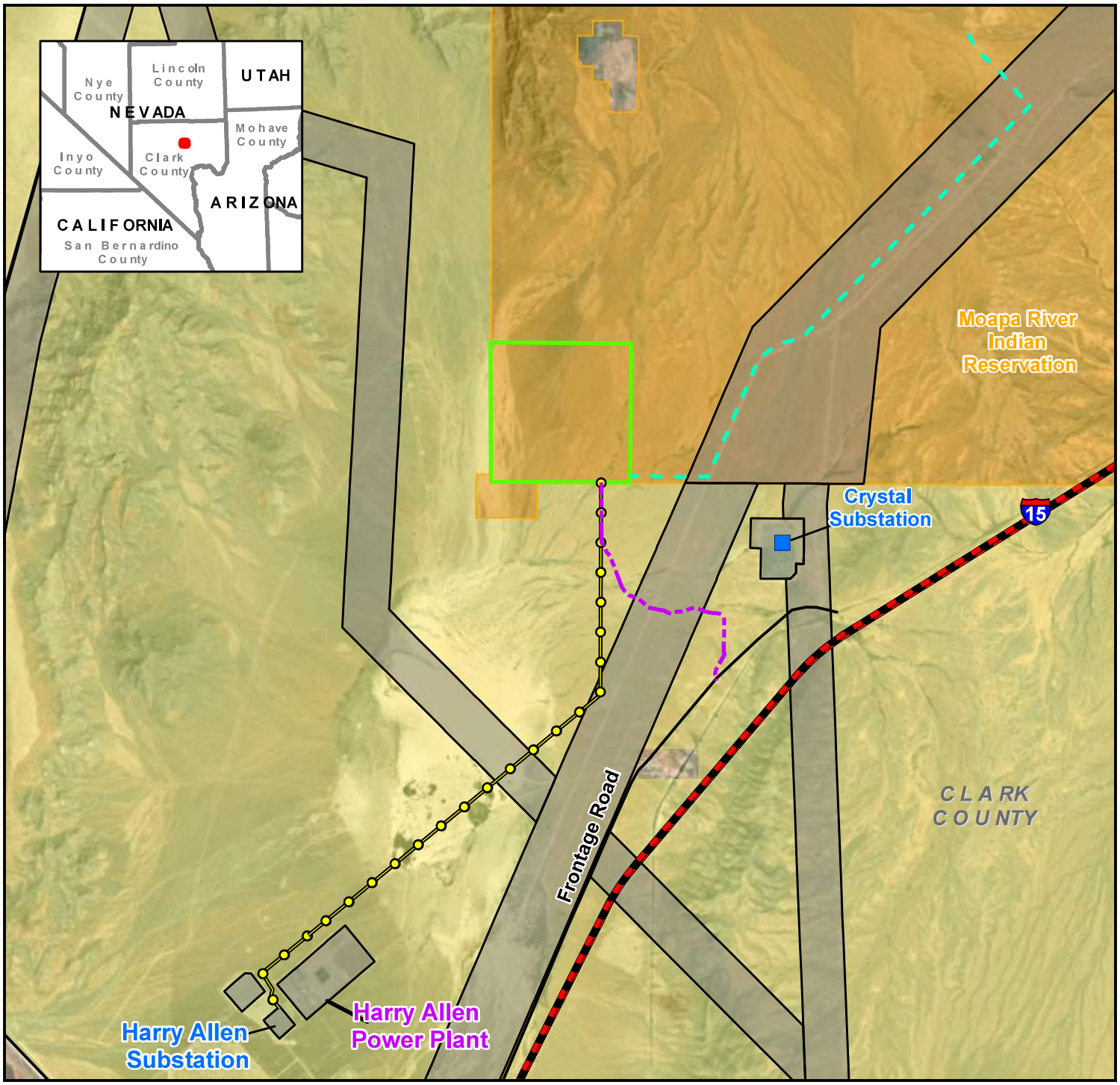
Arrow Canyon Solar Project

FIGURE 1-1
PROJECT LOCATION

Map Extent: Clark County, Nevada

Date: 06-07-13		Author: djb

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



Project Components

- Gen-Tie - Approved
- Access Road - Approved
- Water Pipeline - Approved
- Original MSEC Boundary - Approved

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

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Miles

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

ARROW CANYON SOLAR PROJECT

Figure 1-2
Originally Approved MSEC Project

Map Extent: Clark County, Nevada

Date: 02-17-20 | Author: rnc

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

Honorable Dennis Patch
Chairman, Colorado River Indian Tribes
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 for the Arrow Canyon Solar Project (Project No. 2019-109)**, on the Moapa River Indian Reservation. The undertaking can be characterized as the construction of a 200-megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,683 acres on land of the Moapa Band of Paiute Indians.

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, Arrow Canyon Solar, LLC (project proponent), Bureau of Land Management (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 your community 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,

Rodney McVey
Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Tribal Historic Preservation Officer, CRIT (w/enc)
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Reg., NPS
Director, Solar Development, EDF Renewables
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

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 about the proposed project: **approval of a lease for the Arrow Canyon Solar Project (Project No. 2019-109)**, on the Moapa River Indian Reservation. The undertaking can be characterized as the construction of a 200-megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,683 acres on land of the Moapa Band of Paiute Indians.

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, Arrow Canyon Solar, LLC (project proponent), Bureau of Land Management (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 your community 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,

Rodney McVey
Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency (w/enc)
Attn: Environmental Coordinator
Chairman, Moapa Business Council (w/enc)
Chairperson, Moapa Cultural Committee (w/enc)
Director, Cultural Center, Chemehuevi Indian Tribe (w/enc)
Field Manager, Las Vegas Field Office, BLM (w/enc)
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Reg., NPS (w/enc)
Director, Solar Development, EDF Renewables (w/enc)
Regional Realty Officer, WRO (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

Honorable Timothy Williams
Fort Mojave Indian Tribe
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 about the proposed project: **approval of a lease for the Arrow Canyon Solar Project (Project No. 2019-109)**, on the Moapa River Indian Reservation. The undertaking can be characterized as the construction of a 200-megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,683 acres on land of the Moapa Band of Paiute Indians.

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, Arrow Canyon Solar, LLC (project proponent), Bureau of Land Management (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 your community 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,

Rodney McVey
Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Director, Aha Makav Cultural Society (w/enc)
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Reg., NPS
Director, Solar Development, EDF Renewables
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

Honorable Timothy L. Nuvangyaoma
Chairman, Hopi Tribe
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 for the Arrow Canyon Solar Project (Project No. 2019-109)**, on the Moapa River Indian Reservation. The undertaking can be characterized as the construction of a 200-megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,683 acres on land of the Moapa Band of Paiute Indians.

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, Arrow Canyon Solar, LLC (project proponent), Bureau of Land Management (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 your community 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,

Rodney McVey
Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Superintendent, Hopi Agency (w/enc)
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Tribal Historic Preservation Officer, Hopi Tribe (w/enc)
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Reg., NPS
Director, Solar Development, EDF Renewables
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

Honorable Damon R. Clarke
Chairman, Hualapai Tribe
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 Tribe about the proposed project: **approval of a lease for the Arrow Canyon Solar Project (Project No. 2019-109)**, on the Moapa River Indian Reservation. The undertaking can be characterized as the construction of a 200-megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,683 acres on land of the Moapa Band of Paiute Indians.

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, Arrow Canyon Solar, LLC (project proponent), Bureau of Land Management (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 your community 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,

Rodney McVey
Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Tribal Historic Preservation Officer, Hualapai Tribe (w/enc)
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Reg., NPS
Director, Solar Development, EDF Renewables
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

Honorable Ona Segundo
Chairwoman, Kaibab Band of Paiute Indians
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 about the proposed project: **approval of a lease for the Arrow Canyon Solar Project (Project No. 2019-109)**, on the Moapa River Indian Reservation. The undertaking can be characterized as the construction of a 200-megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,683 acres on land of the Moapa Band of Paiute Indians.

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, Arrow Canyon Solar, LLC (project proponent), Bureau of Land Management (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 your community 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,

Rodney McVey
Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Director, Cultural Resources, Kaibab Band of Paiute Indians (enc)
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Reg., NPS
Director, Solar Development, EDF Renewables
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

Honorable Curtis Anderson
Chairman, Las Vegas Band of Paiute Indians
One Paiute Drive
Las Vegas, Nevada 89106

Dear Chairman Anderson:

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 Band of Paiute Indians about the proposed project: **approval of a lease for the Arrow Canyon Solar Project (Project No. 2019-109)**, on the Moapa River Indian Reservation. The undertaking can be characterized as the construction of a 200-megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,683 acres on land of the Moapa Band of Paiute Indians.

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, Arrow Canyon Solar, LLC (project proponent), Bureau of Land Management (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 your community 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,

Rodney McVey
Deputy Regional Director - Trust Services

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. Reg., NPS
Director, Solar Development, EDF Renewables
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

Honorable Tamra Borchardt-Slayton
Chairwoman, Paiute Indian Tribe of Utah
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 for the Arrow Canyon Solar Project (Project No. 2019-109)**, on the Moapa River Indian Reservation. The undertaking can be characterized as the construction of a 200-megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,683 acres on land of the Moapa Band of Paiute Indians. The proposed undertaking would 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, Arrow Canyon Solar, LLC (project proponent), Bureau of Land Management (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 your community 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,

Rodney McVey
Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Cultural Resources Director, PITU (w/enc)
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Reg., NPS
Director, Solar Development, EDF Renewables
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

Honorable Paul Ostapuk
President, Old Spanish Trail Association
P.O. Box 3532
Page, Arizona 86040

Dear President Ostapuk:

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 for the Arrow Canyon Solar Project (Project No. 2019-109)**, on the Moapa River Indian Reservation. The undertaking can be characterized as the construction of a 200-megawatt solar photovoltaic electricity generation facility on the Moapa River Indian Reservation. The ground lease for the solar facility would encumber up to 2,683 acres on land of the Moapa Band of Paiute Indians.

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, Arrow Canyon Solar, LLC (project proponent), Bureau of Land Management (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 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,

Rodney McVey
Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Executive Director, OSTA (w/enc)
Field Manager, Las Vegas Field Office, BLM
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Reg., NPS
Director, Solar Development, EDF Renewables
Regional Realty Officer, WRO

NEVADA
STATE HISTORIC PRESERVATION OFFICE

Department of Conservation and Natural Resources

Steve Sisolak, Governor
Bradley Crowell, Director
Rebecca L. Palmer, Administrator, SHPO

May 19, 2020

Rodney McVey
Deputy Regional Director – Trust Services
U.S. Department of the Interior
Bureau of Indian Affairs
Western Regional Office
2600 North Central Avenue
Phoenix, Arizona 85004-3008

Re: Arrow Canyon Solar, LLC.: Approval of a Lease for the Arrow Canyon Solar Project on the Moapa River Indian Reservation, Clark County, NV (Project # 2019-109 / Undertaking #2020-6261)

Dear Mr. McVey:

The Nevada State Historic Preservation Office (SHPO) has reviewed the subject documents received April 20, 2020 in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

Due to COVID-19, our office has accepted the Bureau of Indian Affairs' (BIA) electronic submission for Section 106 review. Please note that our office requests a hard copy of this submittal to be mailed when regular business hours and conditions resume. The SHPO looks forward to receipt of all hard copy materials for our administrative record.

Project Description
The SHPO understands this undertaking to be for the lease of 2,200 acres for the Arrow Canyon Solar Project, including the construction of the project (e.g., 200-megawatt solar energetic generating facility and associated infrastructure), maintenance, and ultimately decommissioning of the facility.

Area of Potential Effect (APE)
The BIA has determined that all direct physical effects as a result of this undertaking will be contained within a 2,200-acre area. Furthermore, the BIA has determined that all visual effects will be contained within a 5-mile area surrounding the 2,200 acres based upon the analysis completed for the previous proposed solar energy project in this area (UT# 2013-2452).

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

Consulting Parties and Public Consultation
The SHPO notes that consultation with the public, tribes, and representatives of organizations that have a demonstrated interest in historic properties is proposed in keeping with 36 CFR §800.2(c)(2)(i)(B), 36 CFR §800.2(c)(5), and 36 CFR §800.3(f)(2). 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 e-mail at jaxsom@shpo.nv.gov.

Sincerely,

Robin K. Reed
Deputy State Historic Preservation Officer

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

JUL 21 2020

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:

As Agency Official for purposes of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), as codified at Title 36 Code of Federal Regulations (CFR) Part 800, the Bureau of Indian Affairs (BIA) wishes to consult with you regarding the proposed undertaking, **approval of a lease for the Arrow Canyon Solar Project and associated infrastructure, Clark County, Nevada (Project No. 2019-109; SHPO Undertaking No. 2020-6261)**. This undertaking would occur on the Moapa River Indian Reservation of the Moapa Band of Paiute Indians (Moapa Band) (Enclosures 1—2).

Description of Undertaking

As noted in our initial letter to your office dated April 20, 2020, the present undertaking includes and expands upon a previous project for which the BIA successfully completed consultation with your office (Enclosures 3—6). The previous undertaking (SHPO Undertaking No. 2013-2452), known as the *RES Americas Moapa Solar Energy Center* (MSEC), was never built. The current undertaking is known as the *Arrow Canyon Solar Project* (ACSP). Its proponent is Arrow Canyon Solar, LLC (ACS), a subsidiary of EDF Renewables Development, Inc.

The current proposed undertaking can be characterized as follows:

- expansion of the original MSEC 850-acre lease to encumber a lease study area of approximately 2,683 acres;
- development of up to 2,200 acres of the proposed lease study area; and
- construction, maintenance, and eventual decommissioning of a 200-megawatt solar energy generating facility using photovoltaic technology and battery storage.

The ACSP's main access road, 230-kilovolt generation tie-in line, and water pipeline were previously approved during the 2013 consultation process associated with the MSEC (Enclosures 4—6). These elements would be incorporated, without change, into the current ACSP. Their development and operation were analyzed in the previous Environmental Impact Statement (EIS),

documented in the extant Record of Decision, and described in the Bureau of Land Management (BLM) right-of-way (ROW) agreements. Because the ROWs for these linear corridors were approved by the BLM as part of the previous MSEC, the ACSP requires no action on the part of BLM. The present undertaking only involves BIA approval of the proposed lease expansion.

Environmental Impacts and Compliance

In accordance with 40 CFR § 1502.9(c)(1)(i), the BIA has determined that the proposed expansion of the solar facility lease from 850 to 2,683 acres would result in "substantial changes to the proposed action that are relevant to environmental concerns." Because the proposed expansion could result in additional environmental effects beyond the range of those analyzed in the initial EIS, a Supplemental EIS is being developed to evaluate the proposed expansion.

Pursuant to 36 CFR § 800.3, we wish to continue the consultation process for the above-described undertaking with the Nevada State Historic Preservation Office (SHPO) (Enclosures 7—8). More specifically, we request your review of and concurrence with the adequacy of the enclosed reports and the determinations of eligibility and finding of effect described below.

Consulting Parties

Besides our respective offices, additional consulting parties for the undertaking include the Moapa Band, ACS, and the National Park Service (NPS). Pursuant to 36 CFR § 800.2(c)(2)(ii) and 800.3(f), the BIA has notified by letter the following to assess their interest in participating as consulting parties: Chemehuevi Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Hopi Tribe, Hualapai Tribe, Kaibab Band of Paiute Indians, Las Vegas Band of Paiute Indians, Paiute Indian Tribe of Utah, and the Old Spanish Trail Association (OSTA). Consultation was initiated through official BIA correspondence on April 4, 2020. The Hopi Tribe responded to notify us that they defer to the Moapa Band. The OSTA advised us by letter dated June 26, 2020, that they wish to participate as a consulting party.

Area of Potential Effects

In accordance with 36 CFR § 800.16(d), the BIA has defined the area of potential effects (APE) for the present undertaking. This area is subdivided into a *direct* APE and an *indirect* APE. The former consists of the proposed study lease, where there exists the potential for project activities to physically affect cultural resources. The latter consists of an adjacent buffer zone wherein project activities may affect the ambient visual, auditory, atmospheric, or olfactory attributes of the environment. The direct APE is coterminous with the proposed 2,683-acre study lease. The indirect APE includes all land within 5 miles of the direct APE or visual horizon. The 5-mile buffer area was defined based on the project description, landscape, and effective sensory capabilities, following discussions with your office and the successful application of similar APEs with other, nearby undertakings.

The direct APE and indirect APE are located in portions of Sections 33—36 of Township (T) 15 South (S), Range (R) 63 East (E); Sections 31—36 of T15S, R64E; Sections 1—5 and 8—36 of T16S, R63E; Sections 1—36 of T16S, R64E; Sections 6, 7, 17—20, and 29—32 of T16S, R65E; Sections 8—17, 20—28, and 33—36 of T17S, R63E; Sections 7—36 of T17S, R64E; Sections 7, 8, 17—20, 30, and 31 of T17S, R65E; Sections 1 and 2 of T18S, R63E; and Sections 3—6 of

T18S, R64E, all relative to the Mount Diablo Baseline and Meridian. The comprehensive APE is depicted on U.S. Geological Survey topographic maps (7.5-minute series) of the Arrow Canyon SE (NV), Cottonwood Pass (NV), Dry Lake (NV), Moapa Peak SE (NV), Moapa West (NV), Muddy Peak (NV), and Ute (NV) quadrangles. All portions of the direct APE are located on lands of the Moapa Band, within the Moapa River Indian Reservation, in Clark County, Nevada. Some portions of the indirect APE are located on the Moapa River Indian Reservation, while other portions are on federal lands administered by the BLM.

Cultural Resource Inventory Efforts

In consultation with the consulting parties, the BIA has made a reasonable and good faith effort to carry out appropriate identification efforts as prescribed at 36 CFR § 800.4. The agency has gathered sufficient information to identify cultural resources within the comprehensive APE, evaluate their eligibility for the National Register of Historic Places (National Register), and make a determination of project effect upon historic properties. The direct APE has been subjected in its entirety to intensive (Class III) pedestrian survey. The Indirect APE has been subjected, in its entirety, to Class I archival research to identify previously-recorded cultural resources.

A total of 132 cultural resource investigations have been conducted within the area encompassed by the direct and indirect APE. Three of these, completed in furtherance of the present undertaking, are described below. The remaining 129 are synopsized by Owen et al. (2020:Table 3).

Two cultural resource surveys were completed in 2013, in conjunction with the MSEC. These efforts were detailed in the reports *An Archaeological Survey of Approximately 1,850 Acres for the Moapa Solar Energy Center, Clark County, Nevada* (Baker and Harper 2013) and *Addendum Class III Archaeological Survey of Approximately 108 Acres for the Moapa Solar Energy Center, Clark County, Nevada* (Harper and Anderson 2013). Your office previously concurred with the adequacy of these reports (Enclosures 4—6).

In conjunction with the current undertaking, another Class III survey was recently completed, as described in the report *Class III Cultural Resource Inventory of Approximately 1,843.1 Acres for the Arrow Canyon Solar Project, Near Crystal, Clark County, Nevada* (Owen et al. 2020), which is enclosed for your review and comment (Enclosure 9).

The efforts reflected in the report by Owen et al. (2020) include an evaluation of indirect effects. This analysis is detailed in *Indirect Effects' Analysis of the Proposed Arrow Canyon Solar Project, Clark County, Nevada* (Owen et al. 2020: Appendix E), a copy of which is provided here as Enclosure 10 for your review and comment.

In conjunction with the Eagle Shadow Solar Project, an adjacent but unrelated undertaking (SHPO No. 2019-5682), the BIA had evaluated a potentially-historic AT&T microwave relay tower that is located in the current project's indirect APE. This assessment is described in *National Register of Historic Places (NRHP) Eligibility Evaluation of the Microwave Site (SHPO Resource No. S2160/Agency No. CRNV-53-9463) near Crystal, Clark County, Nevada* (Levstik 2019).

Cultural Resources Identified and Eligibility

In the course of executing the above-referenced 132 investigations identified during the Class I review, archaeologists recorded a total of 179 archaeological sites. Just three of these lie within or intersect with the current undertaking's direct APE and are listed in Table 1.

During the course of the most recent survey, researchers encountered 22 historic cadastral markers (Owen et al. 2020:Table 7) and four isolated occurrences (Owen et al. 2020:Table 8), each of which the BIA has determined to be ineligible for inclusion in the National Register.

Within the current undertaking's direct APE, Owen et al. (2020) encountered one previously-recorded site (26CK6149) and two previously-unrecorded sites: 26CK10785 and 26CK10786.

> Site 26CK6149 consists of a broken pottery vessel on the Moapa River Indian Reservation. In 2000, the original recorders counted 11 surface sherds, which they identified as having come from a single Las Vegas Buffware vessel. During the most recent survey, Owen et al. (2020) located eight sherds in the same location, believing them to have come from a single Shinarump series vessel. Each sherd was analyzed and photographed in the field. There is no indication of subsurface deposits. The BIA has determined that site 26CK6149 is **not eligible** for the National Register.
>
> Site 26CK10785 consists of a prehistoric lithic scatter on the Moapa River Indian Reservation. The surface assemblage includes a total of 55 surface artifacts, two of which are bifacial tools. No indications of subsurface deposits were noted. The lithic material is local to the area. All pertinent analyses were performed in the field. The BIA has determined that site 26CK10785 is **not eligible** for the National Register.
>
> Site 26CK10786 consists of an historic trash scatter on the Moapa River Indian Reservation. The surface assemblage includes a total of 13 empty cans. The refuse cannot be associated with a particular person, group, or event, and none of the cans are rare or particularly diagnostic. The artifacts were analyzed and recorded in the field. The BIA has determined that site 26CK10786 is **not eligible** for the National Register.

Using a variety of sources, a total of 176 previously recorded sites were identified within the indirect APE. Using the protocol we successfully implemented for the previous Eagle Shadow Solar Project, we proceeded to address these sites using the following criteria established to assist us in determining which sites to visit:

- Unevaluated rock shelters (with cultural material recorded on site form) that are visible from and face toward 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 were not 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.

Using these criteria, we identified eight previously-recorded sites with the potential for visual effects resulting from the project (Table 2). Owen et al. (2020:Appendix E) visited all eight site locations to assess potential visual effects. Four of the sites (26CK1366, 26CK1367, 26CK1368, and 26CK1661) could not be relocated, despite considerable effort. Each consists of one or more rockshelters, with associated features and artifacts. The BIA suspects that these four sites, none of which have been evaluated for National Register eligibility, were misplotted at the time of their original recording. For the purpose of Section 106 consultation, all four are **treated as eligible** under criteria A, B, C, and D. The four remaining sites were relocated, and are synopsized below.

The Old Spanish Trail, also known as the Mormon Wagon Road, has been assigned site numbers 26CK3536 and 26CK3848. The site is **listed on the National Register**, under criteria A and D (No. 01000863). Both contributing and non-contributing segments have been identified within the indirect APE.

The Arrowhead Trail Highway, also known as Old Highway 91, has been assigned site numbers 26CK4958, 26CK4369, and 26CK7793. Within the indirect APE, the site includes segments that have been previously **determined eligible** for the National Register under criteria A and D. Other segments within the indirect APE have not been evaluated for National Register eligibility. For the purpose of Section 106 consultation, the unevaluated segments in the indirect APE are **treated as eligible**.

Site numbers 26CK4429 and 26CK5685 have been assigned to segments of the Union Pacific Railroad alignment (St. Thomas Branch) within the indirect APE. This resource is also known as the San Pedro, Los Angeles, and Salt Lake Railroad. This property, as a whole, has been **determined eligible** for the National Register under Criterion A. Some segments of the alignment have been evaluated individually, and in each case identified as contributing elements. The remainder have not been evaluated for contribution to National Register eligibility. For the purpose of Section 106 consultation, the unevaluated segments in the indirect APE are **treated as eligible.**

Structure number S2160 is an historic microwave relay tower, believed to have been constructed in the 1960s as part of AT&T's microwave network. (See Levstik 2019). For the present undertaking, BIA has elected to consider S2160 as unevaluated and **treated as eligible**.

Finding of Effect

No historic properties (*sensu* 36 CFR § 800.16[l][1]) have been identified within the undertaking's direct APE. A visual effects analysis was also performed for eight sites within the indirect APE. All eight site locations were visited. Four could not be relocated despite wide-ranging searches, and the BIA suspects these were misplotted. The other four were relocated and assessed for effects upon visibility. The consulting parties have considered the proposed undertaking's potential indirect effects, including visual, auditory, and atmospheric. We conclude that the undertaking will not alter the characteristics of these historic properties that make them eligible for the National

Register. This conclusion is based foremost on our simulations from numerous key observations points (KOP) of what the facility would look like before and after construction of the solar facility. As can be judged by the simulations from various and multiple perspectives provided in the enclosed report, we have determined that the indirect effects will be negligible and cause no adverse effects to these historic properties.

Based upon the above, and pursuant to 36 CFR 800.5(a), the BIA has applied the criteria of adverse effect and has determined that a finding of ***no adverse effect***, pursuant to 36 CFR § 800.5(b), is appropriate for the proposed undertaking.

Summary

The current undertaking's direct APE has been surveyed in its entirety, and is known to include three archaeological sites, each of which has been determined to be not eligible for the National Register. Thus, the undertaking will have no direct effects upon historic properties. A Class I inventory indicated that eight sites warranted further evaluation of indirect effects.

The BIA's determination of **no adverse effect** to historic properties will be included as part of the Supplemental EIS documentation being prepared for the proposed undertaking. As part of the National Environmental Policy Act review process, we are employing corresponding federal and tribal notification procedures for addressing our responsibilities as defined at 36 CFR 800.2(d).

As required at 36 CFR 800.5(c), we are submitting documentation of this finding and await your response within 30 days of receipt. We ask for your concurrence with our determinations of eligibility and effect. 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,

RODNEY MCVEY Digitally signed by RODNEY MCVEY Date: 2020.07.21 07:02:46 -07'00'

Rodney McVey
Deputy Regional Director - Trust Services

Enclosures

cc: Superintendent, Southern Paiute Agency
Attn: Environmental Coordinator
Chairman, Moapa Business Council
Chairperson, Moapa Cultural Committee
Field Manager, Las Vegas Field Office, BLM
Attn: Archeologist
Cultural Resource Specialist, Nat'l Trails System-Intermtn. Reg., NPS
Director, Solar Development, EDF Renewables
Regional Realty Officer, BIA WRO

Table 1. Cultural resources within or intersecting with the direct APE.

Site Information			
Number	**Age**	**Name / Description**	**Eligibility Recommendation**
26CK6149	Prehistoric	Pot-break, LV Buffware	Ineligible
26CK10785	Prehistoric	Lithics, 2 bifaces	Ineligible
26CK10786	Historic	Trash	Ineligible

Table 2. Sites in indirect APE with potential for visual effects.

Site Number	Age	Description	Eligibility (Criteria)	Effect
26CK1366	P	Rockshelter	Unevaluated; treated as eligible	Not relocated
26CK1367	P	Rockshelter	Unevaluated; treated as eligible	Not relocated
26CK1368	P	Rockshelter	Unevaluated; treated as eligible	Not relocated
26CK1661	P	Rockshelter	Unevaluated; treated as eligible	Not relocated
26CK3536 / 3848	H	Old Spanish Trail / Mormon Wagon Road	Listed (A, D); contributing and non-contributing segments	No adverse effect
26CK4429 / 5685	H	UPRR alignment	Unevaluated; treated as eligible	No adverse effect
26CK4958 / 4369 / 7793	H	Highway 91 / Arrowhead Trail	Unevaluated; treated as eligible	No adverse effect
S2160	H	AT&T relay tower	Unevaluated; treated as eligible	No adverse effect

June 26, 2020

Environmental Quality Services MS-620 EQS

Attn: Rodney McVey
Deputy Regional Director-Trust Services
Bureau of Indian Affairs
Western Regional Office
2600 North Central Avenue
Phoenix, Arizona 85004-3008

Garry J. Cantley
Regional Archeologist
Bureau of Indian Affairs
Western Regional Office
2600 North Central Avenue
Phoenix, Arizona 85004-3008
Garry.Cantley@bia.gov

Subject: Environmental Quality Services MS-620 EQS – Proposed Arrow Canyon and Southern Bighorn Solar Projects

Dear Mr. McVey and Mr Cantley,

This letter confirms the interest of the Old Spanish Trail Association (OSTA)[1] as a consulting party regarding the proposed approval of a lease for the Arrow Canyon Solar Project (Project No. 2019-109), and approval of two leases and concomitant rights-of-way (ROWs) for the Southern Bighorn Solar Project (Project No. 2019-124). Both of these projects are on the Moapa River Indian Reservation.

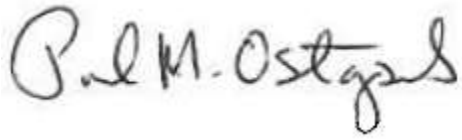
OSTA is an organization directly involved in management of the Old Spanish National Historic Trail (OSNHT) and associated cultural resources. These projects have the potential to impact this national trail corridor. Adverse impacts will need to be addressed and mitigated, as applicable.

We wish to emphasize that federal review of these projects mandate review of the National Historic Trails Act of 1968. The NTSA provisions are important considerations in addition to Section 106 of the National Historic Preservation Act (NHPA). To the greatest extent possible, our organization expects the BIA to manage the OSNHT so as to safeguard the nature and purposes of trail resources and in a manner that protects the values for which the components of the National Trail System Act were designated. This

includes recognizing the nationally significant scenic, historic, cultural, recreation, natural, and other landscape values inherent with the OSNHT trail corridor.

Should these projects gain agency approval, our organization would like to see the stakeholders provide funds for development of interpretive media products that could highlight the cultural significance of historic trails from a native American perspective and in particular give voice to the Moapa River community in this regard. These shared perspectives are important aspects of our national heritage and our organization would be interested in collaborating with others to accomplish this effort.

Thank you for contacting our organization. As the process moves forward, we look forward to contributing as a consulting party to these two proposed solar projects



Paul Ostapuk
President
Old Spanish Trail Association
postapuk@gmail.com
928.614.9655

[1]OSTA is a 501 (c) 3 organization whose mission is to study, preserve and protect, interpret and educate, and promote respectful use of the Old Spanish Trail (OST), the Old Spanish National Historic Trail (OSNHT) and closely related historic routes. OSTA is the designated volunteer organization for the OSNHT, recognized by both the National Park Service and BLM, under Section 11 of The National Trails System Act (NTSA) of 1968, as amended [16 USC 1250].

NEVADA
STATE HISTORIC PRESERVATION OFFICE

Department of Conservation and Natural Resources

Steve Sisolak, Governor
Bradley Crowell, Director
Rebecca L. Palmer, Administrator, SHPO

December 2, 2020

Rodney McVey
Deputy Regional Director – Trust Services
U.S. Department of the Interior
Bureau of Indian Affairs
Western Regional Office
2600 North Central Avenue
Phoenix, Arizona 85004-3008

Re: Arrow Canyon Solar, LLC.: Approval of a Lease for the Arrow Canyon Solar Project on the Moapa River Indian Reservation, Clark County, NV (BIA Project # 2019-109 / SHPO Undertaking #2020-6261)

Dear Mr. McVey:

The Nevada State Historic Preservation Office (SHPO) has reviewed the subject documents received April 20, 2020, July 22, 2020, October 13, 2020, October 15, 2020, and November 5, 2020 (from NPS via email) in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

Please see the SHPO letter dated August 20, 2020 for additional SHPO comments and review of this undertaking.

Project Description
The SHPO understands this undertaking to be for the lease of 2,200 acres for the Arrow Canyon Solar Project, including the construction of the project (e.g., 200-megawatt solar energetic generating facility and associated infrastructure), maintenance, and ultimately decommissioning of the facility.

Area of Potential Effect (APE)
The SHPO *previously concurred* on May 19, 2020, with the Bureau of Indian Affairs' (BIA) determination that this area of potential effect (APE) accounts for all potential effects that may result from this undertaking in keeping with 36 CFR §800.4(a)(1) and 36 CFR §800.16(d).

Identification and Evaluation of Historic Properties
Thank you for providing clarification on the location of the following historic properties (i.e., listed and previously determined eligible for listing in the National Register of Historic Places [NRHP]) and unevaluated cultural resources within the APE.

Direct Physical APE:
As a result of this clarification, the SHPO acknowledges that Segment 1 of the Old Spanish Trail (26CK6115) is not located within the direct physical APE established for this undertaking

Indirect Effects (Visual, Auditory, and Atmospheric):
Within the visual APE, the Old Spanish National Historic Trail/Mormon Wagon Road (26CK6115/26CK3848/26CK3536/NPS #01000863) was relocated for this undertaking. Contributing, unevaluated, and non-contributing segments of this listed property were identified within the established visual APE.

The following previously identified cultural resources were relocated within the visual APE: 26CK4429/26CK5685 (San Pedro, Los Angeles, and Salt Lake Railroad/Union Pacific Railroad), 26CK4958/26CK4369/26CK7793 (Highway 91/Arrowhead Trail), and S2160 (Relay Tower). The BIA has left these cultural resources unevaluated for NRHP-eligibility under all the Secretary's Significance Criteria (i.e., A-D, inclusive). The BIA is treating them as eligible for listing in the NRHP for the purpose of compliance with NHPA for this undertaking.

Consulting Parties and Public Consultation
The SHPO notes that consultation with the public, tribes, and representatives of organizations that have a demonstrated interest in historic properties has been initiated in keeping with 36 CFR §800.2(c)(2)(i)(B), 36 CFR §800.2(c)(5), and 36 CFR §800.3(f)(2).

The SHPO acknowledges receipt of the letter dated September 21, 2020 from the Old Spanish Trail Association (OSTA) to the BIA.

The National Park Service –Intermountain Trails Office (NPS) states in their November 5, 2020 email to the BIA that "... the Old Spanish Trail within the Arrow Canyon APE is not within the designated alignment of the Old Spanish National Historic Trail. Because this resource is not considered a part of the National Historic Trail, Trail Administration does not have any capacity to comment on the proposed solar project."

Finding of Effect
Thank you for providing maps of the following historic properties in relation to the established APE: the Old Spanish National Historic Trail/Mormon Wagon Road (26CK6115/26CK3848/26CK3536/NPS #01000863), San Pedro, Los Angeles, and Salt Lake Railroad/Union Pacific Railroad (26CK4429/26CK5685), Highway 91/Arrowhead Trail (26CK4958/26CK4369/26CK7793), and Relay Tower (S2160).

The SHPO further acknowledges receipt of maps keyed to the photographs and Key Observation Points (KOPs) to document potential visual effects. The photographs and KOPs as part of the visual

effects analysis appear to represent the historic properties as they exist within the APE except for the Old Spanish National Historic Trail/Mormon Wagon Road.

The SHPO notes that the photographs and KOPs used to document this undertaking's potential visual effects to the Old Spanish National Historic Trail/Mormon Wagon Road (OST) are clustered in the northernmost section of the OST and the APE. The exception is the group of photographs and KOPs #135 through 138. The undertaking appears to be visible in photographs and KOPs #135-138 as a grey line. It is not clear if this simulation accounts for the reflective surfaces that can occur with solar panels. Please clarify. In addition, the SHPO is requesting additional photos and KOPs for the segments of the OST south of KOPs #135-138. This missing documentation needs to be provided to understand the effect of this undertaking on the OST. This documentation is needed before the SHPO is able to comment on the finding of effect for this undertaking.

Should you have any questions concerning this correspondence, please contact Jessica Axsom at (775) 684-3445 or by e-mail at jaxsom@shpo.nv.gov.

Sincerely,

Robin K. Reed
Deputy State Historic Preservation Officer

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

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 is in response to your letter of December 2, 2020, regarding the Bureau of Indian Affairs (BIA) undertaking: **approval of a lease for the Arrow Canyon Solar Project (Project No. 2019-109); SHPO Undertaking No. 2020-6261)**, on the Moapa River Indian Reservation.

Your letter expressed some concerns that our simulations did not address impacts from reflective surfaces. Please be advised that it has been our intent for the simulations to provide an accurate representation of the proposed solar facility so we can best judge the effects for ourselves. As a result, it is fair to say the simulations are the best representation we can generate of the reflective surface of the solar panels. Please note that the panels are engineered to absorb as much light as possible and have an anti-reflective coating; thus, reflection is not considered to be a substantial issue.

The reason for the cluster of Key Observation Points (KOP) in the northernmost section of the Old Spanish Trail/Mormon Wagon Road (OST) is twofold. First, these KOPs are the closest to the project area and illustrate where the solar facility would be most visible. Due to the flat topography, the visibility of the project would be on the horizon line regardless of the KOP. Second, we are unable to find any intact trace of the OST toward the south (see Enclosure). The OST was plotted in this area using NVCRIS from data that was recorded in the 1990s. This area presently is heavily disturbed by commercial traffic, off-road vehicular damage, utilities installation, and erosion. As a result, any KOP location purported to represent the OST toward the south would be a guess at best. Moreover, the KOP would be from an area that probably would lack any integrity and not be a contributing element of the OST for the National Register of Historic Places.

As previously mentioned in our October 13, 2020 letter, we had verbal and written communication with the Old Spanish Trail Association (separate from the National Park Service) regarding any issues with effects to the OST. Nothing specific was brought to our attention and we feel we have fully satisfied our responsibilities in this regard.

Our original determination of ***no adverse effect*** pursuant to 36 CFR § 800.5(b) remains the same. We seek your concurrence with this finding.

If there are any questions, please contact Mr. Garry J. Cantley, Regional Archaeologist, at (602) 379-6750, extension 1256, or by email at Garry.Cantley@bia.gov.

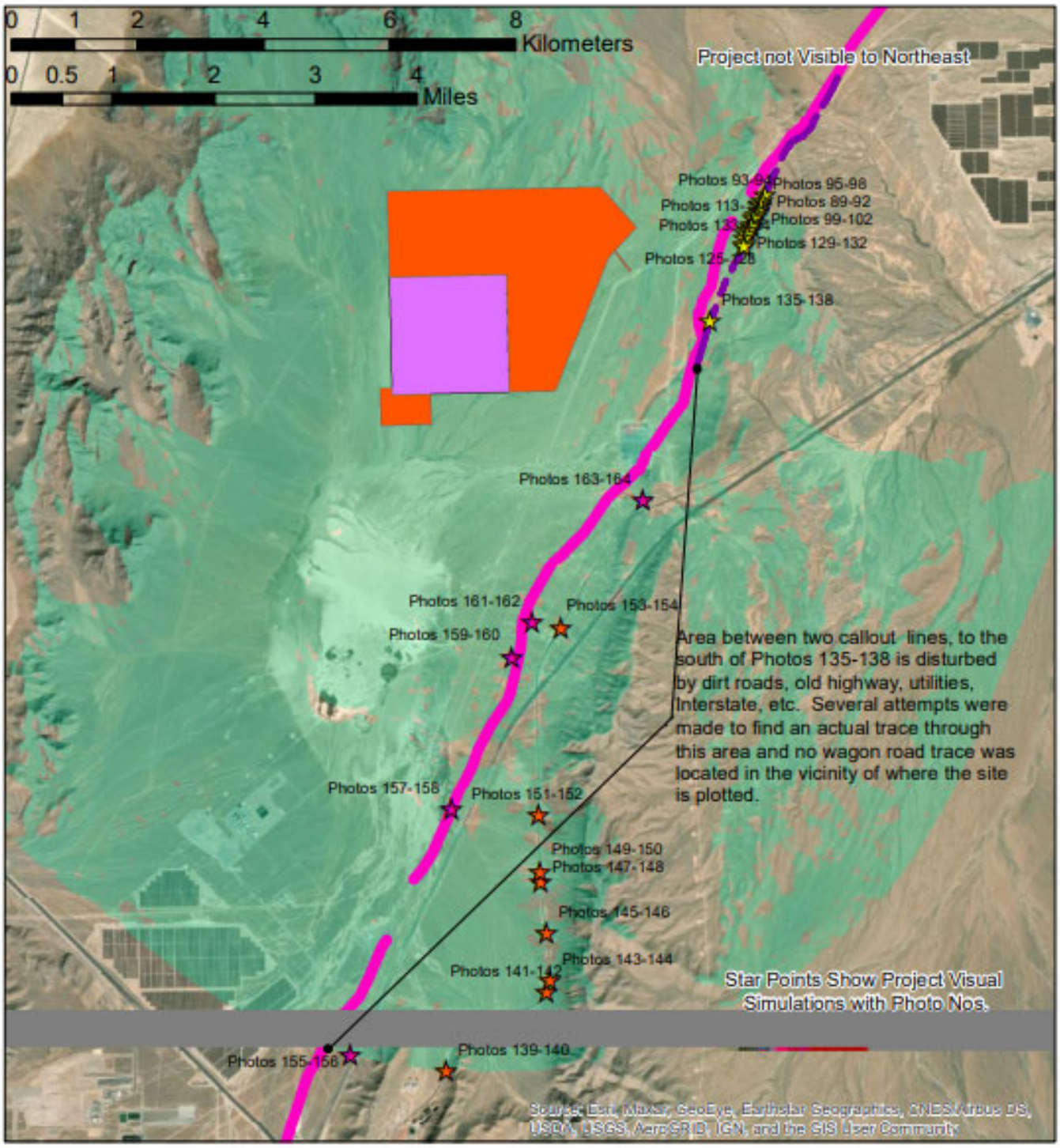
Sincerely,

NANCY JONES Digitally signed by NANCY JONES Date: 2020.12.03 16:51:23 -07'00'

Rodney McVey
Deputy Regional Director - Trust Services

Enclosure

cc: Superintendent, Southern Paiute Agency (w/enc)
Attn: Environmental Coordinator
Chairwoman, 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. Reg., NPS (w/enc)
Director, Solar Development, EDF Renewables (w/enc)
Regional Realty Officer, WRO (w/enc)



Arrow Canyon Solar BIA Project 2019-109
CK3848 CK3536 - Mormon Wagon Rd, Old Spanish Tr.
All Visual Simulations that Apply

The NATIONAL_REGISTER_RESOURCES is the current NVCRIS plot for the site.

Knight & Leavitt Associates, Inc.
Map by A. J. Thompson December 3, 2020

- CK3536 - Known Segments
- NATIONAL_REGISTER_RESOURCES
- Direct APE (Project Area)
- Previously Surveyed Parcel
- Visibility from Project

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Department of Conservation and Natural Resources

Steve Sisolak, Governor
Bradley Crowell, Director
Rebecca L. Palmer, Administrator, SHPO

December 4, 2020

Rodney McVey
Deputy Regional Director – Trust Services
U.S. Department of the Interior
Bureau of Indian Affairs
Western Regional Office
2600 North Central Avenue
Phoenix, Arizona 85004-3008

Re: Arrow Canyon Solar, LLC.: Approval of a Lease for the Arrow Canyon Solar Project on the Moapa River Indian Reservation, Clark County, NV (BIA Project # 2019-109 / SHPO Undertaking #2020-6261; 27633)

Dear Mr. McVey:

The Nevada State Historic Preservation Office (SHPO) has reviewed the subject documents received April 20, 2020, July 22, 2020, October 13, 2020, October 15, 2020, November 5, 2020 (from NPS via email), December 3, 2020, and December 4, 2020 in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

Please see the SHPO letter dated August 20, 2020 and December 2, 2020 for additional SHPO comments and review of this undertaking.

Thank you for clarifying that the previously identified segments of the Old Spanish National Historic Trail/Mormon Wagon Road (26CK6115/26CK3848/26CK3536/NPS #01000863/[OST]) located in the southern part of the APE could not be relocated. The OST is no longer observable south of the photograph cluster #135-138, as illustrated in the map (received December 3, 2020). Therefore, no visual simulations were completed for the OST south of the photograph cluster #135-138.

The SHPO **concurs** with the BIA's finding of **No Adverse Effect** to Historic Properties for this undertaking.

If any buried and/or previously unidentified resources are located during the project activities, the SHPO recommends that all work in the vicinity of the find cease and this office be contacted for additional consultation per 36 CFR §800.13(b)(3).

Should you have any questions concerning this correspondence, please contact Jessica Axsom at (775) 684-3445 or by email at jaxsom@shpo.nv.gov.

Sincerely,

Robin K. Reed
Deputy State Historic Preservation Officer

Appendix L

Traffic Plan

Traffic Plan

Arrow Canyon Solar Project

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Arrow Canyon Solar Project
TRAFFIC PLAN

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1 PROJECT INFORMATION

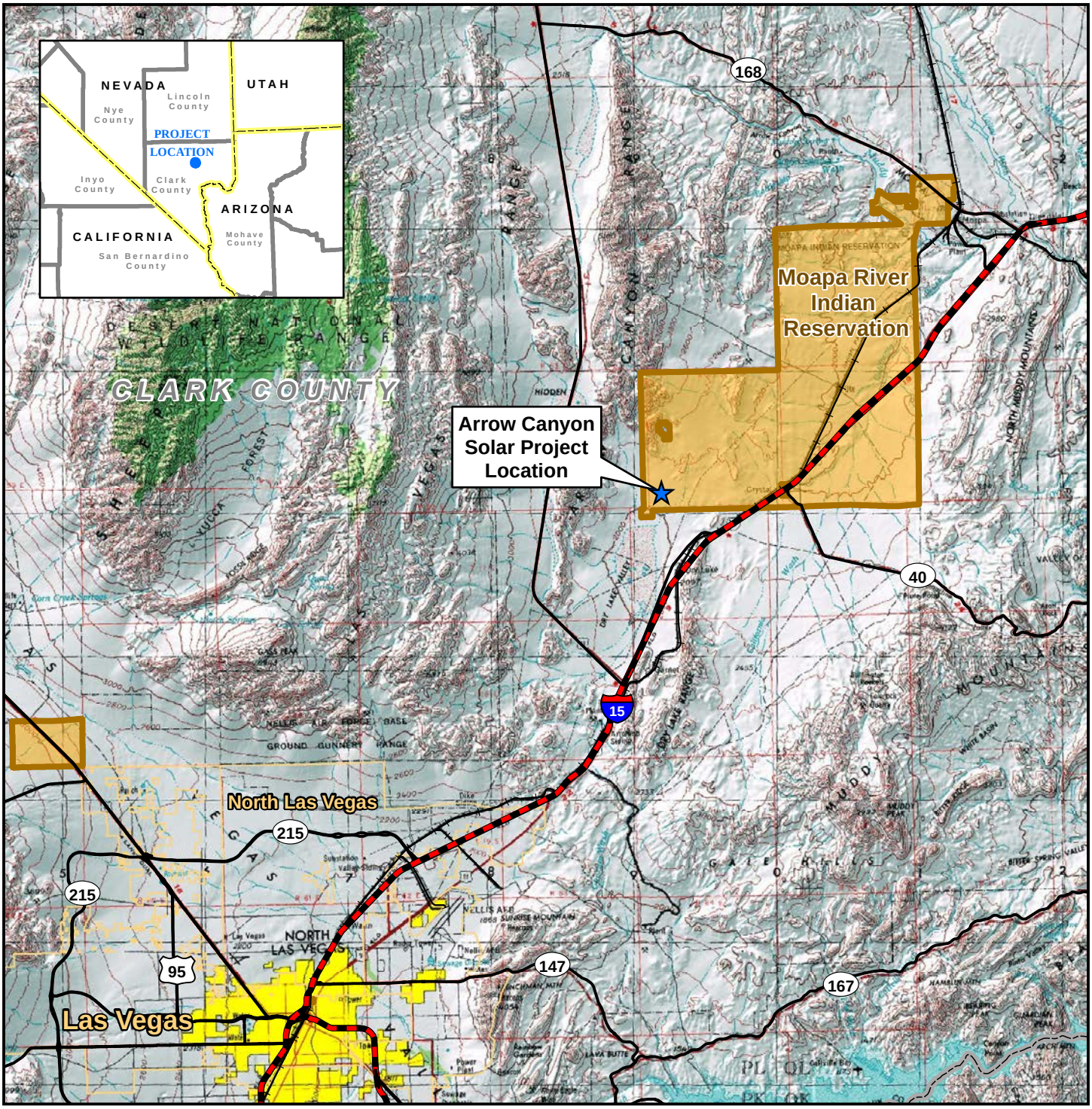
1.1 Background

Arrow Canyon Solar LLC (Applicant), a subsidiary of EDF Renewables Development, Inc. (EDFR), has entered into an agreement with the Moapa Band of Paiute Indians (Band) to expand the solar field lease area for the previously approved Moapa Solar Energy Center (MSEC) project located on the Moapa River Indian Reservation (Reservation) in Clark County, Nevada. The solar field ground lease would be expanded from the previously approved 850 acres to up to 2,200 acres for constructing, operating and maintaining, and decommissioning a 200-megawatt (MW) solar energy generating facility using solar photovoltaic (PV) technology. The expanded solar project and associated facilities are now referred to as the Arrow Canyon Solar Project (ACSP or Project). **Figure 1** shows the proposed general location for the Project.

The original MSEC Project, was analyzed through the National Environmental Policy Act (NEPA) and a Final Environmental Impact Statement (EIS) was published in February 2014 by the Bureau of Indian Affairs (BIA) as lead agency and the Bureau of Land Management (BLM), the Moapa Band, and others as cooperating agencies (BIA 2014). A Record of Decision (ROD) was executed by the BIA in May 2014 that approved the lease for an 850-acre solar site located on the Reservation. A ROD was executed by BLM in May 2014 approving the linear facilities associated with the Project that crossed BLM-administered lands including: 1) the Project's main access road from North Las Vegas Boulevard crossing approximately 2.5 miles of federal lands to the Project boundary on the Reservation; 2) a 230-kV generation-tie (gen-tie) line crossing approximately 7.1 miles of federal land from the Project site to the NV Energy-owned Harry Allen Substation; and 3) a water pipeline between an existing water well located on the Reservation and the Project Site located on the Reservation but within a designated utility corridor managed by the BLM. The solar ground lease was approved by BIA in June 2014 and a ROW was issued by the BLM for the linear facilities in August 2015 (ROW N-88870).

The previously approved linear ancillary facilities, (i.e. main access road, 230kV gen-tie line, and temporary water pipeline) would remain a part of the ACSP project description. They would be unchanged and would be developed as analyzed in the previous EIS and as described in the ROD and ROW issued by the BLM. These features have been assessed and approved for the Moapa Solar Energy Center (MSEC).

The Project will require vehicular access for construction, operation, maintenance, and decommissioning. The Project would develop and use the approved access road in accordance with the previously issued BLM ROW with no changes. This would be an approximately 2.4-mile access road located on BLM-administered lands connecting the SPGF to the existing paved frontage road (North Las Vegas Boulevard) adjacent to I-15 (**Figure 2**).



Legend

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

0 2 4 6 8 10

Miles

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

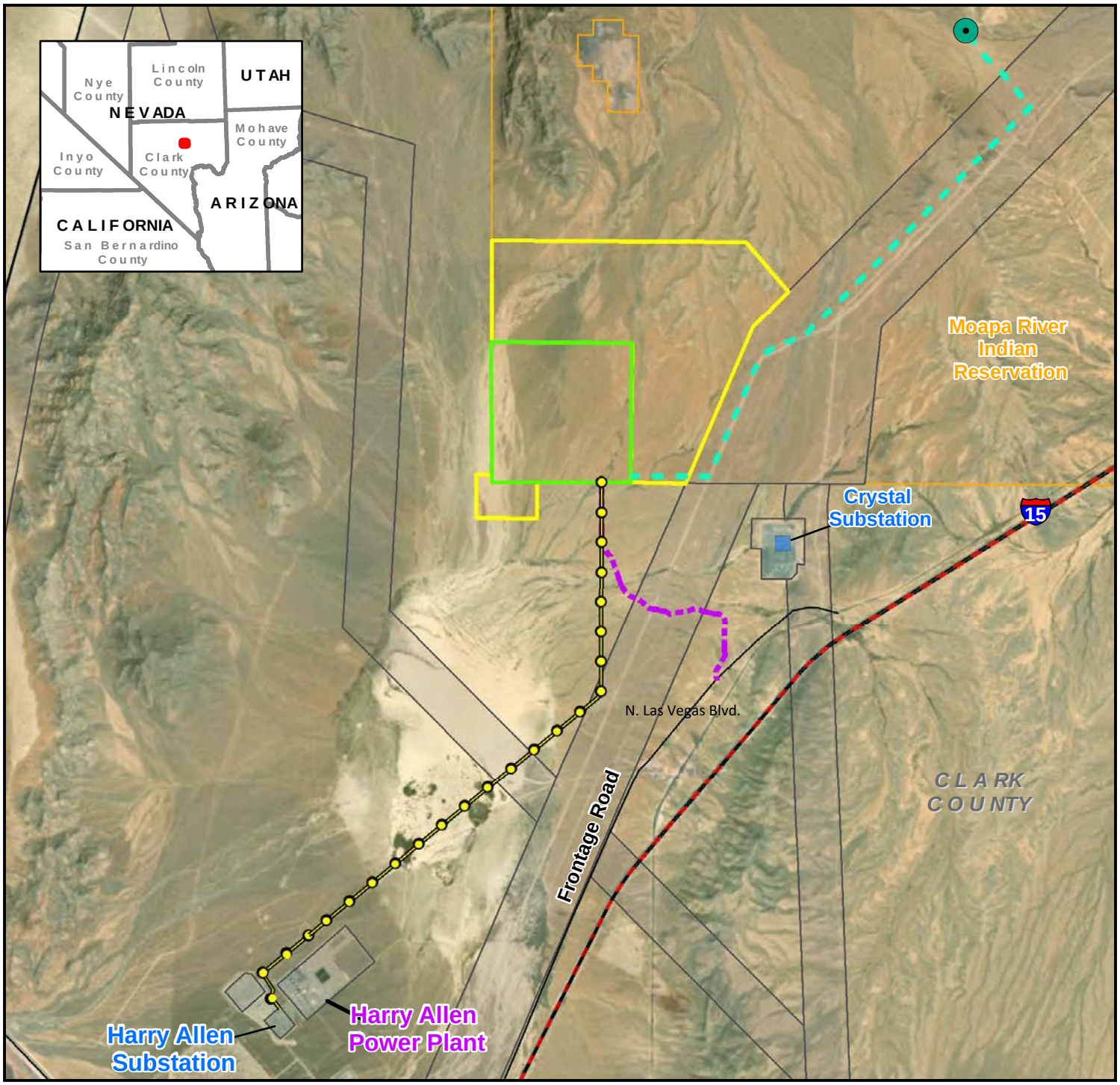
Arrow Canyon Solar Project

FIGURE 1
General Location

Map Extent: Clark County, Nevada

Date: 10-15-19		Author: rnc

G:\Eagle Shadow Mountain Solar Project/MXD's/Project Location 8.5x11 101519.mxd



Project Components

- Gen-Tie - Approved
- Access Road - Approved
- Water Pipeline - Approved
- Arrow Canyon Expansion Area
- Original MSEC Boundary - Approved

General Features

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

Jurisdictional Land Ownership

- Bureau of Land Management Land
- Indian Land

0 1 2

Miles

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

ARROW CANYON SOLAR PROJECT

Figure 2
Previously-Approved ROWs

Map Extent: Clark County, Nevada

Date: 03-24-20 | Author: mc

1.2 Location

The Project would be located approximately 30 miles northeast of Las Vegas in Clark County, Nevada, west of I-15 and east of U.S. Highway 93. The Project would be located on the Reservation in Township 16 South, Range 64 East, Sections 28, 29, 30, 31, 32, and 33; and part of section 7 in Township 17 South, Range 64 East, Mount Diablo Base Meridian

All construction traffic associated with the solar site would use the roads and route described above. 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. The I-15 / US-93 interchange has recently been significantly upgraded to improve traffic flow. No additional upgrades to 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 Project, new access ways would be located within the SPGF 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 ACSP is anticipated to begin construction in the Spring of 2021. Construction is expected to take approximately 20 months and would include mobilization, grading and site preparation, installation of drainage and erosion controls, PV panel/tracker assembly, solar field, water pipeline and gen-tie.

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 areas 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 (**Table 1-1, Figure 3**). In addition to the roads in the area, the Union Pacific Railroad runs north-south within approximately 1.5 miles from the proposed solar site (**Table 1-1, Figure 3**). **Table 1-2** provides detailed information on the annual average daily traffic volumes (AADT) for the primary access roads in the vicinity of the Proposed Project. **Figure 3** shows the primary access route along North Las Vegas Boulevard.

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 access to Proposed Project via US-93.
US-93	east-west	Paved Principal Arterial	2 (each direction)	US 93 is a major highway providing primary access south of the site
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.
Project Access Road	east-west	Project-specific access	1 (each direction)	This new approved road would provide access from North Las Vegas Boulevard across BLM-managed land to the site
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
Project access road	No data

Source: NDOT Traffic Records Information Access data, 2018.

2 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.

Construction of the Project is expected to take up to 20 months. Daily trips during construction of the Project would be generated by delivery of equipment and supplies and the commuting of the construction workforce. The number of workers expected on the site during construction of the Project would vary over the construction period and is expected to average up to approximately 400 with a peak of 500 workers each day, generating an average of about 800 up to a peak of 1,000 daily trips. Also, up to 100 trips per day (50 trips to the site and 50 trips leaving the site) would occur as a result of delivery of construction equipment and materials to the site. Combined, these would result in an average increase of 900 vehicle trips (or 450 roundtrips) per day during construction. All project related parking would be onsite during construction.

Construction would generally occur between 5 a.m. and 5 p.m., Monday through Friday but could occur 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 (as early as 3:00 am) to avoid work during high ambient temperatures. Also, 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.

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 1,100 vehicle trips daily (average increase of 900). 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

The ACSP is expected to require up to 12 personnel during operations. Daily operation of the plant begins when there is sufficient sunlight to begin operation of the solar trackers. When the site becomes operational, it would be expected to generate only up to 10 to 15 round trips per day from maintenance and security personnel. Trips for water trucks to deliver water to the site to clean the panels could also occur requiring up to 33 round trips per day but would be relatively infrequent as the panels could be cleaned only periodically. There could also be other deliveries of supplies or equipment that could occur to support operations and maintenance. This would result in a maximum of up to 25 daily round trips (during washing events) and more commonly 10 or less during the operational phase of the Project. The Project would operate at a minimum for the life of its power purchase agreement (PPA) or other energy contracts and its lease with the Tribe. The roadways and intersections are projected to be unaffected during the operations phase.

3 MITIGATION OF TRAFFIC IMPACTS

The traffic impacts from construction identified in the previous sections could cause minor 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 contractor responsible for building the ACSP would be required to develop a detailed traffic management plan in consultation with NDOT. This plan would include:

- Proposed vehicle routes
- Projected schedule for traffic to and from the site
    - Delivery of equipment and supplies
    - Expected numbers of workers over time along with expected shift schedules
- Plans for worker parking and potential carpooling
- Vehicle movement onto, on, and from the site
- Signage / flagging
- Public information plans (if needed)

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 could 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 POTENTIAL EFFECTS TO THE PUBLIC

4.1 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 be less than five minutes and have a minor effect on delivery and service vehicles.

4.2 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 20-month construction period. Increased traffic during operations would be minimal.

The traffic volumes during construction will increase along I-15, the ramps at US-93, (Exit 64), along North Las Vegas Boulevard, and the approved but not yet constructed access road. Potential measures that could be included in the final traffic management plan have been described in Section 3.

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Appendix M

List of Acronyms

Acronyms Used in the EIS

AC	Alternating Current
ACSP	Arrow Canyon Solar Project
ACEC	Areas of Critical Environmental Concern
ac-ft	acre-feet
ADT	Annual Average Daily Traffic
AFY	acre-feet per year
APE	Area of Potential Effect
ASME	American Society of Mechanical Engineers
APP	Avian Protection Plan
BACT	Best Available Control Technology
Band	Moapa Band of Paiute Indians
BBCS	Bird and Bat Conservation Strategy
BESS	Battery Energy Storage System
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
Blvd.	Boulevard
BMPs	Best Management Practices
BO	Biological Opinion
CAA	Clean Air Act
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
cm	centimeter
CO	carbon monoxide
CO_2	carbon dioxide
CO2e	CO_2 Equivalent
CT	Census Tract
CWA	Clean Water Act
DAQEM	Department of Air Quality and Environmental Management
DSEIS	Draft Supplemental Environmental Impact Statement
DEM	Digital Elevation Model
DOT	Department of Transportation
DWMA	Desert Wildlife Management Area
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPC	Engineering, Procurement and Construction

EPRI	Electric Power Research Institute
ESA	Endangered Species Act
ESMSP	Eagle Shadow Mountain Solar Project
FSEIS	Final Supplemental Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FLPMA	Federal Land Policy Management Act
FTE	Full-time Equivalent
GHG	Greenhouse Gas
GIS	Geographic Information System
gpm	gallons per minute
GPS	Global Positioning System
HA	Hydrographic Area
I-15	Interstate 15
IBC	International Building Code
IECC	International Energy Conservation Code
IPCC	Intergovernmental Panel on Climate Change
ITA	Indian Trust Assets
JD	Jurisdictional Determination
K Road	K Road Moapa Solar LLC
KOPs	Key Observation Points
kV	kilovolt
LEP	Limited English Proficiency
LOS	Level of Service
LWC	Lands with Wilderness Characteristics
m	meter
MBTA	Migratory Bird Treaty Act
mm	millimeter
MMT	million metric tons
MOA	Memorandum of Agreement
mph	miles per hour
MSDS	Material Safety Data Sheet
MSEC	Moapa Solar Energy Center
MSHCP	Multiple Species Habitat Conservation Plan
MW	megawatt
MWac	megawatts of alternating current
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NAD	North American Datum
NCCAC	Nevada Climate Change Advisory Committee
NDEP	Nevada Department of Environmental Protection
NDOT	Nevada Department of Transportation

NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NNHP	Nevada Natural Heritage Program
NO2	Nitrogen Dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NOx	nitrogen oxide
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRCS	National Resources Conservation Service
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NSR	New Source Review
NV	Nevada
O_3	ozone
O&M	Operations and Maintenance
OHV	off highway vehicle
OSHA	Occupational Safety and Health Administration
Pb	lead
PBO	Programmatic Biological Opinion
PCEs	primary constituent elements
PCS	Plant Control System
PLC	Programmable Logic Controller
PM	particulate matter
PM10	particulate matter 10 microns or less
PM2.5	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
RCRA	Resource Conservation Recovery Act
Reservation	Moapa River Indian Reservation
ROD	Record of Decision
ROW	right(s)-of-way
RPS	Renewable Portfolio Standard

SCADA	Supervisory Control and Data Acquisition
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMAs	Special Management Areas
SNWA	Southern Nevada Water Authority
SO2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasures Plan
SWPPP	Storm Water Pollution Prevention Plan
T&E	threatened and endangered
TDS	Total Dissolved Solids
TERO	Tribal Employment Rights Ordinance
TES	Thermal Energy Storage
Travel Plaza	Moapa Travel Plaza
Tribe	Moapa Band of Paiute Indians
µm	micrometer
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
URTD	Upper Respiratory Tract Disease
U.S.	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USCB	United State Census Bureau
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGCRP	United States Global Change Research Program
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WEAP	Worker Environmental Awareness Program
WSA	Wilderness Study Areas
°C	degrees Centigrade
°F	degrees Fahrenheit

Appendix N

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Appendix O

DSEIS Comments / Responses

Arrow Canyon Solar Project FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (FSEIS) RESPONSES TO COMMENTS ON THE DRAFT SEIS				
Commentor	**Comment ID**	**Comment Summary**	**Response**	**Location of Change in FEIS**
Bureau of Land Management Kelly Douglas Wildlife Biologist	A - 1	Section 3.5.2.1 (page 42 [3-8]) - In reference to the Environmental Consequences analysis for Groundwater; is there more up to date data or events that would be applicable to this analysis? In 2017, a Remand Order was issued requiring the State Engineer to "recalculate the appropriations from Cave Valley, Dry Lake Valley and Delamar Valley to avoid over appropriations or conflicts with down-gradient existing waters rights". Is there information as to if this order will impact the previous EIS analysis for Environmental Consequences of groundwater and those natural resources dependent upon it?	It is unknown whether this could have an impact on the Band's groundwater appropriation. As suggested in the response to the comment from the Southern Nevada Water Authority (see comment D-1 below), language acknowledging there is uncertainty regarding the quantity of groundwater that can be sustainably pumped has been added to this FSEIS.	Language added to Section 3.5.2.1
	A - 2	Appendix H-BBCS, SEIS Volume 2 (page 366 [16]) - in reference to the Arrow Canyon Solar Bird and Bat Conservation Strategy; the analysis of occurrence in Table 2 for the Yuma Ridgeway's Rail may need additional language. This also applies to the species discussion found in section 4.1.2, pg 38; and 5.1.2, pg. 49). Recent research (Harrity & Conway, 2018), suggests the species can undertake long migrations and that the movement is not limited to river corridors. It is recommended that collaboration with NDOW/and USFWS take place to confirm that the current language within the supplemental EIS is applicable, current and valid.	Additional language regarding the Yuma Ridgeway's Rail's potential for migration has been added to the BBCS and Biological Assessment.	Language added to Appendix G (BA) and Appendix H (BBCS)

Arrow Canyon Solar Project FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (FSEIS) RESPONSES TO COMMENTS ON THE DRAFT SEIS				
Commentor	**Comment ID**	**Comment Summary**	**Response**	**Location of Change in FEIS**
Jean Prijatel Manager Environmental Review Branch US Environmental Protection Agency Region IX 75 Hawthorne Street San Francisco, CA 94105	B - 1	***Recommendation:*** We continue to recommend that the project design include wider buffers around existing drainages, particularly in the northwest portion of the site where braided ephemeral drainages contain xeroriparian vegetation as depicted in Figure 3-4. Consider elevated support structures where possible to preserve existing flow paths.	Wider buffers around existing drainages have not been proposed because of the limited amount of land available to the Moapa Band. The entire Moapa River Indian Reservation land base is 71,954 acres, all of which was set aside for the "benefit and use of the Moapa Band…". This limited land base likewise limits the economic opportunities available to the Band. Based on the conceptual site plan for the ACSP exhibited in Figure 2-2 of the SEIS, the addition of 500-foot buffers around the three primary drainages being avoided would amount to approximately 564 acres of land not used to economically benefit the Band (278 acres for the west drainage, 156 acres for the central drainage, and 130 acres for the east drainage). This represents approximately 0.8 percent of the total tribal land base and approximately 25.6percent of the 2,200 acres that the Band has made available for the ACSP lease. Adding the drainage buffers to this Project would require that an additional 564 acres be developed for solar within the Reservation over that currently proposed to create the same amount of energy and economic benefit to the Band. The BIA has no authority to change the size or location of the lease area designated by the Moapa Band for the ACSP and for which EDF has a signed lease option to develop. In contrast, if a project is located on federal lands managed by the BLM, there is significantly more land available to accommodate wider drainage buffers where appropriate. The BLM manages approximately 47,800,000 acres in Nevada, providing greater flexibility regarding the amount of land affected by an individual project. Also, the BLM's mandate is to provide for multiple uses of resources under their management. The BIA's mission is to act as trustee for the tribes. In addition to the acreage limitations described above, the major drainages and floodways have been avoided by the ACSP. The lands surrounding the drainages that would be developed for solar are proposed to be mowed instead of graded, maintaining the existing drainage flow patterns and leaving plant roots intact, thus allowing for more timely revegetation. Also, the perimeter fences would be elevated to help keep the existing overland flow patterns intact.	A discussion of an alternative that includes these drainage buffers has been included in Chapter 2 of the FSEIS

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
	B - 2	***Recommendation:*** In the FSEIS, identify the anticipated construction schedules for this and the other solar projects in the vicinity. We recommend the project proponent coordinate with the project managers for Southern Bighorn Phase I and Gemini Solar Energy Project to pursue phased grading with these projects if construction will occur concurrently. We also recommend the following be incorporated into the construction contracts: • the development and implementation of the pending Dust Control Plan; • the requirement for a dust control monitor to be onsite if there are more than 50 acres of actively disturbed soil at any given time to ensure compliance with soil stabilization and dust suppression; • a prohibition against application of organic petroleum products, deliquescent/hygroscopic salts, and lignin-based dust palliatives within 20 yards of any natural wash/drainage to prevent leaching into the groundwater aquifer; • mitigation measures to reduce exposure to *Coccidioides immitis* that the FSEIS identifies on page 3-37 that "could be implemented as needed". We note these measures were included as agency required mitigation for the Eagle Shadow Mountain Solar Project (Appendix C-1 of the FEIS).	The construction schedule for each project is dictated by their contracts to deliver power and procure equipment independent of each other. The current estimate for the start of construction on the Gemini Solar Project is late 2020, for the Southern Bighorn Projects in mid-2021, and for the ACSP in third quarter of 2021. All these projects are planned to be mowed with limited grading. The site preparation activities (mowing, grading, etc) would occur primarily during the first few months of construction within each development area on each project. This would help limit the amount of grading and soil exposed at one time to the extent possible. The mitigation measures that would be employed for this Project are described in Appendix C and would be incorporated into the Record of Decision (ROD) and the lease for the Project. Specific to the measures identified here: • A Fugitive Dust Control Plan is an applicant commitment for all projects on the Reservation and a local permit requirement for projects off the Reservation. • Dust control monitoring would be conducted by on-site environmental monitors. A separate monitor specifically for dust monitoring would not be used on the ACSP as this is a Clark County requirement not applicable to tribal land. • An applicant commitment is that only palliatives approved by the USFWS would be applied if needed. This would eliminate the potential use of the palliatives of concern. • The mitigation measures to reduce exposure to *Coccidioides immitis* have been included as agency required mitigation in Appendix C-1 of the FSEIS.	Anticipated construction schedules for the identified projects have been added to the cumulative projects table (Table 3-8) and information on project schedule was added to the air quality discussion in Section 3.6. The additional measures to reduce exposure to *Coccidioides immitis* have been included as agency required mitigation in Appendix C-1
	B - 3	***Recommendation:*** We continue to recommend that BIA ensure the plans' mitigation measures are implemented and that the FSEIS detail what actions or enforcement will take place if they are not, as well as how mitigation effectiveness will be tracked and shared among the other projects' site managers.	The applicant-proposed and agency required mitigation measures will become conditions of the lease for the Project. The Applicant has the responsibility to comply with and the BIA has the authority to enforce the terms and conditions of the lease as outlined in the leasing regulations (25 CFR 162.466) detailing the process for dealing with non-compliance.	No change made to FSEIS

Arrow Canyon Solar Project FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (FSEIS) RESPONSES TO COMMENTS ON THE DRAFT SEIS				
Commentor	**Comment ID**	**Comment Summary**	**Response**	**Location of Change in FEIS**
Paul Ostapuk President Old Spanish Trail Association P.O. Box 629 Corrales, NM 87048-9582	C-1	Should this project gain agency approval, our organization would like to see stakeholders provide a trust fund for development of recreational and educational projects. For example, these monies could be used to: • Record oral histories from the Moapa River community to give voice regarding the cultural significance of historic trails (not just OST) from a Native American perspective; • Develop recreational walking paths and mountain bike pump tracks to encourage healthy lifestyle choices in the Moapa River community and reverse the trend of diabetes related medical issues; • Provide improved educational and interpretative materials for tribal headquarters and the truck stop; • Develop materials for a traveling national trails exhibit that would include the important perspectives of the Moapa Band of Paiute Indians.	Because there are no impacts to the Old Spanish Trail associated with this Project, BIA will not request compensation from the Applicant.	No change made to FSEIS
Zane Marshall Director, Water Resources Southern Nevada Water Authority 100 City Parkway Las Vegas, NV 89106	D-1	The SEIS should acknowledge there is uncertainty regarding the quantity of groundwater that can be sustainably pumped within the LWRFS, and existing groundwater rights, including those held by the Moapa Band in California Wash, may be subject to conjunctive management, curtailment, or other actions, in accordance with any future decisions issued by the Nevada State Engineer on the LWRFS. In addition, to comply with the triggers on spring flows in the Warm Springs area established under the Biological Opinion issued by the U.S. Fish and Wildlife Service to protect the endangered Moapa dace, actions may need to be adjusted based upon the new information gathered through the Order # 1309 process.	Language acknowledging there is uncertainty regarding the quantity of groundwater that can be sustainably pumped and the associated water rights has been added to this FSEIS. In addition, a discussion of Order 1309 as it relates to the Moapa dace is included in the Biological Opinion (BO) issued for this Project and included as an appendix to this FSEIS.	Language added to Section 3.5.2.1
Desert Tortoise Council 4654 East Avenue S #257B Palmdale, California 93552	E-1	Additional geotechnical testing may be needed prior to beginning construction of the Project. This pre-construction activity includes cross-country vehicle use that may result in adverse impacts to/incidental take of tortoises and degradation/loss of tortoise habitat. Please ensure this activity is minimized and that an authorized biologist accompanies each vehicle to clear the path the vehicle and equipment will use so as not to crush tortoises, especially those in cover sites.	Comment noted; this is already ensured as part of the approval process of these activities with BIA and USFWS.	No change made to FSEIS
	E-2	"BIA is drafting a fire management plan that includes the project area to improve direction in the future." This statement implies that BIA has not yet addressed the very serious issue of fire at the Project site.	Comment noted. A Project-specific fire management would be prepared by the Applicant and the construction contractor and would be approved by the agencies prior to implementation.	No change made to FSEIS
	E-3	We presume the water in the storage tanks must be accessed and used by personnel to suppress any fires and that the fire detection system for the batteries only alerts people that a fire is occurring but does not include equipment with non-aquatic materials to automatically suppress a fire (We note that water and lithium ion batteries result in fires and explosions). We were unable to find information on where the closest fire station is with personnel trained to fight fires. We found no consolidated information that could be called a plan to prevent and suppress fires in the DSEIS. We request that this plan be developed and included in the FSEIS. In addition, this fire prevention/suppression plan should discuss the ecological liability of a fire. If a fire occurs at the Project site and spreads to an adjacent area, the Project proponent should be responsible for the resulting degradation/loss of tortoise habitat and tortoises and should be obligated to fully compensate for this degradation/loss. Please include this commitment in the FSEIS.	Comment noted. A Project-specific fire management would be prepared by the Applicant and the construction contractor and would be approved by the agencies prior to implementation. The Reservation was set aside for the specific economic benefit of the Band and not for the sole purpose of conservation. The risk of ecological impacts from fire is not reasonably foreseeable and has not been included in this analysis.	No change made to FSEIS

Arrow Canyon Solar Project FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (FSEIS) RESPONSES TO COMMENTS ON THE DRAFT SEIS				
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	E-4	"Improvements including armored channelization and/or berms would be incorporated as needed to direct and maintain flow within the primary drainage paths and away from the solar arrays." We request that these improvements be "tortoise friendly;" that is, tortoises of any size should be able to traverse these armored channels or berms and not become trapped or overturned. Please include this commitment in the FSEIS.	The armored channelization areas and berms would not block tortoise movement as they will be small enough to walk around. Any armoring of channels with rip-rap would require that the rocks be large enough to be effective. Therefore, the armoring could not be sized to accommodate any size tortoise.	No change made to FSEIS
	E-5	Because translocation and relocation of tortoises is a mitigation measure, the lands where these tortoises are being moved to should be protected in perpetuity from ground disturbance or other activities that are not compatible with tortoise survival. In addition, these lands should be managed for the benefit of the tortoise in perpetuity (Specifically identified in our scoping comments). Other issues, such as the status of the recipient populations and how they will be affected, must also be studied prior to translocation.	The DTTP is a requirement of the Biological Opinion. It will be approved by the USFWS and appended to the BO, which will be appended to the Final SEIS. As discussed in the DSEIS, because of the plan for a raised fence following construction, tortoises are expected to re-inhabit the solar site during operations as opposed to being relocated to a traditional long-term translocation area that may be located distant from the site. As described in the DTTP, tortoises within 500 meters of the fence would be relocated outside the fence and those on the interior of the site (greater than 500 meters) would be moved to temporary holding pens and returned to the site following construction.	Clarification language regarding tortoise relocation has been added to Section 3.8.2.1. The DTTP is appended to the BO in Appendix P.
	E-6	"areas where vegetation was removed during construction activities and that are no longer needed for future operation and maintenance would be restored in a manner consistent with BLM and Tribal requirements to encourage natural revegetation." Encouraging natural revegetation does not mitigate for the temporal or spatial loss of habitat for the tortoise. The FSEIS must include a science-based restoration plan with success criteria for perennial and annual native plant species such that the functions and values of the habitat prior to its degradation/loss are replaced. Please add this commitment to the FDEIS.	The Applicant will pay a remuneration fee, as determined by the USFWS, for all temporal and spatial loss of tortoise habitat, even though all temporary impact areas will be allowed to revegetate and would not be a permanent loss. The BO and DTTP require a quantitative long-term vegetation/habitat study to assess vegetation recovery and how it affects tortoise movement after construction. Results would be reported to the USFWS on a regular basis.	The DTTP and BO are included in Appendix P.
	E-7	During operation and maintenance activities, desert tortoise "[e]xclusion fencing would be removed after construction, allowing tortoises to move onto and through the site during operations, except around the substation, O&M area and central BESS (if chosen), where the exclusion fencing would remain intact…" We presume there are roadways throughout the Project site so vehicles and equipment may routinely access the solar field, BESS, small operations building and the proposed electric substation, and other facilities within the Project site for maintenance. Please explain in the FSEIS the measures that would be implemented to ensure that take of tortoises (e.g., injury, mortality, collection, etc.) does not occur during O&M activities at the Project site for all areas, not just off-road areas.	The BA lists O&M Minimization Measures that would be implemented to reduce the potential for take (WEAP training, biological monitors, speed limits, predator deterrents). These are listed in Section 2.3.2, Pages 30 and 31 of Appendix G in the DSEIS and are included in the BO. The BO accounts for O&M activities that may result in incidental take, in the form of mortality or injury.	No change made to FSEIS

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
	E-8	The DSEIS defines terms used in this chapter including "Short-term: impacts that would be less than 5 years in duration. Long-term: impacts that would be 5 years or greater in duration." However, in reviewing the remainder of the document, these terms were not found. Rather, the terms "temporary" and "permanent" are used with no definition for these terms…" This disturbance is calculated as temporary but the impacts would be long-term as it will take longer than 5 years for the woody vegetation to return to its preconstruction cover, in many cases decades.	The impact definition terms have been updated in the introduction to Chapter 3. The USFWS considers impacts to vegetation in the solar field temporary impacts (short-term) because of the proposed construction techniques that limit grading in the solar field. Mowing the vegetation to a height of 18 inches as planned would leave the roots intact allowing herbaceous and woody vegetation to re-establish more quickly.	Language added to section 3.1
	E-9	We question the determination that short-term impacts would affect only 1,937 acres of tortoise habitat from construction of the solar array field…It will take much longer than 5 years for the vegetation to recover and provide the current functions and values to the tortoise. Therefore, the area experiencing these impacts should be classified as long-term impacts.	The USFWS considers impacts to vegetation in the solar field temporary impacts (short-term) because of the proposed construction techniques that limit grading in the solar field. Mowing the vegetation to a height of 18 inches as planned would leave the roots intact allowing herbaceous and woody vegetation to re-establish more quickly.	No change made to FSEIS
	E-10	The Project would result in an increase in vehicle traffic along a recently approved right-of-way road in tortoise habitat that is south of the Project solar field. This new road likely crosses the home ranges of several tortoises. Injury and mortality to tortoises on roads from vehicle collisions are well-documented (Homer et al. 1998, von Seckendorff Hoff and Marlow 2002, Hughson and Darby 2013). To avoid or minimize this impact, we request that mitigation for this increased traffic include constructing and maintaining desert tortoise exclusion fencing along the access roadway for the life of the Project and removal/restoration of the roadway during the decommissioning phase. In addition, we request that use of the road be limited to those vehicles with business directly tied to the Project. To maintain tortoise connectivity that would bisect the home ranges of tortoises, at least one tortoise connectivity structure should be provided so tortoises may move from habitat on one side of the roadway to the other side without the risk of injury or mortality from vehicles.	The site access road has already been approved (NEPA analysis, ROD, and ROW issued) and is not part of this analysis. The BO developed for that ROW is still in effect. The BO for the ACSP (Appendix P) accounts for O&M activities that may result in incidental take, in the form of mortality or injury. A tortoise fence along the access road would have a negative effect on local connectivity.	The BO is included in Appendix P of the FSEIS
	E-11	It appears the 2019 field surveys for the tortoise were not conducted throughout the action area. This information is unclear… Please provide information in the FSEIS that clarifies when and where protocol-level surveys were conducted, the results including the results for the translocation areas, and how the surveyed area compares to the Action Area identified in the DSEIS and the action area as defined in 50 CFR 402.2.	The initial 2019 surveys were not conducted in the larger Action Area because it had not been defined at that time. Data collection within the Action Area began in the spring of 2020 and is ongoing. The Applicant has been providing the USFWS sampling data in real time and it is being used to support the Section 7 consultation process between the BIA and USFWS. The most up-to-date data will be included in the BO which will be appended to the FSEIS.	No change made to FSEIS
	E-12	We recommend that the Project install shade structures periodically on the outside of the exclusion fencing to minimize the overheating/death of tortoises.	Comment noted. This measure has been added to the FSEIS.	This measure has been added to the agency-required measures in Appendix C.

Arrow Canyon Solar Project FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (FSEIS) RESPONSES TO COMMENTS ON THE DRAFT SEIS				
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	E-13	BIA should ensure that the activities of all phases of the Project do not impede the movement of tortoises through the Project area including roads, berms, channels, and other ancillary features.	The Project will have a raised security fence to ensure that tortoise movement is not inhibited and tortoise movement would not be impeded by roads, berms, or channels as none of these would be fenced as described in Section 2.1.1 of the DSEIS.	No change made to FSEIS
	E-14	We found no consideration of the Mojave desert tortoise in the Decommissioning Plan or the Restoration and Revegetation Plan…These activities have the potential to adversely affect the tortoise and result in incidental take. Consequently, the Mojave desert tortoise and any other listed species should be included in the Decommissioning Plan... However, the Decommissioning Plan should mention adherence to all applicable federal and state laws and regulations including the Federal Endangered Species Act.	As stated in the Decommissioning Plan, Section 1.2, "…because this document addresses Project actions that would occur well into the future, it will be updated and finalized in the months prior to any scheduled decommissioning to ensure that the final plan addresses the proposed future land use of the site and the applicable rules and regulations in place at that time." This would include Section 7 consultation which would address any potential impacts to the desert tortoise.	No change made to FSEIS
	E-15	"The goal of this SRRP [Site Restoration and Revegetation Plan] 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 conditions." The goal should not be to facilitate restoration; it should be to accomplish restoration. One of the objectives of the SRRP is to "Return the project site to conditions similar to those that existed prior to project-initiation by restoring soils, topography, plant species and their densities and distribution." Please ensure that meeting this objective includes both native annual and perennial plant species and biological soil crusts. In addition, the access road to the Project site should be blocked so the public cannot access the Project site and degrade/destroy the restoration and revegetation activities.	Comment noted. The plan to mow the site as opposed to grading would keep native plant stock and biocrust materials in place. Comment noted. The access road is not part of this analysis. It is located on BLM-administered land and the BLM would determine any closing requirements.	No change made to FSEIS

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
	E-16	The Post-Construction Restoration and Revegetation Plan should use the latest science to determine the best methods to implement the SRRP. The Post-Decommissioning restoration efforts, presumed to be 30 years or more in the future, should use the latest science at that time to determine the best methods to implement the RSSP. For both phases, the SRRP should include the following attributes: plant species palette of native perennial and annual plants, and the densities, cover, and distribution of these species, as there is more than one vegetation association at the Project site. If the requirement is to return the Project site to pre-project conditions, the SPPR must include pre-project data and aerial photography of the vegetation at the Project site with respect to these attributes. In addition, the SRRP must include the minimum standards/success criteria that the contractor will be required to meet with respect to these attributes. We recommend that success criteria for density be at least 75 percent and plant palette be at least 90 percent each for annual and perennial species per vegetation association. Given climate change and the extended droughts now and in the future, any restoration and revegetation efforts will likely take longer than in the past. Consequently, the SRRP and issued contract should not have a clause that allows restoration and revegetation efforts to terminate after a few years of effort. It should continue until the success criteria are met.	Restoration efforts post construction and post decommissioning will use the science and requirements applicable at the time. This will be ensured by the review and approval by the agencies prior to finalization and implementation. The reclamation success criteria that will be used relative to the establishment of tortoise habitat are described in the DTTP.	The reclamation success criteria are included in Section 6.2.1 of the DTTP in Appendix P
	E-17	Several management plans are not provided in the DSEIS or are incomplete but have a direct bearing on impacts to the tortoise and tortoise habitat. The Council requests that all management plans be included in the FSEIS. These mitigation plans should include an implementation schedule that is tied to key actions of the construction, operations and maintenance, and decommissioning/restoration phases of the Project so that mitigation occurs concurrently with or in advance of the impacts. The plans should specify success criteria, include a monitoring plan to collect data to determine whether success criteria have been met, and identify actions that would be required if the mitigation measures do not meet the success criteria (i.e., adaptive management). Including these plans in the FSEIS is requested so the public and the decisionmaker may review them to determine their adequacy/effectiveness in mitigating the impacts to the tortoise. This information is needed to see if the plans will function as intended.	Monitoring requirements for desert tortoise are included in the BO that is issued by the USFWS. Most of the mitigation plans were included in Volume 2 of the DSEIS with an expectation that they would be updated/finalized as needed prior to the start of construction. A few of these plans have been updated and included in the FEIS. The plans not included in the DSEIS will be based on the final project design and will be the responsibility of the engineering, procurement, and construction (EPC) contractor and will be developed for approval by the agencies prior to construction.	The BO is included as Appendix P of the FSEIS. Updated versions of the BA and BBCS are included in Appendices G and H, respectively.
	E-18	"The compensation for habitat loss under Section 7 of the Endangered Species Act (ESA) is an annually adjusted rate, currently $923/acre (subject to change annually on March 1)." We note this per-acre amount is not sufficient to purchase an acre of habitat or the additional expenses of improving the habitat and then managing it in perpetuity for the tortoise. As such, we strongly recommend this amount be recalculated to provide adequate compensation for the degradation/loss of tortoise habitat and its management in perpetuity.	Comment noted. This rate is determined by the USFWS on an annual basis.	No change made to FSEIS

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
	E-19	We found no discussion of the juvenile tortoises that were found during the 2019 tortoise surveys and how they would be impacted by Project implementation. Furthermore, we found no discussion and analysis of the results of the 2020 surveys when more tortoises were found (43 adults and 8 juveniles). Please include an analysis of the impacts of the Project on all size classes of tortoises and include the impacts of translocation on the moved tortoises and the resident tortoises. Please include a discussion and analysis of the issues reiterated above from our February scoping comments, specifically the first, second, fourth, fifth, sixth, seventh, eight, and ninth bulleted items above under Comments Submitted during Scoping.	Juvenile tortoises would experience the same impacts as adult tortoises and these are discussed in Section 3.8.2.1 of the DSEIS and in the BA. Impacts to juvenile tortoises and estimated take are more specifically discussed in the Project BO which is appended to the FSEIS. The referenced scoping comments are all based on the assumption that the original MSEC Project had been built, which it was not. For the reasons discussed in Section 2.2 of the DSEIS, alternative sites were not considered in this analysis.	The BO is included as Appendix P of the FSEIS
	E-20	We were unable to find the Project's Desert Tortoise Translocation Plan. Please include the tortoise translocation plan in the FSEIS.	The Desert Tortoise Translocation Plan was developed and is appended to the BO which is appended to the FSEIS.	The BO including the DTTP is included as Appendix P of the FSEIS
	E-21	"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." Please provide citations to support this conclusion. Given the extensive degradation to perennial woody vegetation from mowing and crushing vegetation, surface disturbance from vehicles and heavy equipment during construction and operation and maintenance activities and other solar facilities planned and built in the area, we request an analysis of these cumulative impacts to the tortoise, tortoise habitat, and connectivity of tortoise populations in the area.	Free movement of tortoises without barriers would be facilitated by the design of this Project and would be expected to preserve genetic connectivity. Long-term monitoring will be conducted the help support this hypothesis. Cumulative impacts are discussed in Section 3.15 of the DSEIS and take into account all reasonably foreseeable solar projects in the area. Cumulative impacts from other future federal actions (including solar projects) will be analyzed in future Section 7 consultations.	No change made to FSEIS
	E-22	"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." Please provide citations to support these conclusions. Please revise this section and provide a scientific analysis of the impacts of noise and vibration to tortoises generated from the various sources during construction, operation and maintenance, and decommissioning/restoration phases of the Project. In addition, the statement about noise is confusing. We do not understand what "noise would be increased at greater distances" means. Please clarify this statement.	Noise and vibration could result from on-site heavy equipment during construction and decommissioning activities. However, when these activities occur, all tortoises would have been removed from the site and, therefore, would not experience impacts from vibration unless the source of the vibration (construction equipment) and the tortoise both were close to the same location at the project perimeter. There would not be appreciable vibrations and very little noise during operations because of the very limited use of equipment. This statement means that "noise would be increased for greater distances…" than vibration. This is because of as vibrations travel through the ground, they decrease with distance away from the source due to the attenuating / dampening effect of the soils.	The language in the Biological Assessment was updated to reflect this change.

Arrow Canyon Solar Project FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (FSEIS) RESPONSES TO COMMENTS ON THE DRAFT SEIS				
Commentor	**Comment ID**	**Comment Summary**	**Response**	**Location of Change in FEIS**
	E-23	If the solar panels are constructed over the mowed/crushed vegetation, how would sufficient precipitation reach the vegetation to wash away the dust on the vegetation? Given the infrequency of a rainfall event in the Mojave Desert, what would be the time that plants would be covered with increased levels of dust, which adversely affect their respiration, photosynthesis, growth, and reproduction (Sharifi et al. 1997, Wijayratne et al. 2009) before it is removed by precipitation? Please answer these questions and provide citations to support conclusions presented in the FSEIS.	The solar panels will be mounted on a single-axis trackers system that rotates over the course of each day (rain or sun) allowing different parts of the ground surface to be exposed to precipitation when rainfall events occur. During operation, plants could be covered with some dust until the next precipitation event. On average it rains approximately once per month in this location (https://www.climatestotravel.com/climate/united-states/las-vegas).	No change made to FSEIS

Commentor	Comment ID	Comment Summary	Response	Location of Change in FEIS
	E-24	Raven Control Plan – "To prevent nesting on Project structures, the Applicant will implement the following measures: "1. Limiting Raptor Enhancement Measures. Utility pole construction will include raptor-friendly designs or retrofits that are intended to encourage or enhance the potential for raptor nests that could also be used by ravens." This commitment appears to provide nesting substrates for ravens rather than prevent nesting creation of nesting substrates for ravens. Please change this measure so utility pole construction will not provide surfaces for raven nesting. "2. Utility and building structures. Acquire a MBTA Depredation Permit in order to remove any raven nests that are found on project infrastructure." While this effort should be implemented, another effort that should be implemented weekly during the raven breeding season the removal of raven nests that do not have eggs. As a nest is being built, it can be destroyed and there is no requirement for a permit under the MBTA. Please add this measure to the Raven Control Plan in the FSEIS. The Raven Control Plan should also add language that as new effective measures are developed, they will be added to this plan for implementation. 3.1 Monitoring - A survey conducted once a month may be on a day when weather precludes ravens from being active. Consequently, we request that the collection of data on raven occurrence at and around the Action Area should be science- and statistically-based and should consider both the biology of the desert tortoise and the biology of the common raven. The method for collecting data (e.g., biologists using binoculars/ spotting scopes, etc. and/or remote sensing, etc.) should also be described. 3.3 Adaptive Management - From a scientific and statistical perspective, monitoring for one year of a 30+ year project is not likely to provide sufficient data or assurances that the implementation of the raven control measures are working including eliminating the monitoring component of the Raven Control Plan. The implementation of the Raven Control Plan including its duration should be science-based. Consequently, we are opposed to this language that limits the surveying and reporting to only one year. We assert that if the potential for ravens to adversely affect the local wildlife population, including the tortoise, is less than significant, the surveying and reporting requirements should not be discontinued. Without these data, Applicant and the USFWS would not know if the raven control measures are working. Perhaps after a period of documented success, the monitoring frequency may be adjusted, but it should not be discontinued.	1. Statement was updated as suggested. 2. This measure is included so that <u>any</u> raven nests could be removed, including nests being actively built and does not need to be modified. Section 3.3 of the plan describes adaptive management and allows for the plan to be updated in consultation with the agencies. 3. 3.1 – The surveys are required monthly for a period of 3 years. It is expected that raven activity during good and bad weather will be well-documented. The survey methodology is described in Section 3.1 Monitoring. 4. 3.3 – The purpose of the 1-year monitoring period is to document whether or not the Project is attracting ravens. 12 sampling periods should be sufficient to demonstrate this. The adaptive management clause allows the agencies to extend this monitoring to three years if they deem that necessary.	1. Updated language included In the Raven Control Plan Section 2.3. 2. No change made to FSEIS 3. No change made to FSEIS 4. No change made to FSEIS

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Arrow Canyon Draft SEIS – Co-operating Agency Review **Specialist Name: Kelly Douglas; Wildlife Biologist; Energy & Infrastructure; BLM**

	Section		
1	3.5.2.1	42, (3-8)	In reference to the Environmental Consequences analysis for Groundwater; is there more up to date data or events that would be applicable to this analysis? In 2017, a Remand Order was issued requiring the State Engineer to "recalculate the appropriations from Cave Valley, Dry Lake Valley and Delamar Valley to avoid over appropriations or conflicts with down-gradient existing waters rights". Is there information as to if this order will impact the previous EIS analysis for Environmental Consequences of groundwater and those natural resources dependent upon it?
2	Appendix H	EIS Volume II, pg. 366; BBCS, pg.13	In reference to the Arrow Canyon Solar Bird and Bat Conservation Strategy; the analysis of occurrence in Table 2 for the Yuma Ridgeway's Rail may need additional language. This also applies to the species discussion found in section 4.1.2, pg 38; and 5.1.2, pg. 49). Recent research (Harrity & Conway, 2018), suggests the species can undertake long migrations and that the movement is not limited to river corridors. It is recommended that collaboration with NDOW/and USFWS take place to confirm that the current language within the supplemental EIS is applicable, current and valid.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

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September 14, 2020

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

Subject: Draft Supplemental Environmental Impact Statement, Arrow Canyon Solar Project, Moapa River Indian Reservation, Clark County, Nevada (EIS No. 20200162)

Dear Chip 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 (March 2, 2020), comments on Chapters 1 and 2 of the Administrative Draft EIS (April 7, 2020) and Chapter 3 of the Administrative Draft EIS (July 10, 2020).

The Bureau of Indian Affairs is supplementing the 2014 Final Environmental Impact Statement prepared for the Moapa Solar Energy Center Project which evaluated impacts for an 850-acre solar power generation facility and ancillary facilities. The new applicant proposes to expand the project by 1,350 acres for a total of 2,200 acres. This expansion would be located entirely on the Moapa River Indian Reservation and named the Arrow Canyon Solar Project. There would be no changes to the ancillary facilities previously approved.

In our comments on the Administrative DEIS, we recommended larger buffers for avoidance of drainages to preserve the xeroriparian vegetation and better maintain the natural hydrology on site. We also recommended additional efforts to ensure air quality standards are not exceeded from concurrent project construction, as well as additional information regarding monitoring and enforcement of mitigation measures. We continue to have these suggestions in our attached detailed comments.

Effective October 22, 2018, the EPA no longer includes ratings in our comment letters. Information about this change and the 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 DSEIS. When the FSEIS is released for public review, please send one copy to Karen Vitulano, the lead reviewer for this project, at vitulano.karen@epa.gov. If you have any questions, please contact me at (415) 947-4167, or contact Karen at 415-947-4178.

Sincerely,

Jean Prijatel
Manager, Environmental Review Branch

Enclosure

cc: Laura Watters, Chairwoman, Moapa Band of Paiutes

EPA DETAILED COMMENTS ON THE SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR ARROW CANYON SOLAR PROJECT, MOAPA RIVER INDIAN RESERVATION, CLARK COUNTY, NEVADA, SEPTEMBER 14, 2020

Drainages and hydrology

Our ADEIS comments expressed concerns regarding the project's proposed stormwater management and drainage approach. We appreciate the clarifications provided by the BIA in the response to our comments and in the DSEIS, which indicates that most drainages would be left in their natural condition but that armored channelization and/or berms would be incorporated as needed to direct and maintain flow within the primary drainage paths and away from the solar arrays (p. 2-8). We note that armored channelization will increase flow velocities and the potential for erosion. Nearby projects on BLM land are providing 500-foot buffers of on each side of drainages.[1] Other solar energy projects[2] in the desert are proposing to use elevated support structures in lieu of solid concrete or steel foundations so drainage flows can follow existing paths beneath the structures.

1 ***Recommendation:*** We continue to recommend that the project design include wider buffers around existing drainages, particularly in the northwest portion of the site where braided ephemeral drainages contain xeroriparian vegetation as depicted in Figure 3-4. Consider elevated support structures where possible to preserve existing flow paths.

Air quality and health impacts

We had expressed concerns in our ADEIS comments regarding potential air quality impacts from the concurrent construction of multiple adjacent and nearby solar energy projects both on and off-Reservation.[3] With the possible presence of *Coccidioides immitis* spores which cause Valley Fever, concurrent construction could exacerbate impacts to workers' health. The DSEIS states that because best management practices are required on all projects, short-term cumulative impacts are expected to be minor and to comply with existing air quality standards. We appreciate that the applicant-proposed mitigation measures in Appendix C indicate the measures identified will be incorporated into construction contracts by the project proponent to address fugitive dust, including phasing grading operations. There are no applicant-proposed measures to address *Coccidioides immitis* exposure of workers.

Recommendation: In the FSEIS, identify the anticipated construction schedules for this and the other solar projects in the vicinity. We recommend the project proponent coordinate with the project managers for Southern Bighorn Phase I and Gemini Solar Energy Project to pursue phased grading with these projects if construction will occur concurrently. We also recommend the following be
2 incorporated into the construction contracts:

- the development and implementation of the pending Dust Control Plan;[4]
- the requirement for a dust control monitor to be onsite if there are more than 50 acres of actively disturbed soil at any given time to ensure compliance with soil stabilization and dust suppression;

[1] See Yellow Pine Energy Project DEIS, March 20, 2020 at https://eplanning.blm.gov/eplanning-ui/project/81665/510
[2] Crimson Solar Project DEIS, November 2, 2019 at https://eplanning.blm.gov/eplanning-ui/project/88925/510
[3] Should construction of Arrow Canyon, Southern Bighorn Phase I, and BLM's Gemini Solar Energy Project occur at the same time, it appears possible that air quality standards could be exceeded, based on modeling done for Gemini Solar Energy Project (Gemini Solar Project EIS available at https://eplanning.blm.gov/eplanning-ui/project/100498/510)
[4] This Plan is referenced under the Soils mitigation measures but unlike the Air Quality measures, does not indicate it would be a provision in the construction contracts.

- a prohibition against application of organic petroleum products, deliquescent/hygroscopic salts, and lignin-based dust palliatives within 20 yards of any natural wash/drainage to prevent leaching into the groundwater aquifer;[5]
- mitigation measures to reduce exposure to *Coccidioides immitis* that the FSEIS identifies on page 3-37 that "could be implemented as needed". We note these measures were included as agency required mitigation for the Eagle Shadow Mountain Solar Project (Appendix C-1 of the FEIS).

Project coordination/enforcement and monitoring of mitigation measures

Our ADEIS comments noted the many plans that are identified in the appendices and we recommended that information regarding implementation of these plans and mitigation measures be provided in the DSEIS, along with information as to whether monitoring and documentation would occur. As the infill of new projects occurs, situated adjacent to others on the Reservation that were evaluated and approved separately, the effect becomes that of one project of a much larger size. For this reason, site management needs to be coordinated, and monitoring results documented and shared among the different project proponents so problems being experienced at one site, for example invasive species proliferation, can be anticipated and addressed early at a neighboring site.

3 ***Recommendation:*** We continue to recommend that BIA ensure the plans' mitigation measures are implemented and that the FSEIS detail what actions or enforcement will take place if they are not, as well as how mitigation effectiveness will be tracked and shared among the other projects' site managers.

[5] This is consistent with Clark County's Dust Control requirements and is recommended for protection of tribal groundwater resources. Clark County Dust Control requirements are available at: https://www.cleanairnet.org/caiasia/1412/articles-58190_resource_1.pdf

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September 21, 2020

Attn: Mr. Chip Lewis
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BIA Western Regional Office, Branch of Environmental Quality Services
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Garry J. Cantley
Regional Archeologist
Bureau of Indian Affairs
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Subject: DSEIS Comments, Proposed Arrow Canyon Solar Project

Dear Mr. Lewis and Mr. Cantley,

Thank you for the opportunity to participate as a consulting party regarding the expansion of the Arrow Canyon solar field from 850 acres to 2,200 acres.

OSTA is an organization directly involved in management of the Old Spanish National Historic Trail (OSNHT), its trail corridor and associated natural resources.

We appreciate and respect the purpose and need of this proposed solar project to:

(1) Help provide a long-term, diverse, and viable economic revenue base and job opportunities for the Moapa Band;

(2) Meet the terms of the existing Power Purchase Agreement for the output of the Project;

(3) Help Nevada and neighboring states to meet their State renewable energy needs; and

(4) Allow the Moapa Band to optimize the use of the lease site and maximize potential economic benefit.

We wish to emphasize that this project mandates review of the National Historic Trails Act of 1968 in addition to Section 106 of the National Historic Preservation Act (NHPA). We noted the draft SEIS made no

specific reference to the NTSA nor to agency Resource Management Plans in regards to the establishment of a National Trail Management Corridor for this area.

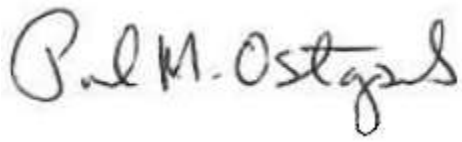
OSTA is concerned about growing cumulative impacts to natural resources within the OSNHT trail corridor. The long-term cumulative change to the visual character of the desert landscape and loss of tortoise habitat has become notable along the OSNHT across southern Nevada. As such, we appreciate this project's effort to help mitigate negative impacts to these valuable trail resources.

1 Should this project gain agency approval, our organization would like to see stakeholders provide a trust fund for development of recreational and educational projects. For example, these monies could be used to:

- Record oral histories from the Moapa River community to give voice regarding the cultural significance of historic trails (not just OST) from a Native American perspective;
- Develop recreational walking paths and mountain bike pump tracks to encourage healthy lifestyle choices in the Moapa River community and reverse the trend of diabetes related medical issues;
- Provide improved educational and interpretative materials for tribal headquarters and the truck stop;
- Develop materials for a traveling national trails exhibit that would include the important perspectives of the Moapa Band of Paiute Indians.

These shared perspectives are important aspects of our national heritage and our well-being. The OSTA organization is interested in collaborating with others to foster progress in these areas. Our aim is to engage a younger generation with an emphasis and focus on recreation and establishing connections to our historic trails. We hope to bring awareness and education regarding the potential for recreational trail opportunities for communities along the national historic trail such as the Moapa River community.

Thank you for the opportunity to comment on the draft Supplemental EIS.



Paul Ostapuk
President
Old Spanish Trail Association
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928.614.9655

[1]OSTA is a 501 (c) 3 organization whose mission is to study, preserve and protect, interpret and educate, and promote respectful use of the Old Spanish Trail (OST), the Old Spanish National Historic Trail (OSNHT) and closely related historic routes. OSTA is the designated volunteer organization for the OSNHT, recognized by both the National Park Service and BLM, under Section 11 of The National Trails System Act (NTSA) of 1968, as amended [16 USC 1250].

SOUTHERN NEVADA WATER AUTHORITY
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Submitted electronically via Chip.Lewis@bia.gov

September 21, 2020

Mr. Chip Lewis, Regional Environmental Protection Officer
Bureau of Indian Affairs Western Regional Office
2600 North Central Avenue, 4th Floor Mail Room
Phoenix, AZ 85004-3008

SUBJECT: COMMENTS, ARROW CANYON SOLAR PROJECT DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

Dear Mr. Lewis,

The Southern Nevada Water Authority (SNWA) appreciates the opportunity to provide comments on the Bureau of Indian Affairs' (BIA) Draft Supplemental Environmental Impact Statement (Draft SEIS) for the Arrow Canyon Solar Project (Project) (previously named Moapa Solar Energy Center [MSEC] Project). SNWA is supportive of efforts to help the region meet renewable energy needs and efforts by the Moapa Band of Paiute Indians (Moapa Band) to expand its economic opportunities.

The Draft SEIS identifies water supply for construction and operation of the Project would be obtained from the Moapa Band's existing groundwater rights. The Moapa Band has been permitted 2,500 acre-feet per year in California Wash. To date, a portion of this water has been committed and utilized to date by other projects. The Draft SEIS relies upon groundwater modeling previously conducted in 2013 for the MSEC Project. That previous modeling and its conclusions are inconsistent with the Nevada State Engineer's findings on the Lower White River Flow System (LWRFS) in Order #1309, issued on June 15, 2020. Order #1309 and its findings as they relate to the Project should be described in the SEIS.

The SEIS should acknowledge there is uncertainty regarding the quantity of groundwater that can be sustainably pumped within the LWRFS, and existing groundwater rights, including those held by the Moapa Band in California Wash, may be subject to conjunctive management, curtailment, or other actions, in accordance with any future decisions issued by the Nevada State Engineer on the LWRFS. In addition, to comply with the triggers on spring flows in the Warm Springs area established under the Biological Opinion issued by the U.S. Fish and Wildlife Service to protect the endangered Moapa dace, actions may need to be adjusted based upon the new information gathered through the Order #1309 process.

1

The MSEC Final EIS states the Moapa Band is acting as a municipality and does not need to change the permitted use of its existing rights from municipal to industrial use (MSEC Final EIS, p. 3-14). This assertion is a matter of state law that would need to be addressed by the Nevada

State Engineer. If change applications are necessary, such applications would be processed in accordance with Nevada Revised Statute 533.370, pursuant to Order #1309.

SNWA has a long history of cooperating with the Moapa Band on water supply issues in the region. Solar projects like this are well suited for the LWRFS because the long-term use of water is fairly low. Given the few caveats arising from recent State Engineer orders, SNWA supports the Moapa Band's development efforts and looks forward to continuing to engage cooperatively on finding long-term water management solutions that protect the Moapa dace and senior water rights on the Muddy River.

If you have any questions regarding these comments, please contact me at (702) 862-3713 or Lisa Luptowitz at lisa.luptowitz@snwa.com or (702) 862-3789.

Sincerely,

Zane L. Marshall
Director, Water Resources

ZLM:LL:AR:sn

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DESERT TORTOISE COUNCIL
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Via email

21 September 2020

Chip Lewis, Regional Environmental Protection Officer
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chip.lewis@bia.gov

Re: Draft Supplemental Environmental Impact Statement for the Arrow Canyon Solar Project

Dear Mr. Lewis,

The Desert Tortoise Council (Council) is a non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of desert tortoise species. Established in 1975 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council routinely provides information and other forms of assistance to individuals, organizations, and management and regulatory agencies on matters potentially affecting desert tortoises within their geographic ranges.

We appreciate this opportunity to provide comments on the above-referenced project. Given the location of the Arrow Canyon Solar Project and areas nearby occur in habitats likely occupied by the Mojave desert tortoise (*Gopherus agassizii*) (also known as "Agassiz's desert tortoise"), a threatened species under the Federal Endangered Species Act, our comments pertain to enhancing protection of this species during activities authorized by the Bureau of Indian Affairs (BIA) (lead agency), and the Bureau of Land Management (BLM), U.S. Environmental Protection Agency (USEPA), U.S. Fish and Wildlife Service (USFWS), and the Moapa Band of Paiute Indians (Moapa Band) as cooperating agencies.

Arrow Canyon Solar, LLC (Applicant), a wholly owned subsidiary of EDF Renewables Development, Inc. (EDFR), plans to expand the solar field for the previously-approved Moapa Solar Energy Center (MSEC) Project located on the Moapa River Indian Reservation (Reservation) in Clark County, Nevada. The expanded project is now referred to as the Arrow Canyon Solar Project (ACSP or Project). The Project is expected to operate at a minimum for the life of its lease with the Tribe (i.e., 30 years) and the term of its Power Purchase Agreement (PPA) or other energy contracts.

Description of the Proposed Action
The Applicant currently plans to expand the previously-approved MSEC photovoltaic (PV) solar field on the tribal lands of the Moapa Band. The Project, located adjacent to the MSEC site, would expand the solar facility on the Reservation by 1,350 acres or from 850 acres to a total of 2,200 acres within in a lease study area of 2,683 acres. This expansion would be located entirely on the Reservation. No changes would occur to the ancillary facilities of the MSEC Project on federal public lands that the BLM approved when it issued the right-of-way in 2015.

Alternatives Analyzed
The Draft Supplemental Environmental Impact Statement for the Arrow Canyon Solar Project (DSEIS) analyzes two alternatives, the Proposed Action Alternative (Project) and the No Action Alternative.

The Proposed Action Alternative includes:

- Expansion of an approved but yet to be built solar field from 850 acres to up to 2,200 acres;
- Addition of a battery energy storage system (BESS). The most likely BESS technology would be either lithium-ion (Li-ion) or redox flow battery distributed throughout the Project site or confined to one site;
- Increasing in maximum height of solar panels from 12 feet to 18 feet;
- Increasing water consumption during construction from 50 acre-feet per year (AFY) to 100-300 AFY;
- Modifying site preparation techniques to mow vegetation to a height of 18 inches and drive over and crush the remaining vegetation with equipment as needed during construction;
- Modifying the site perimeter fencing around groups of arrays instead of the entire Project perimeter and to leave a gap of 6-8 inches at the bottom of the fence to allow movement of animals, including desert tortoises, onto and through the solar site after construction;
- Utilizing a septic system for wastewater management during operations instead of evaporation ponds;
- Using trucks to bring in water during operations;
- Using trenching equipment to install cable and wiring;
- Installing a small operations building and the proposed electric substation; and,
- Pile driving or pre-drilling H-pile foundations to support the PV panel mounting system.

The No Action Alternative assumes that the expansion of the lease area would be denied and only the originally approved 850-acre lease area would be developed as a solar power facility.

Comments Submitted during Scoping
We were unable to find in the DSEIS that BIA had addressed many of our issues provided in our scoping comments submitted in our February 28, 2020 comment letter, which is attached. These unaddressed issues include:

- Urging the BIA to include in the translocation plan, legal safeguards to protect the translocation areas from future development or disturbance.
- Ensuring adequate nutritional plants are present at the translocation site.

- Questioning whether the Project footprint has been predetermined such that if there are areas of lower tortoise densities adjacent to the 850-acre existing site where impacts could be minimized, those areas would not be considered.
- Documenting how methods may need to be modified for this expansion compared to the 850-acre project. Specifically, will new tortoises be displaced into the same areas as the previous tortoises? How long will these new tortoises be monitored?
- Documenting the current conditions of the proposed translocation area for this project. This includes, at a minimum, the quality of the habitat into which tortoises will be displaced. Are there any degraded habitats or barren areas that may impair success of the translocation? Are there incompatible human uses in the new translocation area that need to be eliminated or managed to protect newly-translocated tortoise?
- Identifying a range of alternatives for various translocation areas. Importantly, protocol-level surveys must be conducted, with planning input from the USFWS that will result in density estimates for tortoises at the alternative translocation sites. Based on these comparisons and resulting field data that should be provided in the Supplemental EIS, we expect that the DSEIS will identify a preferred alternative for the one translocation area that will facilitate successful translocation.
- Identifying a formal translocation plan based on these survey results and analyses that is include in the DSEIS. The translocation plan should be responsive to lessons learned from earlier translocation efforts and available for review as part of the DSEIS.
- Summarizing the successes and failures of past translocation efforts for the tortoise and demonstrating how the current project will be planned to enhance translocation success. Specifically, how will the proponent minimize predation of translocated tortoises and avoid adverse climatic conditions, such as low winter rainfall conditions, that may exacerbate translocation success?
- Analyzing how the health of tortoises may be jeopardized if tortoises are displaced during drought conditions, which is known to undermine translocation successes (Esque et al. 2010). If drought conditions are present at the time of project development, we request that the proponent confer with the USFWS immediately prior to displacing tortoises and seek input on ways to avoid loss of tortoises due to stressors associated with drought. One viable alternative if such adverse conditions exist is to postpone site development until a time when conditions are favorable to enhance translocation success.
- Analyzing how the proposed action would contribute to the spread and proliferation of nonnative invasive plant species, and how this spread/proliferation would affect the desert tortoise and its habitats (including the frequency and size of human-caused fires).
- Discussing all project impacts within the region since development of the 2014 project and include future state, federal, and private actions affecting listed species on state, federal, and private lands. Please ensure that the Council on Environmental Quality's (CEQ) "Considering Cumulative Effects under the National Environmental Policy Act" (1997) is followed, including the eight principles, when analyzing cumulative effects of the proposed action to the tortoise and its habitats.
- Providing a detailed analysis of the "heat sink" effects of solar development on adjacent desert areas and particularly the Mojave desert tortoise. We expect the DSEIS to describe how this project will impact the movement of tortoises relative to linkage corridors, and how this project may impact proximate conservation areas, such as BLM designated Areas of Critical Environmental Concern (ACECs).

Given that none of these issues identified in our scoping letter were addressed, the Council finds the DSEIS to be deficient, and expects that these deficiencies will be discussed and analyzed in the Final SEIS (FSEIS).

Specific Comments on the DSEIS

The Council is concerned that the DSEIS does not describe or analyze all the impacts to the Mojave desert tortoise and its habitat from implementation of all phases of the Project, and consequently, will not implement effective mitigation (including monitoring and adaptive management) to offset these impacts. The following are some examples of impacts to the tortoise that we did not find analyzed in the DSEIS and/or commitments to implement mitigation, monitoring, and adaptive management to effectively offset these impacts.

1

1. Proposed Action and Alternatives, page 2-14: Additional geotechnical testing may be needed prior to beginning construction of the Project (also, Appendix G – Biological Assessment, page 22). This pre-construction activity includes cross-country vehicle use that may result in adverse impacts to/incidental take of tortoises and degradation/loss of tortoise habitat. Please ensure this activity is minimized and that an authorized biologist accompanies each vehicle to clear the path the vehicle and equipment will use so as not to crush tortoises, especially those in cover sites.

2

2. Affected Environment and Environmental Consequences, page 3-36: "BIA is drafting a fire management plan that includes the project area to improve direction in the future." This statement implies that BIA has not yet addressed the very serious issue of fire at the Project site.

3

3. Proposed Action and Alternatives, page 2-7: Equipment to help detect and suppress fires is mentioned at a few locations in the DSEIS. There is a fire protection water system of up to "three above-ground raw water storage tanks located on the Project site holding up to 12,000 gallons each." In addition, each BESS container would have its own fire detection system. (Appendix F – Weed Management Plan, page 3, Appendix J – Raven Control Plan, Appendix G – Biological Assessment, page 24, Appendix L – Traffic Plan, page 9 – Emergency Services). We presume the water in the storage tanks must be accessed and used by personnel to suppress any fires and that the fire detection system for the batteries only alerts people that a fire is occurring but does not include equipment with non-aquatic materials to automatically suppress a fire (We note that water and lithium ion batteries result in fires and explosions). We were unable to find information on where the closest fire station is with personnel trained to fight fires. We found no consolidated information that could be called a plan to prevent and suppress fires in the DSEIS. We request that this plan be developed and included in the FSEIS. In addition, this fire prevention/suppression plan should discuss the ecological liability of a fire. If a fire occurs at the Project site and spreads to an adjacent area, the Project proponent should be responsible for the resulting degradation/loss of tortoise habitat and tortoises and should be obligated to fully compensate for this degradation/loss. Please include this commitment in the FSEIS.

4

4. Appendix G – Biological Assessment, page 18: "Improvements including armored channelization and/or berms would be incorporated as needed to direct and maintain flow within the primary drainage paths and away from the solar arrays." We request that these improvements be "tortoise friendly;" that is, tortoises of any size should be able to traverse these armored channels or berms and not become trapped or overturned. Please include this commitment in the FSEIS.

5. Affected Environment and Environmental Consequences, page 3-21: A translocation plan was referred to in the DSEIS and in Appendix G – Biological Assessment, but not included for public review and comment. Because translocation and relocation of tortoises is a mitigation measure, the lands where these tortoises are being moved to should be protected in perpetuity from ground
5 disturbance or other activities that are not compatible with tortoise survival. In addition, these lands should be managed for the benefit of the tortoise in perpetuity (Specifically identified in our scoping comments). Other issues, such as the status of the recipient populations and how they will be affected, must also be studied prior to translocation.

6. Proposed Action and Alternatives, Page 2-15: Disturbed "areas where vegetation was removed during construction activities and that are no longer needed for future operation and maintenance would be restored in a manner consistent with BLM and Tribal requirements to encourage natural revegetation." Encouraging natural revegetation does not mitigate for the temporal or
6 spatial loss of habitat for the tortoise. The FSEIS must include a science-based restoration plan with success criteria for perennial and annual native plant species such that the functions and values of the habitat prior to its degradation/loss are replaced. Please add this commitment to the FDEIS.

7. During operation and maintenance activities (Appendix G – Biological Assessment, page 51), desert tortoise "[e]xclusion fencing would be removed after construction, allowing tortoises to move onto and through the site during operations, except around the substation, O&M area and central BESS (if chosen), where the exclusion fencing would remain intact." Additionally, page 2-15 of DSEIS: "No heavy equipment would be used during normal plant operation. Operation and maintenance vehicles would include trucks (pickups, flatbeds, and dump trucks), forklifts, and loaders for routine and unscheduled maintenance, and occasionally water trucks for solar panel washing. Large heavy-haul transport equipment may be brought to the site infrequently for
7 equipment repair or replacement." We presume there are roadways throughout the Project site so vehicles and equipment may routinely access the solar field, BESS, small operations building and the proposed electric substation, and other facilities within the Project site for maintenance. Please explain in the FSEIS the measures that would be implemented to ensure that take of tortoises (e.g., injury, mortality, collection, etc.) does not occur during O&M activities at the Project site for all areas, not just off-road areas.

8. Affected Environment and Environmental Consequences, page 3-1: The DSEIS defines terms used in this chapter including "Short-term: impacts that would be less than 5 years in duration. Long-term: impacts that would be 5 years or greater in duration." However, in reviewing the remainder of the document, these terms were not found. Rather, the terms "temporary" and "permanent" are used with no definition for these terms. If they are considered the same as short-term and long-term, then we conclude that their use is inaccurate with respect to the impacts to the tortoise and its habitat. For example, "Where grading is not necessary, vegetation would be mowed to a height of approximately 18 inches and driven over / crushed during construction
8 activities where feasible and where it does not pose a safety risk." "Vegetation would be allowed to regrow within the solar field area, including the ephemeral washes that cross the site." This disturbance is calculated as temporary but the impacts would be long-term as it will take longer than 5 years for the woody vegetation to return to its preconstruction cover, in many cases decades. Using "temporary" and "permanent" without using "short-term" and "long-term" give the public an inaccurate description of the temporal nature of the impacts and the loss of the

functions and values of the vegetation impacted by the Project, especially with respect to the tortoise. When the terms temporary and permanent are used in the FSEIS, please add the appropriate terms, "short-term" or "long-term," to the description of the impact. Please recalculate the numbers in tables in the FSEIS to include the appropriate amounts for short-term and long-term impacts, especially for impacts to all aspects of tortoise habitat.

9. According to the SDEIS (page ES-6), the Project would have "Short-term direct and indirect effects on more acres of tortoise habitat than the original MSEC Project (up to 1,937 vs 850 acres) from construction and long-term impact to 187 acres of tortoise habitat and foraging area, potential more rapid restoration of tortoise habitat because of mowing vs grading on most of the site, long-term impacts to tortoise following construction would be less than the original MSEC Project because perimeter fencing would be raised at the bottom allowing tortoises to reoccupy and move through the site."

9

We question the determination that short-term impacts would affect only 1,937 acres of tortoise habitat from construction of the solar array fields. During construction, these areas will be accessed by vehicles and heavy equipment for pile driving frames for array, crushing perennial woody and annual vegetation, disrupting/destroying soil crusts, and whatever vegetation remains will be mowed to a height of 18 inches. These impacts to desert vegetation will reduce/remove vegetation that provides needed forage and cover from predators and thermal extremes. It will take much longer than 5 years for the vegetation to recover and provide the current functions and values to the tortoise. Therefore, the area experiencing these impacts should be classified as long-term impacts. Please be sure the FSEIS accurately reflects these impacts.

10. Proposed Action and Alternatives, page 2-15: "Operation of the [Project] site would be expected to generate only up to 10 to 15 round trips per day from maintenance and security personnel. Trips for water trucks to deliver water to the site to clean the panels could also occur but would be relatively infrequent as the panels could be cleaned only periodically. If panel washing were to occur, each event would generate up to 33 water truck trips. There could also be other deliveries of supplies or equipment that could occur to support operations and maintenance. This would result in a maximum of up to 34 daily round trips (during washing events) and more commonly less than one daily round trip during the operational phase of the Project. Potable water would be stored in a 15,000-gallon storage tank."

The Project would result in an increase in vehicle traffic along a recently approved right-of-way road in tortoise habitat that is south of the Project solar field. This new road likely crosses the home ranges of several tortoises. Injury and mortality to tortoises on roads from vehicle collisions are well-documented (Homer et al. 1998, von Seckendorff Hoff and Marlow 2002, Hughson and Darby 2013). To avoid or minimize this impact, we request that mitigation for this increased traffic include constructing and maintaining desert tortoise exclusion fencing along the access roadway for the life of the Project and removal/restoration of the roadway during the decommissioning phase. In addition, we request that use of the road be limited to those vehicles with business directly tied to the Project. To maintain tortoise connectivity that would bisect the home ranges of tortoises, at least one tortoise connectivity structure should be provided so tortoises may move from habitat on one side of the roadway to the other side without the risk of injury or mortality from vehicles.

10

11. Affected Environment and Environmental Consequences, pages 3-13 and 3-14: The results of surveys for the Mojave desert tortoise are confusing. During spring 2019 protocol surveys for Mojave desert tortoise, 13 adult tortoises and 6 juveniles were located on the expanded solar site. In spring 2020, 43 adults and 8 juveniles were found using different survey methods and more time spent surveying.

BIA says, "To assess the presence of the Mojave desert tortoise in the ACSP area, field surveys were conducted on the expanded solar site (including the original MSEC Project area and expansion area) during May 2019 (Heritage 2019)." "Desert tortoise health assessments were conducted within a larger 'Action Area' in the spring of 2020, that is, recipient areas for short- and long-distance tortoise translocations (2,683 acres less the final areas of direct impacts, plus a 1.5 km buffer). The Action Area for this Project includes the 2,683-acre lease study area plus potential recipient areas for tortoise translocations (an additional 1.5-kilometer buffer). More tortoises were found in this larger Action Area during health assessments (43 adults and 8 juveniles)." Thus, it appears the 2019 field surveys for the tortoise were not conducted throughout the action area.

11

This information is unclear as it appears that only the potential location for the Project was surveyed by Heritage (2019) and not the action area defined by 50 Code of Federal regulations (CFR) 402.2 as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." Using this definition, the action area that should be considered when implementing USFWS-protocol surveys for the tortoise would include the translocation area(s), areas with tortoises affected by the exclusion fence blocking tortoise movements, access road and road effect zone, etc. In the FSEIS, please explain why these additional areas were not included in the action area. Please provide information in the FSEIS that clarifies when and where protocol-level surveys were conducted, the results including the results for the translocation areas, and how the surveyed area compares to the Action Area identified in the DSEIS and the action area as defined in 50 CFR 402.2.

12. Affected Environment and Environmental Consequences, Mojave Desert Tortoise, page 3-19 to 3-21: A desert tortoise exclusion fence would be constructed around the Project site during the construction phase and removed after that. For those tortoises moved to the outside of the exclusion fence, these animals and the resident animals "know" their home range and will pace along the newly constructed exclusion fence trying to get to the other side, becoming overheated and die. We recommend that the Project install shade structures periodically on the outside of the exclusion fencing to minimize the overheating/death of tortoises.

12

13. Appendix G – Biological Assessment, page 46: The Project is not located in critical habitat designated for the Mojave desert tortoise, but appears to be located in one of the "priority areas for conservation of desert tortoise population connectivity" (USFWS 2012). As such, BIA should ensure that the activities of all phases of the Project do not impede the movement of tortoises through the Project area including roads, berms, channels, and other ancillary features. Please see our comments under #7 above.

13

14. Appendix D – Decommissioning Plan: Thank you for including this plan in the DSEIS. It refers to a Final Decommissioning Plan (prepared just in advance of project closure) and the Restoration and Revegetation Plan. Unfortunately, we found no consideration of the Mojave desert tortoise in this plan. Because the Project will construct and maintain fences that allow tortoises access to the Project Site, the tortoises may be present during decommissioning activities. These activities have the potential to adversely affect the tortoise and result in incidental take. Consequently, the Mojave desert tortoise and any other listed species should be included in the Decommissioning Plan. We realize that it is difficult to determine exactly what would be required in 30 years or longer in the future when decommissioning occurs. However, the Decommissioning Plan should mention adherence to all applicable federal and state laws and regulations including the Federal Endangered Species Act.

14

15. Appendix E – Site Restoration and Revegetation Plan, page 1: "The goal of this SRRP [Site Restoration and Revegetation Plan] 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 conditions." The goal should not be to facilitate restoration; it should be to accomplish restoration.

15

One of the objectives of the SRRP is to "Return the project site to conditions similar to those that existed prior to project-initiation by restoring soils, topography, plant species and their densities and distribution." Please ensure that meeting this objective includes both native annual and perennial plant species and biological soil crusts. These soil crusts enhance soil stability and nutrient retention and contribute to soil fertility (Belnap et al. 2008). Soil crusts are a deterrent to the establishment and proliferation of non-native invasive annual plants. They seem to consistently suppress the germination of large-seeded, non-native, annual grasses, such as cheat grass (*Bromus tectorum*) (Belnap and Lange 2003). In addition, the access road to the Project site should be blocked so the public cannot access the Project site and degrade/destroy the restoration and revegetation activities.

16. Appendix E – Site Revegetation Restoration Plan, page 10: "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."

The SRRP identifies two phases of restoration. The Post-Construction Restoration and Revegetation Plan should use the latest science to determine the best methods to implement the SRRP. The Post-Decommissioning restoration efforts, presumed to be 30 years or more in the future, should use the latest science at that time to determine the best methods to implement the RSSP. For both phases, the SRRP should include the following attributes: plant species palette of native perennial and annual plants, and the densities, cover, and distribution of these species, as there is more than one vegetation association at the Project site. If the requirement is to return the Project site to pre-project conditions, the SPPR must include pre-project data and aerial photography of the vegetation at the Project site with respect to these attributes. In addition, the SRRP must include the minimum standards/success criteria that the contractor will be required to meet with respect to these attributes. We recommend that success criteria for density be at least 75 percent and plant palette be at least 90 percent each for annual and perennial species per

16

vegetation association. Given climate change and the extended droughts now and in the future, any restoration and revegetation efforts will likely take longer than in the past. Consequently, the SRRP and issued contract should not have a clause that allows restoration and revegetation efforts to terminate after a few years of effort. It should continue until the success criteria are met.

To assist BIA and the Tribe with its post-construction restoration and revegetation efforts, we have included a copy of Enhancing and Restoring Habitat for the Desert Tortoise, *Gopherus agassizii* by Scott R. Abella and Kristin H. Berry (2016).

17. Appendix G – Biological Assessment, Mitigation – 2.3.1 Management Plans, page 24: "The Applicant would be prepared the following management plans, which would be submitted to the Moapa Band of Paiutes, BIA, and USFWS (as appropriate) for approval:

- Weed Management Plan
- Raven Control Plan
- Decommissioning Plan
- Restoration and Revegetation Plan
- Dust Abatement Plan
- Spill Prevention Control and Countermeasure Plan
- Health and Safety Program
- Fire Management Plan
- Hazardous Materials and Waste Management Plan
- Surface Water Protection Plan
- Site Drainage Plan
- Traffic Management Plan
- Worker Environmental Awareness Program
- Bird and Bat Conservation Strategy"

17

Several management plans are not provided in the DSEIS or are incomplete, but have a direct bearing on impacts to the tortoise and tortoise habitat. The Council requests that all management plans be included in the FSEIS. These mitigation plans should include an implementation schedule that is tied to key actions of the construction, operations and maintenance, and decommissioning/restoration phases of the Project so that mitigation occurs concurrently with or in advance of the impacts. The plans should specify success criteria, include a monitoring plan to collect data to determine whether success criteria have been met, and identify actions that would be required if the mitigation measures do not meet the success criteria (i.e., adaptive management). Including these plans in the FSEIS is requested so the public and the decisionmaker may review them to determine their adequacy/effectiveness in mitigating the impacts to the tortoise. This information is needed to see if the plans will function as intended.

18. Appendix G – Biological Assessment, page 32: "The compensation for habitat loss under Section 7 of the Endangered Species Act (ESA) is an annually adjusted rate, currently $923/acre (subject to change annually on March 1)."

18

We note this per-acre amount is not sufficient to purchase an acre of habitat or the additional expenses of improving the habitat and then managing it in perpetuity for the tortoise. As such, we strongly recommend this amount be recalculated to provide adequate compensation for the degradation/loss of tortoise habitat and its management in perpetuity. The Recovery Action Plan for the Mojave Desert Tortoise in the Northeast Mojave Desert (USFWS 2014) identified habitat restoration as the highest priority action for implementation was habitat restoration. Thus, halting the loss/degradation of tortoise habitat and improving tortoise habitat is very important for tortoise recovery.

19. Appendix G – Biological Assessment – 5.2 Desert Tortoise, 5.2.1 Injury and Mortality, page 50**:** "An estimated 24 desert tortoises are expected to occupy the Action Area (95% CI: 12.91‑45.64 (based on 2019 USFWS protocol calculations). Therefore, construction of the Proposed Action may result in impacts to up to 24 adult desert tortoises through injury or direct mortality of desert tortoise."

19 We found no discussion of the juvenile tortoises that were found during the 2019 tortoise surveys and how they would be impacted by Project implementation. Furthermore, we found no discussion and analysis of the results of the 2020 surveys when more tortoises were found (43 adults and 8 juveniles). Please include an analysis of the impacts of the Project on all size classes of tortoises and include the impacts of translocation on the moved tortoises and the resident tortoises. Please include a discussion and analysis of the issues reiterated above from our February scoping comments, specifically the first, second, fourth, fifth, sixth, seventh, eight, and ninth bulleted items above under Comments Submitted during Scoping.

20. Appendix G – Biological Assessment, page 50 and other locations: This page mentions the
20 Project's translocation plan for the Mojave desert tortoise. However, we were unable to find this plan. Please include the tortoise translocation plan in the FSEIS.

21. Appendix G – Biological Assessment, page 51 – "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." Please provide citations to support this conclusion. Given the extensive degradation to perennial woody vegetation from mowing and
21 crushing vegetation, surface disturbance from vehicles and heavy equipment during construction and operation and maintenance activities (see language from page 2-15 of the DSEIS O&M Activities above), and other solar facilities planned and built in the area, we request an analysis of these cumulative impacts to the tortoise, tortoise habitat, and connectivity of tortoise populations in the area.

22. Appendix G – Biological Assessment, 5.2.5 Vibration and Noise, page 52: "Vibration is unlikely to be noticeable more than 40 or 50 feet beyond the source; noise would be increased at
22 greater distances though would also be temporary and sporadic." Please provide citations to support these conclusions.

Given that pile driving, trenching, operation of generators and a batch plant, and other construction activities using heavy equipment (size was not specified) would be used during the Project's construction phase, vibration and noise would likely be heard/felt at distances greater than 40 or 50 feet. For example, a pile driver has an average decibel level of 110 dBA. According to Washington State Department of Transportation (2012), noise reduction over a distance of 50 feet from a 95 dBA source from a construction point source would be none. The sound would be 95 dBA 50 feet from the source. Please revise this section and provide a scientific analysis of the impacts of noise and vibration to tortoises generated from the various sources during construction, operation and maintenance, and decommissioning/restoration phases of the Project.

In addition, the statement about noise is confusing. We do not understand what "noise would be increased at greater distances" means. Please clarify this statement.

23. Appendix G – Biological Assessment, 5.2.6 Dust, page 52: BIA says, "It is assumed that this low-level dusting effect during construction would be minimal and most likely washed away during rainstorms."

If the solar panels are constructed over the mowed/crushed vegetation, how would sufficient precipitation reach the vegetation to wash away the dust on the vegetation? Given the infrequency of a rainfall event in the Mojave Desert, what would be the time that plants would be covered with increased levels of dust, which adversely affect their respiration, photosynthesis, growth, and reproduction (Sharifi et al. 1997, Wijayratne et al. 2009) before it is removed by precipitation? Please answer these questions and provide citations to support conclusions presented in the FSEIS.

23

24. Raven Control Plan – Appendix J, pages 8 through 11: "To prevent nesting on Project structures, the Applicant will implement the following measures:

"1. Limiting Raptor Enhancement Measures. Utility pole construction will include raptor friendly designs or retrofits (outlined in the Avian Power Line Interaction Committee guidelines [APLIC 2006]) that are intended to encourage or enhance the potential for raptor nests that could also be used by ravens."

24

This commitment appears to provide nesting substrates for ravens rather than prevent nesting creation of nesting substrates for ravens. Please change this measure so utility pole construction will **not** provide surfaces for raven nesting.

"2. Utility and building structures. Acquire a MBTA Depredation Permit in order to remove any raven nests that are found on project infrastructure." While this effort should be implemented, another effort that should be implemented weekly during the raven breeding season the removal of raven nests that do not have eggs. As a nest is being built, it can be destroyed and there is no requirement for a permit under the MBTA. Please add this measure to the Raven Control Plan in the FSEIS.

The Raven Control Plan should also add language that as new effective measures are developed, they will be added to this plan for implementation. The Project will operate for at least 30 years. During this time, we are likely to develop new measures that are better/more effective than current measures.

"Roost prevention as a contingency. To avoid the introduction of new roost and nest locations for ravens (and consequently non-target avian species), the Applicant will ensure perch enhancements are not installed. The SPGF [solar power generation plant] will be monitored to identify frequently used locations."

3.1 Monitoring: "The roads will be driven slowly (10 mph). Binoculars and spotting scopes will be used to observe raven activity within two kilometers of the site. All raven observations will be documented, including date, time, location, habitat, number of individuals, and behavior, as well as locations of occupied and potential nests. Survey visits will occur once monthly during the breeding season (February to August) the year following completion of construction for a total of 3 years and once annually thereafter for the duration of facility operations. Each survey visit will last two days. Each day the survey route will be driven once in the early morning (starting 30 minutes prior to sunrise), a second time in the midday (starting between noon and 2 p.m.), and a third time in the evening (completed within one hour following sunset)."

A survey conducted once a month may be on a day when weather precludes ravens from being active. Consequently, we request that the collection of data on raven occurrence at and around the Action Area should be science- and statistically-based and should consider both the biology of the desert tortoise and the biology of the common raven. The method for collecting data (e.g., biologists using binoculars/ spotting scopes, etc. and/or remote sensing, etc.) should also be described.

3.3 Adaptive Management: "The agencies will review the results of raven control efforts and in cooperation with the Project owner will determine if changes in the plan are warranted following the first year of commercial operation of the Project. If the agencies determine that the raven management program is effective, and the potential for ravens to adversely affect the local wildlife population is less than significant, then the raven surveying and reporting requirement may be discontinued. Components of the Raven Control Plan, such as preventing access to anthropogenic food and water resources, preventing nesting, and discouraging roosting will remain effective throughout the lifetime of the Project."

From a scientific and statistical perspective, monitoring for one year of a 30+ year project is not likely to provide sufficient data or assurances that the implementation of the raven control measures are working including eliminating the monitoring component of the Raven Control Plan. The implementation of the Raven Control Plan including its duration should be science-based. Consequently, we are opposed to this language that limits the surveying and reporting to only one year.

In addition, Tracy et al. (2004) reported that numerous impacts to the tortoise are "synergistic causes of desert tortoise declines." The "multiple threats, 'death of a thousand cuts,' perspective is unsatisfying and difficult to accept." "Unfortunately, we firmly believe that this is the situation

we are forced to deal with." Tracy et al. (2004) added "the [tortoise] populations are not at all likely to respond significantly if only one threat is dealt with." Given this synergy of impacts to the tortoise from multiple sources, we assert that if the potential for ravens to adversely affect the local wildlife population, including the tortoise, is less than significant, the surveying and reporting requirements should not be discontinued. Without these data, Applicant and the USFWS would not know if the raven control measures are working. Perhaps after a period of documented success, the monitoring frequency may be adjusted, but it should not be discontinued.

We appreciate this opportunity to provide input and trust that our comments will help protect tortoises during any authorized project activities. Herein, we reiterate our request that the Desert Tortoise Council be identified as an Affected Interest for this and all other BIA projects that may affect species of desert tortoises, and that any subsequent environmental documentation for this particular project is provided to us at the contact information listed above.

Regards,

Edward L. LaRue, Jr., M.S.
Desert Tortoise Council, Ecosystems Advisory Committee, Chairperson

Attachments:

Abella, S.R., and K.K. Berry. 2016. Enhancing and Restoring Habitat for the Desert Tortoise, *Gopherus agassizii*. Journal of Fish and Wildlife Management June 2016 7(1):1-25.

Desert Tortoise Council Scoping Comments of February 28, 2020.

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[USFWS] U.S. Fish and Wildlife Service. 2012. Connectivity of Mojave Desert Tortoise Populations. DTRO, USFWS, Reno, NV. March 2012.

[USFWS] U.S. Fish and Wildlife Service. 2014. Recovery Action Plan for the Mojave Desert Tortoise in the Northeast Mojave Desert.

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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-0179
and 08ENVS00-2020-I-0180,
08ENVS00-2013-F-301,
and 1-5-05-FW-536, Tier 6

November 12, 2020
Sent by email only

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 Arrow Canyon 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 the Bureau of Indian Affairs (BIA) memorandum received July 24, 2020, requesting reinitiation of formal consultation for the Arrow Canyon Solar project (formerly the Moapa Solar Energy Center (MSEC) Project) in Clark County, Nevada. This biological opinion addresses potential effects to the federally threatened Mojave desert tortoise (*Gopherus agassizii*) and federally endangered 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 BIA Programmatic Biological Opinion (File No. 1-5-05-FW-536) 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. 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 on July 24, 2020; the biological assessment; the programmatic biological opinion (File No. 1-5-05-FW-536); correspondence between the Service, BIA, the Moapa Band of Paiutes (Band), the Applicant (Arrow Canyon Solar, LLC) and their consultants; the Desert Tortoise Translocation Plan: Arrow Canyon Solar Project, Clark County, Nevada; 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 Arrow Canyon Solar project

File Nos. 08ENVS00-2019-F-0179
and 08ENVS00-2020-I-0180

Issued to:

Bureau of Indian Affairs
Western Regional Office
2600 N. Central Ave
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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, 2020

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INFORMAL CONSULTATION (FILE NO. 08ENVS00-2020-I-0180)

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*). The potential effects of solar facility construction and operation to these listed birds could 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 Pahranagat 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 (Arrow Canyon Solar, LLC) 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, including listed 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. 08ENVS00-2020-F-0179)

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. 08ENVS00-2013-F-301 and 1-5-05-FW-536, Tier 6) 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.

January 21, 2014 – The Biological Opinion (BO) for the MSEC project was signed (File No. 84320-2013-F-0301).

March 19, 2020 – A list of species that may occur within the Arrow Canyon Solar project (ACSP) was obtained from the United States Fish and Wildlife Service's (USFWS) website Information for Planning and Consultation System (IPaC; 08ENVS00-2020-SLI-0087).

December 11, 2019 – The Applicant (Arrow Canyon Solar, LLC) met with USFWS 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.

February 25, 2020 – The Service participated in a site visit with the Moapa Band of Paiutes (Band), BIA, the Applicant, and cooperating agencies to discuss the proposed Eagle Shadow Mountain Solar project.

April 21, 2020 – The Service, BIA, 8 Minute Energy, and environmental consultants had discussions and resolved questions regarding information needed for the biological assessment (BA).

June 2, 2020 – The Service met with BIA and environmental consultants to clarify questions related to aspects of the proposed action.

August 3, 2020 – The Service received BIA's BA and request to initiate formal consultation for the Arrow Canyon Solar Project to address potential adverse effects to the desert tortoise.

August 18, 2020 – The Service, BIA, and environmental consultants discussed and clarified the BA comments that the Service provided.

September 8, 2020 – The BIA and environmental consultants provided a draft desert tortoise translocation plan for the Arrow Canyon Solar project to the Service.

October 1, 2020 – The Service provided BIA and environmental consultants comments on the draft desert tortoise translocation plan for the Arrow Canyon Solar project.

October 15, 2020 – The Service sent BIA and environmental consultants a draft biological opinion (BO).

October 22, 2020 – The BIA and environmental consultants provided comments on the draft BO.

DESCRIPTION OF THE PROPOSED ACTION

Definition of Action Area

The Applicant has entered into an agreement with the Band to lease their land to construct a photovoltaic (PV) solar power generation facility (SPGF) on 2,200 acres of land in Clark County, Nevada. The solar field ground lease would be expanded from the previously approved 850 acres up to 2,200 acres for constructing, operating and maintaining, and decommissioning a 200-megawatt (MW) solar energy generating facility using photovoltaic (PV) technology. The expanded solar project and associated facilities are now referred to as the Arrow Canyon Solar project (ACSP).

The proposed 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 a larger 2,683-acre lease study area on the Moapa River Indian Reservation (Reservation) in Township 16 South, Range 64 East, Sections 28, 29, 30, 31, 32, and 33; and part of section 7 in Township 17 South, Range 64 East, Mount Diablo Base Meridian (Figure 1).

The action area also includes the previously approved linear ancillary facilities, (i.e. main access road (15 acres), 230-Kilovolt (kV) gen-tie line (50 acres), and water pipeline (22 acres)) that were part of the Moapa Solar Energy Center (MSEC) (Figure 2). The gen-tie lines would consist of approximately 7.3 miles of single-circuit 230-kV overhead transmission line from the project site to the Harry Allen 230-kV Substation, of which 6.9 miles occurs on BLM-managed land. These previously approved linear facilities would remain unchanged and become part of the Arrow Canyon Solar project description. However, these components are not analyzed and we do not provide take exemptions for those actions as part of this consultation. The effects of constructing, operating, and maintaining these ancillary facilities and the incidental take associated with these actions are addressed in the MSEC biological opinion (08ENVS00-2013-F-301, and 1-5-05-FW-536 Tier 6).

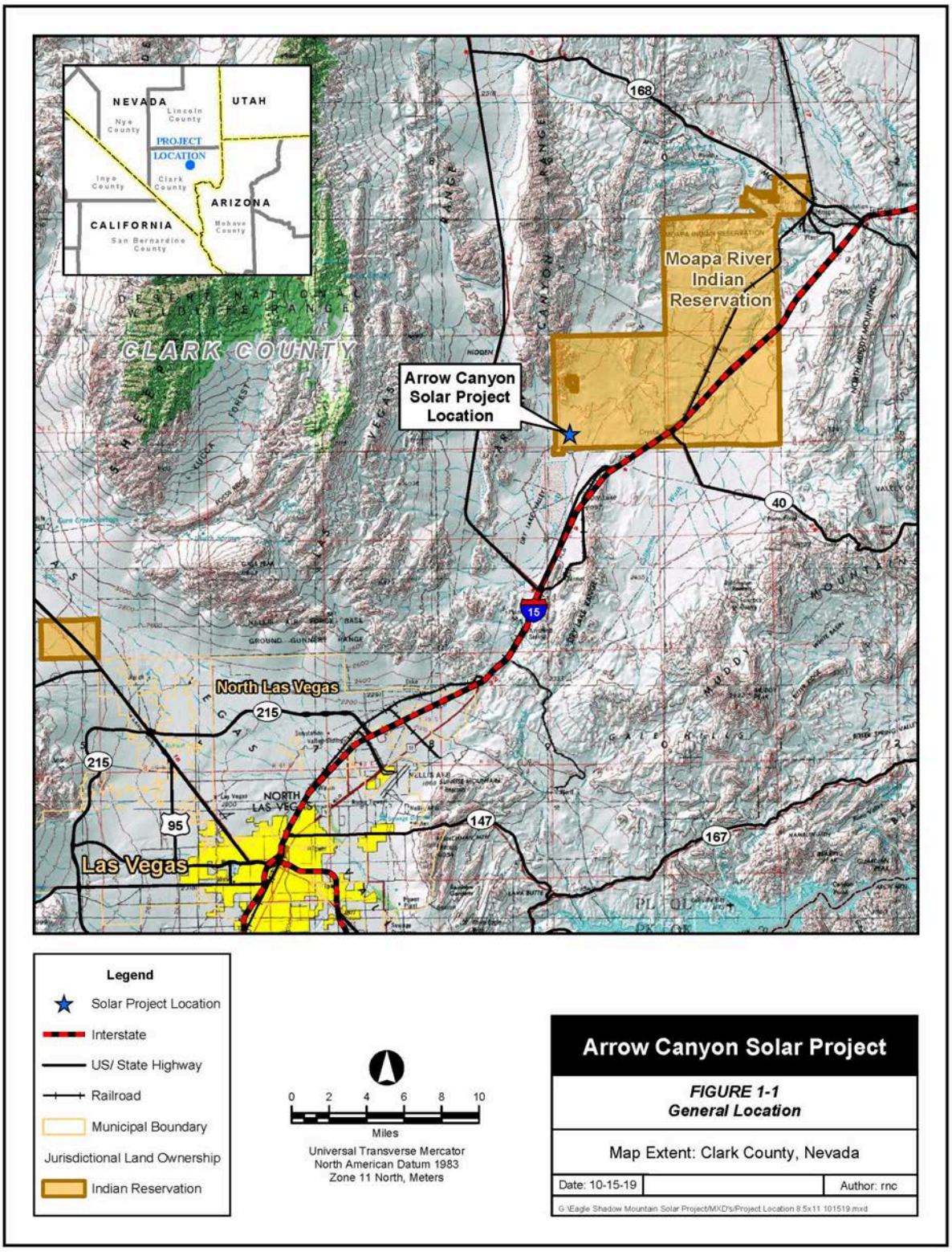

Figure 1. Location of the Arrow Canyon Solar Project.

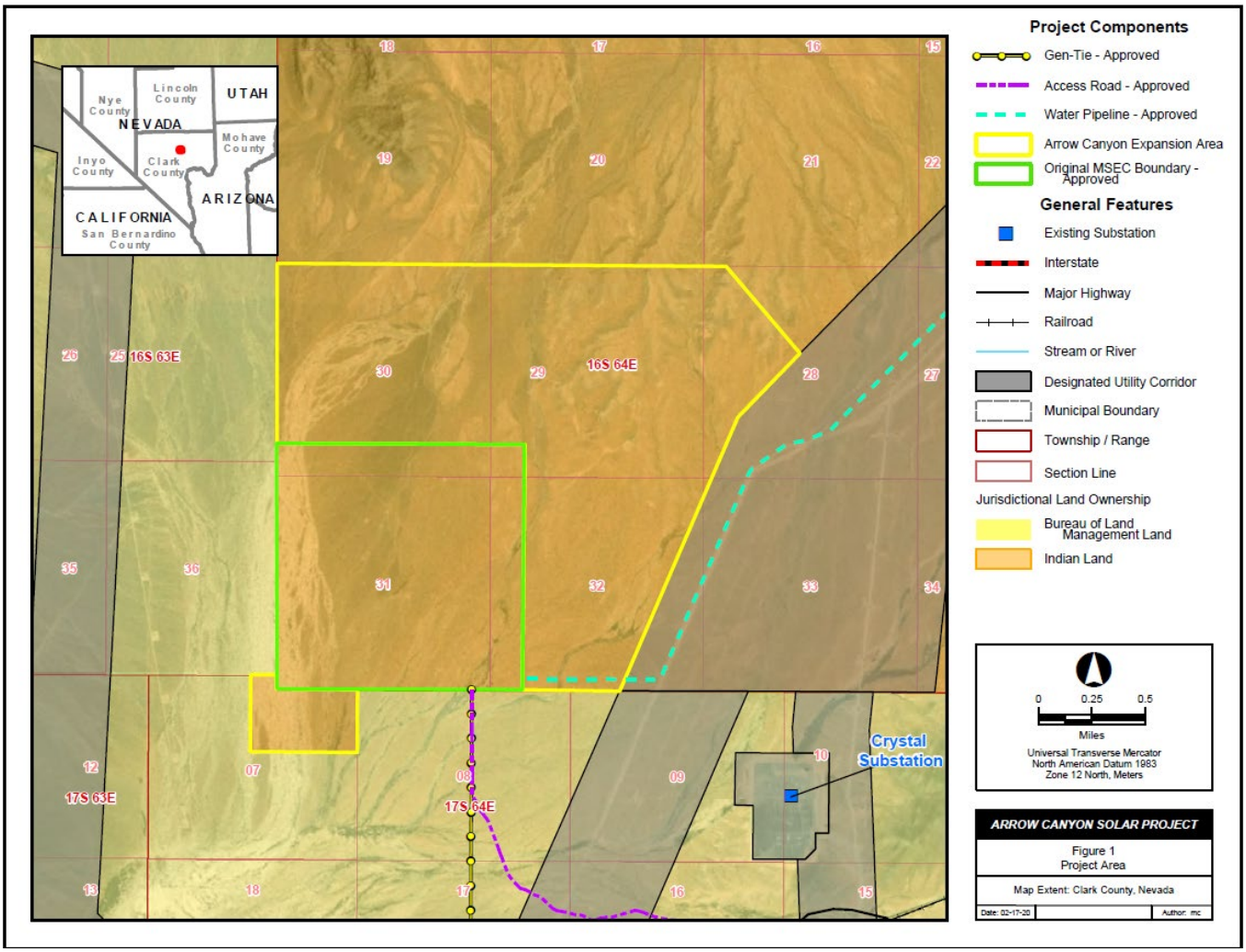

Figure 2. Total Lease Study Area (2,683 acres) of Arrow Canyon Solar project, which includes the Expanded Solar Field (1,833 acres) and Previously Approved MSEC (850 acres).

Proposed Action

The project would include the construction, operation and maintenance (O&M), and potential decommissioning; the solar field is located entirely on the Reservation. The project includes the 850-acre Moapa Solar project that was approved by the BIA and the BLM in 2004, and the proposed 1,350-acre expansion within a total lease study area of 2,683 acres (Figure 2). The MSEC, excluding the linear features, was redesigned as part of the larger Arrow Canyon Solar project. Onsite facilities include a 200-MW alternating current solar field mounted on single-axis tracking systems, associated inverter and transformer equipment, a battery energy storage system (BESS), a project substation, and O&M facilities.

The total acreage of disturbance associated with the project would include 1,937 acres of temporary disturbance and 187 acres of permanent disturbance (Table 1).

Table 1. Project temporary and permanent disturbances in acres.

Project Component	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Piles	0	10
Inverters / Transformers	0	10
O&M Area	0	3
Substation	0	7
Battery Energy Storage System (BESS)	0	20.5
Solar Site Roads (within solar arrays)	0	73.1
Solar Site Roads (between solar fields)	0	1.8
Drainage Features	0	61.2
Solar Facility – within Fenced Areas	1,936.6	0
Total	**1,936.6[1]**	**186.6[2]**

[1] 5.8 acres of the 1,936.6 are previously disturbed.
[2] These acres would be graded and kept free of vegetation for the duration of operations. Grading would be limited on the remainder of the site to only those areas where necessary and vegetation would be allowed to regrow following completion of construction so long as it does not cause safety or operational issues. In areas where grading is not needed, vegetation would be mowed and crushed during construction and allowed to return following construction.

Onsite project Components

The project would include the following onsite key elements located within the 2,200-acre solar project boundary:

- Solar field
- Battery energy storage system
- Onsite electrical collection system and substation
- Site security and fencing
- Communication systems infrastructure
- Operations and maintenance area
- Erosion control and maintenance area
- Internal project roads, including roads between solar arrays
- Lighting
- Water supply
- Wastewater treatment and Waste and Hazardous Materials management
- Fire protection

Solar Field

The proposed PV solar field would utilize crystalline silicon, bifacial, or thin-film PV panels that would be mounted on single-axis trackers to convert sunlight directly into electricity. Using single-axis trackers, the panels would be oriented in north-south rows with the panels moving to track the sun as it moves across the sky during the day. A number of solar cells electrically connected to each other and mounted in a single support structure or frame is called a module. Several modules may be wired together to form an array and arrays can be connected in both series and parallel electrical arrangements to produce any required voltage and current combination. The PV modules, inverters, and transformers would be grouped into array blocks of up to 4.4 MW each occupying approximately 23 acres. Inverter and transformer sizes would be selected based on cost and market availability prior to construction.

A typical panel layout depicting the arrangement of a block of solar arrays for a single-axis tracker configuration is shown in Figure 3 and Figure 4. The highest point for a tracker would be achieved during the morning and evening hours when the trackers are titled at their maximum angle and would be up to 18 feet above the ground surface.

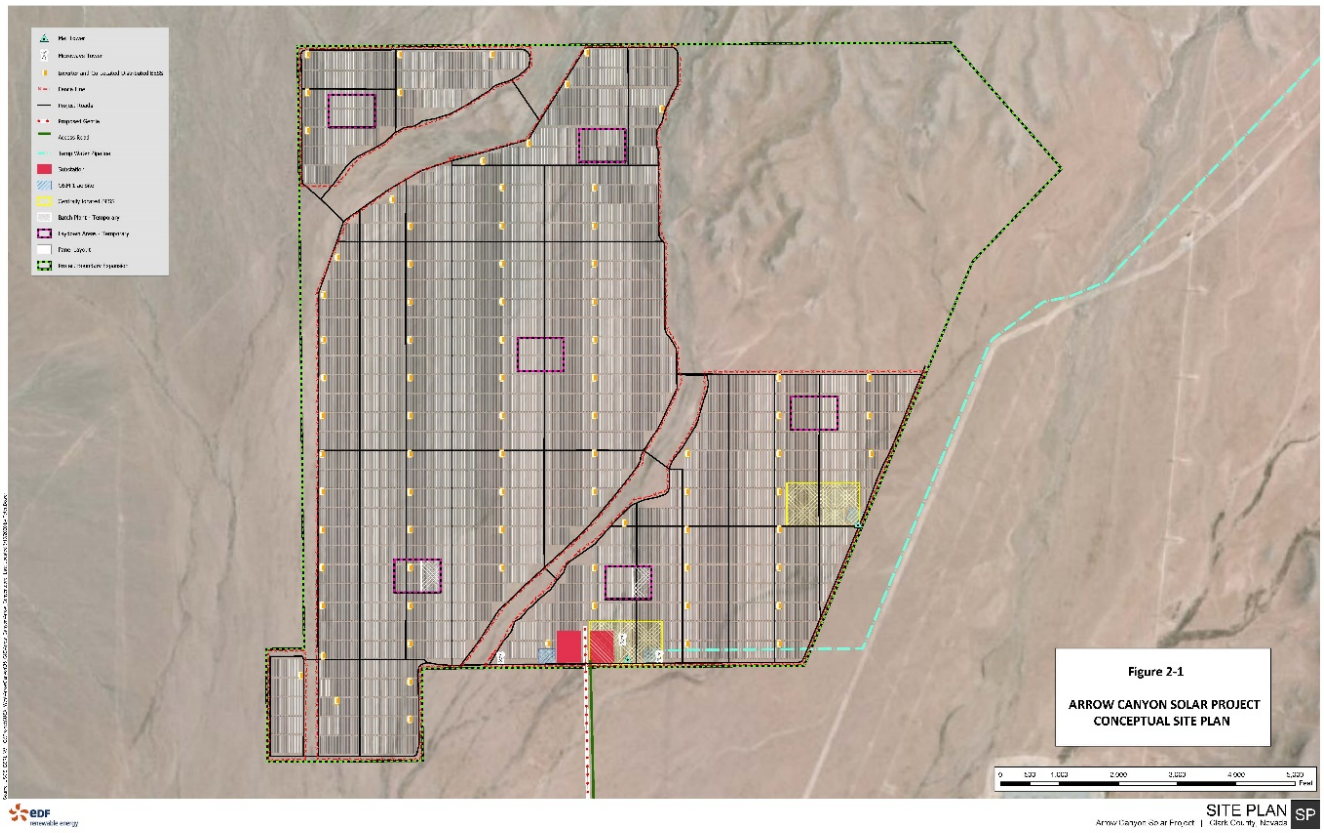

Figure 3. Conceptual Site Plan.

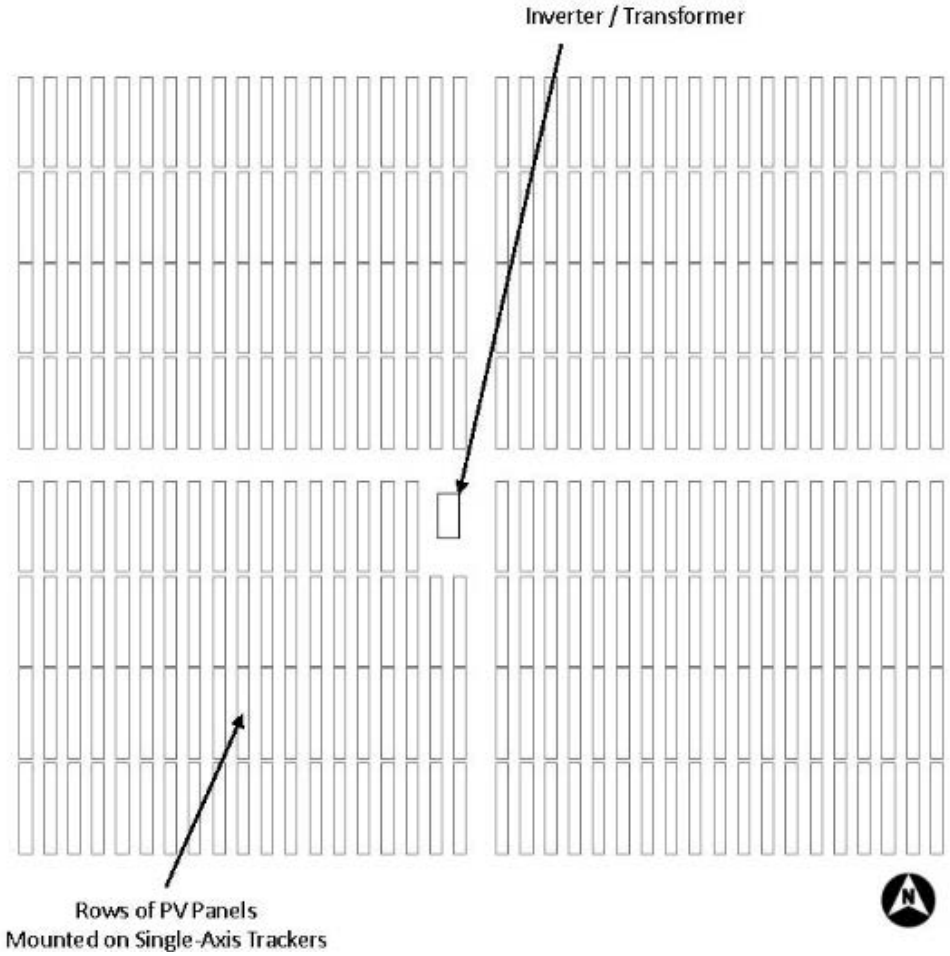

Figure 4. Typical Single-Axis Tracker Array Layout.

The PV units would be mounted on driven H-pile foundations or pre-drilled H-Pile foundations to support the panel mounting system. Site-specific soil tests would validate the preliminary engineering and if additional tests or installations conclude that further foundations are required, the vertical steel beams would be attached to concrete ballasts. The electrical equipment (inverters and transformers) would be in enclosures or covered by shade structures approximately 8 to 10 feet high.

One or more small meteorological monitoring stations would track solar insolation, temperature, wind direction, and speed and communicate with the tracker units. This would allow the trackers to rotate to a flat position during high winds. These stations would have a height of approximately 10 feet and would be located within the disturbed site.

Battery Energy Storage System (BESS)

The most likely BESS technology would be either lithium-ion (Li-ion) or redox flow battery. The BESS could be integrated into the project in two primary configurations – distributed throughout the solar field at each array or the BESS facilities would be centrally located near the

project substation or O&M facilities. Most of the BESS would be installed initially during construction. The remainder would be added later during the project life as needed to increase capacity as the system capacity degrades over time. This would be done as part of regular O&M activities.

Each BESS container would have its own fire detection system. In the case of BESS located in buildings, the building would comply with the local fire code and contain equipment at multiple sections of the building for fire detection, suppression and necessary alarms to alert the local fire authorities. The BESS containers or building would also be located such that it is readily accessible by the fire department.

Distributed BESS

In this configuration, Li-ion batteries would be in BESS containers distributed throughout the project site with each solar block having up to two BESS containers placed adjacent to the solar inverters and the converters. Containers would be up to 13 feet tall, 70 feet long, and 12 feet wide. The total area on the solar site attributed to the BESS facilities would be approximately 8.5 acres (0.085 acres per solar block).

The BESS containers could be made of steel or concrete. In addition to the battery modules, the containers would also contain a fire detection system, alarms and monitoring system, HVAC system, data collection and control system, and other electrical wiring and auxiliary systems. Distributed BESS containers would be located within the solar arrays and would not be fenced to exclude desert tortoise because the containers themselves are closed.

Centrally Located BESS

In this configuration, all the BESS facilities would be located on the site at the project substation or the O&M area and the system would use either Li-ion or redox flow technology.

- If Li-ion batteries, they would be in BESS containers (up to 13 feet tall, 70 feet long, and 12 feet wide) at this location or in a warehouse-type building. The total land disturbance on the solar site attributed to the BESS facilities under this scenario would be 10 acres at this one location.

- If redox flow technology is used, all battery equipment would be placed in one warehouse-type building or the batteries would be placed in multiple containers at this location. In addition to the battery modules, the building or containers would also have storage tanks for redox flow battery electrolytes, spill containment, plumbing, fire detection system, alarms and monitoring system, HVAC units, data collection and control system, and other electrical wiring and auxiliary systems.

The building would be similar to the O&M building (described below) and the BESS inverter pads or transformers would be located outside and adjacent to the building. The electrolyte storage tanks may also be located outside the building rather than inside depending on the system design. The maximum disturbance for this configuration would be 20.5 acres. This would be the

maximum total disturbance for the three BESS options and this acreage (Table 1). The centrally located BESS would be located at the substation or the Operations and Maintenance area; therefore, it would be fenced to exclude desert tortoise.

Operations and Maintenance Area

The project would include an Operations and Maintenance (O&M) building developed on the site that contains administrative offices, parts storage, a maintenance shop, plant security systems, and plant monitoring equipment with adjacent worker parking. The O&M building would likely consist of one single story building of approximately 6,000 square feet with a maximum height of approximately 25 feet. The building would have exterior lighting on motion sensors, and fire and security alarms. The total disturbance would be 3 acres and this area would be permanently fenced to exclude tortoises.

Water Use

During construction, the project would use between 100–300 acre-feet per year (afy), primarily for dust control. This is an increase from the 50 afy analyzed in the MSEC biological opinion (File No. 84320-2013-F-0301).

Water required for the project would be leased from the Band and provided from their existing production wells on the Reservation located about 5.4 miles northeast of the solar facility. The well is located in the California Wash Basin of the Arrow Canyon Range Cell of the Carbonate-Rock Aquifer. Water would be delivered via a 5.4-mile underground water pipeline located on Reservation lands, of which approximately 4.7 miles occurs within an existing utility corridor managed by the BLM. The water pipeline would be 8 to 12 inches in diameter and would be buried 3 to 6 feet below the ground surface. The water would be stored in covered aboveground water tanks located on site.

During operations, water would be trucked to the site when needed. Operation of the project would require up to 30 afy of water for panel washing, potable and sanitary uses, and other operational uses, such as dust control.

Wastewater Management

Wastewater generated during construction and operation would include sanitary waste from bathroom and shower facilities located within the O&M building. A septic tank and drain field system would be used for collection, treatment, and disposal of sanitary waste during operations.

Project Support Systems

The project includes the following support systems.

Site Substation

A substation with medium to high voltage (34.5–230-kV) step-up transformer(s) with mineral oil, breakers, buswork, protective relaying, supervisory control and data acquisition (SCADA), and associated substation equipment would be located on site. The substation would be fenced for safety in accordance with applicable codes and one or more structures may be outside the fence for meters and control equipment. The communication system for the substation may include aboveground fiber optic cable mounted on the gen-tie line structures as one of the shield-wires, or a microwave tower. The project would be interconnected to the regional transmission system from this on-site substation/switchyard via the previously approved gen-tie interconnection described in the MSEC biological opinion. The total disturbance would be 7 acres and this area would be permanently fenced to exclude tortoises.

Fencing and Security

The project site would be enclosed with a chain link fence with barbed wire, measuring up to 8 feet from the finished grade. The fence would have controlled access points and warning signs in both English and Spanish along the perimeter.

Temporary desert tortoise exclusion fencing would be installed and kept in place during construction. The permanent perimeter fence would be installed, leaving a 6- to 8-inch opening at the bottom of the fence to allow for the movement of desert tortoises and other wildlife across and through the site after the construction of the facility is complete.

Lighting

The project's lighting system would provide operation and maintenance personnel with illumination for both normal and emergency conditions near the main entrance, the substation, and at the BESS facilities. Minimal lighting would be used onsite and directed inward and downwards. There would be no lighting in the solar field except for emergency lighting at the BESS facilities. If lighting at individual solar panels or other equipment is needed for night maintenance, portable lighting would be used. Motion sensor lights may be used for security purposes.

Internal Site Roads

Internal project roads would be built within the solar field to provide access to the solar arrays and the project facilities area that includes the O&M building, substation, and BESS facilities.

Fire Protection System

The project's fire protection water system would be supplied from up to three aboveground raw water storage tanks located on the solar site holding up to 12,000 gallons each. Pump flowrates would be in accordance with applicable standards. All fire protection system pumps must be shut off manually.

In addition, each BESS container would have its own fire detection system. Whether the BESS is located in containers or buildings, the structures would comply with the local and federal fire code and contain equipment at multiple sections of the building for fire detection and necessary alarms to alert the local fire authorities. The BESS containers or building would be readily accessible to the fire department.

The construction contractor would develop and implement a Fire Prevention Plan for construction, operation, and decommissioning of the facility and the Applicant would prepare and implement a Fire Management Plan for O&M. The plan would include measures to safeguard human life, prevent personnel injury, preserve property, and minimize downtime due to fire or explosion. Fire protection measures would include prevention methods using fire-safe construction, reduction of ignition sources, control of fuel sources, availability of water, and proper maintenance of fire-fighting systems. The plan would be coordinated with the BIA, Band, and Clark County.

Erosion Control and Stormwater Drainage

Three ephemeral drainages (located on the western, central, and eastern portions of the site) exist onsite that convey stormwater runoff through the project site from the north to the Dry Lake playa located to the south. Construction of the solar field avoids these primary drainages. Stormwater flows from upstream of the site would flow through the site via these ephemeral drainages with the overall drainage patterns maintained. Most of these drainages would be left in their natural condition but improvements would include armored channelization and/or berms, as needed, to direct and maintain flow within the primary drainage paths and away from the solar arrays (Figure 3a). Detention basins or other design features may be incorporated into the final solar field design to manage flows.

Most of the site would be drained by sheet flow to on- and off-site drainages. Best management practices (BMPs) would be implemented in areas of the facility that have the potential for release of contaminants from vehicles and project components such as the O&M building, substation, BESS facilities, delivery areas, and paved roads. These drainages would be managed to accommodate runoff from the 100-year storm event at a minimum. The contractor for the construction and operational phases of the project would develop erosion and sediment control plans.

Spill Prevention / Containment

A spill prevention control and countermeasure plan (SPCC) would be prepared to meet the requirements of the regulations administered by the EPA. Local area containments would be placed around certain locations such as oil-filled transformers and chemical storage areas.

Offsite project Components

Offsite project components including access roads, a 230-kV gen-tie transmission line, and water pipeline were previously approved as part of the Moapa Solar Energy Center (MSEC; 08ENVS00-2013-F-301 and 1-5-05-FW-536 Tier 6). These components would be incorporated

into the Arrow Canyon Solar project (ACSP) and remain unchanged. These linear facilities are not analyzed in this consultation and we do not estimate any associated take as part of this consultation. The effect of constructing these ancillary facilities and the incidental take associated with these actions are addressed in the MSEC biological opinion. Incidental take associated with O&M of those features was also addressed in the previous biological opinion; however, at the time, incidental take associated with O&M was estimated for the entire project, including the fenced solar site and the linear ROWs outside the fencing. Incidental take of tortoises resulting from O&M activities in the solar site is now estimated and analyzed separately in this biological opinion. Because the previous project design included a permanent perimeter of tortoise-exclusion fencing around the solar facility boundary, incidental take resulting from O&M activities, as analyzed in the previous biological opinion, was already most likely to occur outside the perimeter fencing (i.e. along the ROWs). The estimate in the previous biological opinion remains in effect exclusively for the ancillary features. See Figure 2 for the offsite components approved as part of the MSEC. Note that the 500-kV transmission line is no longer part of the project.

Project Construction

Solar Power Facility Construction

Grading and Site Preparation
Prior to the initiation of construction, the project site would be surveyed and staked. Preconstruction survey work would consist of locating the site and rights-of-way (ROW) boundaries, locations of proposed facilities, and the centerlines of linear features. Environmental clearance surveys would be initiated following installation of the temporary tortoise exclusion fencing. Prior to construction, with the exception of one activity, authorized desert tortoise biologists will conduct surveys to translocate any desert tortoise out of the project area. The only construction activity that would occur prior to the completion of fencing and the translocation of tortoises would be the geotechnical activities described below.

Initial grading work would include the use of excavators, graders, dump trucks, and end loaders, in addition to support pickups, water trucks and cranes. Vegetation would be permanently cleared from roadways, access ways, and at inverter equipment, substations, BESS locations, 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. Vegetation within the solar arrays would be mowed to a height of 18 inches leaving the roots intact to facilitate regrowth during operations. Construction equipment would drive over and crush the vegetation during installation of the arrays.

Within the solar field, grading would be required for the project substation, O&M area, battery storage area (s), perimeter roads around the solar arrays, electrical equipment pads, and where the panel support foundations are driven or drilled. A small graded pad may be required within each solar array to accommodate the inverter and transformer or they could be installed on driven piers. Excavation may be required for trenches for electrically connecting some of the equipment on site. Following construction, all underground trenches would be filled with native

fines and compacted. The cuts and fills associated with all earthwork are planned to be balanced onsite to the extent practicable.

Construction of the solar facility is expected to take 20 months. This schedule is designed to meet the December 2022 commercial operations date (COD) for delivery of 200 MWs of energy required by the approved Power Purchase Agreement (PPA). Construction would generally occur between 7 a.m. and 7 p.m., Monday through Friday. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. For instance, during hot weather, it may be necessary to start work earlier to avoid pouring concrete and minimize labor during high ambient temperatures.

The contractor will prepare site maps showing the construction project in detail. The construction phases of the project are anticipated as follows:

1. Geotechnical testing – final on-site assessments of site conditions and pile testing will be completed, as needed, to inform the final project design.
2. Fencing - Temporary desert tortoise exclusion fencing would be installed and kept in place during construction. Permanent fencing would be installed around solar arrays as a part of overall site development with a 6–8 inch opening at the bottom to provide access for tortoises and other wildlife.
3. Clearing - Vegetation removal for installation would be completed as necessary ahead of equipment installation, but conducted to minimize the amount of disturbed ground surface at any one time.
4. Parking and Laydown - Parking areas for construction workers and laydown areas for construction materials would be prepared inside the project area. Potential locations for these facilities have been developed and included in the conceptual site plan and the final location of the laydown and parking areas would be developed after a contractor is hired to construct the facility.
5. Site Roads - The internal site roads would be constructed and maintained.
6. Site Grading - Because of the relatively flat topography at the site, relatively minimal volumes of soil would be moved because of grading.
7. Foundation Construction – foundations for the substation, inverters and/or BESS containers (if necessary) would be constructed and may require some earthen fill.
8. Array Installation - The solar arrays are installed first by driving piles (including pre-drilling if required by site soil conditions). The tracker is then attached to the piles and then the PV modules (panels) are attached to the tracker. At the same time, the substation equipment, inverters and BESS are installed. This includes running cables between all equipment. Cables between the PV panels and inverter are commonly routed through hangers or trays. Cables from the inverters to the substation would be underground (installed by trenching, laying the cable, and backfilling).
9. Balance of Plant (BOP) -With the major equipment in place, the remaining fieldwork would be electrical and smaller component installations.
10. Testing and Commissioning -Testing of subsystems would be conducted as completed. Modules would be tested once all supporting subsystems are installed and tested.
11. Site Stabilization - Disturbed areas would be stabilized during construction to minimize wind and water erosion and fugitive dust by watering and/or using dust palliatives

approved by the USFWS. Cleared and graded surfaces that would not be subject to future disturbance would be restored. Revegetation would be conducted as soon as practicable, based on seasonal weather conditions, to maximize revegetation success.

12. Demobilization - Any temporary fabrication and construction facilities would be removed from the site once construction is complete.

Temporary construction facilities and laydown areas would be marked within the project site. Temporary construction facilities would include:

- Full-length trailer offices or equivalent
- Generators
- Portable toilets
- Parking for construction vehicles
- Tool sheds/containers
- Parking construction equipment
- Construction material laydown area
- Solar field equipment laydown area
- Batch plant (if needed, may be located within one of the temporary laydown areas)

Site Access and Traffic

All equipment, permanent materials, and commodities for the project would be transported to the site via rail and/or local highways. Any shipments by railroad would go to the nearest active railroad spur for offloading and transported to the project site. Construction materials such as concrete, pipe, wire and cable, fuels, reinforcing steel, and small tools and consumables would be delivered to the site by truck. All equipment and material deliveries would utilize the previously approved site access route.

There is currently little traffic on any of the roads bordering or in the immediate vicinity of the project. The use on these roads is primarily associated with the energy infrastructure in the area. Truck deliveries of equipment and materials would occur from the initial construction notice and proceed through the entire duration of the project. Delivery of equipment and supplies and the commuting of the construction workforce would generate daily trips during construction of the project.

Roads that are expected to be heavily used would be surfaced. Onsite roads would be surfaced with native soil and treated with water and/or a dust palliative approved by USFWS, as needed. However, areas that tortoises can access will not use palliatives.

Construction Workforce

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

The number of workers expected on the site during construction of the project would vary over the construction period and is expected to average up to approximately 400 with a peak of 500 workers each day, generating an average of 800 to 1,000 daily trips. Up to 100 trips per day (50 trips to the site and 50 trips leaving the site) would occur as a result of delivery of construction equipment and materials to the site. Combined, these would result in an average increase of 900 vehicle trips (or 450 roundtrips) per day during construction. All project related parking would be onsite during construction. 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.

Geotechnical Testing

Geotechnical investigations are needed to determine the site soil conditions and to provide geotechnical engineering data for the foundation design of the proposed gen-tie lines. Some of these investigations have already been completed for the project under informal consultation with the Service (File No. 8ENVS00-2019-I-0144). Geotechnical testing activities would commence immediately upon the BIA's approval of the lease expansion and amendments and would commence prior to the construction of tortoise exclusion fencing.

In order to complete the final project design, additional analysis of soil borings would be conducted using the following parameters. The testing process includes field survey staking and flagging of each test location and sample collection via a truck-mounted drill rig. This would be done from a standard light-duty pickup truck and a one or two-person survey crew. Samples collected from the borings would be analyzed to determine soil classification, moisture content, density, depth to groundwater and other characteristics. After each test boring is completed, the spoils would be backfilled by hand and lightly compacted. After backfill, the test location would be smoothed and hand-graded as necessary to return the area to the pre-test grade.

Pile testing would also be conducted at up to thirty (30) testing locations coinciding with previously disturbed geotechnical investigation sites identified in the informal consultation described above. The proposed test program includes six (6) test piles each of the thirty (30) test locations, for a total of 180 test piles. The pile sizes for testing will be W6x9 bare steel sections. At each test location, the piles will be installed to variable depths between 5 and 7 feet.

Pre-drilling may be required to facilitate pile installation at some locations. Pre-drilling will be performed concurrent with pile driving/installation, and only when pile driving refusal is encountered (see the following section for details of pile driving/installation). The primary pre-drilling method will be a "Pilot Hole Pre-Drilling" method with a 6-inch or 7-inch borehole diameter. In some cases, a larger 10-inch diameter borehole may be drilled. The maximum drilling depth will be 7 feet below ground surface. The soil borings will be completed using continuous flight augers (hollow-stem or solid stem auger type) or air rotary drilling methods. A geotechnical engineer or geologist will log the borings in the field and classify the materials encountered during boring. All boreholes will be backfilled with soil cuttings immediately upon completion and extraction of the augers or bit (holes will not be left open between pre-drilling and test pile installation). While not anticipated, if groundwater is encountered while drilling, the

depth of water will be noted, and the borehole will be sealed with cement-bentonite grout, tremie pumped from the bottom of the borehole.

After completion of pile installation, each pile will be load tested. Upon completion of pile load testing the test piles will be left in place temporarily for later extraction and removal during construction. Note that the W6x9 test piles are "H" type shaped and do not have an open end requiring capping.

Temporary work spaces for either the soil borings or the pile testing would measure up to approximately 40 by 40 feet. This will result in a total combined work area footprint of approximately 1.1 acres. This area is included in the estimated acres of permanent disturbance provided in Table 1 above. In addition to the work space required for investigation, the work equipment and crews will travel across the site to each test location. The travel path will be approximately 10 feet wide and will follow the routes previously utilized during the geotechnical investigation.

Equipment for boring and testing activities will include one drill rig, one Hydraulic Hammer Rig, and a truck and trailer to mobilize and demobilize the rig. The drilling rig will be all-terrain and designed specifically for low ground pressure and working on rugged terrain while minimizing ground disturbance. The rig type may be a conventional drilling rig or a tractor mounted auger attachment. A standard heavy-duty pickup truck will be utilized by the crew on a daily basis for travel and support. Side-by-side utility vehicles (UTVs) may also be utilized by on site staff.

Desert Tortoise Translocation

Presence/absence surveys for desert tortoise were conducted in the action area in the spring of 2019. During spring and summer of 2020, a combination of transect surveys and targeted searches in suitable habitat and at known and historical locations were conducted to record tortoises, affix radio transmitters and conduct health assessments. Radio tracking was conducted twice monthly from June through August, 2020. 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 2020 and continuing through the winter 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, if available. Addenda for unknown adults located during clearance efforts including health assessment data and photographs would be submitted to BIA and the Service's Desert Tortoise Recovery Office (DTRO) 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 where 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 (the Over-the-fence Group) 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 2,214-acre recipient area. Tortoises located within the interior of the solar site, greater than approximately 500 m from the fenceline (Pen-and-return Group), would be penned and returned to the solar site, or translocated to another suitable area determined on a case-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 45.

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 once within 24 hours of release, once daily for the first two weeks after release, one time per week during the tortoise active season (as defined in the Translocation Plan), once per week during the less-active summer season and 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.

Proposed Operation and Maintenance

The O&M requirements for this project would include regular monitoring, periodic inspections, and maintenance as needed. Although O&M activities are expected to be minimal.

Daily operation of the plant begins when there is sufficient sunlight to begin operation of the solar trackers. The panels would be facing east in the morning and rotate on the single axis to follow the sun throughout the day. In the evening, the trackers rotate back to the east using power from the electrical grid so that the panels are once again in position to receive the morning sun.

The project is expected to require up to 12 personnel during operations. Maintenance and administrative staff typically work 8-hour days, Monday through Friday. Periods when non-routine maintenance or major repairs are in progress, the maintenance workforce may work longer hours, and contract labor may be used as necessary. Typical O&M vehicles would include trucks (pickups, flatbeds, dump trucks), forklifts, and loaders for routine and unscheduled

maintenance, and occasionally water trucks for solar panel washing. No heavy equipment would be used during normal plant operation. However, large heavy-haul transport equipment may be brought to the site infrequently for equipment repair or replacement.

Operation of the site would be expected to generate up to 10 to 15 round trips per day from maintenance and security personnel. Delivery of supplies or equipment to support operations and maintenance would typically generate less than one daily round trip. Water trucks would be used to clean the panels and each event would generate up to 33 water truck trips. Although panel washing would be relatively infrequent as the panels can only be cleaned periodically. Potable water would be stored in a 15,000-gallon storage tank.

A long-term maintenance schedule would be developed to include periodic maintenance and replacement of equipment in accordance with manufacturer recommendations. Solar panels and BESS components would be replaced as needed. Solar panels are designed to last 35 years. Moving parts, such as motors and tracking module drive equipment would be serviced on a regular basis, and unscheduled maintenance would be conducted as necessary.

Proposed Project Decommissioning

The ACSP would operate for at least the life of its PPA or other energy contracts and its lease with the Band. It is possible, because much of the needed electrical infrastructure would have been developed, this solar facility could continue to be upgraded and used to generate solar energy even beyond the term of the initial energy purchase agreements and/or lease. Therefore, it is possible that the project site would remain in solar energy production for the foreseeable future.

However, if this project were decommissioned, the solar field, support structures, and electrical equipment would be removed from the site, and it would be restored with native species and similar to the original condition of the site. A draft Decommissioning Plan has been developed and is included in Appendix D in the DEIS.

- A draft Restoration and Revegetation Plan has been developed and is included in Appendix E in the DEIS. The restoration plan would include the following information:
- Goals and objectives of the plan
- Methods to be used to achieve site restoration
- Criteria to be used to determine the success or failure of the restoration
- Monitoring and maintenance of the site during and periodically after restoration
- What facilities and access routes would be removed, reclaimed and/or restored
- How facilities and access routes would be removed, and the disturbed areas restored
- The time of year the facilities and access routes would be removed and restored
- Noxious weed control during rehabilitation
- Stabilization and reclamation techniques to be used during restoration
- Annual reporting procedures
- Restoration implementation and monitoring schedule

Management Plans, Minimization Measures, and Compensatory Mitigation

Management Plans

The Applicant would prepare the following management plans, which would be submitted to the Moapa Band of Paiutes, BIA, and USFWS (as appropriate) for approval:

- Weed Management Plan
- Raven Control Plan
- Decommissioning Plan
- Restoration and Revegetation Plan
- Dust Abatement Plan
- Spill Prevention Control and Countermeasure Plan
- Health and Safety Program
- Fire Management Plan
- Hazardous Materials and Waste Management Plan
- Surface Water Protection Plan
- Site Drainage Plan
- Traffic Management Plan
- Worker Environmental Awareness Program
- Bird and Bat Conservation Strategy

Proposed Minimization Measures

The following proposed minimization measures and BMPs will be implemented as part of the proposed project to avoid and minimize environmental impacts associated with the proposed action to the Mojave desert tortoise. Minimization measures include the general conservation strategies (i.e., BMPs), as well as specific measures for desert tortoise.

Construction Minimization Measures
The following measures will be implemented to reduce effects on the desert tortoise during construction and O&M.

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 that could result in take 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 and the Service.

   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 (Translocation Plan, Appendix).

6. Desert tortoise clearance surveys and translocation. After installation of tortoise fencing around the perimeter of the solar facility and prior to the commencement of activities described in the construction phases that follow fencing, as listed above, 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.

The Service will approve the Translocation Plan following the 2020 guidance (U.S. Fish and Wildlife Service 2020) prior to the start of construction. 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 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:

- 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.

- Study area translocation: 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).

    - Any samples collected during desert tortoise health assessments that are not used for tests would be archived with UCLA. Appropriate fees, assessed as $3,000 as of the date of this biological opinion, would be paid to UCLA by the Applicant.

    - 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 translocated tortoises 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 translocation review package/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 follow 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. Internal Site Access roads. Construction access will be limited to the project area and established access roads to the extent practicable, and vehicle traffic off established internal site access roads will be minimized as much as practicable.

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. Surface Water Protection Plan. The applicant will oversee the establishment and functionality of sediment control devices as outlined in this 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 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 $923/acre (subject to change annually on March 1). Fees are based on the current $923/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 effects 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

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 80 or more hectares (200 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 square kilometers (1.5 square miles) 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 (lambda, 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 range-wide sampling but erred in citing 160 millimeters as the size below which surveyors' ability to detect desert tortoises decreases. In range-wide 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 range-wide 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, range-wide 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 5 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.

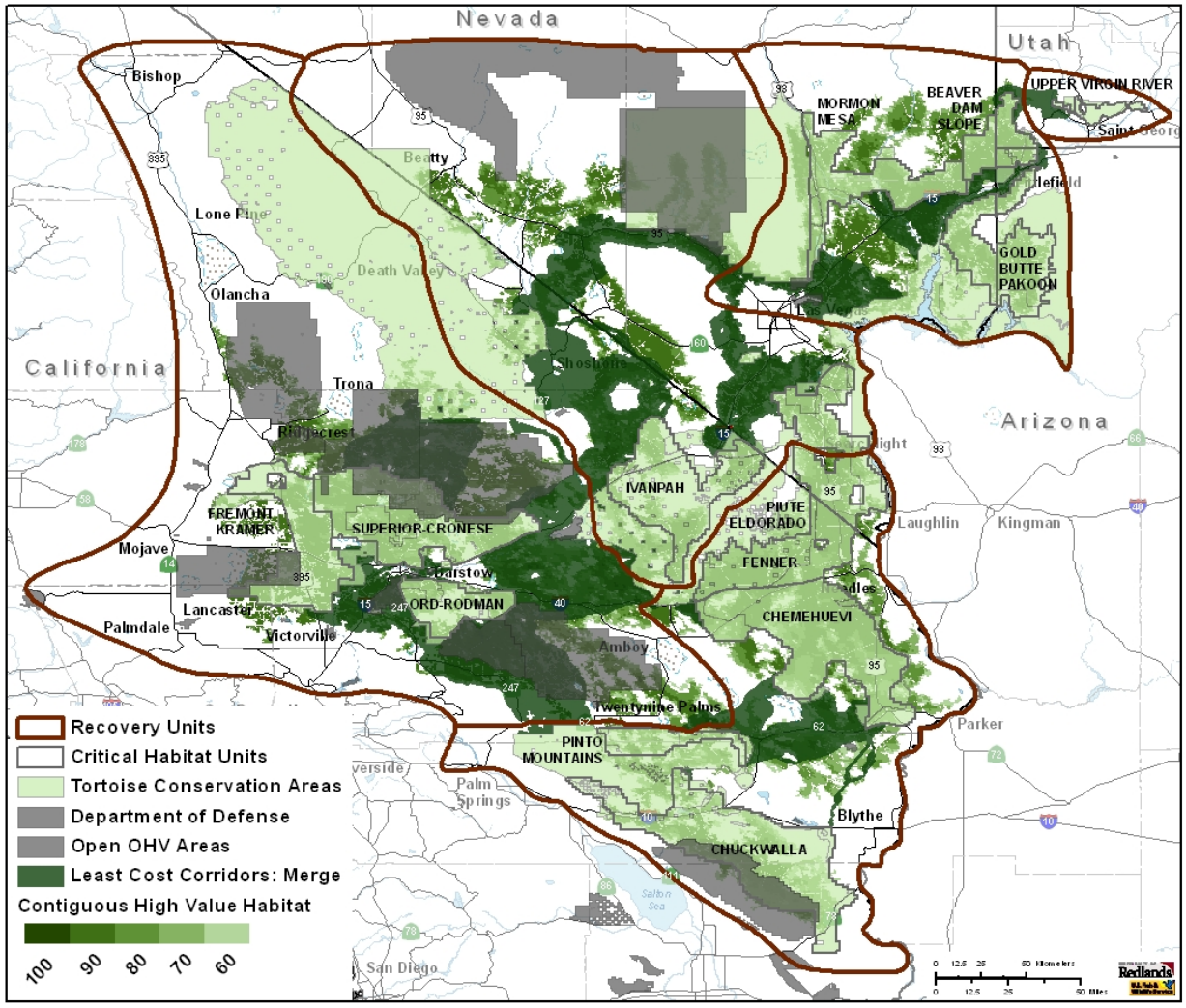

Figure 5. Recovery units, critical habitat units, conservation areas, and contiguous high value habitat.

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 6) 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).

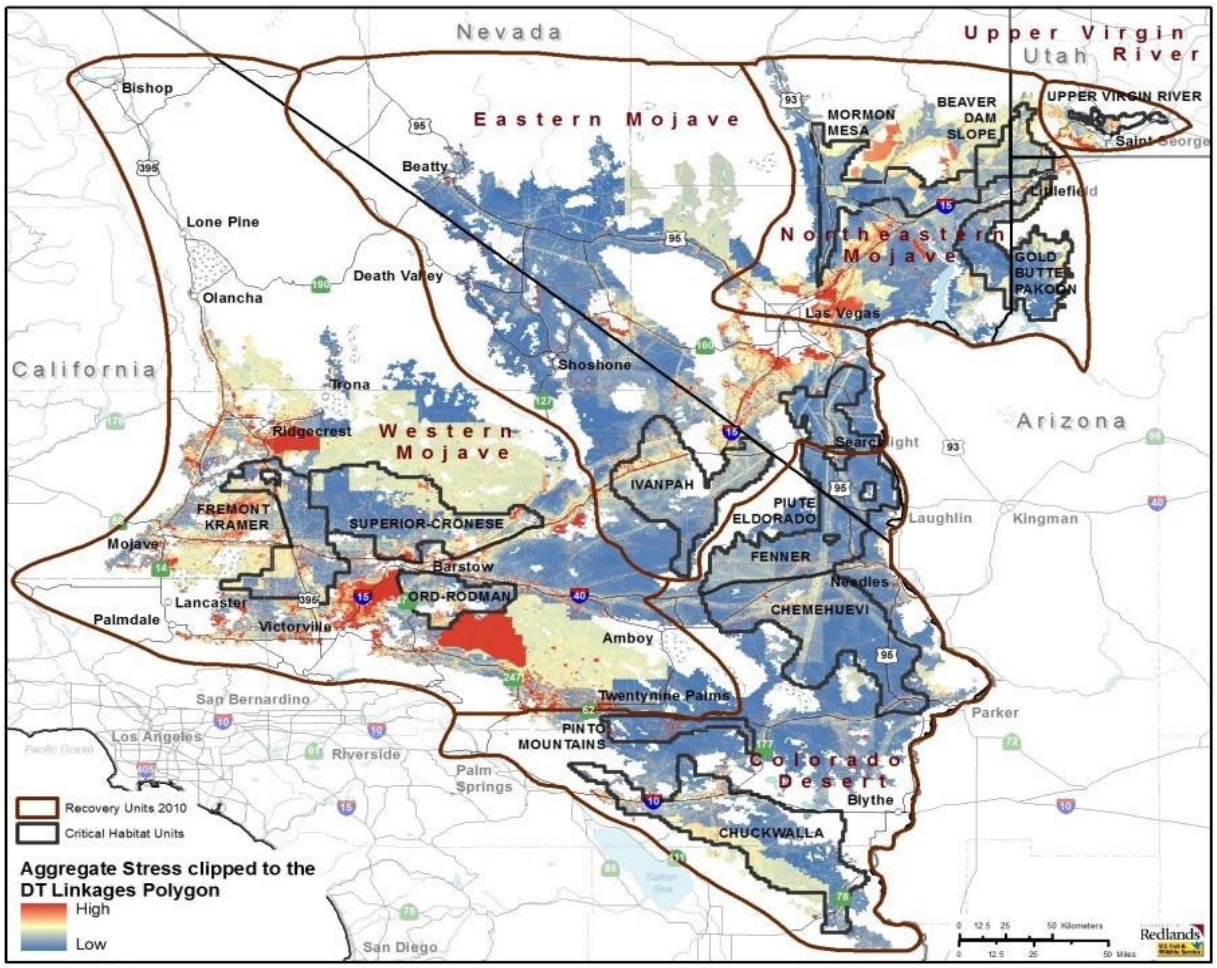

Figure 6. Critical habitat units, recovery units, and linkages.

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 range-wide 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 7 depicts the potential for these species to invade desert tortoise habitat. 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.

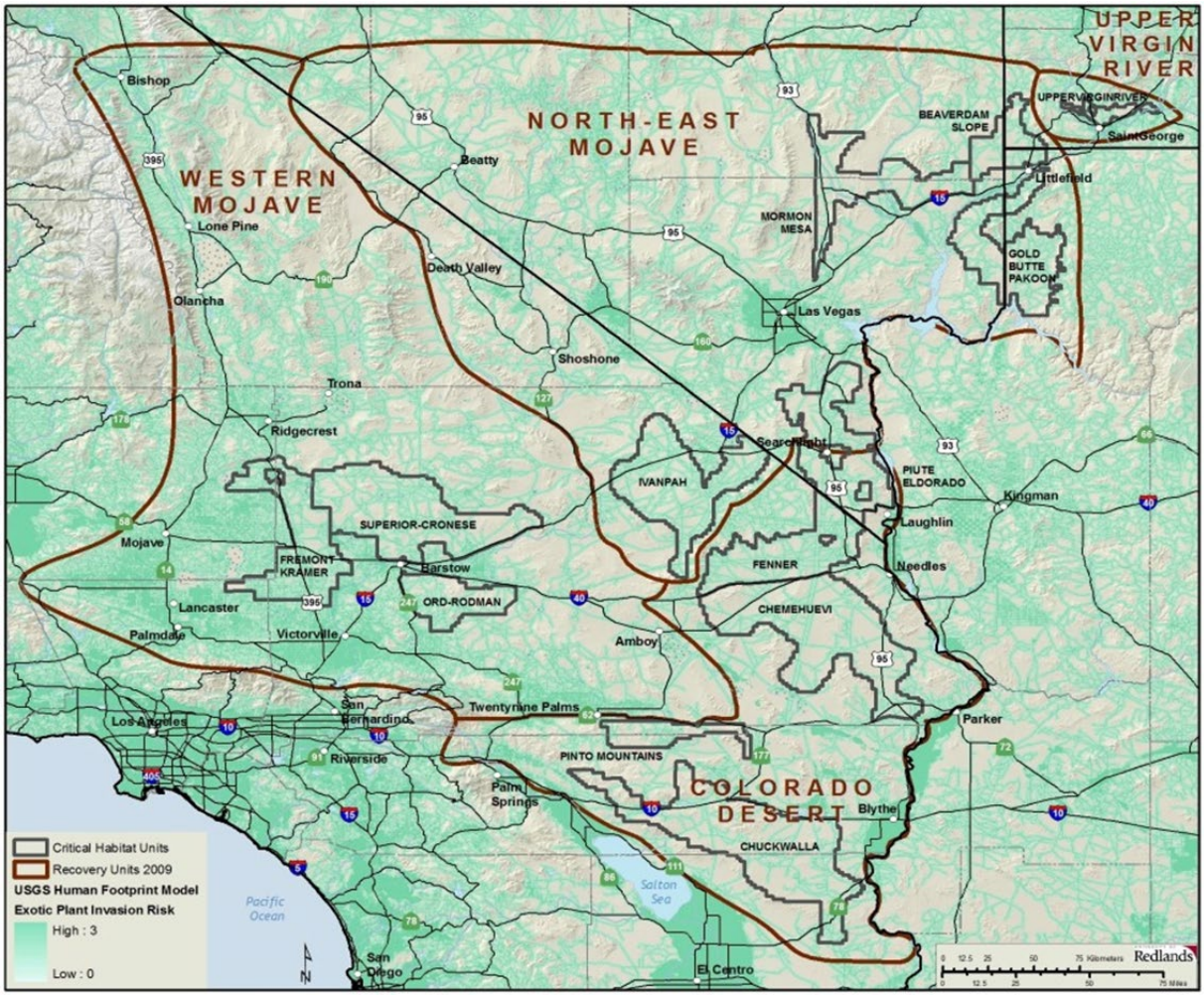

Figure 7. Potential for exotic plant invasion in desert tortoise habitat.

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 65,560 acres of habitat of the desert tortoise. We also predicted that the project areas supported up to 13,594 desert tortoises; we concluded that many 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, 661 desert tortoises have been observed during construction of solar projects (Table 2); 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 2 summarizes information regarding the solar projects for which the Fish and Wildlife Service has issued a biological opinion, pursuant to section 7(a)(2), or an incidental take permit, pursuant to section 10(a)(1)(B) of the Endangered Species Act, with regard to the desert tortoise. We are aware of five solar projects for which we issued biological opinions that are no longer on the Federal agency's list of projects; we have removed these projects from this list.

Table 2. Solar projects for which the Service has issued biological opinions or incidental take permits. References are in Literature Cited.

Project	**Recovery Unit**	**Acres of Desert Tortoise Habitat[1]**	**Desert Tortoises Estimated[2]**	**Desert Tortoises Observed[3]**	**Citations[4]**
Ivanpah Solar Electric Generating System	Eastern Mojave	3,582	1,136	175	Service 2011b, Davis 2014
Stateline	Eastern Mojave	1,685	947	55	Service 2013a, Ironwood Consulting 2014
Silver State North	Eastern Mojave	685	14	7	Service 2010b, Newfields 2011
Silver State South	Eastern Mojave	2,427	1,020	152	Service 2013a, Cota 2014
Nevada Solar One	Eastern Mojave	400	-[5]	-[5]	Burroughs 2012, 2014
Copper Mountain North	Eastern Mojave	1,400	-[5]	-[5]	Burroughs 2012
Copper Mountain	Eastern Mojave	380	-[5]	-[5]	Burroughs 2012, 2014
Townsite	Eastern Mojave	885	-[5]	-[5]	Service 2014b
Techren Boulder City	Eastern Mojave	2,200	-[5]	-[5]	Service 2012b
Valley Electric Association	Eastern Mojave	80	4	4	Service 2015a
Canyon Mesa	Eastern Mojave	123	2	-	Service 2019a

Project	Recovery Unit	Acres of Desert Tortoise Habitat[1]	Desert Tortoises Estimated[2]	Desert Tortoises Observed[3]	Citations[4]
Yellow Pine	Eastern Mojave	4,285	1,032	-	Service 2020b
Mojave	Western Mojave	Primarily in abandoned agricultural fields	4	0	Service 2011c
Cinco	Western Mojave	500	53	2	Service 2015b, Daitch 2015
Soda Mountain	Western Mojave	1,726	78	-	Service 2015c
High Desert	Western Mojave	547	24	4	Service 2019b, ECORP Consulting 2020
Res Americas Moapa Solar Energy Center	Northeastern Mojave	951	104	-	Service 2014a
Moapa K Road	Northeastern Mojave	2,141	208	177	Service 2012a, Cardno 2018
Playa	Northeastern Mojave	1,538	258	77	Service 2015d, Ironwood Consulting 2016
Invenergy Harry Allen	Northeastern Mojave	594	242	-	Service 2015d
NV Energy Dry Lake Solar Energy Center	Northeastern Mojave	751	45	-	Service 2015d
NV Energy Dry Lake Solar Energy Center at Harry Allen	Northeastern Mojave	55	15	-	Service 2015d
Aiya	Northeastern Mojave	672	91	-	Service 2015e
Mountainview	Northeastern Mojave	146	-[5]	-[5]	Wise 2018
Gemini	Northeastern Mojave	7,113	5,215	-	Service 2019c
Eagle Shadow Mountain	Northeastern Mojave	2,285	2,941	-	Service 2019d

Project	Recovery Unit	Acres of Desert Tortoise Habitat[1]	Desert Tortoises Estimated[2]	Desert Tortoises Observed[3]	Citations[4]
Genesis	Colorado	1,774	8	0	Service 2010c, Fraser 2014a
Blythe	Colorado	6,958	30	0	Service 2010d, Fraser 2014b
Desert Sunlight	Colorado	4,004	56	7	Service 2011d, Fraser 2014a
McCoy	Colorado	4,533	15	0	Service 2013c, Fraser 2014b
Desert Harvest	Colorado	1,300	5	-	Service 2013b
Rice	Colorado	1,368	18	1	Service 2011e, Fraser 2014a
Desert Quartzite	Colorado	2,831	4	-	Service 2019e
IP Athos	Colorado	3,440	5	-	Service 2019f
Crimson	Colorado	2,201	20	-	Service 2020a
Total		**65,560**	**13,594**	**661**	

[1] The acreages may include substations and other ancillary facilities.
[2] The numbers in this column are not necessarily comparable because the methodologies for estimating the numbers of desert tortoises occasionally vary between projects. The largest numbers included the estimated number of small desert tortoises, which likely far exceeded the numbers of individuals present. In some cases, desert tortoises will remain inside the security fence for the solar project; we anticipated that some mortalities would occur during operation of the facility and included these numbers in the estimated total.
[3] This 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 had not broken ground at the time of this biological opinion.
[4] The 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.
[5]These 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. In some case, the Service issued biological opinions for access roads and generator tie-in line for these projects. We did not include the acreages and number of desert tortoises for those aspects of the overall action; we did not want to provide the impression that those effects were directly associated with the solar facility.

In August 2016, the Service (2016) 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 (2016) 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 2017). 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 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 (Oftedal 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 (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; 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 range-wide 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 range-wide basis, historical densities in some parts of the desert exceeded 100 adults in a square mile (38 per square kilometer; 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 range-wide 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 range-wide 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 3 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 3. Tortoise estimates within recovery units and change in abundance (Allison and McLuckie 2018).

Recovery Unit	**Modeled Habitat (km^2)**	**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 range-wide 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 further 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 square kilometer (14.8 per square mile). In contrast, surveys in the same areas in 2014 indicated that densities had decreased to 2.8 adults per square kilometer (7.3 per square mile). 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 square mile (19 to 58 per square kilometer; 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 square kilometer [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 square kilometer, and the Upper Virgin River Recovery Unit, which is by far the smallest recovery unit, supported 15.3 adults per square kilometer.

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 range-wide sampling in density estimations because they are more difficult to detect and surveyors frequently do not observe them during sampling. However, this systematic range-wide 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 7). 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 range-wide 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.

Table 4 and Figure 8 depicts 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.

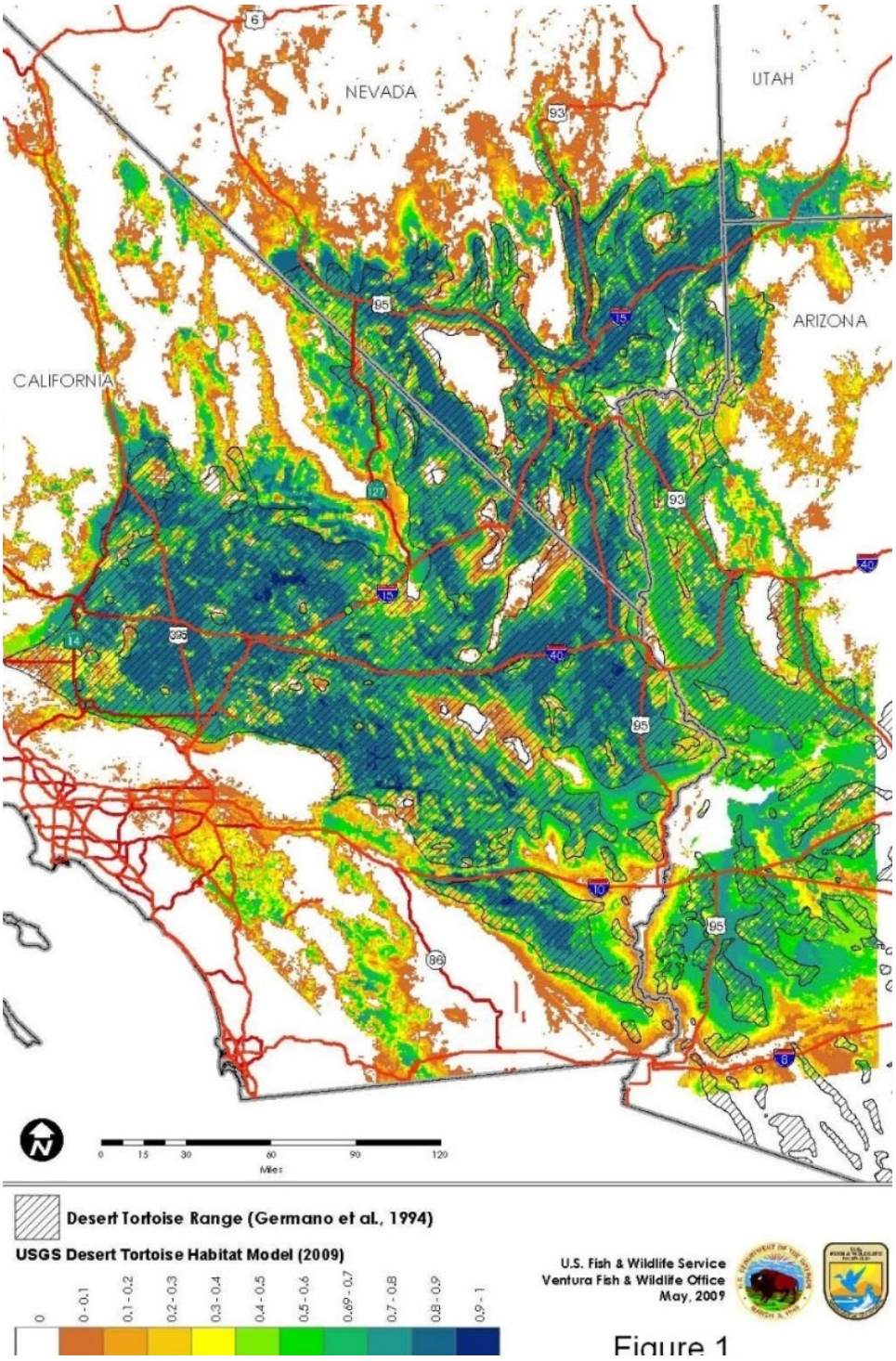

Figure 8. Modeled tortoise habitat within recovery units.

Table 4. 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 86º F, Deacon and Bradley (1972) indicated that the species reaches its greatest abundance at warmer temperatures between 82.4 and 86.0º 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 Apcar 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 9).

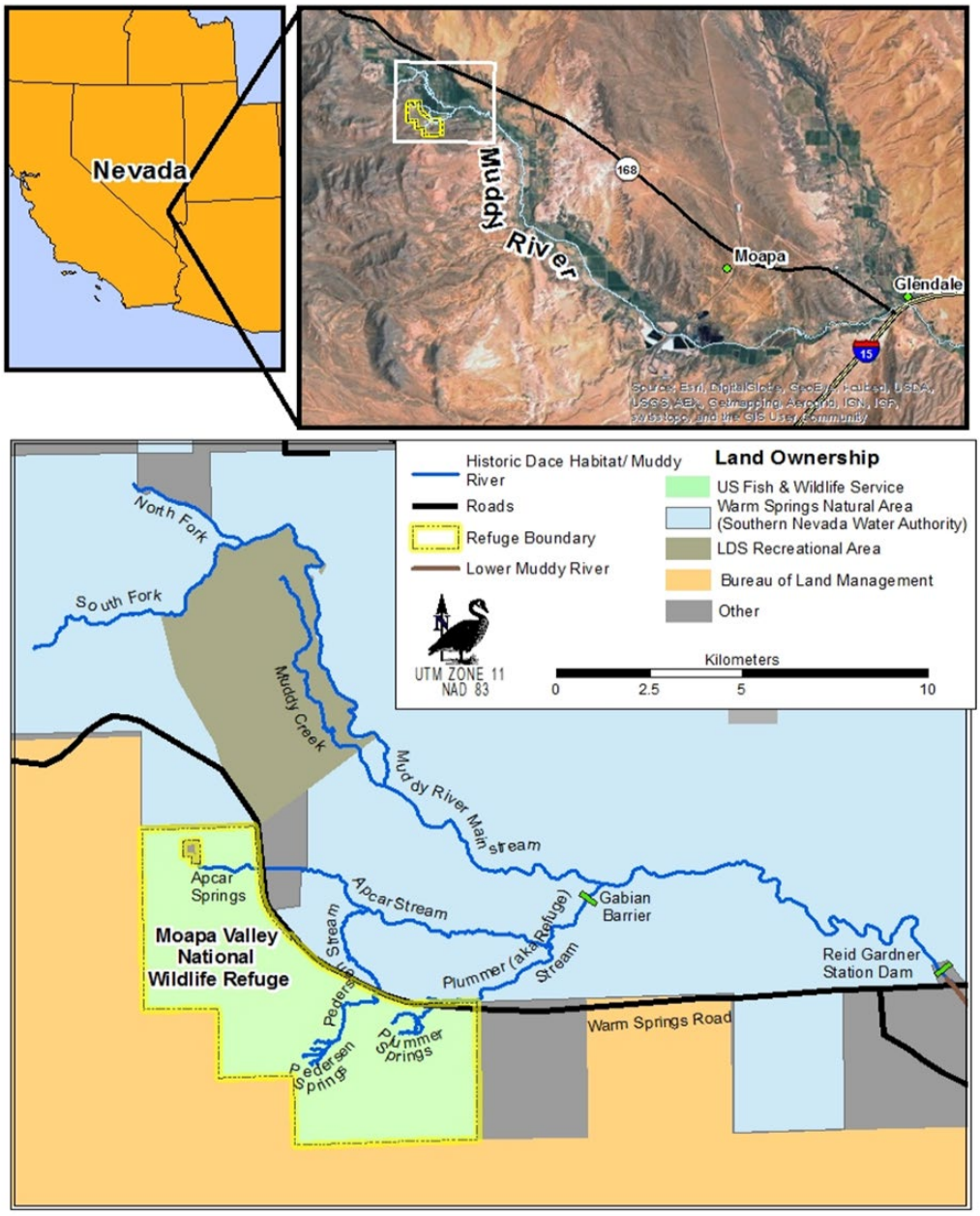

Figure 9. General and specific locations where Moapa dace occur.

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:

a. Protect instream flows and historical habitat within the upper Muddy River and tributary spring systems
b. Conduct restoration/management activities
c. Monitor Moapa dace population
d. Research population health
e. 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, Scoppettone et al. 1987), and laboratory experiments have demonstrated that shortfin mollies are predators of fish larvae (Scoppettone 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 (File No. 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). In August 2020, the Moapa dace count was 2342 individuals, similar to August 2015, and the highest count since 1994 (M. Schwemm pers. comm. 2020).

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 SNWA 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.

Eight 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; (6) Tier 7- a lease approved by BLM for construction and operation of the Playa Solar project within BLM's Solar Energy Zone; and (7) Tier 8 - a lease approved by the BIA for construction and operation of the Eagle Shadow Mountains Solar Project (this biological opinion). Tier 4 was the proposed cement plant, which was withdrawn without a biological opinion being issued. Tiers 1, 2, 5, 6, 7, and 8 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 required 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. The Moapa Solar Energy Center (MSEC) has become the proposed Arrow Canyon Solar Project and the subject of this consultation, expanding the solar field and keeping the linear features (gen-tie, water pipeline and access roads) from the MSEC. The proposed project would require 300 AF of water for construction and 30 afy during O&M.

- **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.

- **Tier 8:** The BIA proposes to construct, maintain, and operate a 300 MW PV solar project on 2,200 acres of BIA lands, 283 acres of BLM lands in the Dry Lake Solar Energy Zone (SEZ), and 8 acres of private land. Other facilities include access roads, and a 230-kV gen-tie line. The project would require 300 AF of water for construction and operations and would be obtained from the Band's appropriated 2,500 afy of water.

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.

Nevada State Engineer Order 1309
In 2020, the Nevada State Engineer issued Order 1309. Order 1309 included directives that: 1) defined the Lower White River Flow System as a single hydrographic basin consisting of the Kane Springs Valley, Coyote Spring Valley, Muddy River Springs Area, California Wash, Hidden Valley, Gamet Valley, and the northwest portion of the Black Mountains, 2) limited the maximum quantity of groundwater that may be pumped from the Lower White River Flow System Hydrographic Basin on an average annual basis to 8,000 acre feet or less, and 3) ordered

that the maximum quantity of water that may be pumped from the Lower White River Flow System Hydrographic Basin may be reduced if it is determined that pumping will adversely impact the endangered Moapa dace. Although Order 1309 may further constrain water use relative to that considered in this biological opinion and the PBO, the PBO and MOA remain in effect, and Order 1309 does not result in adverse effects beyond those considered 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 for Moapa dace is scheduled to be initiated 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, 230-kV gen-tie ROWs, and water pipeline; (2) the area of indirect impacts: short-distance and long-distance translocation tortoise recipient areas for short- and long-distance

translocations (2,214 acres), plus a 1.5 km (0.9 mile) buffer (8,026 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. The offsite, linear components of this project that includes the 230-kV gen-tie transmission line, access road, and water pipeline were analyzed as part of the MSEC biological opinion.

In addition, the action area includes a 0.8 km (0.5)-mile wide buffer around the solar facility project boundary, along each side of linear project areas; the proposed desert tortoise translocation areas; all contiguous desert tortoise habitat within 1.5 km (0.9) of the short distance translocation areas receiving desert tortoises from less than 500 m; and all contiguous habitat within 6.5 km (4.0 miles) of long-distance translocation areas receiving desert tortoises from greater than 500 m away. We include a 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 mi^2 (Duda et al. 1999, Harless et al. 2009). We included habitat within 0.9 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 meters, 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 moved 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, Gowan and Berry 2009).

For the Moapa dace, the action area 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

Mojave creosotebush-white bursage is the dominant vegetation community throughout the Action Area. This community is dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) with other associated species. Approximately 1,880 acres of this community type exists within the proposed solar field, 432 acres of Xeroriparian, 365 acres of Mojave Yucca Scrub, and 6 acres of disturbed habitat (Table 5). All the plant species that were observed during ACSP biological surveys/site visits and biological surveys for the original MSEC project.

Table 5. Vegetative Cover and Acreage.

Vegetation Cover	**Acreage**
Creosotebush-White Bursage	1,880
Xeroriparian	432
Mojave Yucca Scrub	365
Disturbed	6
Total	**2,683**

This community is dominated by creosotebush shrubs and white bursage, 0.5–3m tall and widely spaced with bare ground between. This plant community is usually found on well-drained secondary soils with very low water-holding capacity on slopes, fans, and valleys (CNPS 2009). Other less numerous species of annuals appear following summer thundershowers. This creosote bush scrub is typical of the Mojave Desert.

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 (mi^2/km^2)**	**Number Transects**	**Total Transect Length (mi/km)**	**No. Tortoises Observed**	**Density Estimate (mi^2/km^2)**
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 May 2019. The lease study area (2,683 acres) was surveyed in accordance with current Service protocols (Service 2019b). The area surveyed using 10-meter (33-foot) wide parallel pedestrian transects. 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. During the protocol surveys, 13 live adult and 6 juvenile tortoises were observed within the proposed solar field, primarily in the northern portion of the surveyed area. Desert tortoise sign (scat, carcasses/shell fragments, tracks and burrows) were observed throughout the survey area.

Desert tortoise health assessments were conducted within the action area in the spring of 2020 (Heritage 2020). More tortoises were documented during health assessments (43 adults and 8 juveniles) than during the protocol surveys (13 adults and 6 juveniles). It is important to note that greater numbers of desert tortoises were detected in the northeast corner of the project area, and that this section of the project area would not be within the solar field; we have accounted for this in our estimates of tortoises that will be affected by the project (see Figures 3 and 10).

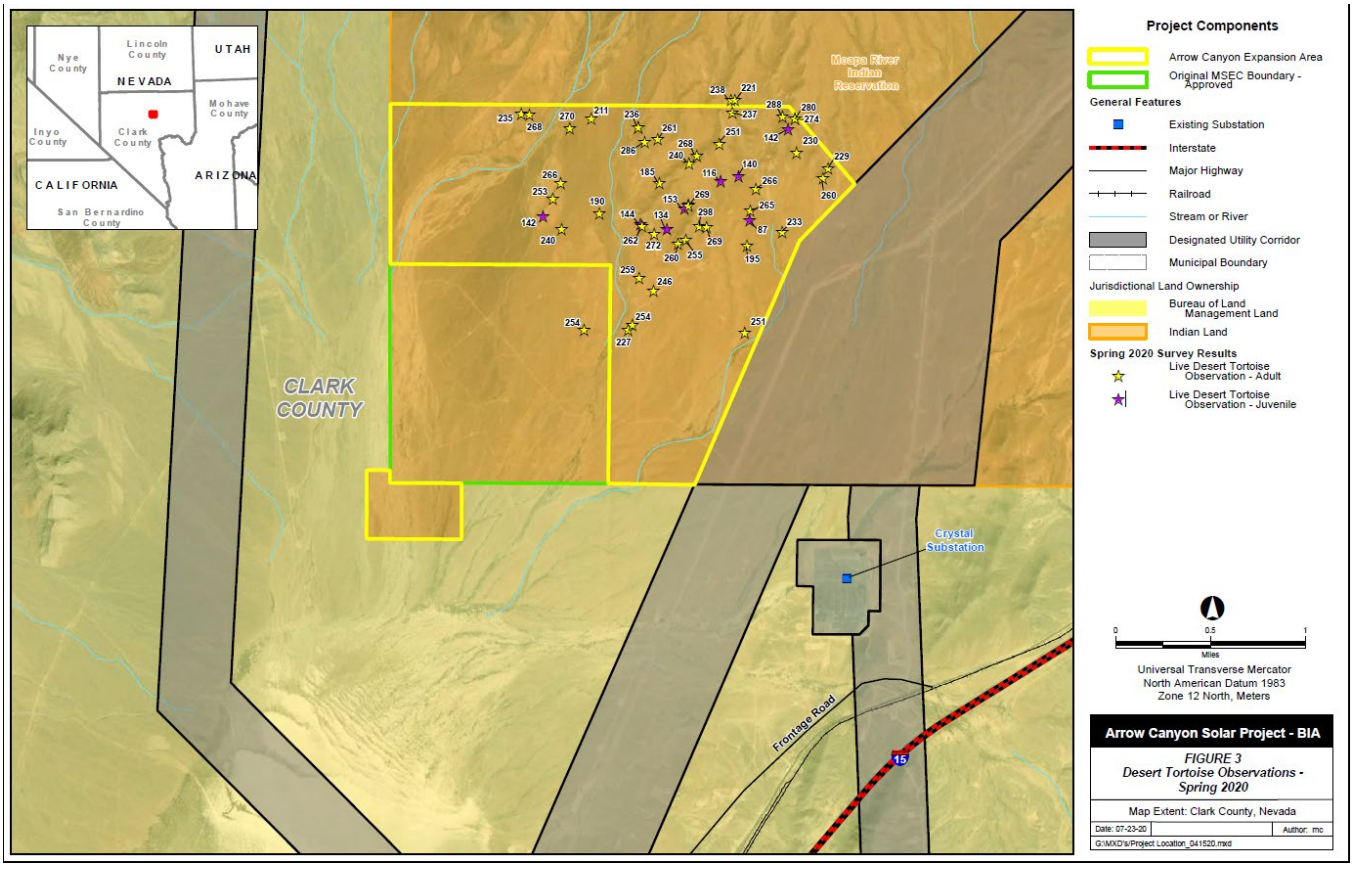

Figure 10. Results of 2020 Health Assessments.

To estimate the number of tortoises that live within the project survey area, the formula (equation in Figure 11) divides the number of adult tortoises observed during the survey by the product of the probability that a tortoise is aboveground during the survey (Pa), and the probability that a surveyor would see the tortoise if it is aboveground (the searcher efficiency, Pd). Pa is relative to the previous winter's rainfall recorded between October and March by the Western Regional Climate Center.

$$\left(\begin{array}{c}\text{Estimated number of tortoises}\\ \text{within action area}\end{array}\right) = \frac{\left(\begin{array}{c}\text{Number of tortoises}\\ \text{observed above ground}\end{array}\right)}{\left(\begin{array}{c}\text{Probability that}\\ \text{a tortoise is}\\ \text{above ground } (P_a)\end{array}\right)\left(\begin{array}{c}\text{Probability of}\\ \text{detecting a tortoise,}\\ \text{if above ground } (P_d)\end{array}\right)}\left(\frac{\text{Size of action area}}{\text{Size of area surveyed}}\right)$$

Figure 11. Equation used for tortoise estimates.

Using the results of the 2019 protocol surveys, the estimated number of tortoises within the 2,200-acre solar field was calculated to be 24, with a 95% confidence interval of 13 to 46 adult tortoises. The 2020 health assessments observed more than three times the number of adults than in 2019, but did not implement the 10-meter 100 percent coverage protocol and essentially targeted the known burrows and tortoises from the 2019 survey. Therefore, we cannot use the equation to determine a 95 percent confidence interval based on the 2020 health assessment observations. Forty-three adult and eight juvenile tortoises were documented during the health assessment (Figure 10).

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 (based on protocol data and the equation above), we have allowed for a 25 percent buffer for additional tortoises to be captured and moved on past solar projects. For this project, the number of observations made during the 2020 health assessments demonstrated that there is potential for even more tortoises to be moved than what our previous method would have estimated. Therefore, we based our estimate on the best available information, including the 2019 survey results, the 2020 health assessment observations, and the project design. This provides our estimate of 45 adult and subadult desert tortoises that will be translocated from within the solar site.

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
Project limit for translocation of adults	45
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 45/0.132	341
The number of juvenile desert tortoises; calculated by 341-45	296

The estimated total adults for the solar field is 45 and estimated juveniles is 296. However, 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. (1987), 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.

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 occur in the proposed project area.

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 mi^2 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 mi^2 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 2,214 acres (9 km^2). The area immediately adjacent to the solar site that will receive tortoises and their dispersal is called the Study Area Recipient Site and is 8,026 acres (32.5 km^2).

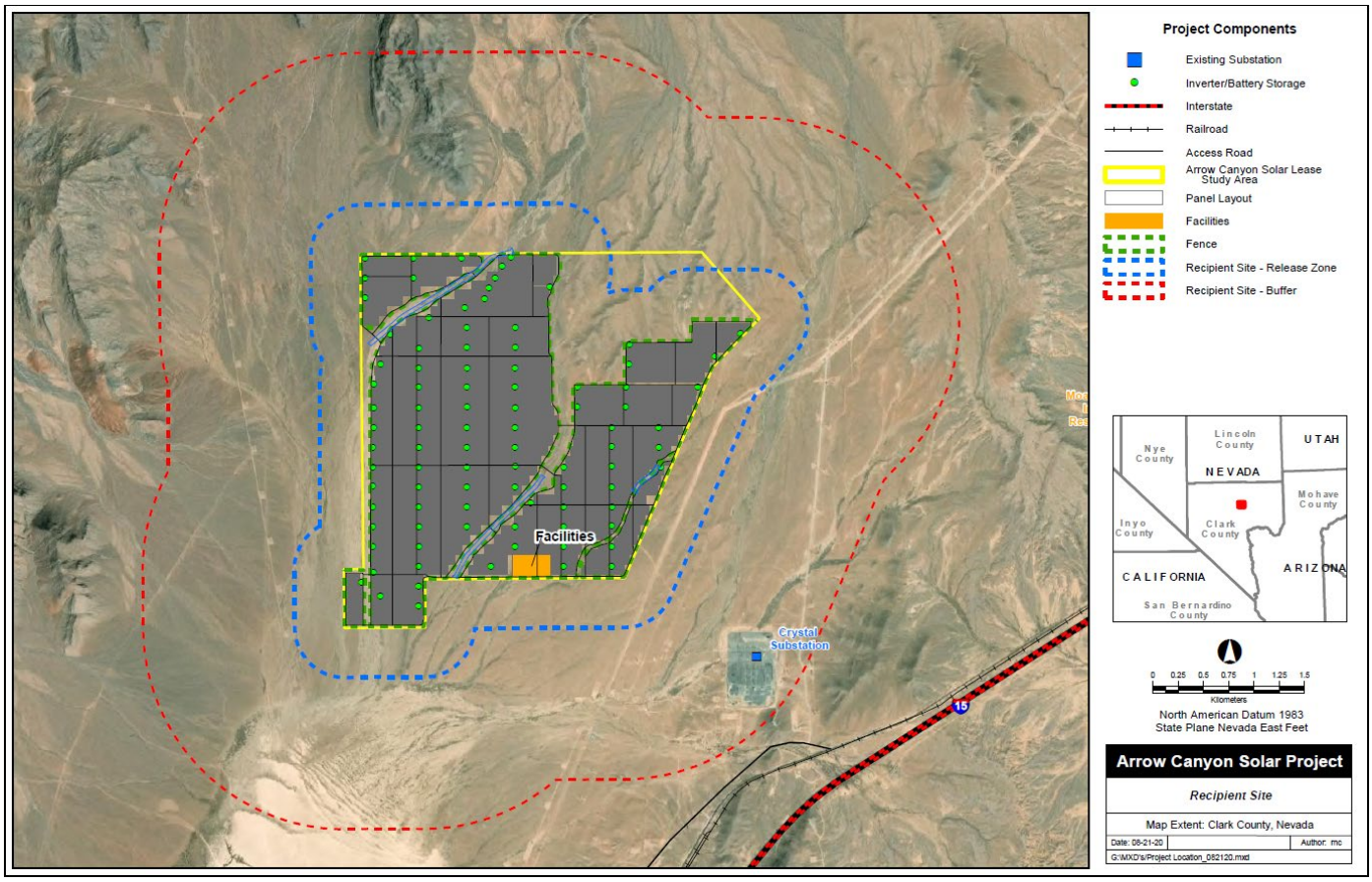

Figure 12. Arrow Canyon Solar Project Recipient Site.

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.

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 2019b). 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. We estimate that 45 tortoises may be found within the solar field area and would need to be translocated or captured and moved for the project to be built.

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 2020). 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 2019b). 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 (File No. 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 (File No. 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 (File No. 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 (File No. 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 (KRGT) 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 KRGT pipeline was issued to FERC on December 21, 1990 (File No. 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 (File No. 1-5-02-F-476; Service 2002) to FERC for construction, operation, and maintenance of the second KRGT 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 KRGT pipeline. During construction of the second KRGT 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 KRGT pipelines (File No. 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 (File No. 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 (File No. 6-UT-09-F-023; Service 2009b). The UNEV gas pipeline project aligns with the previous KRGT 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 (File No. 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 l0(a)(l)(B) permit. Additionally, activities associated with surface and groundwater withdrawal are outside of the scope of the MSHCP and the l0(a)(l)(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 Pahranagat 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 (File No. 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 (File No. 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 (File No. 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 (File No. 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 (File No. 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 (File No. 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 (File No. 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 (File No. 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 (File No. 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 (File No. 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 (File No. 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 (File No. 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 mi^2.

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 (File No. 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 (File No. 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 (File No. 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 (File No. 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 (File No. 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; File No. 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.

Gemini Solar
On November 7, 2019, the Service issued a biological opinion (File Nos. 08ENVS00-2019-F-0125 and 08ENVS00-2019-I-0126) to the BLM for the Gemini solar project. The project involves the construction, O&M, and decommissioning of a 690 MW PV solar project on 7,113 acres of BLM land. Other facilities include approximately 11.5 miles of gen-tie lines, internal access roads, substations, and an operations and maintenance building.

Desert tortoise pre-project surveys documented 130 live adult tortoises within the all areas of the proposed project. The biological opinion identified a threshold of 794 adult and subadult and 2,700 juvenile desert tortoises could be taken by capture for construction, operation, and decommissioning. Incidental take for mortality or injury was identified as 23 for adults and subadults and 1,802 for juveniles for construction, operation and maintenance, and decommissioning. Unlike many previous solar facilities constructed in desert tortoise habitat that removed all tortoises and tortoise habitat from the site, habitat will be mowed within the project footprint and tortoises located within the interior of the solar site will either be returned to the solar site post construction, or translocated to another suitable area determined on a cases-by-case basis. Construction of the Gemini Solar Facility has not yet commenced.

Eagle Shadow Mountain Solar
On November 12, 2019, the Service issued a biological opinion (File Nos. 08ENVS00-2019-F-0132 and 08ENVS00-2019-I-0133) to the BIA for the Eagle Shadow Mountain Solar project tiered to the intra-Service PBO for the Proposed Muddy River MOA (File No. 1-5-05-FW-536, Tier 8). The project involves the construction, O&M, and decommissioning of a 300 MW PV solar project on 2,200 acres of the Moapa River Indian Reservation. Other facilities include an approximately 12.5 mile single- or dual-circuit 230kV gen-tie line located on the Reservation, BLM-administered lands, and private lands, and an existing road that would provide access to the facility and electric distribution and communication lines. The project would require up to 200 acre-feet (af) of water for construction-related activities, and up to 20 af per year for operations.

Desert tortoise pre-project surveys documented 40 live adult tortoises within the proposed solar field development area, 10 within the recipient area, and 6 along the gen-tie route. The biological opinion identified a threshold of 435 adult and subadult and 1,850 juvenile desert tortoises could be taken by capture. Incidental take for mortality or injury was identified as 22 for adults and subadults and 690 for juveniles for all construction, operation and maintenance, and decommissioning. Similar to the Gemini solar facility, habitat will be mowed within the project footprint and tortoises located within the interior of the solar site will either be returned to the solar site post construction, or translocated to another suitable area determined on a cases-by-

case basis. Construction of the Eagle Shadow Mountain Solar Facility commenced on August 4, 2020.

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 (File No. 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 (File No. 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

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 (File No. 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 (File No. 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 2,124 acres of desert

tortoise habitat and contribute towards the combined effects to the 2,214-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 0.08 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 (187 acres) constitutes only approximately 0.007 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 pile testing; 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.

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. However, we acknowledge 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 early in the construction phases, prior to the commencement of the majority of surface disturbing activities. 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 conduct soil borings and pile tests, 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(s). Desert tortoises may be adversely affected by ground vibrations that result from construction activities. Areas surrounding individual boring and pile-test locations, and areas outside of the exclusion fence may experience short-term vibrations that could potentially disturb desert tortoises. 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. Responses to disturbance from vibrations could include altered breeding, feeding, and sheltering, which could lead to poor health and increased risk of mortality. Because few data exist relative to the effects of vibrations, we cannot determine the extent to which such vibrations may affect desert tortoises within and adjacent to project areas. However, the number of tortoises that could be affected by vibration from construction activities is expected to be minimal because the majority of vibration causing activities will occur within the fenced construction area after tortoises have been translocated.

Blasting during construction would also produce vibration. 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 buffer 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. 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. Therefore, long-term adverse effects from dust on vegetation are not expected to occur.

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. 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.

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 and intermittent in nature and is expected to last approximately 20 months. Construction activities would use 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 (dB).

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. 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 sound pressure level) 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. Desert tortoises 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. During the O&M phase of the project, effects of noise

are expected to be insignificant because the amount of noise would not represent a significant change from the current ambient levels.

Project Access (Roads and Fencing)

Primary access to the proposed project site would be via existing a 2.5-mile gravel access road from a paved frontage road adjacent to I-15. The effects of the access road construction on desert tortoise and its habitat are analyzed in the MSEC biological opinion.

In general, 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 no more than 25 mph (Minimization Measures 10 and 20), workers will 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 would minimize the potential of vehicle strikes (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.

When fencing is installed, tortoises in 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 provide shade and help in preventing such mortality.

Effects of Loss of Habitat

A total of approximately 187 acres of occupied desert tortoise habitat would be permanently disturbed and up to 1,937 acres would be temporarily disturbed as a result of constructing the proposed project. This acreage only accounts for the solar field. The effects of constructing the linear components (230-kV gen-tie transmission line, access road, water pipeline), which were part of the proposed MSEC and are now incorporated into the ACSP have been analyzed in the MSEC biological opinion.

The permanent perimeter fence would be constructed inside of the exclusion fencing. Exclusion fencing would be removed after construction, allowing tortoises to move into and through the site during operations. During construction, equipment would not operate beyond the fenced boundary with the exceptions of the access road and the gen-tie ROWs, and limited activities prior to the completion of the exclusion fencing. 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.

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.

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, 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 (Abella 2010). 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 (Abella 2010).

The ACSP will employ drive-and-crush temporary disturbance on vegetation cut to a minimum of 18 inches. Mowing and trimming allows vegetation to remain in place, thereby allowing tortoises to reinhabit the solar field after construction and continue using the burrows within their home ranges. Therefore, the likelihood of vegetation recovery is much faster than if the vegetation was cut to the ground or completely removed. The vegetation recovery will be monitored. We anticipate that an unknown number of desert tortoises would re-occupy the site.

The proposed project will permanently and temporarily impact approximately 2,124 acres of desert tortoise habitat and contribute towards the combined effects to the 2,214-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 0.08 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 (187 acres) constitutes approximately 0.007 percent of the habitat in the Northeastern Mojave Recovery Unit. While the model does not take into account anthropogenic 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.

The percentage (0.007) of lost habitat does not constitute a numerically significant portion of the Northeastern Mojave Recovery Unit, and 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. Although the percentage of habitat lost

within the recovery unit is low, we have also considered additional effects to habitat in this biological opinion, such as changes in species composition, 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 A). Effects would occur both to the translocated tortoises and to the resident tortoises where translocated tortoises are moved. Based on surveys from 2019, health assessment observations from 2020, the project design, and evidence from other solar sites in the same geographic area, we estimated that 45 tortoises may be present at the solar site and translocated. Although these numbers could be higher depending upon the actual number of tortoises in the area during clearance. 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 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).

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, adhere to the most recent guidance, and implement the conservation measures outlined in the proposed action, we anticipate any mortality or injury to desert tortoises from activities associated with translocating tortoises is unlikely.

Translocation has the potential to increase the prevalence of diseases, such as URTD, in translocated and resident desert tortoises. Additionally, 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 biologists approved by the Service, we do not expect health assessments 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. However, the potential exists for predators or poachers to target quarantined desert tortoises, although regularly scheduled monitoring in accordance with the desert tortoise Translocation Plan would minimize this risk. 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 circumstances 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 tortoise 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. Generally, these individuals would be removed from the wild, and thereby no longer contribute to the environmental baseline for the action area. However, removing these individuals may inadvertently reduce the resistance of the population to disease outbreaks. Because the Applicant would coordinate with the Service and perform follow-up testing of ELISA-positive individuals, 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. Desert tortoises that spend less time aboveground are less vulnerable to predation and environmental extremes. We expect tortoises that are moved from the project site 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. Locating desert tortoises translocated from the solar facility via telemetry as outlined in

the long term monitoring plan would ensure that they not exhibiting behaviors that may endanger their well-being such as walking along the exclusion fence.

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. Despite the fact that almost half of the animals in their study returned to their capture sites, more than half did not (Hinderle et al. 2015). 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.

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.

We are aware of two other 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.

As with prior translocations, we anticipate that predation is likely to be the primary source of post-translocation mortality particularly for small tortoises (Nussear 2004, Field et al. 2007). 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. The level of winter rainfall may dictate the amount of predation observed in desert tortoises, with less precipitation potentially increasing predation rates (Drake et al. 2009, Esque et al. 2010). Although 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. 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. Desert tortoises have a long reproductive life, and given 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 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 project site would be moved to areas now supporting a resident population, which may result in (1) increased inter-specific encounters, increased potential for spread of disease, and potentially reduced health of the overall population; (2) increased competition for shelter sites and other limited resources; (3) increased competition for forage, especially during drought years; and (4) 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 2,214-acre release area represents 0.08 percent of the 2,626,111 million acres of remaining desert tortoise habitat in the Northeastern Mojave Recovery Unit, and the wider 8,026-acre recipient site buffer constitutes 0.31 percent (0.39 percent, combined). The northeastern portion of the release area was included in the health assessment surveys conducted in 2020. Because only a portion of the release area was surveyed, formal density estimates were not produced. During those surveys, the field crew documented 32 adults; radio-tracking efforts documented 35 occupying the release area. Therefore, we estimate the number of tortoises within the release area is approximately 35, which results in a pre-translocation density of approximately 3.9 adult tortoises per km2. The tortoise density within the solar field of this project is 4.8 tortoises per km^2 (43 observed in 2020 / 8.9 km^2). The maximum recommended post-translocation density within the Northeastern Mojave Recovery Unit is 6.1 adult tortoises per km^2 (Service 2020).

Based on survey data, health assessment data, the proposed project footprint within the lease study area, and professional judgment, we estimated that 45 adult tortoises may be translocated. There will be two groups of translocated tortoises: those that will be returned back into the interior of the solar site following construction, and those that will be translocated to the nearest

suitable habitat outside of the fenced solar site within 500 m. The project will attempt to balance the number of adult tortoises in each group (up to a minimum of 20 tortoises per group). Because the exact final number of tortoises in either group cannot be known until tortoises are located during clearance surveys, we have calculated densities of adult tortoises using estimates of tortoises per group. These are intended to be approximations and are not intended as thresholds. Final numbers in either group may deviate from those used in these calculations, but would not deviate enough to produce meaningful differences for the purposes of density calculations. Out of the estimated 45 translocated adult tortoises, approximately 20 would be penned and held off-site for release back into the solar site post-construction. The remainder (up to 25 tortoises) would be translocated over the fence into the release area. The translocation of up to 25 tortoises into the release area (plus resident tortoises) would result in an immediate increase in density in the release area (up to 6.7 tortoises per km^2) but this is expected to decrease as tortoises disperse within the wider Study Area Recipient Site.

Tortoises released into the 2,214-acre (9.0 km^2) release area (500 m buffer around the fenceline) will be allowed to move within their home range, excluding the solar site during construction. Tortoises would likely disperse into the surrounding 8,026-acre (32.5 km^2) recipient site buffer (the 1.5-km buffer around the set of potential release locations). Collectively, the release area and recipient site buffer constitute 10,240 acres (41.4 km^2; Recipient Site). If we assume that the tortoise density is the same in the recipient site buffer as the density within the translocation release area (3.9 tortoises per km^2), then we would assume there to be 127 resident adult tortoises (32.5 km^2 x 3.9 tortoises per km^2) within the 8,026-acre buffer. When added to the release area estimate (35 adult tortoises), this produces a total estimate of 162 adult tortoises in the Recipient Site. After the translocation of up to approximately 25 tortoises into the release area and subsequent dispersal within the Recipient Site, the density of the Recipient Site would increase from 3.9 to 4.5 tortoises per km^2 ([162 + 25] / 41.4 km2).

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. All returned and many translocated tortoises may return to the project area following construction. Therefore, the increase in tortoise density in the Recipient Site (from 3.9 pre-translocation to 4.5 after the first translocation) is not expected to be a permanent increase. Immediately after all translocation is completed post-construction and the approximately 20 penned tortoises are returned to the solar site, the tortoise density within the solar site would be 2.2 tortoises per km^2 (20 / 8.9 km2). We expect the relative densities between the solar site and Recipient Site to shift toward an equilibrium as tortoises move freely between the solar site and Recipient Site. The average across the entire Recipient Site and the solar site would be approximately 4.1 tortoises per km^2 ([162 + ~45 tortoises] / [41.4 + 8.9 km^2]). Table 8 shows the post-translocation and relocation tortoise density estimates.

Table 8. Adult tortoise densities before and after translocation and relocation

Study Area Recipient Site size (km^2)	**Estimated # of tortoises in Recipient Site**	**Current estimated density in Recipient Site (# tortoises per km^2)**	**Approximate # of tortoises in Recipient Site post translocation (resident and translocated)[1]**	**Temporary post-translocation density in Recipient Site (# tortoises per km^2)[1]**	**Post-translocation and post-relocation density in Recipient Site and solar site (# tortoises per km^2)[1,2]**
41.4	162	3.9	187	4.5	4.1

[1] These numbers may be higher if more than the estimated 45 tortoises, total, are translocated.
[2] 187 resident and translocated tortoises + 20 returned = 207 tortoises. 207 tortoises / 50.3 km^2 = 4.1 tortoises/ km^2

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 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 adults (Wilson et al. 1999) and we do not frequent interactions with 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.

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. The site will contain native vegetation that desert tortoises rely on for forage and shelter; however, this vegetation will have been mowed and crushed in order to install the solar panels. The site will also contain new access roads 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 will use the site once returned. There is also a chance that tortoises placed back into the mowed site will move out of the area after release. Identifying how tortoises respond to being placed back into the 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. BIA 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 A). 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 100 subadult and/or adult desert tortoises (i.e., approximately 45 to be translocated, 35 in the release area, 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 be monitored for two years post-construction as part of the long-term monitoring plan. In the project area, this tracking program would include tortoises that were held in pens and directly relocated to the project site; and 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. 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 as well as environmental covariates potentially influencing tortoise movements and (2) assessment of evidence of reproduction on the site.

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, 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 Applicant 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

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. There would be no lighting in the solar field except for emergency lighting at the BESS facilities. During construction, temporary lighting would be used at dawn and dusk at the construction offices, laydown yard, entrances, and substation area. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be downward facing and shielded to focus illumination on the desired areas only. Lighting used onsite would be low intensity, in compliance with any requirements of the Band. Lighting would likely be used more during the wintertime to ensure safe working conditions for personnel.

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. We expect light trespass on surrounding properties would be minimal. Therefore, 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. Human activities facilitate expansion of raven and coyote populations 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). Aside from the Tribal community, no other human communities occur in the action area.

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). Natural predation rates may be altered or increased when natural habitats are disturbed or modified. Thus, facility infrastructure, such as gen-tie transmission lines, fences, buildings, and other structures on the project site may provide perching, roosting, and nesting opportunities for ravens and other avian predators.

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. Thus, removal of carcasses when found would eliminate the odor and further attraction to the site by predators.

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.

Red-tailed hawks (*Buteo jamaicensis*) are confirmed predators of desert tortoise. 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 Control 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 actively monitoring the site for ravens.

Exposure to Chemicals

The primary wastes generated at the project site during construction, operation, and maintenance would be nonhazardous solid and liquid wastes. The nonhazardous wastes 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 BESS, if included, could include lithium-ion batteries that require replacement periodically, and the used batteries would need to be disposed of according to appropriate protocols. Limited quantities of hazardous materials would be used and stored on the project site. The primary hazardous materials onsite during construction would be the fuels, lubricating oils, and solvents associated with construction equipment, which could affect desert tortoise through poisoning causing decreased health or mortality.

The Applicant will prepare a Spill Prevention Control and Countermeasure 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 of 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 and Revegetation Plan and a Weed Management Plan with standard operating procedures for managing vegetation and minimizing the spread of non-native and noxious weeds, including integrated pest management and use of herbicides.

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. Any herbicide use would be implemented during the less active tortoise season. 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. Herbicides that are believed to have deleterious effects on reptiles, such as 2,4-D, would not be allowed.

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). Palliatives would only be used in areas where tortoises have been excluded. Therefore, tortoises are not likely to come into contact with these substances.

Nonnative Plant Species

Development of the proposed project has the potential to introduce and spread nonnative invasive plant species into habitats adjacent to or within the project site. Construction and O&M activities of the proposed project components may increase distribution and abundance of nonnative plant 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.

Invasive plant species reduce habitat quality and quantity for desert tortoise, in particular, foraging habitat (Tracy et al. 2004), which may lead to reduced tortoise health or mortality. Nonnative species can out-compete native forage plants and generally do not provide adequate nutrition, thereby reducing the amount of food available to desert tortoises (Abella and Berry 2016). Drake et al. (2016) studied captive Mojave desert tortoises' response to a variety of diets ranging from all native grass to all invasive grass (*Bromus rubens*). Thirty seven percent of the tortoises given only invasive grasses 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.

We expect no injury or mortality to desert tortoises from the presence of nonnative species. However, diets that include invasive species in the Mojave Desert may decrease desert tortoise health because invasive plants do not provide adequate nutrition, which may reduce reproduction potential and affect how tortoises are distributed across the range. 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.

The Applicant will implement a Weed Management Plan prior to the initiation of ground-disturbing activities. Measures in this plan include mapping areas of current weeds, inspecting heavy equipment for weed seeds before being used 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, which 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 Control Plan. Because project vegetation will remain 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. Therefore, edge effects from this solar development project are minimal.

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 solar site. The lack of information is especially relevant when evaluating effects to individuals within the habitat linkage that would be affected 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 substantially decrease population connectivity beyond 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 anthropogenic

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. Existing anthropogenic constrictions in the action area 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.

Leaving vegetation within the solar field would allow tortoises to reoccupy the site following construction and continue to use the action area as part of the connectivity corridor. Therefore, we anticipate that opportunities for desert tortoise connectivity would not be significantly modified by the construction of the solar 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* 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, which also sequesters carbon (Allen and McHughen 2011). The permanent removal of plant life from approximately 187 acres within the action area is likely to reduce the amount of carbon that natural processes can sequester in this localized area. Because the majority of the solar facility 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.

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. Nonetheless, the project is unlikely to have a measureable effect because the amount of vegetation (carbon sequestration) lost would be minor relative to the entire Mojave Desert. 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 albedo[1] of the action area to the degree that it affects local climatic conditions. Millstein and Menon (2011) found that large-scale PV solar facilities 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. However, 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 regarding the layout, efficiency, and reflectivity of the solar panels (near Harper Dry Lake in western Mojave Desert and near Blythe in the Colorado Desert) that would affect how a solar facility may actually affect the local environment. Those assumptions likely render the model's predictions somewhat different from real world conditions and outcomes. Furthermore, the model may be inappropriate for the scale of this biological opinion because the two modeled solar plants covered 4,633,207 acres, which is approximately 2,106 times larger than the 2,200-acre Arrow Canyon Solar Project. Consequently, the modeled solar plants that generated a local temperature increase of 0.4 degree Celsius were much larger than the area of the proposed ACSP. Therefore, the proposed action is 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 Measure 22 and 23. 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 may also be used for this.

Although the compensation and protection of vegetation within the project site 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. The Applicant is responsible for the costs associated with project construction, monitoring, and surveys, translocation of tortoises, and their disposition (e.g., translocation, care at an onsite facility), as well as the habitat use study.

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 20 months) relative to the reproductive life of female desert tortoises.

[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.

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).

Only very limited surface disturbing activities would occur at the project site prior to the completion of tortoise exclusion fencing and tortoise clearance surveys. Those activities, described under Geotechnical Testing in the Project Construction section, constitute only a small amount of the overall project's estimated disturbance, and effects would be minimized by the implementation of the proposed minimization measures. Because the desert tortoises will be translocated from the site prior to the remainder of construction activities and because all the adult individuals found will be moved, we expect that few, if any, adult animals will die because 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 because 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 pre-project tortoise surveys, observations during health assessments, and a 25 percent buffer, we

estimate that up to 45 adult tortoises and 296 juvenile tortoises may experience some type of take during construction of the solar site (not including the offsite components: access road, gen-tie line, and water pipeline). We expect most tortoises to be captured and moved, although we acknowledge 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 harms way, and 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 be 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 45 adult desert tortoises estimated to be translocated or moved from the project would comprise a very small portion (approximately 0.10 percent) of the overall population within the Northeastern Mojave Recovery Unit and an even smaller portion (0.02 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 Northeastern Mojave 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 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 187 acres of desert tortoise habitat because of the project's construction 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 0.007 percent of the total amount of desert tortoise habitat in the Northeastern Mojave Recovery Unit and approximately 0.0011 percent of the total amount of desert tortoise habitat throughout its range (16,745,848 acres).

Because the project will leave vegetation within the solar field and allow 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 that the direct and indirect effects 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 potential 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 design will allow vegetation to remain on the majority of the site, and tortoises will be allowed back into the solar field to use 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. In addition, if the proposed project pumping lowers carbonate water levels in the Warm Springs Area, 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 Apcar 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 the Metropolitan Valley Water District’s (MVWD) 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 include: 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, which has been reinitiated and become the ACSP that will increase the water use to 300 AF during construction (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 Eagle Shadow Mountain Solar project (Tier 8). The highest use of water for the Band would be during construction of the proposed ACSP when 300 AF of water would be needed for two years and 200 AF for Eagle Shadow Mountain Solar. However, construction is not likely to occur at the same time. The use of up to 90 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 Arrow Canyon 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 300 AF during construction and up to 30 afy during O&M is 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 300 AF of water over an approximately 20-month period for construction-related activities and approximately 30 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. 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. Any loss of fish or their habitat would affect reproduction. However, 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, but the actual death or injury of fish will be difficult to detect. The project would have relatively low water usage and minimal effects to Moapa dace numbers in the action area are likely. In-stream flow triggers will also provide for the curtailment of groundwater pumping if certain flow levels are reached, which would further reduce the numbers of Moapa dace affected. Additionally, future and on-going biological and hydrological studies will assist in determining how any flow reductions or thermal load losses affect Moapa dace numbers.

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 affects 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 nonnative species are contributing factors to the decline of Moapa dace, but we do not anticipate habitat loss, and there will be no introduction of nonnative 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. Similarly, future projects that include increases in ground water withdrawal could contribute to habitat loss to Moapa dace, however as discussed above, Nevada State Engineer Order 1309 greatly curtails new water use in the region. Most future actions in the action area would likely require section 7 consultation.

The Southern Bighorn Solar and Storage Center (300 MW and 135 MW storage system) has recently been proposed and would be located on the Moapa River Indian Reservation. Since the action area for this project is 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 reasons.

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 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 and most or all of these tortoises are expected to survive the translocation.
3. Mitigation and remuneration fees, based on acres disturbed, will fund an important habitat use study for this 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 will be addressed through adaptive management.
6. The project would not significantly affect the rangewide number, distribution, population connectivity, or reproduction of the desert tortoise.
7. 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.
8. 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 45 estimated adult tortoises were lost due to program activities, the loss would account for 0.10 percent of all adult tortoises within the recovery unit and an even lower percent (0.02) of all adult tortoises rangewide. Biologists will find most adult desert tortoises during clearance surveys; therefore, killing all 45 adult tortoises is unlikely.
9. 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 0.007 percent of the habitat in the recovery unit and only 0.0011 percent loss of habitat rangewide (187 acres of 16,745,848 total acres).
10. There will be no impacts to desert tortoise designated critical habitat.
11. The proposed action will not appreciably reduce the likelihood of recovery of the desert tortoise.

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 300 AF 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 30 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 appreciably reduce the likelihood of recovery of Moapa dace.

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(a)(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(a)(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 solar field development area, 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.

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 45 tortoises) on the proposed project site 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 in the project site and release area, combined, 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 45 adult and sub-adult tortoises will be captured within the fenced perimeter for the solar facility and translocated; and up to 4 adult or sub-adult desert tortoises may be killed or injured during construction activities. Most activities within the solar field that would result in the need to move tortoises, or potentially result in injury or mortality to tortoises, would occur after the installation of perimeter fencing when there is a clear delineation between the solar field and the surrounding environment. However, geotechnical investigations and pile-testing would occur before the fence has been constructed. Any take that may occur within the footprint of the

solar field (prior to or after the installation of fencing) is accounted for in the included threshold. Additionally, up to 1 subadult or adult (≥180 mm) may be killed outside of the solar field during construction, and up to 7 subadults & adults (≥180 mm) may be killed outside the solar field during operation and maintenance.

For all construction activities, we estimate that up to 50 juvenile tortoises (those that will be detected) may be captured and moved or translocated. We estimate that the 246 juveniles not detected may be incidentally killed or injured (although only a subset of those may actually be detected) during construction. An undetermined number of tortoise eggs will be destroyed because of the project.

O&M activities may result in incidental take, in the form of mortality or injury, of no more than 5 subadult or adult desert tortoise per year or a total of 25 for the life of the project within the solar field open to desert tortoise. O&M activities may also result in mortality or injury of 10 juvenile desert tortoises in a single year, not to exceed 100 for the life of the project. It is difficult to know how many tortoises may be within the solar site if or when decommissioning activities occur 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 (5 tortoises per km^2), we would estimate there to be 45 adults and/or sub-adults and 200 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 (4 to 5 adults and 20 juveniles). The total take for capturing and moving for adults and juveniles over the 30-year project life would be 250 adults and 1,000 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	4	0	25[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	246[3]	100[4]	396
Capture-subadults & adults (≥180 mm) both moved out of harm's way and handled for monitoring	We estimate that 45 adults/subadults may be moved out of harm's way within the solar field and 60 resident tortoises may be handled in the recipient areas	N/A[5]	250[6]	355
Capture-hatchling & juveniles (<180 mm) both moved out of harm's way and handled for monitoring	We estimate that 50 juveniles may be moved during all construction activities, and 20 juveniles handled within the site, and 20 juveniles handled in recipient areas	N/A[5]	1,000[7]	1,090

[1] Not to exceed 5 per calendar year or 25 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 10 per calendar year or 100 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 20 per calendar year or 1,000 during the life of the project (50 years).

The temporary and permanent disturbance of up to 2,124 acres of habitat from construction of the proposed solar project 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). Therefore, while we cannot estimate for the number of eggs, should more than 45 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 45 adult and sub-adult desert tortoises in harm's way and approximately 60 resident desert tortoises in support of translocation activities at recipient areas. Take in the form of capture would occur affecting up to 50 juvenile desert tortoises in harm's way and approximately 40 resident desert tortoises could be handled both within and outside the site in support of translocation activities. Take in the form of capture is expressed in terms of individuals, but these individuals may be handled as a result of translocation and monitoring multiple times. All activities at control sites will be covered under section 10(a)(1)(A) recovery permits. Also, it is important to note that some monitoring activities including health assessment and telemetry was conducted prior to completion of this biological opinion under 10(a)(1)(A) recovery permits. Take associated with handling of these tortoises will henceforth be covered under this incidental take statement. 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 adult and subadult tortoises into the Recipient Site 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 site 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 Applicant 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 because 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, because 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 up to 300 AF of groundwater over 20 months during construction and 30 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 Arrow Canyon 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 this 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 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.

Similarly, for Moapa dace, the BIA and Tribe will implement conservation measures outlined in the Muddy River MOA that are specific to the project applicant, as well as those measures to be carried out in conjunction with other Parties to the MOA. The specific measures applicable to the Tribe are detailed in the PBO (File No. 1-5-05-FW-536). The Service believes these measures are adequate and appropriate to minimize the incidental take of Moapa dace. 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 or Moapa dace 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, and in the MOA and PBO, 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 and Moapa dace 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 A).

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 July 24, 2020. 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 Jessica Zehr in the Southern Nevada Fish and Wildlife Office at (702) 515-5232 or by e-mail at Jessica_Zehr@fws.gov. Please reference File Nos. 08ENVS00-2020-F-0179 and 08ENVS00-2020-I-0180 in future correspondence concerning this consultation.

cc: Chairman, Moapa Band of Paiutes, Moapa, Nevada
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Supervisory Biologist - Habitat, Nevada Department of Wildlife, Las Vegas, Nevada

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APPENDIX - DESERT TORTOISE TRANSLOCATION PLAN

DESERT TORTOISE TRANSLOCATION PLAN: ARROW CANYON SOLAR PROJECT CLARK COUNTY, NEVADA

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1.0 INTRODUCTION

This translocation plan describes the methods for moving Mojave desert tortoises (*Gopherus agassizii*) from the development area of the proposed Arrow Canyon Solar Project (ACSP; 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 12,440 acres. The up to approximately 2,200-acre solar site would be developed as part of the Project. The remaining approximately 10,240 acres represent the Study Area Recipient Site and 1.5 km buffer 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), and the Bureau of Indian Affairs (BIA) as coordinating agencies/entities, and other appropriate agencies, such as U.S. Fish and Wildlife Service (USFWS).

1.1 Description of Project

The original Moapa Solar Energy Center (MSEC) Project was analyzed under the National Environmental Policy Act (NEPA) in the Final Environmental Impact Statement (FEIS) which was published in February 2014 by the Bureau of Indian Affairs (BIA) as lead agency and the Bureau of Land Management (BLM), the Moapa Band, and others as cooperating agencies (BIA 2014). A Record of Decision (ROD) was executed by the BIA in May 2014 that approved the lease for an 850-acre solar site located on the Reservation. A ROD was executed by BLM in May 2014 approving the linear facilities associated with the Project that crossed BLM-administered lands including: 1) the Project's main access road from North Las Vegas Boulevard crossing approximately 2.5 miles of federal lands to the Project boundary on the Reservation; 2) a 230-kV generation-tie (gen-tie) line crossing approximately 7.1 miles of federal land from the Project site to the NV Energy-owned Harry Allen Substation; and 3) a water pipeline between an existing water well located on the Reservation and the Project Site located on the Reservation but within a designated utility corridor managed by the BLM. The solar ground lease was approved by BIA in June 2014 and a ROW was issued by the BLM for the linear facilities in August 2015 (ROW N-88870).

The previously approved linear ancillary facilities, (i.e. main access road, 230kV gen-tie line, and water pipeline) would remain a part of the ACSP project description. They would be unchanged and would be developed as analyzed in the previous EIS and as described in the ROD and ROW issued by the BLM. These features have been assessed and approved in the 2013 Biological Opinion for the MSEC (USFWS 2013). Only the "Lease Study Area" of approximately 2,683 acres will be addressed in this plan. The proposed linear (ROWs) will not be analyzed in this plan.

The expanded solar power generating facility (SPGF) would be located wholly on lands within the Reservation. It would be developed using PV solar technology to generate up to 200 MWs of solar energy and would include a Battery Energy Storage System (BESS). The SPGF would disturb up to 2,200 acres within a larger 2,683-acre lease study area. Onsite facilities would include:

- Solar field (including internal access roads)

- BESS
- Onsite substation
- Operation and maintenance (O&M) facilities
- Electric distribution and communication lines
- Temporary construction facilities including staging areas.

A complete Project description is presented in Section 2 of the project BA (BIA 2020).

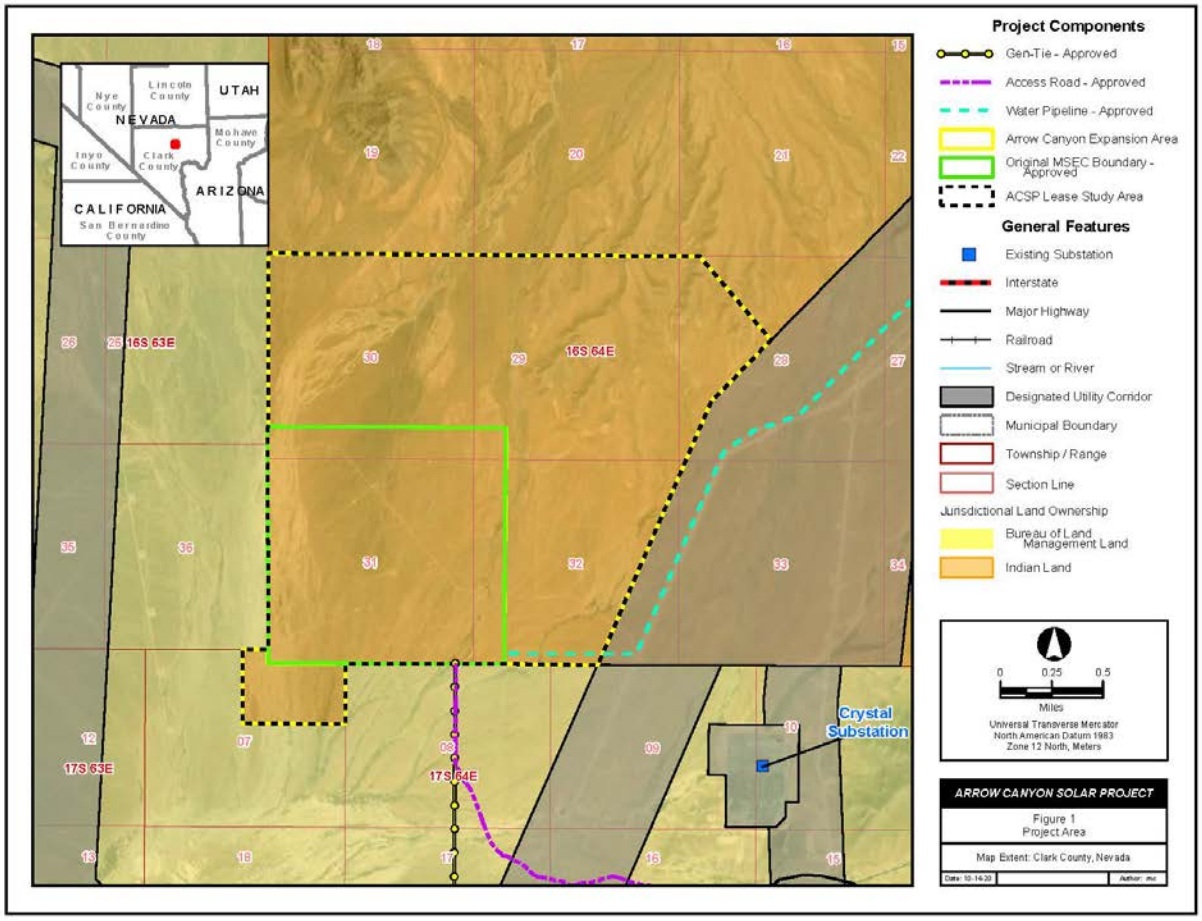

Figure 1. Map of project components.

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). 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 of the translocation plan is to evaluate the effectiveness of developing the site in a way that leaves vegetation and allows for reoccupation by desert tortoises. A sample of tortoises will be held temporarily in pens and returned to the project area, and a sample will be translocated up to approximately 500 meters adjacent to the project fence and allowed to return on their own. Tortoises found greater than 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 area (including preliminary data about the surrounding recipient area) was collected in Spring 2019 and Spring 2020.

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 2019), as updated in coordination with BIA, and USFWS.

Those tasks listed under Sections 3.0 and 4.0 were completed by the Proponent in spring 2019. 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 May 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. No tortoises are currently transmittered. Adult tortoises are defined as animals ≥180 mm MCL, and juvenile tortoises are animals <180 mm MCL.

The following timeline provides a general description of the sequence of events:

Spring 2019

- 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.

Spring and Summer 2020

- A combination of transect surveys and targeted searches in suitable habitat and at known historical locations were conducted to record tortoise locations, affix radio transmitters and conduct health assessments.
- Radio tracking was conducted twice monthly from June through August.

Fall 2020 - Winter 2020

- Surveys will be conducted 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 BIA and the Desert Tortoise Recovery Office (DTRO) for approval.
- Continued monitoring of transmittered tortoises or resurvey prior to translocation.

Spring 2021

- Translocate tortoises.
    - Short-term and long-term monitoring will begin, following translocation, on a subset of tortoises. (Section 6.1)

Beyond 2021

- Continued monitoring of transmittered 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 (see **Section 4.2**), field surveys were conducted. In May 2019, 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 2019 USFWS protocol (USFWS 2019). Health assessments and transmittering occurred in April and May 2020. Animals located were affixed with radio transmitters; a total of 51 animals are currently being tracked between the solar site and the recipient site.

3.3 Solar Site Tortoise Estimates

Data collected within the survey area were analyzed using the USFWS 2019 Protocol equation to estimate the number of tortoises within the Action Area. A total of 377 east-west transects of differing lengths were walked over the course of the survey to achieve 100% coverage of the survey area, totaling approximately 1,088 kilometers of transect length. Desert tortoise and desert tortoise sign were observed. A total of 13 adult desert tortoises (≥180 mm MCL) and 6 juveniles were observed over the course of the surveys, primarily in the northern portions of the survey area (**Figure 2**). Desert tortoise sign (scat, carcasses/shell fragments, tracks and burrows) were observed throughout the survey area, with higher numbers in the northern portions where the live tortoises were discovered. The estimated number of adult tortoises within the lease study area was calculated to be 24, with a 95% confidence interval of 13 to 46 adult tortoises during the 2019 surveys. Desert tortoise health assessments were conducted within the Action Area in the spring of 2020 (Heritage 2020). More tortoises were found during health assessments (43 adults and 8 juveniles) resulting from different survey methods and more time spent surveying (**Figure 3**).

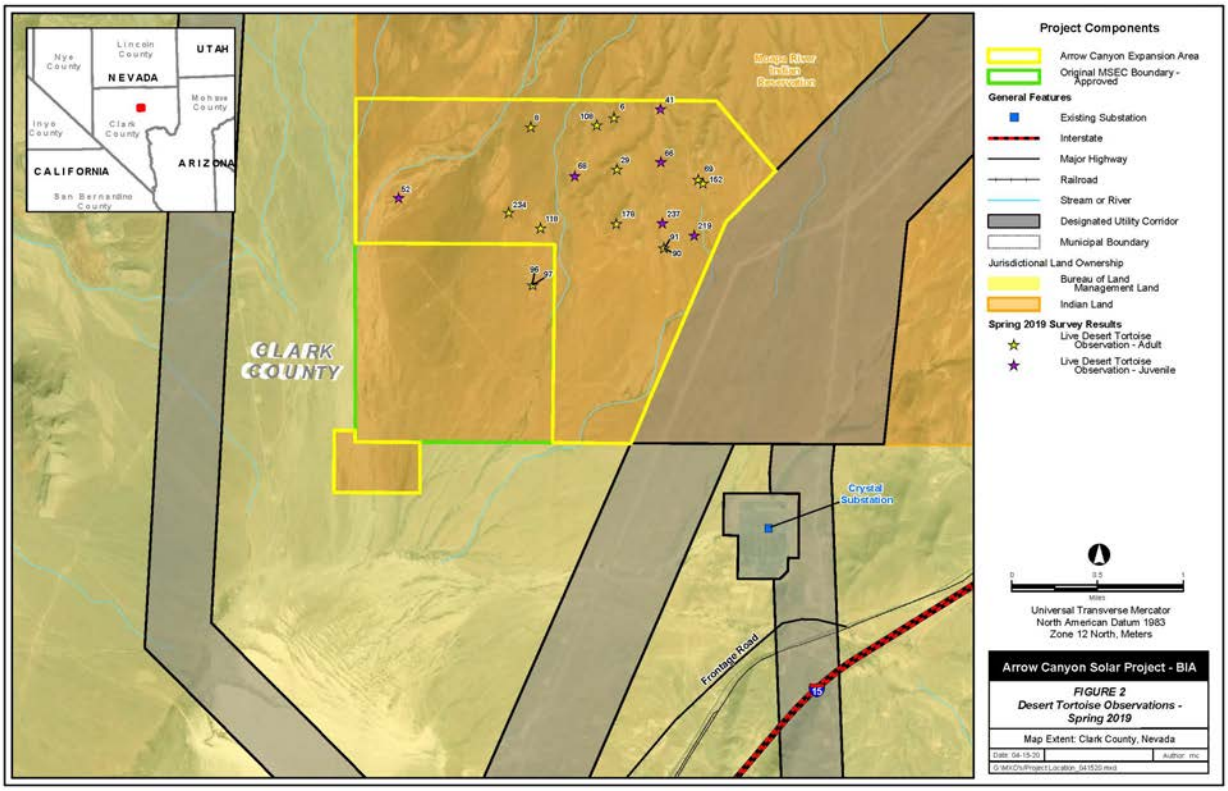

Figure 2. Map of the 2019 tortoise survey results.

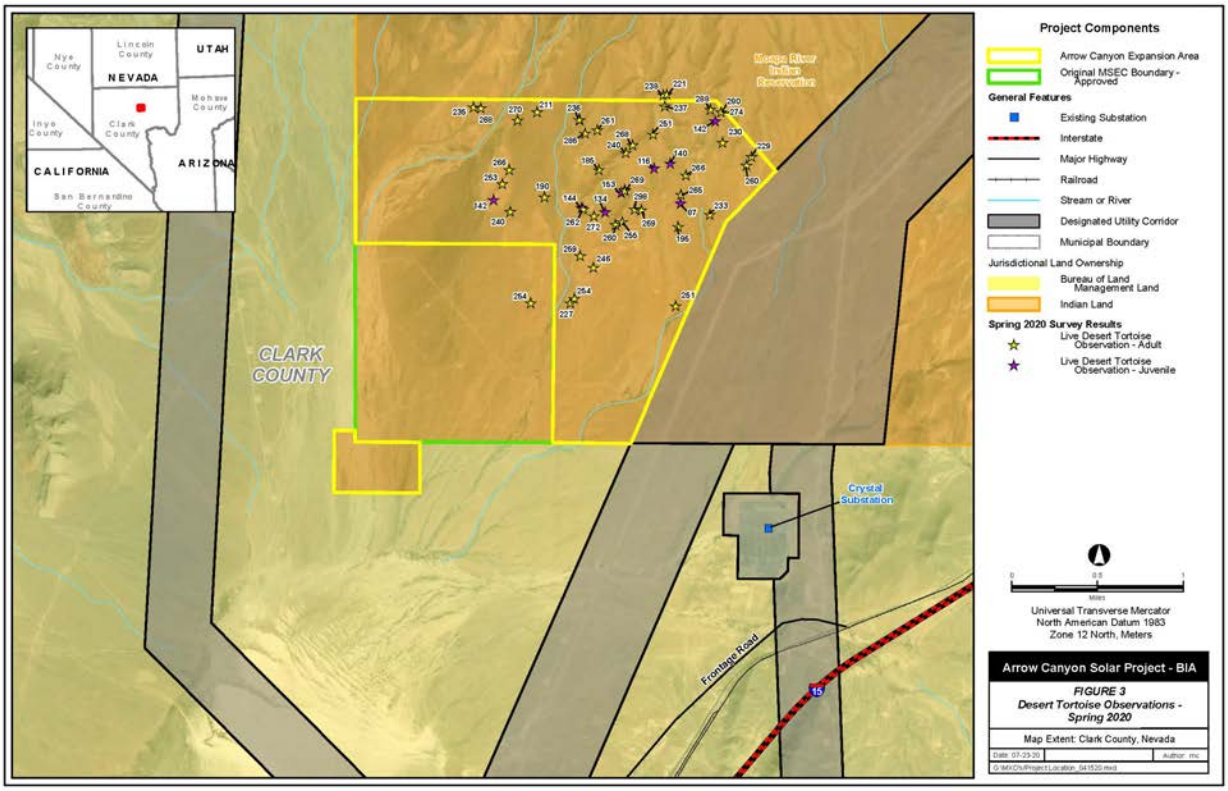

Figure 3. Map of the 2020 health assessment observations.

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, most 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, along the access road and along the water pipeline 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 northeastern portion 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, 2019). These surveys focused on capturing tortoises to perform health assessments. 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.

All tortoises assessed to-date have shown normal health results. Health assessment results from sample collection (e.g., ELISA, qPCR, etc.) are not yet available, thus, results are based on only the other components of health assessments.

4.3 Recipient Site Density Estimate

Surveys conducted in the northeastern portion of the Recipient Site documented 32 adult desert tortoises in 2020; recent radio tracking efforts indicate 35 known tortoises presently occupying the recipient site. Because only a small portion of the recipient site was surveyed, with a focus on health assessments, formal density estimates have not yet been produced. Surveys planned for fall 2020 and spring 2021 would more comprehensively survey the proposed receiver sites and provide sufficient data for density estimation.

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 between 13 and 46 adult tortoises and an unknown number of juvenile tortoises. Some of these may be returned to the interior of the project site following construction. The remainder of the tortoises would be moved to the nearest suitable site outside the proposed disturbance areas – a distance of less than 500 m. The project will attempt to balance the number of adult tortoises in each group (up to a minimum of 20 tortoises per group) in order to facilitate long-term monitoring. 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, grading of the solar site would be minimized during construction and existing vegetation would be crushed and/or trimmed where feasible; 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 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 the lowest resultant post-translocation densities. For these reasons, 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 Dry Lake SEZ as 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. Pen-and-return Group: 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 be crushed and/or trimmed where feasible during construction 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.

   Over-the-fence Group: 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.

   The project will attempt to balance the number of adult tortoises in each group (up to a minimum of 20 tortoises per group) in order to facilitate long-term monitoring. As such, some individuals discovered < approximately 500 meters from the project fenceline may be moved to temporary holding pens before being directly translocated to the project following construction. Decisions about final disposition of each tortoise will be made in consultation with USFWS.

   The project will also monitor up to 20 juvenile tortoises in the project interior (pen-and-return group) and up 20 juvenile tortoises in the over-the-fence group. The project will attempt to balance the samples of juvenile tortoises within each relocation group (up to a minimum sample of 20) using the same procedures described above. If fewer than 40 juvenile tortoises are found between the two groups, the project will augment the groups with captive-reared tortoises obtained from USGS.

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 a final check through the translocation suitability algorithm 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 2019), as updated in coordination with USFWS, until all known tortoises are removed from the solar site.

Table 10 – Disposition activities for telemetered and untelemetered individuals found within the Project Site

Status	Initial Location	Weight (g)	MCL (mm)	Class	Mark	Transmitter	1st Health Assessment and Sample Collection[1]	2nd Health Assessment (14 – 30 days prior to translocation)[1]	Final TRP Review	Final Health Assessment (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: Hold in temporary pens, return following construction.
	<500m from fence line	< 100		Hatchling	Yes	No	Yes (No samples)	N/A	No	Yes	Upon detection: translocate

Status	Initial Location	Weight (g)	MCL (mm)	Class	Mark	Transmitter	1st Health Assessment and Sample Collection[1]	2nd Health Assessment (14 – 30 days prior to translocation)[1]	Final TRP Review	Final Health Assessment (immediately prior to translocation)[1]	Translocate/ Return
		≥ 100	< 180	Juvenile	Yes	Yes	Yes	N/A	Yes	Yes	After TRP approval: Translocate (may use temporary pens if necessary for sample size)
		≥ 100	≥ 180	Adult[2,3]	Yes	Yes	Yes	No	Yes	Yes	After TRP approval: Translocate (may use temporary pens if necessary for sample size)
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.

Status	Initial Location	Weight (g)	MCL (mm)	Class	Mark	Transmitter	1st Health Assessment and Sample Collection[1]	2nd Health Assessment (14 – 30 days prior to translocation)[1]	Final TRP Review	Final Health Assessment (immediately prior to translocation)[1]	Translocate/ Return
	<500m from fence line	≥ 100	< 180	Juvenile	Yes	Yes	Yes	Yes	Yes	Yes	After TRP approval: Translocate (may use temporary pens if necessary for sample size)_
		≥ 100	≥ 180	Adult[2,3]	Yes	Yes	Yes	Yes	Yes	Yes	After TRP approval: Translocate (may use temporary pens if necessary for sample size)_

[1]The 1st, 2nd and final health assessments may occur concurrently; depending on size class and when in the process tortoises are located. Samples are considered valid for 1 year following collection. New samples will be collected if translocation does not occur within 1 year of sample collection

[2]For 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.

[3]Unknown 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 2**. The location and boundary delineation of any such project fencing will be coordinated between the Proponent and the agencies.

Table 11 – 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 (e.g., if a tortoise makes a long-distance movement near or across the project boundary).
<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 additional health assessments (includes full physical examination including oral cavity, but no sample collection) spaced 14 – 30 days apart with the third assessment occurring within two days of 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 a final check through the translocation suitability algorithm 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.

1 **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 the extent feasible 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. A portion of the adult tortoises in this group may be moved into the "Indirect Translocation" group (below) to balance sample sizes (up to a minimum sample size of 20). Decisions about the disposition of individual tortoises will be made in consultation with USFWS.

2 **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 vegetation/site conditions are suitable for tortoises to be released in the interior of the site. 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 4 depicts the translocation zones and buffer.

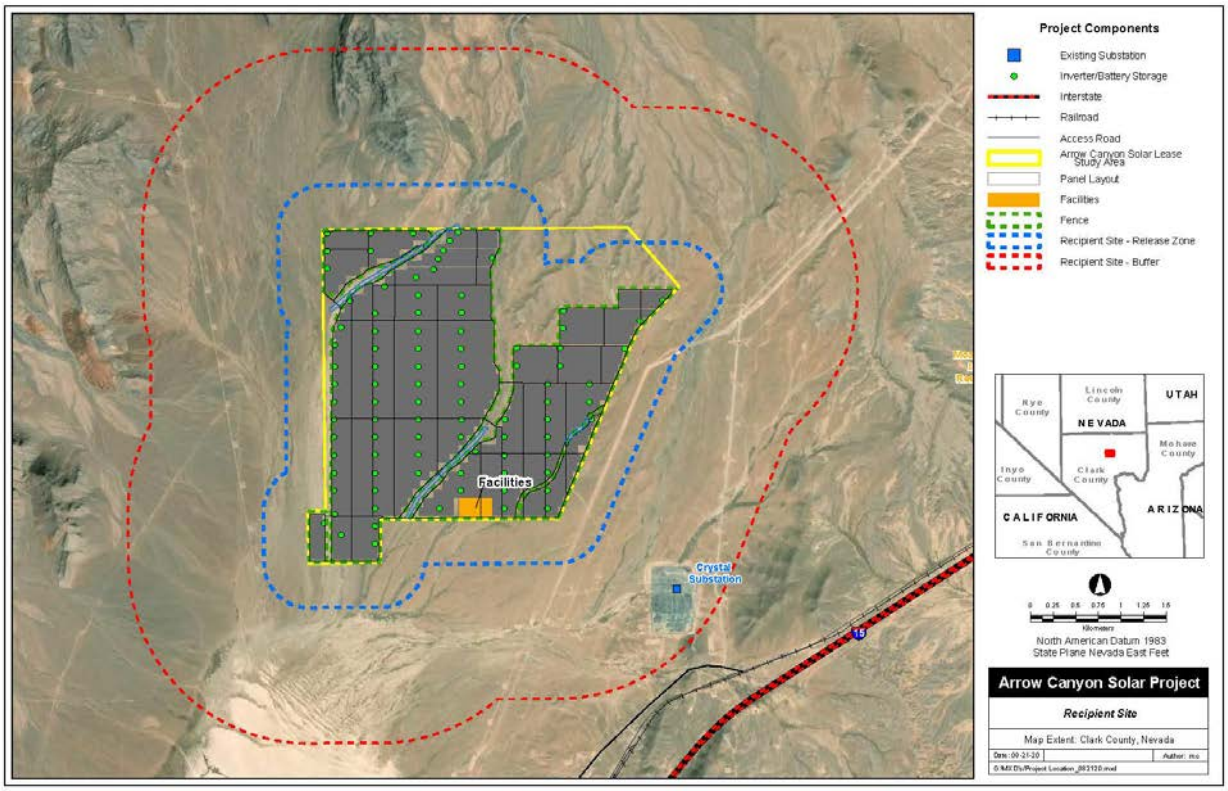

Figure 4. Map of translocation zones and buffers.

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 1.

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 (or longer if vegetation conditions do not support the release of tortoises on the project site). 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 (juveniles may be housed together as determined on a case-by-case basis in consultation with USFWS).

- 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 health assessment at time of translocation). Tortoises found > approximately 500 m from the project fenceline 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 ≥ 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 (≤12 month) Monitoring

For the short-term monitoring program, all translocated tortoises 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 adult and 20 translocated juvenile tortoises (selected using a stratified random design to include a balanced sex and age distribution) as well as 20 adult and 20 juvenile 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. If fewer than 20 juvenile tortoises are discovered on the project site, this group may be augmented with captive-reared individuals obtained from USGS. 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 two 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) assessment of evidence of reproduction on the site.

6.2.1 Direct Tracking

Direct tracking would continue for five years following translocation to determine space-use patterns of translocated desert tortoises. In the project area, this tracking program would include: 1) adult and juvenile tortoises (with a target sample size of 20) 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. 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 (variables measured will be coordinated with USFWS to maximize comparability of results across neighboring projects to the maximum extent practicable). 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 kriging 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 Health Assessments and Ultrasound/X-ray

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, x-ray 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 ultrasound/x-ray 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 demographic 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 in 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.

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