VOLUME 1

FINAL
ENVIRONMENTAL IMPACT STATEMENT
Eagle Shadow Mountain Solar Project

On Behalf of:

THE MOAPA BAND OF PAIUTE INDIANS

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

Estimated Lead Agency Total Costs Associated with Developing and Producing This EIS
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Volume 1

FINAL
ENVIRONMENTAL IMPACT STATEMENT
(FEIS)

EAGLE SHADOW MOUNTAIN SOLAR PROJECT

On Behalf of:

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OF PAIUTE INDIANS

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

November 2019

TABLE OF CONTENTS

EXECUTIVE SUMMARY **ES-1**
ES.1 Purpose of the Project ES-1
ES.2 Agency Purpose and Need ES-1
ES.3 Public Involvement ES-2
ES.4 Alternatives ES-3
ES.5 Environmental Consequences and Mitigation ES-3

CHAPTER 1 – Purpose and Need **1-1**
1.1 Introduction 1-1
1.2 Project Background, Overview, and Location 1-1
1.3 Purpose and Need of the Proposed Project 1-2
1.4 Agency Purpose and Need 1-3
1.4.1 BIA Purpose and Need 1-3
1.4.2 BLM Purpose and Need 1-3
1.4.3 Decisions to be Made 1-3
1.5 Summary of Public Scoping and Issue Identification 1-4
1.5.1 Public Scoping Process 1-4
1.6 Policies and Programs 1-6
1.6.1 Relationship to Federal Policies, Plans, and Programs 1-6
1.7 Permits and Approvals Required for the Proposed Project 1-6

CHAPTER 2 – Proposed Action and Alternatives **2-1**
2.1 Proposed Action and Alternatives 2-1
2.1.1 Proposed Action Alternative 2-1
2.1.1.1 Project Construction 2-9
2.1.1.2 Temporary Construction Facilities (to be removed following construction) 2-15
2.1.1.3 Operations and Maintenance 2-16
2.1.1.4 Decommissioning 2-17
2.1.2 Alternative 1 - Gen-Tie Route 2-18
2.1.3 Alternative 2 - No Action Alternative 2-18
2.2 Alternatives Considered but Eliminated from Detailed Analysis in the EIS 2-18
2.2.1 Alternative Reservation Locations 2-19
2.2.2 Alternative Off-Reservation Locations 2-19
2.2.3 Alternative Interconnection Options 2-19
2.2.4 Concentrated Photovoltaic (CPV) Technology 2-20
2.2.5 Distributed Solar Generation 2-20
2.2.6 Wind Energy 2-20

CHAPTER 3 – Affected Environment and Environmental Consequences **3-1**
3.1 Water Resources 3-13
3.1.1 Affected Environment 3-13
3.1.1.1 Surface Water 3-13
3.1.1.2 Ground Water 3-15

3.1.1.3 Water Rights 3-15
3.1.1.4 Jurisdictional Waters, Drainages, and Riparian Areas 3-16
3.1.2 Environmental Consequences 3-17
3.1.2.1 Proposed Action 3-17
3.1.2.2 Alternative Gen-tie Route 3-20
3.1.2.3 No Action 3-20
3.2 Biological Resources 3-21
3.2.1 Affected Environment 3-21
3.2.1.1 Ecosystems and Biological Communities 3-21
3.2.1.2 Vegetation 3-23
3.2.1.3 Wildlife 3-25
3.2.2 Environmental Consequences 3-36
3.2.2.1 Proposed Action 3-36
3.2.2.2 Alternative Gen-tie Route 3-46
3.2.2.3 No Action 3-47
3.3 Cultural Resources 3-47
3.3.1 Affected Environment 3-47
3.3.1.1 Cultural History 3-47
3.3.1.2 Results of the Literature Review and Field Inventory 3-48
3.3.2 Environmental Consequences 3-50
3.3.2.1 Proposed Action 3-50
3.3.2.2 Alternative Gen-tie Route 3-50
3.3.2.3 No Action 3-51
3.4 Native American Concerns 3-51
3.5 Socioeconomics 3-52
3.5.1 Affected Environment 3-52
3.5.1.1 Employment and Income 3-52
3.5.1.2 Unemployment 3-54
3.5.2 Environmental Consequences 3-54
3.5.2.1 Proposed Action 3-54
3.5.2.2 Alternative Gen-tie Route 3-57
3.5.2.3 No Action 3-57
3.6 Lands and Realty 3-58
3.6.1 Affected Environment 3-58
3.6.1.1 Existing and Planned Land Uses 3-58
3.6.2 Environmental Consequences 3-59
3.6.2.1 Proposed Action 3-59
3.6.2.2 Alternative Gen-tie Route 3-60
3.6.2.3 No Action 3-60
3.7 Visual Resources 3-60
3.7.1 Affected Environment 3-61
3.7.1.1 Visual Resources Inventory 3-61
3.7.1.2 Visual Resource Management Classes 3-61
3.7.1.3 Visibility 3-62
3.7.1.4 Key Observation Points 3-63
3.7.2 Environmental Consequences 3-64
3.7.2.1 Proposed Action 3-64

3.7.2.2 Alternative Gen-tie Route 3-67
3.7.2.3 No Action 3-68
3.8 Cumulative Impacts 3-68
3.8.1 Cumulative Projects 3-68
3.8.2 Cumulative Impacts by Resource 3-69
3.8.2.1 Water Resources 3-70
3.8.2.2 Biological Resources 3-71
3.8.2.3 Cultural Resources 3-72
3.8.2.4 Socioeconomics 3-72
3.8.2.5 Visual Resources 3-73
3.9 Unavoidable Adverse Impacts 3-73
3.10 Relationship Between Short-Term Uses and Long-Term Productivity of the Environment 3-75

CHAPTER 4 – List of Preparers and Consultation/Coordinator 4-1
4.1 List of Preparers and Reviewers 4-1
4.2 Consultation and Coordination 4-2
4.2.1 Public Scoping 4-2
4.2.2 Consultation with Others 4-3
4.2.2 Non-Governmental Organizations 4-4
4.2.3 Native American Tribes 4-5

FIGURES

All figures are in Appendix A of Volume 2

TABLES

TABLE ES-1 COMPARISON OF ALTERNATIVES ES-5
TABLE 1-1 SUMMARY OF AGENCY DECISIONS TO BE MADE 1-4
TABLE 1-2 KEY ISSUES IDENTIFIED DURING SCOPING 1-5
TABLE 1-3 ANTICIPATED PERMITS / APPROVALS FOR THE PROPOSED PROJECT 1-7
TABLE 2-1 SUMMARY OF AGENCY LANDS / JURISDICTION 2-2
PROPOSED EAGLE SHADOW MOUNTAIN SOLAR PROJECT 2-2
TABLE 2-2 TEMPORARY AND PERMANENT DISTURBANCE 2-3
TABLE 3-1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS 3-3
TABLE 3-2 FEDERALLY LISTED AND CANDIDATE THREATENED / ENDANGERED ANIMAL SPECIES IN CLARK COUNTY, NV 3-26
TABLE 3-3 DESERT TORTOISE SIGN OBSERVATIONS IN THE ESMSP AREA 3-29
TABLE 3-4 SPECIAL STATUS BIRD SPECIES IN CLARK COUNTY, NV* 3-32
TABLE 3-5 IMPACTS TO VEGETATION TYPES BY ESMSP COMPONENTS (ACRES) 3-39
TABLE 3-6 TEMPORARY AND PERMANENT DISTURBANCE 3-42
TABLE 3-7 LISTS OF SITES RECORDED IN THE DIRECT APE OF THE SOLAR FIELD 3-48
TABLE 3-8 LIST OF SITES RECORDED IN THE DIRECT APE OF THE GEN-TIE CORRIDORS 3-49
TABLE 3-9 POVERTY LEVEL AND MEDIAN HOUSEHOLD INCOME (ESTIMATES) IN 2017 3-53
TABLE 3-10 EMPLOYMENT BY INDUSTRY IN FY 2017 3-53
TABLE 3-11 UNEMPLOYMENT RATES 3-54
TABLE 3-12 CUMULATIVE PROJECTS IN THE PROJECT AREA 3-69

EXECUTIVE SUMMARY

The following sections summarize the Final Environmental Impact Statement (FEIS) for the Eagle Shadow Mountain Solar Project (ESMSP or Project), a 300-megawatt (MW) photovoltaic (PV) solar energy facility located on the Moapa River Indian Reservation (Reservation) about 30 miles north of Las Vegas in Clark County, Nevada.

325MK 8me LLC (Applicant), a subsidiary of 8minutenergy, has entered into an agreement with the Moapa Band of Paiute Indians (Band) to lease up to 2,200 acres of land on the Reservation for up to 40 years for the purposes of constructing, operating and maintaining, and decommissioning the Project. The ESMSP infrastructure would include an approximately 12.5-mile 230 kilovolt (kV) electric transmission generation interconnection (gen-tie) line that would connect the Project to the regional electric grid and would cross Tribal, Federal, and private lands. **Figures 1-1** and **1-2** in **Appendix A** show the location of the Project and its components.

ES.1 Purpose of the Project

The primary purposes for the proposed Project are to: 1) create an economic development opportunity for the Band by providing a long-term, economically viable revenue source (lease income) and creating new jobs and employment opportunities for Band members; 2) meet the terms of the Power Purchase Agreement (PPA) in place for the output of the Project; and 3) develop clean renewable electricity generation from the Band's solar resources that can be efficiently connected to the regional grid to assist the State of Nevada and neighboring states meet their renewable energy goals documented in each state's respective renewable portfolio standard (RPS). The Project would also help meet the goals of the Federal Government to eliminate or reduce greenhouse gas (GHG) emissions and promote the deployment of renewable energy technologies. In addition, the use of the Band's water proposed by the Project would help the Band affirm and sustain its rights to the water.

ES.2 Agency Purpose and Need

The need for the Bureau of Indian Affairs (BIA) action is established by the BIA's responsibility to respond to a request for a business lease approval and a right-of-way (ROW) application over or across lands held in trust for Indian tribes. The BIA must meet its responsibility to review and approve actions on Tribal lands held in trust for the benefit of the Band (as defined in 42 United States Code [U.S.C.] §§ 4321 *et seq*). For this Project, the BIA purpose, pursuant to 25 U.S.C. § 415, is to deny, grant, or grant with modifications the solar energy ground lease for the generation facility and associated ROW agreements between the Band and Applicant for the solar facility and the portions of the gen-tie line and other associated facilities located on the Reservation.

The need for the Bureau of Land Management (BLM) action is established under Title V of the Federal Land Policy and Management Act (FLPMA) (43 U.S.C. § 1761), where the BLM must respond to 325MK 8me's application for a ROW grant for the gen-tie line, as well as provide a ROW for use of the existing site access road. In accordance with Section 103(c) of FLPMA, public lands are to be

managed for multiple uses that take into account the long-term needs of future generations for renewable and non-renewable resources. The BLM purpose is to deny, grant, or grant with modifications the ROW request to construct, operate, maintain, and decommission the proposed gen-tie line and associated access, as well as use of the existing site access road located on Tribal land within the designated utility corridor and the portion on BLM lands. The application for the gen-tie ROW is the BLM ROW application N-97443.

Because the BIA has a jurisdictional trust responsibility over Indian lands and the BLM has land management responsibilities under FLPMA, the Project is a major Federal action and must comply with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. §§ 4321 *et seq.*). Because the majority of the Project would be located on Tribal trust lands, the BIA is the lead Federal agency. The Band, BLM, Environmental Protection Agency (EPA), Nevada Department of Wildlife (NDOW), and United States Fish and Wildlife Service (USFWS) are cooperating agencies on the Environmental Impact Statement (EIS) for the Project. The BIA and BLM will use this EIS to make their respective decisions, and the other cooperating parties will use this information to support their analyses and decisions, as needed.

ES.3 Public Involvement

The BIA published a Notice of Intent (NOI) to prepare an EIS for the Project in the *Federal Register* on February 4, 2018. In addition, notices were placed in local newspapers, and two public scoping meetings were held for the Project—one on the Reservation on March 5, 2019, and the other in Las Vegas, Nevada, on March 6, 2019.

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

- Potential impacts to desert tortoise, birds, and other sensitive species
- Potential impacts to vegetation and need to control weeds
- Socioeconomic impacts to Band members and the regional economy
- Impacts to other existing and proposed land uses in the area
- Potential impacts to cultural resources
- Impacts to water resources including water use and effects on ephemeral drainages
- Visibility of the project on the landscape from I-15 and the Old Spanish National Historic Trail
- Impacts from cumulative projects in the vicinity of the proposed Project

The BIA published a Notice of Availability (NOA) announcing the publication of the DEIS for the Proposed Project in the *Federal Register* on August 9, 2019. In addition, notices were placed in local newspapers and two public meetings were held to receive comments on the DEIS - one on the Reservation on September 3, 2019 and the other at the BLM office located in Las Vegas, Nevada on September 4, 2019.

ES.4 Alternatives

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

Proposed Action

The ESMSP solar site would be on 2,200 acres located entirely on the Reservation that would be leased by the Band to the Applicant for a term of 30 years with two 5-year extension periods for a total term of up to 40 years. Major onsite facilities include a 300MW alternating current (AC) solar field comprised of multiple blocks of PV solar panels mounted on single-axis tracking systems, associated inverter and transformer equipment, an energy storage system (ESS), a project substation, and operations and maintenance (O&M) facilities. The offsite facilities would include an approximately 12.5-mile single- or dual-circuit 230kV gen-tie located on the Reservation, BLM-administered lands, and private lands owned by Nevada (NV) Energy that would connect the Project to the existing Reid-Gardner Substation. Most of the gen-tie would be within a federally designated utility corridor on the Reservation that is managed by BLM. Additional offsite facilities include an existing road that would provide access to the Project.

Alternative Gen-Tie Route

Under this alternative, all the onsite and temporary facilities would be the same as discussed in the Proposed Action Alternative. An alternative route for the gen-tie would locate the approximately 12.5-mile line parallel to and northwest of the proposed gen-tie location at the northwestern edge of the Designated Utility Corridor. This alternative gen-tie route crosses similar distances of land within the corridor and across BLM-administered lands and NV Energy–owned private lands before terminating at the Reid Gardner substation. Once on private land, this alternative would follow the same route as the Proposed Action Alternative to the Reid Gardner Substation.

No Action Alternative

Under NEPA, the BIA and cooperating agencies must consider an alternative that assesses the impacts that would occur if the Project were not constructed and the lease agreement and ROWs were not approved. The No Action Alternative assumes that the lease agreement would be denied, the BLM utility ROWs would not be issued, and the Project would not be built.

ES.5 Environmental Consequences and Mitigation

The proposed ESMSP would be the fourth utility-scale PV solar project on the Reservation to be recently evaluated in an EIS. The three previously evaluated solar projects on the Reservation include:

- K Road Moapa Solar Facility (K Road) – 350 MW PV solar project, Final EIS published in 2012, immediately east-southeast of the ESMSP, constructed and operating (BIA 2012)

- Moapa Solar Energy Center (MSEC) – 200 MW PV solar project, Final EIS published in 2014, near and southwest of the ESMSP, approved but not constructed (BIA 2014a)
- Aiya Solar Project (Aiya) – 100 MW PV solar project, Final EIS published in 2016, north of ESMSP, approved but not constructed (BIA 2016)

Figure 1-3 in **Appendix A** shows the relative locations of these projects. While the solar site and gen-tie associated with the proposed ESMSP would occupy a different footprint than the previously evaluated PV solar projects on the Reservation, the size of the previously analyzed facilities, location, and many of the resources/uses evaluated would be similar to the ESMSP. Analyses from the previous resource investigations are incorporated by reference in this EIS, where applicable. The FEISs for these three previous projects can be found at the following link: https://www.esmsolareis.com/referenced-previous-eiss.html. Referencing allows the BIA to prepare environmental documents without duplicating relevant portions of the previous EISs and Records of Decision (RODs). Since potential impacts to resources/uses from construction, operation, maintenance, and decommissioning of these previous solar energy generating facilities have been analyzed in the previous NEPA documents, the analysis of the relevant resources/uses will not be repeated in this EIS. **Table 3-1** in Chapter 3 identifies all the resources/uses considered by the BIA and cooperating agencies and describes which resources are evaluated in detail in subsequent sections of this EIS and provides the rationale for eliminating some resources/uses from further analysis.

Table ES-1 provides a side-by-side comparison summary of the environmental impacts resulting from constructing, operating, maintaining, and decommissioning the ESMSP alternatives and the planned mitigation. This table focuses on the expected impacts of the resources discussed in detail in Chapter 3.

TABLE ES-1 COMPARISON OF ALTERNATIVES

Resource	Proposed Project	Gen-Tie Alternative	No Action Alternative	Mitigation
Water Resources (surface)	Short-term direct effects consisting of contamination during construction and operations; short- and long-term effects to sedimentation during high rain events	Same as Proposed Project	No direct, indirect, or cumulative impacts	Emergency response plan and Spill Prevention, Control, and Countermeasure Plan (SPCC), Storm Water Pollution Prevention Plan (SWPPP), maintenance of existing drainage patterns, and erosion control measures
Water Resources (ground)	Short-term use of groundwater from Tribal wells during the 18-month construction period and the long-term use of 20 acre-feet per year (AFY) during operations should not impact other water users	Same as Proposed Project	No direct, indirect, or cumulative impacts	No recommendations
Vegetation	Short-term direct and indirect effects on up to 2,165 acres of vegetation from construction; and long-term impact to 120 acres. Potential spread of invasive or noxious species.	Similar to Proposed Project, impacting same cover types. Would result in 12.6 acres of additional permanent impacts and 4.1 acres of additional temporary impacts.	No direct, indirect, or cumulative impacts	Site Restoration Plan, Weed Management Plan
Wildlife	Short-term direct and indirect effects on up to 2,165 acres of habitat from construction and long-term impact to 120 acres of habitat. Nuisance from noise and human presence during construction and operations.	Similar to Proposed Project, impacting same cover types. Would result in 12.6 acres of additional permanent impacts and 4.1 acres of additional temporary impacts.	No direct, indirect, or cumulative impacts	Worker environmental awareness program, biological monitors onsite during construction
Special Status Species	Short-term direct and indirect effects on up to 2,165 acres of vegetation from construction and long-term impact to 120 acres of tortoise habitat and foraging area. Short- and long-term indirect effects to golden eagles as a result of loss of foraging habitat. Incremental adverse cumulative effects to desert tortoise.	Similar to Proposed Project, impacting same cover types. Would result in 12.6 acres of additional permanent impacts and 4.1 acres of additional temporary impacts.	No direct, indirect, or cumulative impacts	Worker awareness program, reduced vehicle speed limits, biological monitors onsite during construction, Weed Management Plan, design of avian safe transmission towers
Cultural Resources	Four currently recommended eligible historic properties located within the Area of Potential Effect (APE) would be adversely affected. Each has limited materials that would be mitigated prior to construction.	Same as Proposed Project	No direct, indirect, or cumulative impacts	Memorandum of Agreement (MOA) between the Band, BIA, BLM, and State Historic Preservation Office (SHPO) will define measures to mitigate impacts to adversely affected properties

TABLE ES-1 COMPARISON OF ALTERNATIVES				
Resource	**Proposed Project**	**Gen-Tie Alternative**	**No Action Alternative**	**Mitigation**
Socioeconomics	Beneficial short- and long-term direct and indirect impacts from increases in employment, population and local spending, economic stimulus to the Band and incremental contribution to cumulative beneficial impacts	Same as Proposed Project	Short and long-term adverse impacts from no economic stimulus to the Band and local area	No recommendations
Transportation	Short-term direct and indirect impacts due to construction workforce and commercial truck traffic during construction. Negligible long-term impacts from operational traffic.	Same as Proposed Project	No direct, indirect or cumulative impacts	Implementation of Traffic Management Plan during construction
Visual Resources	Proposed Project would be visible from I-15 and some local roads. Many potential views from I-15 would be blocked by intervening topography. Gen-tie would be visible from portions of Old Spanish National Historic Trail but at significant distance and not apparent to viewer.	Similar to Proposed Project, as this gen-tie route also occurs in an area with significant existing transmission infrastructure	No direct, indirect or cumulative impacts	No recommendations

CHAPTER 1
Purpose and Need

1.1 Introduction

325MK 8me LLC (Applicant), a subsidiary of 8minutenergy, has entered into an agreement with the Moapa Band of Paiute Indians (Band) to lease land, up to 40 years, on the Moapa River Indian Reservation (Reservation) for the purposes of constructing, operating and maintaining, and decommissioning a 300-megawatt (MW) solar energy generating facility using photovoltaic (PV) technology. The solar project and associated infrastructure are referred to as the Eagle Shadow Mountain Solar Project (ESMSP or Project). **Figure 1-1** (located in **Appendix A** of this document along with all figures) shows the proposed general location for the Project.

The Band is federally recognized and has a Constitution approved by the Secretary of the Interior on April 17, 1942. The current total land base of the Moapa River Indian Reservation is 71,954 acres that is held in trust by the U.S. Government for the sole benefit of the Band. The Reservation lands originally set aside in 1874 consisted of two million acres, but in 1876, the Reservation was reduced to 1,000 acres. In December 1980, Congress added approximately 70,000 acres to the Tribal land base. The stated purpose of the restoration of these Tribal lands was to provide economic development opportunities. A solar project on the Reservation provides a viable economic development opportunity for the Band.

1.2 Project Background, Overview, and Location

The proposed solar generating facility would be constructed entirely within the Reservation on approximately 2,200 acres within a study area of approximately 4,770 acres of tribal trust land within the Reservation set aside by the Band exclusively for this purpose. The Project infrastructure would include an approximately 12.5-mile 230 kilovolt (kV) electric transmission generation interconnection (gen-tie) line that would connect the Project to the regional electric grid.

The right-of-way (ROW) for the gen-tie and associated access would include about 261 acres of lands within a federally designated utility corridor on the Reservation that is administered by the Bureau of Land Management (BLM) Las Vegas Field Office. The remaining portion at the northern end of the gen-tie (approximately 39.1 acres) would include a short ROW on BLM lands (8.1 acres) and lands near the Reid Gardner Substation owned by NV Energy (31 acres).

Access to the solar facility would be from local highways and roads to an existing access road located within the designated utility corridor on the Reservation and on BLM-managed lands off the Reservation. The water supply required for Project construction would be leased from the Band and drawn from the Band's existing water rights. **Figure 1-2** shows the Project study area and the proposed location of the Project components. The Project is described in more detail in Chapter 2.

The Reservation was selected as the proposed location for the ESMSP due to its abundance of solar resources, the availability of suitable land, transmission accessibility, and absence of land use

constraints and restrictive land use designations. The proposed site of the Project on the Reservation was selected by the Band to minimize environmental impacts and infrastructure needs by being located near existing projects and infrastructure. In addition, the Project would create employment opportunities and generate lease income for the Band and would contribute to the local economy and encourage expenditures in local businesses.

The proposed ESMSP would be the fourth utility-scale PV solar project proposed on the Reservation. One of the three previous projects, the 350MW K Road Moapa Solar Facility (K Road), has been constructed and is located immediately east of the proposed ESMSP. Another, the 200MW Moapa Solar Energy Center (MSEC) is not yet constructed and is located near the proposed ESMSP, approximately one mile to the southwest. The 100MW Aiya Solar Project (Aiya) is also unconstructed and is located in the northern portion of the Reservation, approximately 10.5 miles from ESMSP. **Figure 1-3** shows the relative locations of these projects.

1.3 Purpose and Need of the Proposed Project

The primary purpose and need for the proposed Project is to: 1) create an economic development opportunity for the Band by providing a long-term, economically viable revenue source (lease income) and creating new jobs and employment opportunities for Tribal members; 2) meet the terms of the Power Purchase Agreement (PPA) in place for the output of the Project; and 3) develop clean renewable electricity generation from the Band's solar resources that can be efficiently connected to the regional grid to assist the State of Nevada and neighboring states meet their renewable energy goals documented in each state's respective renewable portfolio standard (RPS). The Project would also help meet the goals of the Federal Government to eliminate or reduce greenhouse gas (GHG) emissions and promote the deployment of renewable energy technologies.

The Band identified the proposed Project as a viable opportunity to meet its economic development goals because the lease would provide much needed revenue to the Band while occupying a small portion of the Reservation (3.2 percent). The construction, operations and maintenance (O&M), and decommissioning of the Project would afford employment opportunity to tribal members. The Band has determined that the Project would also be consistent with the Band's tradition of respect for the land and would fulfill the purposes for which the 70,000 acres were restored to the Band by the Federal Government in 1980 (Moapa Paiutes, n.d.). The use of the Band's water proposed by the Project would help the Band affirm and sustain its rights to the water.

Because the Project meets the Band's objectives, they have forwarded a resolution documenting their intent to enter into the lease agreement to the BIA to initiate the environmental review process for the proposed 300MW ESMSP.

1.4 Agency Purpose and Need

1.4.1 BIA Purpose and Need

The need for the BIA action is established by the BIA's responsibility to respond to a request for a business lease approval and a ROW application over or across lands held in trust for Indian tribes. The BIA must meet its responsibility to review and approve actions on tribal lands held in trust for the benefit of the Band (as defined in 42 U.S.C. §§ 4321 *et seq*). For this Project, the BIA must review and respond to the solar ground lease and ROW agreements between the Band and the Applicant.

The BIA purpose, pursuant to 25 United States Code (U.S.C.) §415, is to deny, grant, or grant with modifications the solar energy ground lease for the generation facility and associated ROW agreements between the Band and Applicant for the solar facility and the portions of the gen-tie line and other associated facilities located on the Reservation.

1.4.2 BLM Purpose and Need

The need for the BLM action is established under Title V of Federal Land Policy and Management Act (FLPMA) (43 U.S.C. § 1761), where the BLM must respond to 325MK 8me's application for a ROW grant for the gen-tie line as well as provide a ROW for use of the existing site access road. In accordance with Section 103(c) of FLPMA, public lands are to be managed for multiple uses that take into account the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Department of Interior (DOI) is authorized to grant ROWs on public lands for systems of generation, transmission, and distribution of electrical energy (Section 501[a][4]).

The BLM purpose is to deny, grant, or grant with modifications the ROW request to construct, operate, maintain, and decommission the proposed gen-tie line and associated access as well as use of the existing site access road located on tribal land within the designated utility corridor and the portion on BLM lands. The application for the gen-tie ROW is the BLM ROW application N-97443. One ROW would be issue for both the gen-tie and site access road in compliance with FLPMA, BLM ROW regulations (43 Code of Federal Register [CFR] § 2800), and other applicable Federal and Nevada state laws and policies and would be in compliance with all objections, directions, and requirements of the Las Vegas RMP.

1.4.3 Decisions to be Made

Table 1-1 summarizes the agency decisions to be made for the proposed Project. The BIA and the BLM decisions, if approved, would assist in addressing the management objectives in the Energy Policy Act of 2005 (Title II, Section 211) and Secretarial Order 3285A1 (March 11, 2009) that established the development of environmentally responsible renewable energy as a priority for the Department of the Interior.

TABLE 1-1 SUMMARY OF AGENCY DECISIONS TO BE MADE	
Agency	**Action**
BIA	Approval of solar energy ground lease
	Approval of ROWs for portions of the 230kV gen-tie line and access roads located solely on the Reservation
BLM	Approval of ROW for portions of the 230kV gen-tie line and associated access as well as use of the existing site access road located within the BLM-designated utility corridor on tribal lands and portion on BLM lands
Band	Approval of solar lease and consent to ROWs for portions of the 230kV gen-tie line and access roads located solely on the Reservation

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

1.5 Summary of Public Scoping and Issue Identification

1.5.1 Public Scoping Process

The BIA published a Notice of Intent (NOI) to prepare an EIS for the Project in the *Federal Register* on February 4, 2019. In addition, notices were placed in local newspapers and two public scoping meetings were held for the Project - one on the Reservation on March 5, 2019 and the other in Las Vegas, Nevada on March 6, 2019. The scoping report, found in **Appendix B**, summarizes the comments received and provides a preliminary list of issues and/or concerns identified.

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

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

TABLE 1-2 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 source of the water to be used during construction and operation
Soils	Should include measures to minimize soil disturbance to the extent possible
Vegetation	Should include measures to minimize vegetation clearing to the extent possible
	Should include measures to control weeds to the extent possible
Cultural Resources	Configure the project layout to avoid or minimize potentials effects to significant cultural sites in the lease study area
	Determine whether the project could impact the Old Spanish National Historic Trail
Land / Resource Use	Need to evaluate the potential impact of development of the Project and associated linear facilities on other existing and planned transmission and pipeline facilities within the designated utility corridor
	Consider the impact of precluding other uses by the Band and its members on these lands for the duration of the Project
Socioeconomics	Describe the economic development opportunity for the Band
	Describe the jobs for tribal members and others in the region that would be created
Wildlife	Describe the potential impacts to threatened and endangered species (including the desert tortoise) and other sensitive wildlife species
	Consider measures that minimize impacts to desert tortoise habitat and connectivity
	Describe the potential impacts to avian species from construction and operation of the project
Visual Resources	Evaluate the impact the project could have on views of the landscape
Air Quality/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 general area
	Discuss trends of and cumulative impacts to key resources including desert tortoise and desert washes

1.5.2 Comments on the Draft EIS

The BIA published a Notice of Availability (NOA) announcing the publication of the DEIS for the Proposed Project in the *Federal Register* on August 9, 2019. In addition, notices were placed in local newspapers and two public meetings were held to receive comments on the DEIS for the Proposed

Project - one on the Reservation on September 3, 2019 and the other at the BLM offices located in Las Vegas, Nevada on September 4, 2019. **Appendix R** includes the comments received on the DEIS and a table providing responses to the comments and how they were addressed in this FEIS.

1.6 Policies and Programs

1.6.1 Relationship to Federal Policies, Plans, and Programs

The ESMSP will conform to the Federal, Tribal, state, and local laws, regulations or policies that may apply to the Project. It should be noted that portions of the ESMSP that lie wholly within the Reservation would also be regulated under the Band's Environmental Policy Ordinance, in accordance with NEPA, and in compliance with other Federal regulations that apply on Tribal lands (State, County, and local laws and policies are not applicable to Tribal lands). Furthermore, the transmission line on BLM-administered land may be regulated under county, state, and Federal regulations that apply to the BLM.

1.7 Permits and Approvals Required for the Proposed Project

Table 1-3 lists the anticipated additional local, Tribal, state, Federal and private permits or approvals that may be required for the proposed Project beyond the BIA and BLM decisions and NEPA process discussed earlier. This table has been subdivided by the various components of the Project and land jurisdiction – Tribal and lands administered by the BLM.

TABLE 1-3 ANTICIPATED PERMITS / APPROVALS FOR THE PROPOSED PROJECT

Land Ownership / Jurisdiction	Project Components	
	Solar Field	**Transmission Line**
Moapa River Indian Reservation / BIA	Lease approval, Right-of-way Grant (BIA)	Right-of-way Grant (BIA)
	Section 401 Water Quality Certification (EPA)	Section 401 Water Quality Certification (EPA)
	NPDES 402 Construction Stormwater Permit (EPA)	NPDES 402 Construction Stormwater Permit (EPA)
	Section 7 Consultation (USFWS)	Section 7 Consultation (USFWS)
	Section 106 Consultation (SHPO)	Section 106 Consultation (SHPO)
	Compliance with Tribal Environmental Policy Ordinance	Compliance with Tribal Environmental Policy Ordinance
	Section 404 Permit (USACE)	Section 404 Permit (USACE)
BLM	N/A	Section 404 Permit (USACE)
	N/A	Right-of-way Grant (BLM)
	N/A	Section 7 Consultation (USFWS)
	N/A	NPDES 402 Construction Stormwater Permit (NDEP)
	N/A	401 Water Quality Certification (NDEP)*
	N/A	Section 106 Consultation (SHPO)
	N/A	Clark County Dust Control Permit
	N/A	Clark County Special Use Permit
	N/A	Utility Environmental Protection Act (UEPA) Permit
	N/A	Encroachment / Crossing Permit with Railroad (UPRR)
	N/A	Special Purpose Permit (NDOW) (Desert Tortoise Relocation)
Private Land (NV Energy)	N/A	Clark County Special Use Permit
	N/A	Utility Environmental Protection Act (UEPA) Permit (PUCN)
	N/A	Interconnection Agreement, Easement (NVE)

**NDEP – Nevada Division of Environmental Protection*

CHAPTER 2
Proposed Action and Alternatives

The proposed Project would be located approximately 30 miles northeast of Las Vegas in Clark County, Nevada (**Figure 1-1**), west of I-15 and east of U.S. Highway 93. The ESMSP would be located on up to 2,200 leased acres within a study area of approximately 4,770 acres on the Reservation in Township 16 South, Range 64 East, Sections 1, 9, 10, 11, 14, 15, 16, 21 and 22, Mount Diablo Base Meridian. These lands are currently vacant except for roads, pipelines, a tribal aggregate mine, and two operating water wells. These existing tribal facilities will be excluded from the final lease and solar site area.

The proposed 12.5-mile gen-tie line would be located in Township 16 South, Ranges 64 and 65 East and Township 15 South, Ranges 65 and 66 East. The gen-tie line would be located within an existing utility corridor, adjacent to multiple existing linear electric transmission and pipeline utilities. **Figure 2-1** shows the location of the proposed components of the Project and associated facilities. Project components would include onsite facilities, offsite facilities, and temporary facilities needed to construct the Project.

2.1 Proposed Action and Alternatives

This section describes the Proposed Action and identifies potential alternatives to the ESMSP that were initially identified by the BIA, cooperating agencies, and the Applicant. Alternatives identified by these entities and those suggested by the public or developed to respond to issues identified during the scoping process were evaluated for feasibility. Potential alternatives are categorized as those that are carried forward for detailed analysis and those that were considered but dropped from detailed analysis.

2.1.1 Proposed Action Alternative

The solar site would be located entirely on the Reservation which would be leased by the Band to the Applicant for a term of 30 years with two 5-year extension periods for a total term of up to 40 years. Major onsite facilities include a 300MW AC solar field comprised of multiple blocks of PV solar panels mounted on single-axis tracking systems, associated inverter and transformer equipment, an energy storage system (ESS), a project substation, and O&M facilities. The offsite facilities would include an approximately 12.5-mile single- or dual-circuit 230kV gen-tie located on the Reservation, BLM-administered lands, and private lands. Most of the gen-tie would be within a Federally-designated utility corridor on the Reservation. This line would require a ROW width of 200 feet. Additional offsite facilities include an existing road that would provide access to the Project area. Temporary facilities that would be removed at the end of construction include laydown and construction areas and water storage tanks also located on the Reservation. **Table 2-1** summarizes the principle components of the Project and the associated agency actions.

Power produced by the Project would be conveyed to the regional transmission system via the gen-tie interconnection to NV Energy's existing 230kV Reid Gardner Substation.

TABLE 2-1 SUMMARY OF AGENCY LANDS / JURISDICTION PROPOSED EAGLE SHADOW MOUNTAIN SOLAR PROJECT				
Agency	**Project Component**	**Location**	**Agency Action**	**Mileage/Acreage[1]**
BIA	Solar Field	Reservation	Lease[2]	Up to 2,200 acres
	230 kV Line	Reservation	ROW	Up to 0.1 miles / 2.4 acres
	TOTAL BIA			2,202.4 acres
BLM	230 kV Line	Designated Utility Corridor on Tribal Lands	ROW[3]	10.8 miles / 261 acres
	230 kV Line	Federal Lands managed by BLM	ROW[3]	0.3 miles / 8.1 acres
	Site Access Road	Designated Utility Corridor on Tribal Lands	ROW	4.2 miles / 12.1 acres
	Site Access Road	Federal Lands Managed by BLM	ROW	0.8 miles / 2.2 acres
	TOTAL BLM			16.1 miles / 283 acres
PRIVATE	230 kV Line	Private Lands owned by NV Energy	N/A	1.3 miles / 31 acres
	TOTAL Private			1.3 miles / 31 acres

[1] Acreage and mileage are approximate. Gen-tie acreage is based on a 200-foot ROW and only a portion of the ROW would be disturbed. Access road is existing – no new impacts expected by ROW issued for its use. Only a portion of the 2,200-acre potential solar site and lease area would be disturbed by the final footprint of the solar project.

[2] Lease term would be 30 years plus two 5-year extensions for up to 40 years

[3] BLM ROW term would be 30 years and would need to be extended if Project life extends beyond that period.

In addition to the Federal agency jurisdictions mentioned above, the approximately 1.6-mile portion of the gen-tie crossing BLM lands outside of the Reservation and private lands would be subject to Clark County jurisdiction and would require a Special Use Permit (SUP).

The Project would include the following onsite key elements located within the 2,200-acre solar lease boundary, which are discussed further below. Onsite facilities would impact only a portion of the 2,200-acre solar site lease area.

- Solar Field.
- Energy Storage System.
- Onsite Electrical Collection System and Substation.
- Site Security and Fencing.
- Communication Systems Infrastructure.
- Operations and Maintenance Area.
- Internal Project Roads.
- Lighting.
- Water Supply.
- Wastewater Treatment.
- Waste and Hazardous Materials Management.
- Fire Protection.

The Project would include the following offsite key elements located outside of the 2,200-acre solar lease boundary, which are discussed further below:

- 230kV Transmission Line (Gen-Tie)
- Access Road

The Project would also include the following temporary key elements associated with construction that would be removed once construction is complete. These elements are discussed further in Section 2.1.1.2:

- Contractor use areas on the solar field.
- Contractor use areas along gen-tie line

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

TABLE 2-2 TEMPORARY AND PERMANENT DISTURBANCE

Project Component	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Solar Field and Ancillary Facilities	2,086[1]	100[2]
230kV Gen-Tie Line	79	20
Access Road	0	0
Total	2,165	120

[1] The solar field includes all facilities within its boundary including solar arrays, internal site roads, substation, O&M facility, and all associated components.

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

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

Onsite Project Facilities

Solar Field

The solar field would include mounted PV modules, inverters, and transformers that would be combined to form array blocks approximately 3 MW in size (block size may change based on final design). The blocks would be repeated to create up to 300 MW of AC electrical capacity. Inverter stations are generally located centrally within the blocks. Blocks would produce direct electrical current (DC), which is converted to alternating electrical current (AC) at the inverter stations. **Figure 2-2** shows the conceptual site plan for the ESMSP solar field.

The Project would be constructed using photovoltaic panels or modules that convert sunlight directly into electricity. Panels would be installed on single-axis tracker mount systems oriented in north-south rows that would rotate to follow the sun over the course of the day.

The foundations for the mounting structures would be embedded driven steel posts or other embedded foundation design approximately 8 feet below ground, depending on the structure, soil conditions, and wind loads, and may be encased in concrete or utilize small concrete footings. Final solar panel layout and spacing would be optimized for site characteristics and the desired energy production profile.

A typical panel array layout using single-axis trackers is shown on **Figure 2-3**. The highest point for a tracker would be achieved during the morning and evening hours when the trackers are tilted at their maximum angle and would be up to 20 feet above the ground surface depending on the grade where the posts are installed (**Figure 2-4**). The preferred mounting configuration would use directly embedded driven posts with concrete piers or screw anchors used only if subsurface conditions do not support driven posts.

In the tracking system, each tracker panel array would be powered by a low-voltage electric drive motor. The motors would normally be operated for a few seconds every 5 to 10 minutes during daylight conditions to move the panels in approximately one-degree increments.

Meteorological monitoring stations located at multiple locations (up to 7) within the solar array would monitor wind speed and communicate with the tracker units. This would allow for the trackers to rotate to a flat position during high winds. Meteorological stations would be mounted on or around the inverter units and would not exceed 16 feet in height from the ground.

Energy Storage System

The ESMSP may include one or more ESSs, located at or near the Project substation and/or at the inverter stations, but possibly elsewhere onsite. The ESSs would consist of modular and scalable battery packs and battery control systems that conform to national safety standards. The ESS modules, which may include commercially available flow batteries, typically consist of industry-standard containers (approximately 40 feet x 8 feet x 8 feet) in pad- or post-mounted, stackable metal structures, but could also be housed in a dedicated building in compliance with applicable regulations. The maximum height of a building is not expected to exceed 25 feet. The total acreage of the energy storage system is not expected to exceed 12 acres. The actual dimensions and number of energy storage modules and structures would vary depending on the application, supplier, chosen configuration, and applicable building standards.

Electrical Collection System and Substation

PV modules convert sunlight into DC electricity. The DC electricity generated from the PV modules in each array block would be collected and delivered through underground or above ground cables to a station near the center of the array where an inverter converts the DC electricity to AC electricity and a medium-voltage transformer steps up the voltage to 34.5 kV. This converted AC electricity then would be delivered to the onsite substation via the 34.5 kV AC collection system. At the substation, the electricity again would be stepped up to 230 kV for delivery to NV Energy's transmission grid.

The inverter units would have a rated power of up to 3 MW each, a unit transformer, and voltage switch gear. The unit transformer and voltage switch gear would be housed in steel enclosures, while the inverter unit(s) would be housed in cabinets. The inverter station could also be within an enclosed or canopied metal structure on a skid or concrete mounted pad.

The 34.5 kV collector system would be installed either as overhead single- or double-circuit lines and fiber optic communication lines on wooden poles with post insulators or underground in trenches depending on soil characteristics. The 34.5kV alternating current (AC) collection system would convey electricity from the Inverter Stations to the onsite substation. Pole height would be up to 75 feet above grade and approximately 150-foot spacing between poles. Wood poles typically would be directly embedded to 10 percent of the pole height plus two feet. If the collector system is buried in trenches, the cabling and fiber optic lines would be buried as deep as 4 feet in trenches as wide as 10 feet depending on the number of circuits being collected.

The onsite Project substation would contain several components including auxiliary power transformers, distribution cabinets, revenue metering systems, a microwave transmission tower, voltage switch gear, a small control building, and a mechanical electrical equipment room. The substation would occupy an area of approximately 17 acres and would be secured separately by an additional chain-link fence. The substation may be shared with potential future projects and is being sized to accommodate additional transformers and electrical connections. The proposed location of the Project substation would be near the main site entrance as shown on **Figure 2-2**.

Site Security and Fencing

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

Temporary desert tortoise exclusion fencing would be installed outside of the chain link perimeter fence during construction. The permanent perimeter fence would be installed to leave a 6 to 8-inch opening at the bottom of the fence to allow the movement of desert tortoises across and through the site when the temporary tortoise fence is removed following construction. The specifications for the perimeter fencing would be determined through consultation with the USFWS. Substation fencing would include approved desert tortoise exclusion fencing to prevent tortoises from entering the substation.

Communication Systems Infrastructure

Telecommunications systems would be installed at the Project substation consisting of a remote terminal unit (RTU) and equipment necessary for the solar facility. This equipment would include a communications line (i.e., T-1 line), a microwave receiver mounted on the control building or on a lattice tower up to 100 feet tall, and miscellaneous communication cables and link equipment, as required. Fiber optics would be installed in one of the shield wires of the gen-tie line to link the project substation to the Reid Gardner Substation. Support equipment (i.e., metering class current transformers and potential transformers) would also be installed to facilitate metering of all applicable energy outputs. In addition, an up to 100-foot tall structure may be erected near the substation/control building to facilitate wireless communications to provide a back-up option for site telecommunications.

The Project would have a Supervisory Control and Data Acquisition (SCADA) system that would allow for the remote monitoring and control of inverters and other Project components. The SCADA

system would be able to monitor Project output and availability and to run diagnostics on the equipment. This equipment would be located in the O&M building and would connect to the communications system.

Operation and Maintenance Area

The Project may include an O&M building with associated facilities and on-site parking on approximately 3 acres. The O&M building would be steel framed with metal siding and roof panels up to 20 feet by 80 feet. The O&M building may include offices, repair facility/parts storage, control room, restrooms, potable and non-potable water, and a septic tank and leach field. The design and construction of this building and associated water / wastewater systems would be consistent with Clark County building standards and approved by the Band and BIA.

Additional components of the O&M area would include a temporary construction laydown and storage area, above-ground water storage tanks, security gate, signage, flagpole, and trash containers. The O&M area would be equipped with exterior lighting as approved by the Band and BIA. The water supply for the O&M area would be provided via the Band's nearby well.

Internal Project Roads

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

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

Lighting

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

Water Supply

The Project's construction water requirements would be met from existing water rights owned by the Moapa Band of Paiutes. The Applicant would have access to this water supply through an agreement with the Band.

Up to 200 acre-feet (AF) of water would be required over approximately 18 months for construction-related activities, including dust control. During operations, water demand for panel washing and O&M domestic use is not expected to exceed 20 acre-feet per year. A small water treatment system may be installed to provide deionized water for panel washing. One or more above-ground water storage tanks may be placed on-site near the O&M building.

Wastewater Treatment

Wastewater generated during construction and operation would include sanitary waste. Portable toilets would be used during construction. A septic tank and drain field system could be used for collection, treatment, and disposal of sanitary waste during operations. If a septic system is not installed, portable toilets would be used during operations.

Waste and Hazardous Materials Management

The primary wastes generated at the Project during construction, operation, and maintenance would be nonhazardous solid and liquid wastes. Limited quantities of hazardous materials would be used and stored on the solar site. The ESS, if included, could contain lithium-ion batteries that would need replacement periodically and the used batteries would need to be disposed of according to appropriate protocols. The primary hazardous materials on site during construction would be the fuels, lubricating oils and solvents associated with construction equipment. The nonhazardous wastes produced by construction and O&M activities would include defective or broken electrical materials and batteries, empty containers, the typical refuse generated by workers and 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 Spill Response Plan that address waste and hazardous materials management including BMPs related to storage, spill response, transportation, and handling of materials and wastes. These draft plans are included in **Appendices E** and **F**. Waste management would emphasize the recycling of wastes where possible and would identify the specific landfills that would receive wastes that cannot be recycled.

Fire Protection

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

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

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

Offsite Project Facilities

230 kV Transmission Line (Gen-Tie)

The Project would require the construction of an approximately 12.5-mile single- or dual-circuit 230kV gen-tie for interconnection to the regional transmission grid system. The proposed gen-tie route would proceed east from the Project substation on tribal land before entering the designated BLM utility corridor for approximately 10.8 miles. While in the utility corridor a new transmission line would parallel the existing transmission lines heading northeast to the point where it would exit the Reservation. When leaving the utility corridor, the gen-tie line would enter BLM-administered lands for approximately 0.3 miles, traverse private lands for approximately 1.3 miles, and then terminate at NVE's Reid Gardner substation. An approximate 200-foot wide ROW would be required from BLM and BIA. Figure 2-5 shows the location of the proposed and alternative gen-tie routes and the table below provides the Township, Range, and Section(s) that would be crossed by the proposed gen-tie line by land managing agency.

Reservation (within designated utility corridor)		
Township 16 South	Range 64 East	Sections 12, 13, and 14
Township 16 South	Range 65 East	Sections 5, 6, and 7
Township 15 South	Range 65 East	Sections 12, 13, 14, 22, 23, 27, 28, 32, and 33
BLM		
Township 16 South	Range 66 East	Section 7
Private		
Township 16 South	Range 66 East	Sections 5 and 6

Information based on the Mount Diablo Base Meridian

The Applicant would construct the gen-tie from the Project substation, through the designated utility corridor to a Point of Change of Ownership (POCO) pole structure located on BLM-administered land. From the POCO pole structure, the remaining portion of the gen-tie would be constructed by NV Energy to the Reid Gardner Substation. The gen-tie would be designed to accommodate transmission of energy generated by the ESMSP and potential future solar energy generation and storage projects, with a combined total capacity of up to 800MW AC.

The portion of the overhead 230kV line on federally-administered lands would be installed on approximately 73 support structures spaced approximately 700 to 900 feet apart depending on the topographic, hydrologic, and geologic conditions of the underlying lands. The structures would be up to approximately 150 feet above grade with minimum ground clearance of 25 feet per local and national electrical code requirements. In addition, one of the shield wires on the gen-tie line would include a fiber optic communications cable providing a communications link between the project substation and the Reid Gardner Substation. **Figure 2-6** shows the dimensions of the typical transmission structure. Most of the structures would be accessed via new spur roads constructed from existing utility access roads. Where the line does not parallel existing lines, a new road would be developed within the ROW to facilitate access to the gen-tie transmission structures. The proposed ROW would be 200 feet wide.

All overhead electrical lines would be designed and installed in accordance with the Avian Power Line Interaction Committee's (APLIC) Suggested Practices for Avian Protection on Power Lines (APLIC 2006).The Applicant has also prepared a Bird and Bat Conservation Strategy (BBCS) to address

potential impacts to birds and bats during the construction, operations, and maintenance phases of the Project and it is included in **Appendix D**.

Project Access Road

Main access to the ESMSP site for construction and through operations and decommissioning would be provided via existing roads. Access to this portion of the Reservation would be via I-15, US Highway 93, and North Las Vegas Boulevard to existing improved roads on the Reservation. These existing roads on the Reservation include the road built to provide access to the nearby existing K Road Solar Facility and the road providing access to the existing tribal aggregate operation and water wells that would be adjacent to the ESMSP. No upgrades to these existing roads are anticipated to be necessary to provide the access needed for this Project, other than maintenance during construction and operations, as required. **Figure 2-1** shows the location of the existing road that would be used.

Additionally, one existing road used by the Band to access a potential cement mining operation currently crosses the solar site lease area and therefore would be rerouted outside of the proposed solar facility lease boundary.

2.1.1.1 Project Construction

Prior to any activity on the site, required resource protection plans would be developed and regulatory and permit conditions would be integrated into the final construction compliance documents. Drafts of many of these plans are included as appendices to this EIS and these and other plans would be finalized by the contractor prior to construction. Project construction would begin once all applicable approvals and permits have been obtained. Construction is expected to take approximately 18 months and would include mobilization, grading and site preparation, installation of drainage and erosion control measures, PV panel/tracker assembly, solar field and gen-tie component construction. The Applicant expects that Project construction would commence in the third quarter of 2020.

Onsite Project Facilities Construction

The following construction components occur onsite within the solar lease property and solar field boundary.

***Site Preparation* -** Environmental clearance and geotechnical surveys would be performed at the Project site prior to commencement of construction activities. Geotechnical surveys would involve drilling a series of boreholes throughout the site to inform the grading and foundation design. During the environmental clearance phase, the boundaries of the construction area would be delineated and marked. The site then would be prepared for use by selectively removing vegetation and grading which would be minimized to the extent reasonably practicable.

Initially, a construction office and staging area and entrance and exit gates would be established at the Project's main access where the existing roads on the Reservation enter the site.

Surveying/Staking - Prior to construction, the limits of construction disturbance areas would be determined by surveying and staking. Where necessary, the construction areas and sensitive areas to be avoided would be flagged with appropriate buffers and all construction activities would be limited to prevent unnecessary impacts to the sensitive areas.

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

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

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

Gravel/Aggregate/Concrete - Concrete would be trucked in and poured in place for equipment, gen-tie structures, and building foundations. Aggregate material would be used for parking areas, substation area, and where needed for the perimeter road and access roads. Riprap material could be required for erosion control. This material would be sourced from the Band's existing gravel/materials operation located immediately adjacent to the solar site, as available.

PV Solar Array Assembly and Construction - The construction sequence for the solar field would follow a generally specified order sequenced by arrays. Each array would contain solar panels, an inverter, and a step-up transformer and construction work within each array would generally proceed as follows:

- Install foundations for inverter units;
- Prepare trenches for underground cable within each array;
- Install underground cable as required;
- Backfill trenches;
- Install inverter and transformer equipment;
- Install steel posts and tracker assemblies;
- Install PV modules;
- Install concrete footings for transformers, and substation equipment;

- Perform electrical terminations; and
- Inspect, test, and commission equipment.

Cable trenches within the arrays would contain electrical conductors for low-voltage power collection and fiber optic cables for equipment communication. Trenches would vary between 3 to 10 feet wide and 3 to 4 feet deep. Trench excavation would be performed with conventional trenching equipment and excavated soil would be placed adjacent to the trench and used as backfill once installation is complete.

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

Installation of electrical equipment and necessary infrastructure to energize the equipment would consist primarily of the following tasks:

- Equipment—Installation of all electrical equipment including inverters, transformers, circuit breakers, switches and switchgear, lighting, communication, control, and SCADA equipment.
- Cables—Installation of all cables necessary to energize the Project equipment. Cables would be routed via cable trays, above-grade conduits, below-grade conduit, and overhead structures.
- Grounding—All equipment and structures would be grounded as necessary.
- Telecommunications—Communication systems including T-1 internet cables, fiber optic, and telephone would be installed during electrical construction.

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

Substation Construction - The Project substation would be constructed on the solar site in compliance with applicable electrical safety codes. The onsite substation would require a graded site to create a relatively flat surface approximately one percent maximum slope in any direction. The substation interior would be covered with aggregate surfacing for safe operation.

The substation systems could include heating, ventilating, and air conditioning (HVAC) systems; distribution panels; lighting; communication and control equipment; and lightning protection.

The 17-acre substation area would be excavated to a depth of approximately 10 feet and a copper grounding grid designed to meet the applicable electrical requirements would be installed and the foundations for transformers and metal structures would be prepared. Final ground grid design would be based on site-specific information such as available fault current and local soil resistivity. Typical ground grids consist of direct buried copper conductors with copper-clad ground rods arranged in a grid pattern covering the substation area plus a small buffer outside the fence. After

installation of the grounding grid, the area would be backfilled, compacted and leveled followed by the application of aggregate rock base.

Installation of the transformers, breakers, buswork, and metal dead-end structures would follow. A containment area around the transformers would be sized to hold the full volume of oil within the transformers and lined with an impermeable membrane covered with gravel to capture any expected leaks. A pre-fabricated control house would be installed to house the electronic components required for the substation equipment.

O&M Building Construction - The O&M area would be graded and after the O&M building is constructed, the remaining area would be appropriately surfaced for parking, roads, material storage and the erection of a temporary assembly structure for use during the construction phase of the Project. Following site preparation of the O&M area, construction of the O&M building would commence. Concrete foundations would be poured to support the permanent O&M building and a modular steel building approximately 2,000-3,000 square-foot would be erected. An area adjacent to the building may be developed for parking and an aggregate base could be installed on unpaved areas within the O&M area.

A potable and non-potable water treatment system could be installed in the O&M building. Alternatively, bottled water could be used for potable water. If a potable water system is developed, above ground water tanks could be erected and connected to a service pump to provide water to the building. Active and reserve septic fields could also be established and connected to O&M buildings waste system if portable toilets aren't used during operations. Temporary construction power would be connected to the O&M building.

Offsite Project Facilities Construction

Gen-Tie Line Construction – Prior to construction, geotechnical surveys involving drilling boreholes would be conducted along the line to provide information for the foundation design of the structures and access roads. Construction equipment access would be required at each transmission structure. The Project would use a combination of existing and new access roads and spur roads to get drilling and construction equipment to each structure location.

Most of the proposed gen-tie route is sited to follow existing roads to minimize ground disturbance. Construction of the gen-tie would begin with development of access roads and spur roads where they are needed. New access roads and spur roads would typically be 12 feet wide and only bladed where necessary and would also be compacted to ensure stability if needed. Access roads parallel to the gen-tie alignment and spur roads would be left in place but would not be maintained following construction.

To access the gen-tie service road within the ROW, construction vehicles would use the existing Hidden Valley Road near the Reid Gardner substation on the northern end of the gen-tie route, the existing unnamed gravel road from I-15 Exit 80, and the proposed Project access road via North Las Vegas Boulevard for the southern end of the gen-tie route.

Where the gen-tie would parallel existing lines, the road associated with the existing line would be used and upgraded as needed and short spur roads developed to access structure locations. Spur roads could cross drainages at grade where needed.

Structure Sites - A 125-foot by 50-foot (6,250 square-foot) area would be needed around each of the approximately 73 structure sites on federally-administered land for construction. These areas would be temporarily disturbed during the construction period and would be cleared of vegetation only as required for safety and efficiency. Holes would be developed for each transmission structure using a truck-mounted drill rig or a standalone auger rig if required. The poles would be set within an augured hole (for tangent structures) or on a concrete pier foundation (dead-end structures). The primary equipment used in setting foundations would be concrete trucks, auger rigs, pickup trucks, crane and front-end loaders. Excavated spoil material would be spread around the temporary work areas.

Foundation Installation - The steel poles used for the gen-tie would be supported by steel-reinforced poured pier concrete foundations where needed for the conditions at each structure site. These foundations would be constructed by auguring a cylindrical hole using a truck-mounted drilling rig. Reinforcing steel and anchor bolt cages would be installed in the hole and then the hole would be backfilled with concrete. Foundations could range in size from approximately 4 to 7 feet in diameter and from 12 to 30 feet in depth. Larger diameter and deeper foundations would be needed where the transmission line turns at an angle of 30 degrees or greater.

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

Conductor Stringing - After the structures are erected, the conductors and static wires would be strung between them and attached. Pull and tensioning sites are the locations where equipment would be located to pull the conductors and wires into place. Multiple pulling and tensions sites would be required for installing the conductors on the transmission structures and these sites would be approximately 100 feet wide by 400 feet long and located within the ROW except at angle structures where they would be at least partially outside the ROW. Stringing would likely be conducted one conductor at a time, with all equipment in the same location until all lines are in place.

Conductor stringing is typically accomplished with heavy-duty trucks and telescoping boom lift. If necessary, some sections of line could be strung either by helicopter or by walking a light pulling rope between structures that is used to pull in the heavier conductor. Truck-mounted cable-pulling equipment would be placed at the first and last towers or poles in a segment - pulling equipment at the front end and braking or tensioning equipment at the back end. After the conductors are pulled through the segment, they would be attached to the insulators, and the conductor tension would be increased to achieve a ground clearance of at least 25 feet prior to moving to the next section.

Equipment/Personnel - Typical equipment expected to be used for transmission line construction include bulldozers, graders, compactors, drilling rigs, cranes, boom trucks, flat-bed trucks, crew trucks, concrete trucks, bucket lift trucks, and heavy-duty trucks (puller and tensioner). A detailed list of this equipment and the anticipated construction personnel is included in the POD for the gen-tie found in **Appendix E**.

Site Stabilization, Protection and Reclamation

During and following construction of both onsite and offsite facilities, appropriate water erosion and dust-control measures would be implemented to prevent increased dust and erosion around the site. Dust generated by construction would be controlled and minimized by applying water (obtained from the Band). If needed to control dust during construction, agency approved palliatives would be applied to newly constructed interior access roads after they are constructed at the beginning of the construction period. Depending on the site preparation technique, organic matter could also be worked into the upper soil layers or mulched onsite and redistributed into the fill (except under equipment foundations, trenches and roadways) to aid in dust control.

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

Construction Workforce Schedule, Equipment and Materials

The construction workforce for the solar facility and gen-tie would consist of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel. The construction workforce is anticipated to be an average of 300 construction workers with a peak not expected to exceed 750 workers at any given time. Most construction staff and workers would commute daily to the jobsite from within Clark County primarily from the Reservation and the Las Vegas area. The Applicant would prepare a Worker Environmental Awareness Plan (WEAP) for the Project that would address Project-specific safety, health and environmental concerns and all construction workers would be required to complete WEAP training.

Construction generally would occur between 5:00 a.m. and 5:00 p.m. and could occur seven days a week. Additional hours could be necessary to make up schedule deficiencies, or to complete critical construction activities. For instance, during hot weather, it may be necessary to start work earlier (e.g., at 3:00 am) to avoid work during high ambient temperatures. Further, construction requirements would require some night-time activity for installation, service or electrical connection, inspection and testing activities. Nighttime activities would be performed with temporary lighting.

Initial grading work would include the use of primarily rubber-tired tractors, track-driven excavators, graders, dump trucks, and end loaders, in addition to the support pickups, water trucks, and cranes. Throughout the construction process, temporary above ground fuel storage tanks would be located at the site for construction equipment fueling. For civil work, equipment would include road graders, trenching machines, pumps, excavators for foundations, tractors, and additional support vehicles.

Construction materials such as concrete, pipe, PV modules, wire and cable, fuels, reinforcing steel, and small tools and consumables would be delivered to the site by truck.

Construction Traffic

Typical construction traffic would consist of trucks transporting construction equipment and materials to and from the site and vehicles of management and construction employees during the construction period. Most construction staff and workers would commute daily to the jobsite from within Clark County, primarily from the Reservation and Las Vegas area. All construction traffic would use I-15, Highway 93, North Las Vegas Boulevard, and existing improved roads on the Reservation to access the site. The Applicant has prepared a draft Transportation Management Plan to address Project-related traffic (**Appendix F**).

Health and Safety Program

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

2.1.1.2 Temporary Construction Facilities (to be removed following construction)

Onsite Temporary Project Construction Facilities

The Project construction contractor would establish approximately 20-acres of temporary construction laydown areas near the main entrance to the solar field lease area and in various other locations within each individually fenced portion of the solar field. The selected areas would be cleared of vegetation but would not need to be bladed or compacted. Where practical, laydown areas used to facilitate construction of one portion of the solar facility would itself be developed with solar arrays after it is no longer needed and development of the site progresses. Following construction, equipment would be removed from laydown areas not developed with solar arrays and allowed to revegetate.

The approximately 35-acre portion of the solar facility immediately east of the main access road (**Figure 2-2**) would be used for development of the project substation (approximately 17 acres), an ESS (approximately 12 acres), and an O&M building and parking area (approximately 6 acres). Although this entire 35-acre area is included in the permanent disturbance acreage estimate, during construction, portions of this area would also be used for temporary construction trailers with administrative offices, temporary generators to provide power for the trailers and administrative offices during construction, construction vehicle parking, tool sheds, and equipment and construction materials delivery and storage. Following construction, these facilities would be removed from the site.

Additional temporary project construction facilities include up to ten temporary water holding tanks and temporary generators to provide power to the pumps at two existing wells. These facilities would be installed in pre-disturbed areas adjacent to the existing wells and would be removed following construction.

Offsite Temporary Project Construction Facilities

Temporary construction areas would be located at each gen-tie line structure location and at locations required for conductor stringing, splicing, and pulling operations to accommodate construction of the gen-tie. These areas would be required for staging equipment and materials for foundation construction and tower / conductor installation.

2.1.1.3 Operations and Maintenance

Onsite Project Facilities

The O&M requirements for a PV solar generation facility includes regular monitoring, periodic inspections, and conducting any needed maintenance. Operation of the Project is expected to require a workforce of up to 5 full time-equivalent (FTE) positions. This workforce would include administrative and management personnel, operators, and security and maintenance personnel. Typically, up to three (3) staff would work during the day shift (sunrise to sunset) and the remainder during the night shifts and weekends. Employees would be based at the O&M building.

During the first year of operation, the frequency of inspections would be higher than normal to address any identified post-construction issues. Periodic routine maintenance would include monthly, quarterly, semi-annual and annual inspections and service. Panel washing could be conducted periodically (likely on foot and by hand) as needed to improve power generation efficiency. At designated intervals, approximately every 10 to 15 years, major equipment maintenance would be performed.

Operation and maintenance would require the use of vehicles and equipment including crane trucks for minor equipment maintenance. Additional maintenance equipment would include forklifts, manlifts, and potential chemical application equipment for weed abatement. Pick-up trucks would be in daily use on the site. No heavy equipment would be used during normal plant operation.

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

Safety precautions and emergency systems would be implemented as part of the design and construction of ESMSP to ensure safe and reliable operation. Administrative controls would include classroom and hands-on training in operating and maintenance procedures, general safety items, and a planned maintenance program. These would work with the system design and monitoring features to enhance safety and reliability. The Project would also have an Emergency Response Plan (ERP). The ERP would address potential emergencies including chemical releases, fires, and injuries. All employees would be provided with communication devices, cell phones, or walkie-talkies, to provide aid in the event of an emergency.

The Applicant has prepared a draft Integrated Weed Management Plan (IWMP; **Appendix G**) for the Project that follows an integrated approach as required by BIA and BLM (BLM 2007; BLM 2016; BIA 2014). Herbicides would be used to control noxious weeds, if required. The IWMP would be implemented as needed during operations. Pest control may also be required on the solar site on tribal land, including control of rodents and insects inside of the buildings and electrical equipment enclosures.

Offsite Project Facilities

The gen-tie line would operate continuously throughout the life of the Project. Following construction, operational activities associated with the gen-tie would involve periodic inspection and occasional maintenance and repair. Bi-annual visual inspections would be conducted by ground crews to inspect insulators, overhead grounds, and transmission structure hardware. Gen-tie access roads are not expected to require much regular maintenance but could be graded as needed to provide access to transmission structures for maintenance activities.

Other O&M activities could include insulator washing (as needed), periodic air inspections (as needed), repair or replacement of conductor (as needed), replacement of insulators (as needed), and response to emergency situations (outages) to restore power. With the exception of emergency situations and outages, most maintenance work would take place during daylight hours.

2.1.1.4 Decommissioning

The anticipated operational life of the ESMSP would be up to 40 years after which, the Project would be decommissioned and existing facilities and equipment would be removed. Decommissioning would involve removal of the solar arrays and other facilities with some buried components (such as cabling) potentially remaining in place. Following decommissioning, the solar site would be reclaimed and restored according to applicable regulations at the time of decommissioning.

To ensure that the permanent closure of the facility does not have an adverse effect, the Applicant has prepared a draft Decommissioning Plan included as **Appendix H**. The final Decommissioning Plan would be developed near the time of decommissioning in coordination with the Band and BIA and with input from other agencies as appropriate. The final plan would address future land use plans, removal of hazardous materials, impacts and mitigation associated with closure activities, schedule of closure activities, equipment to remain on the site, and conformance with applicable regulatory requirements and resource plans.

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

Following decommissioning, the disturbed areas would be stabilized and revegetated. Native species would be used for revegetation, if appropriate, and seeding using BLM and BIA recommended seed

mixes. Re-seeding would take place during appropriate months. Seed would be planted using drilling, straw mulching, or hydromulching, as appropriate.

2.1.2 Alternative 1 - Gen-Tie Route

Under this alternative, all of the onsite and temporary facilities would be as discussed in the Proposed Action Alternative. An alternative route for the gen-tie would locate the approximately 12.5-mile line parallel to and northwest of the proposed gen-tie location at the northwestern edge of the Designated Utility Corridor. Under this alternative, this gen-tie route would proceed from the ESMSP Substation east 150 feet into the Utility Corridor and would then turn northeast within and paralleling the edge of the Corridor. This alternative gen-tie route crosses similar distances of land within the corridor and across BLM-administered lands and NV Energy-owned private lands before terminating at the Reid Gardner substation. Once on private land, this alternative would follow the same route as the Proposed Action Alternative to the Reid Gardner Substation.

This alternative route would require the same number of support structures as the Proposed Action Alternative and the specifications and construction methods would also be the same as described for the Proposed Action Alternative. However, this alternative would require the construction of a transmission access road within the ROW for the length of the line since roads associated with the existing transmission lines would not be available to support this alternative gen-tie alignment. The location of this alternative gen-tie route is shown on **Figure 2-5**.

2.1.3 Alternative 2 - No Action Alternative

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

2.2 Alternatives Considered but Eliminated from Detailed Analysis in the EIS

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

2.2.1 Alternative Reservation Locations

The Applicant and Band evaluated other sites on the Reservation for potential solar development. This evaluation considered a variety of factors including up to 2,200 contiguous developable acres, topography, drainage, potential impacts to sensitive resources (including special status species and cultural resources), and proximity to existing infrastructure, transmission interconnection points and access.

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

The existing K Road Moapa Solar Facility site, the approved Moapa Solar Energy Center site, the approved Aiya Solar site, and other sites on the Reservation previously studied and eliminated by the K Road Moapa Solar Facility EIS (BIA 2012) were not considered. In addition, the 6,000-acre desert tortoise relocation areas associated with the K Road Moapa Solar Facility are not available for development.

The proposed site for the ESMSP was identified as the best location for the Project for a number of reasons: it was identified by the Band as a viable solar site, it is close to transmission interconnection points at/near the Reid Gardner Substation (which offer near-term interconnection opportunities), it has existing road access, and it would have limited anticipated impacts to jurisdictional waters. Given the quality of the site, resource constraints on significant portions of the remaining reservation lands, and the importance of locating in close proximity to available transmission, the applicant was not able to find alternative sites on the Reservation where impacts would have been significantly distinguishable from and/or less substantial compared to the alternatives actually considered. Other suitable development sites on the Reservation either have been already developed, approved for other solar projects, or would have similar or greater consequences.

2.2.2 Alternative Off-Reservation Locations

The Project is, by the terms of its purpose, limited to locations on the Moapa River Indian Reservation and held in trust by the BIA for the Band. Accordingly, BIA did not consider off-reservation alternatives.

2.2.3 Alternative Interconnection Options

Alternatives were considered that would interconnect the Project into the nearby Crystal Substation. The Applicant's transmission team considered factors including but not limited to available transmission capacity, interconnection costs, and existing projects in NV Energy's transmission queue. Based on the transmission and economic analysis, the Applicant determined that interconnecting at the Reid Gardner Substation was a superior option for being awarded a Power Purchase Agreement in an extremely competitive marketplace. The Applicant has an

executed Interconnection Agreement with NV Energy for the Proposed Project for interconnection to the Reid Gardner Substation, an executed Power Purchase Agreement, and no flexibility for a different point of interconnection to result in a viable project.

2.2.4 Concentrated Photovoltaic (CPV) Technology

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

2.2.5 Distributed Solar Generation

The concept of distributed solar generation locates smaller projects near the demand for electricity. Generally, these projects would generate power using PV panels (similar to all PV technologies). The PV panels could be installed on private or publicly owned residential, commercial, or industrial building rooftops or in other disturbed areas such as parking lots or disturbed areas adjacent to existing structures such as substations. To be a viable alternative to the proposed Project, there would need to be sufficient locations where new distributed solar generation could be installed to cumulatively generate 300 MW of capacity and sufficient local demand for this electricity.

In order to meet the Project's purpose, generation would need to be located on the Reservation and there are insufficient rooftops or other disturbed areas on the Reservation to make this option viable. Also, a true distributed generation project could not meet one of the fundamental objectives of the proposed utility-scale solar project: to provide renewable energy to utility off-takers. Rooftop systems that lack transmission only generate power for on-site consumption and the limited on-reservation uses create only a fraction of the demand that this Project seeks to serve. Distributed generation projects cannot fill the same energy needs as utility scale projects and one is not a feasible alternative for the other.

2.2.6 Wind Energy

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

The technology is well developed and can be used to generate significant amounts of power. The use of wind energy at the Project location could potentially be feasible at the scale/size of the proposed Project, but it would not eliminate impacts caused by the Project. A wind project would result in impacts on biological and cultural resources, and visual effects would be greater than with

the proposed Project. The acreage of the impacted area would be dependent on the size of the turbines selected.

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

CHAPTER 3
Affected Environment and Environmental Consequences

This chapter describes the physical, biological, social and economic characteristics of the area that would be affected (Affected Environment) and the environmental impacts that would result (Environmental Consequences) from implementation of the ESMSP and alternatives.
The terms "effect" and "impact" are used synonymously in this document. Potential impacts are described in terms of duration, intensity, type, and context. Definitions of impact terms are provided below. In the EIS, impacts fall into three categories:

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

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

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

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

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

For the purposes of the type of impact is defined as follows:

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

Context is the setting within which an impact is analyzed:

- ***Local:*** within and immediately adjacent to the project area.
- ***Regional:*** remaining area outside of the project area, including the remaining Reservation.

The proposed ESMSP would be the fourth utility-scale PV solar project on the Reservation to be recently evaluated in an EIS. The three previously evaluated solar projects on the Reservation include:

- K Road Moapa Solar Facility (K Road) – 350 MW PV solar project, Final EIS published in 2012, immediately east-southeast of the ESMSP, constructed and operating (BIA 2012).

- Moapa Solar Energy Center (MSEC) – 200 MW PV solar project, Final EIS published in 2014, near and southwest of the ESMSP, approved but not constructed (BIA 2014a).
- Aiya Solar Project (Aiya) – 100 MW PV solar project, Final EIS published in 2016, north of ESMSP, approved but not constructed (BIA 2016).

Figure 1-3 shows the relative location of these projects. While the solar site and gen-tie associated with the proposed ESMSP would occupy a different footprint than the previously evaluated PV solar projects on the Reservation, the size of the previously analyzed facilities, location, and many of the resources/uses evaluated would be similar to ESMSP. Analysis from the previous resource investigations are incorporated by reference in this EIS, where applicable. The FEISs for these three previous projects can be found at the following link: https://www.esmsolareis.com/referenced-previous-eiss.html.

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

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

TABLE 3-1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS				
Resource/Use	**Not Present**	**Present Not Affected**	**Present May Be Affected**	**Rationale for Not Analyzing in Detail**
Air Quality			X	The proposed ESMSP project area lies within the same airshed (HA 218 – California Wash) as the three previous EISs for solar projects on the Reservation - K Road (BIA 2012), MSEC (BIA 2014a), and Aiya (BIA 2016). These analyses determined that potential impacts from development, operation and maintenance, and decommissioning of a solar facility and gen-tie line on local and regional air quality would result from fugitive dust emissions and vehicle exhaust emissions primarily during construction. Further, they determined that the impacts would be minor because of implementation of Best Management Practices (BMPs) for dust control and would not require additional measures to minimize or avoid adverse impacts. Following construction, operation of the solar projects was not expected to contribute to measurable or detectable impacts to air quality (BIA 2012: pages 4-26 through 4-31, BIA 2014a: Pages 4-22 through 4-32; BIA 2016: Pages 4-20 through 4-30). The types of construction and operational/maintenance activities that would be undertaken for the ESMSP would be the same as those analyzed for the three previous solar projects and all the same BMPs are included as part of the ESMSP design features. Exhaust and fugitive dust emissions generated from construction equipment and mobile sources would increase ambient concentration of regulated air pollutants. Wind-driven emissions of fugitive dust would be generated following disturbances by construction activities, including mobile sources traveling on paved and unpaved roadway surfaces. Operation of the ESMSP would include combustion emissions from worker commutes, delivery trips, and construction equipment used for maintenance. However, these impacts are anticipated to be well below thresholds that define any noticeable change to local/regional air quality. The ESMSP would have short-term and long-term, direct and indirect negligible adverse air quality impacts resulting from the construction and decommissioning of the Project and long-term, direct and indirect, negligible impacts resulting from operations. There is no potential for new or modified impacts that have not been disclosed in prior environmental documentation. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Areas of Critical Environmental Concern (ACECs)	X			There are no ACECs in the vicinity of the project area so no impact to this resource would result from the ESMSP. Therefore, this resource topic has been eliminated from analysis in this EIS.
BLM Sensitive Species			X	See analysis in Section 3.2.

TABLE 3-1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS				
Resource/Use	**Not Present**	**Present Not Affected**	**Present May Be Affected**	**Rationale for Not Analyzing in Detail**
Climate Change			X	The three previous solar project EISs provide an analysis of potential impacts to climate change associated with the construction, operation, maintenance, and decommissioning of PV solar facilities and gen-ties on the Reservation. Analysis in all three determined that there would be short-term minor increases in green-house gases (GHGs) from construction and decommissioning with exhaust from construction equipment and vehicles increasing ambient concentrations of GHGs (BIA 2012: pages 4-4 through 4-7; BIA 2014a: pages 4-4 through 4-5; BIA 2016: pages 4-3 through 4-4). Since ESMSP is similar in size and construction duration to K Road, it is expected that construction and decommissioning activities of the ESMSP would result in similar emissions and would generate not more than the 14,899 metric tons/year of CO_2e estimated for the K Road project (BIA 2012: pages 4-4 through 4-7). The threshold to require a quantitative and qualitative assessment is 25,000 metric tons or more of CO_2-equivalent (CO_2e) GHG emissions per annum (CEQ 2010). Because GHG emissions for the construction and decommissioning of the ESMSP (14,899) are anticipated to be less than the 25,000 metric ton reporting minimum, no additional assessment is required (CEQ 2010). Operation of the ESMSP would include combustion emissions from worker commutes, delivery trips, and construction equipment. Operational emissions of GHGs are estimated to be less than 1,820 metric tons of CO_2e for the life of the project. However, long-term generation of renewable electricity through solar power would have long-term air quality benefits by reducing GHGs associated with energy generation (BIA 2012: pages 4-24 through 4-26). Therefore, the ESMSP would not result in substantial GHG emissions and would promote federal or state goals to reduce GHG emission levels. ESMSP would have short-term, direct and indirect negligible adverse impacts from the construction and decommissioning of the facilities and long-term, direct and indirect, negligible beneficial impacts on climate change from the reduction of primary contributors to GHG emissions offset by the generation of renewable electricity (EPA 2018). The Proposed Action would not result in greater impacts than previously disclosed in the three solar EISs on the Reservation. There is no potential for new or modified impacts that have not been disclosed in prior environmental documentation. Consequently, this resource topic has been eliminated from further analysis in this EIS.
Cultural Resources			X	See analysis in Section 3.3.

TABLE 3-1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS				
Resource/Use	**Not Present**	**Present Not Affected**	**Present May Be Affected**	**Rationale for Not Analyzing in Detail**
Environmental Justice		X		The tribal members on the Reservation meet the criteria of a minority population and are subject to environmental justice consideration under Executive Order 12898. The proposed ESMSP is being developed by and to benefit the Band by creating temporary and long-term jobs and would not disproportionately negatively affect the Band. The ESMSP would provide beneficial impacts of creating both jobs and revenue for the Band and Tribal members. These impacts would be short-term during construction and decommissioning and long-term during operations. No displacements or permanent changes in populations would occur. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Farm Lands (prime or unique)	X			There are no U.S. Department of Agriculture-designated prime or unique farmlands within the analysis area so no impact to this resource would result from the ESMSP. Therefore, this resource topic has been eliminated from analysis in this EIS.
Fire Management			X	Development of the ESMSP would have a minor long-term beneficial effect by reducing the potential for wildland fires in the area by eliminating some of the fuel source on up to 2,200 acres where a portion of the vegetation could be mowed to a height of 18 inches. At the same time, the Project would introduce a minor short-term increase in the likelihood for ignitions from activities during construction and decommissioning. The proposed Project is in a remote area, located approximately 10 miles from the nearest residential/urban area. Fire management would be similar for the ESMSP as the other solar projects on the Reservation. The BLM responds to all wildland fires on both BLM and BIA and structure fire response will be covered by Clark County Rural Fire and/or Moapa Fire Protection District. BIA is drafting a fire management plan that includes the project area to improve direction in the future. The K Road (BIA 2012, pages 4-100 through 4-102), MSEC (BIA 2014a, pages 4-111 through 4-112), and Aiya (BIA 2016, page 4-96) EISs provide analysis of potential impacts from fire associated with the construction, operation, maintenance, and decommissioning of a PV solar facility located on the same sparse vegetation types as those on this site. These analyses concluded that the threat of harm or loss to structures from wildfires would be negligible. Like for the previous projects, all applicable BMPs to minimize and control fire risk would be incorporated into a fire management plan for the ESMSP that would be submitted to BIA and BLM for approval and implemented during construction, operation, maintenance, and decommissioning. Therefore, this resource topic has been eliminated from further analysis in this EIS.

TABLE 3-1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS				
Resource/Use	**Not Present**	**Present Not Affected**	**Present May Be Affected**	**Rationale for Not Analyzing in Detail**
Floodplains/Flood Hazards		X		The proposed ESMSP site is located on a relatively flat area and does not contain any FEMA designated flood zones. However, the northern end of the gen-tie line would cross a 100-year floodplain (FEMA panel number 32003C0670E) near where it connects with the Reid-Gardner Substation. The gen-tie line would span the drainage channels, but one or two transmission structures could be located within the floodplain. Construction, operation and maintenance, and decommissioning of the gen-tie line within the floodplain would not result in any modification of a floodplain that would impede or redirect flood flows resulting in property damage on- or off-site. The flood-carrying capacity of the floodplain, the pattern, or the magnitude of the flood flow would not be affected. If any gen-tie structures would be located within the floodplain, foundations would be designed to withstand the low-velocity flooding in accordance with Clark County and associated floodplain requirements. Because the ESMSP would have no impact on floodplains, this resource topic has been eliminated from further analysis in this EIS.
Forest Resources	X			The BIA and Band do not consider yucca and cacti to be forest resources so this topic would not apply to tribal lands. The project area on BLM lands does not contain forests or woodlands so no impact to this resource would result from the ESMSP. Therefore, this resource topic has been eliminated from analysis in this EIS.
General Wildlife			X	See analysis in Section 3.2.
Hunting, Fishing, and Gathering	X			No hunting, fishing or gathering has been reported or documented by the Band in the vicinity so no impact to these activities would result from the ESMSP. Therefore, this resource topic has been eliminated from analysis in this EIS.
Indian Trust Assets		X		Like the three previous solar projects, the proposed ESMSP would impact Reservation lands and vegetation and wildlife resources where the Project and associated ROWs are constructed. Indian Trust Assets, such as fishing rights and minerals would not be impacted by implementation of the ESMSP the same as described in the previous EISs (BIA 2012: Page 4-79; BIA 2014a: Page 4-94; BIA 2016: Page 4-79). The ESMSP's proposed use of tribal water would exercise the Band's water rights which would demonstrate the Band's legitimate need for these water rights. This would support the Band against any adverse claims by others in the future. Since this Project would not negatively impact Indian Trust Assets, this resource topic has been eliminated from further analysis in this EIS.

TABLE 3-1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS				
Resource/Use	**Not Present**	**Present Not Affected**	**Present May Be Affected**	**Rationale for Not Analyzing in Detail**
Invasive Plant Species and Noxious Weeds			X	The three previous solar EISs - K Road (BIA 2012), MSEC (BIA 2014a), and Aiya (BIA 2016) - provide a detailed analysis of potential impacts and mitigation for noxious weeds and invasive plants during the construction, operation, maintenance, and decommissioning of a PV solar facility and gen-tie. Appendix C of each EIS contains a Weed Management Plan for each project. Weed sources could include construction vehicles if not properly cleaned, imported fill, hay bales, and invasion from adjacent lands via natural movement such as wind. Invasive weed species could out-compete native plants for resources such as water and space. The proposed location for the ESMSP is within the same vegetation types and has the potential to encounter the same weed species (including Sahara mustard) as the previous projects and the Project has the same potential to generate short and long-term, adverse effects from weed species. A site reconnaissance was conducted for the ESMSP and about 26 acres of Sahara mustard was found along the gen-tie routes. All applicable BMPs associated with weed management specified by BIA and BLM policies to reduce or prevent impacts from weed species were incorporated into the management plans for the previous projects and would likewise be implemented as design features for the ESMSP as outlined in a weed management plan developed to address construction, operation, and decommissioning of the Project. The Integrated Weed Management Plan (Appendix G) would be reviewed and approved by BIA and BLM prior to implementation. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Lands and Realty			X	See detailed analysis in Section 3.6.
Lands with Wilderness Characteristics	X			There are no lands with wilderness characteristics within or near the project area so no impact would result from the ESMSP. Therefore, this resource topic has been eliminated from analysis in this EIS.
Lifestyle and Cultural Values		X		New solar projects (one constructed, two approved awaiting construction, and the proposed ESMSP) have been determined by the Band to offer an opportunity to expand economic development on the Reservation while holding fast to Tribal values for respect and care for tribal land. Therefore, the ESMSP would not impact this resource topic and it has been eliminated from further analysis in this EIS.
Livestock Grazing	X			There is no grazing conducted in the Project area so no impact to this resource would result from the ESMSP. Therefore, this resource topic has been eliminated from analysis in this EIS.
Migratory Birds			X	See detailed analysis in Section 3.2.
Minerals	X			On tribal lands, the ESMSP would not be located in an area identified by the Band for mineral development so would have no effect on mineral exploration and mining, leasing or mineral material sales on the Reservation. The small amount of BLM and private land at the northern end of the gen-tie line has saleable minerals present but as long as any excavated minerals stay within and are utilized within the ROW there are no impacts. Therefore, the ESMSP would not impact this resource topic and it has been eliminated from analysis in this EIS.

TABLE 3-1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS				
Resource/Use	**Not Present**	**Present Not Affected**	**Present May Be Affected**	**Rationale for Not Analyzing in Detail**
Native American Religious Concerns		X		See detailed analysis in Section 3.4.
Noise			X	The previous EISs for the K Road (BIA 2012), MSEC (BIA 2014a), and Aiya (BIA 2016) projects provide a detailed analysis of potential noise impacts associated with the construction, operation, maintenance, and decommissioning of a PV solar facility and gen-tie on this area of the Reservation. These analyses indicated that there are no sensitive human receptors anywhere near the area that would be adversely impacted by noise from short-term construction or long-term operation of the projects and no measures to minimize or avoid adverse impacts were required (BIA 2012: pages 4-32 through 4-39; BIA 2014a: pages 4-33 through 4-38; BIA 2016: pages 4-30 through 4-35). The currently proposed ESMSP would be located in undeveloped terrain in a remote area west of I-15 nearly adjacent to two of these previous projects (K Road and MSEC). There are no nearby identified noise receptors. Noise impacts from the ESMSP would be generated primarily by equipment and vehicles during construction and decommissioning but these impacts would be short-term and negligible. Noise impacts from the ESMSP during operations would be long-term but negligible. There is no potential for new or modified impacts that have not been disclosed in the prior environmental documents. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Paleontological	X			The three previous solar EISs - K Road (BIA 2012), MSEC (BIA 2014a), and Aiya (BIA 2016) - provide an analysis of potential impacts to paleontological resources. The previous projects, like the proposed ESMSP, are located in Quaternary alluvium deposited by flowing water. These analyses indicated that potential paleontological materials are unlikely to exist in the alluvial deposits and the project area is categorized as low potential for paleontological resources. Therefore, no impact to this resource would result from the ESMSP and this resource topic has been eliminated from analysis in this EIS.

TABLE 3-1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS				
Resource/Use	**Not Present**	**Present Not Affected**	**Present May Be Affected**	**Rationale for Not Analyzing in Detail**
Public Health and Safety		X		Potential impacts to public health and safety from development of a PV solar project on the Reservation and a gen-tie on or near the Reservation have been described in the K Road (BIA 2012), MSEC (BIA 2014a), and Aiya (BIA 2016) EISs. Potential health and safety impacts could result from spills of hazardous materials, electrical hazards, or fire hazards but the potential risk to public health was concluded to be minor (BIA 2012: pages 4-95 through 4-102; BIA 2014a: pages 4-107 through 4-112; BIA 2016: pages 4-92 through 4-96). The ESMSP, like the previous projects, would be required to comply with all applicable design codes and develop and finalize a variety of plans prior to the start of construction to minimize these risks during the Project such as spill control plans, hazardous materials management plans, emergency response plans, fire management plans, and health and safety programs. Therefore, the potential risk to public health during construction, operations, and decommissioning the proposed ESMSP would be minor and this resource topic has been eliminated from further analysis in this EIS. In addition, the project area is suspected endemic for *Coccidioides immitis*, a fungus causing Valley Fever and construction workers could potentially be exposed. Additional measures to reduce potential worker exposure have been added to Appendix C of this EIS.
Recreation	X			Public recreation does not occur on the Reservation in or near the project area nor on the small amount of public or private lands at the northern end of the gen-tie line. Therefore, no impact to this resource would result from the ESMSP and this resource topic has been eliminated from analysis in this EIS.
Socioeconomics			X	See detailed analysis in Section 3.5

TABLE 3-1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS				
Resource/Use	**Not Present**	**Present Not Affected**	**Present May Be Affected**	**Rationale for Not Analyzing in Detail**
Soils			X	The K Road (BIA 2012), MSEC (BIA 2014a), and Aiya (BIA 2016) EISs provide a detailed analysis of potential impacts to soils from erosion associated with the construction, operation, maintenance, and decommissioning of a PV solar facility and gen-tie on the Reservation and surrounding lands. The soil types affected by and the potential impacts resulting from the proposed ESMSP are the same as those described for the two nearby previous projects (BIA 2012: pages 4-11 through 4-13; BIA 2014a: pages 4-9 through 4-11). In addition to impacts to all soils, the ESMSP would have long-term impacts on areas where biocrust and desert pavement are present. Construction activities in these areas would disturb the soil stabilization benefits they provide. The potential for wind and water erosion would be increased by soil disturbance during construction and decommissioning resulting in potential adverse impacts from erosion. The solar site would be primarily be mowed instead of graded (leaving roots intact) and with implementation of required BMPs to reduce erosion impacts, impacts to soils should be lessened to minor levels. The BMPs would include physical soil stabilization and revegetation as outlined in plans included as design features for the ESMSP such as the stormwater pollution prevention plan (SWPPP) and fugitive dust control plan. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Threatened or Endangered Species			X	See analysis in Section 3.2.
Timber Harvesting	X			The project area does not contain forests or woodlands that could be harvested for timber so no impact to this resource would result from the ESMSP. Therefore, no impact to this resource would result from the ESMSP and this resource topic has been eliminated from further analysis in this EIS.
Topography/Geology		X		The proposed ESMSP site would avoid major drainages and would be graded only where necessary, so contour changes would be minor and would not create a long-term effect to local topography or drainage. Construction, operation/maintenance, or decommissioning of the proposed Project would not alter the soil stability of the solar site or along the gen-tie corridor. The Project area has moderate to high potential for strong earthquake shaking but all proposed ESMSP structures would be required to comply with applicable seismic building codes reducing the potential for earthquake-related structural damage to the Project. Therefore, no impact would result from the ESMSP and this resource topic has been eliminated from further analysis in this EIS.
Traffic / Transportation			X	Access to the ESMSP solar site would be via the same roads / routes evaluated for two of the previous solar EISs - for K Road (BIA 2012) and MSEC (BIA 2014a). These previous solar EISs provide an analysis of the types and timing of traffic expected and the potential impacts of this traffic on the local roads that would provide primary access (such as I-15, US-93, and North Las Vegas Boulevard) and that would be used during the construction, operation, maintenance, and decommissioning of the PV solar facility and gen-tie on the Reservation in this area. It was determined that traffic impacts would occur primarily during construction and

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

Resource/Use	Not Present	Present Not Affected	Present May Be Affected	Rationale for Not Analyzing in Detail
				would result in short-term adverse effects on traffic volume but would not adversely affect traffic flow on local roadways (BIA 2012: pages 4-81 through 4-84). During construction, the proposed ESMSP would result in short-term minor effects on traffic volume but, similar to the K Road Project, would not be expected to adversely affect traffic flow on local roadways or at intersections even during peak construction. Impacts would be similar but less during decommissioning and traffic impacts would be negligible during the long-term operations and maintenance phase of the Project. In addition, the roads that would be used to access the currently proposed ESMSP were upgraded during development of the existing K Road Project so would not be expected to need additional upgrade as a result of implementation of the ESMSP. A traffic management plan for the ESMSP outlining methods to reduce traffic impacts would be developed prior to and implemented during construction. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Vegetation			X	See analysis in Section 3.2.
Visual Resources			X	See analysis in Section 3.7.
Wastes, Hazardous or Solid			X	The K Road (BIA 2012), MSEC (BIA 2014a), and Aiya (BIA 2016) EISs provide a detailed analysis of potential impacts from hazardous materials associated with the construction, operation, maintenance, and decommissioning of a PV solar facility on the Reservation and gen-tie on or near the Reservation as part of the analysis of public health and safety. Potential risks could result from spills of hazardous materials but the potential risk to public health was concluded to be minor. All potential applicable BMPs associated with hazardous materials and wastes to reduce or prevent environmental impacts are outlined in plans included as design features for the ESMSP and included as appendices in the EIS. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Water Resources (Surface/Ground)			X	See analysis in Section 3.1.
Wetlands/Riparian Zones			X	See analysis in Sections 3.1 and 3.2.
Wild and Scenic Rivers	X			There are no Congressionally-designated Wild and Scenic Rivers within or immediately adjacent to the project area so no impact to this resource would result from the ESMSP. Therefore, this resource topic has been eliminated from further analysis in this EIS.

TABLE 3-1 RESOURCES AND RATIONALE FOR ELIMINATION FROM DETAILED ANALYSIS				
Resource/Use	**Not Present**	**Present Not Affected**	**Present May Be Affected**	**Rationale for Not Analyzing in Detail**
Wilderness/Wilderness Study Areas	X			There are no wilderness or wilderness study areas near the project area so no impact to this resource would result from the ESMSP. Therefore, this resource topic has been eliminated from further analysis in this EIS.
Wild Horses and Burros	X			Wild horses and burros are not found in the Project area. The nearest Herd Management Area (HMA) (Muddy Mountain HMA) is approximately 12 miles southeast of the ESMSP. The Red Rock HMA is located in southern Nevada approximately 40 miles southwest of the project area. Therefore, this resource topic has been eliminated from further analysis in this EIS.

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

3.1 Water Resources

3.1.1 Affected Environment

The proposed ESMSP lies in the northeastern portion of the Mojave Desert in the California Wash Groundwater Basin within the Colorado River watershed (NDWR 2019). The Arrow Valley Range lies to the north and the North Muddy Mountains lie to the west. The project lies west of the California Wash which flows northeast to the Muddy River. The elevation within the Project site ranges from about 2,200 to 2,500 feet above mean sea level (**Figure 3-1**).

3.1.1.1 Surface Water

The proposed ESMSP project area is located on relatively flat topography. Most of the project area (solar site and gen-tie routes) drains to the east and southeast, via ephemeral waterways, to the surrounding areas. Twelve primary ephemeral drainage systems and one perennial river are located within the project area (Newfields 2018a). Of the twelve ephemeral drainages, two drainages located on the solar site flow into Alkali Flat Dry Lake south of the project site. Three ephemeral drainages associated with both the solar site and gen-tie routes are hydrologically disconnected from downstream waters by impoundments (the Union Pacific Railroad and/or Interstate 15) and the seven remaining ephemeral drainages, all associated with the gen-tie routes, flow to the California Wash or the Muddy River. The Muddy River, which drains to the Virgin River, is the only non-ephemeral (perennial) surface water within the project area and is located near the northern terminus of the gen-tie routes. The ephemeral drainage areas are shown on **Figure 3-2a** and described in more detail below.

- **Drainage Areas 1 and 2 (ES 1 and 2)** – Ephemeral drainages on the solar site Study Area that flow southeast that have a low slope and only potentially flow during and immediately after rainfall events. Water from these features would flow into Alkali Flat Dry Lake south of the project site.
- **Drainage Area 3 (ES 3)** – Ephemeral drainage on the solar site Study Area and crossing the gen-tie routes that has a low slope and only potentially flow during and immediately after rainfall events. Downstream of the project area, surface flows in drainage 3 are naturally impounded for over 2,200 linear feet, as evidenced by characteristics of impounded water such as polygonally cracked crusts, continuous and well-developed upland vegetation beyond the impoundment, and no discernable evidence of bed and bank or clear channel. As such, this drainage (and its associated first- and second-order tributaries) has no surface connectivity to downstream waters.
- **Drainage Area 4 (ES 4)** – Ephemeral drainage on the solar site Study Area and crossing the gen-tie routes that has a low slope and only potentially flow during and immediately after rainfall events. Water from this feature flows into a drainage that impounds east of the Project Area at the Union Pacific Railroad (UPRR). Surface flows in drainage 4 are diverted approximately 700 feet north by an elevated segment of the UPRR. From the diversion location, there is no channel for approximately 1,600 feet before the historic bed and bank that is identifiable. Drainage 4 and the first- and second-order ephemeral drainages within the Project Area that flow into it lack hydrologic connectivity with downstream waters.
- **Drainage Areas 5, 6, 7 (ES-5, 6, 7)** – Ephemeral drainages crossing the gen-tie routes that have a low slope and only potentially flow during and immediately after rainfall events. Water from

these features flow into drainages that eventually drain into the California Wash, which eventually flows to the Muddy River.

- **Drainage Area 8 (ES-8)** – Ephemeral drainage crossing the gen-tie routes that has a low slope and only potentially flows during and immediately after rainfall events. Water from this feature flows into a drainage that impounds east of the Project Area at the UPRR. Investigation of the downstream portions found a clear loss of connection to downstream waters.
- **Drainage Areas 9, 10, 11 (ES-9, 10, 11) –** Ephemeral drainages crossing the gen-tie routes that have a low slope and only potentially flow during and immediately after rainfall events. Water from these features flows into drainages that eventually drains into the California Wash, which eventually flows to the Muddy River.
- **Drainage Area 12 (ES-12) –** Ephemeral drainage crossing the gen-tie routes that has a low slope and only potentially flow during and immediately after rainfall events. Water from this feature ultimately flows directly into the Muddy River.

A preliminary hydrology study was also conducted for the ESMSP solar site to determine flow paths and flow volumes onto and from the site (Westwood 2018) and has been included as **Appendix Q** of this EIS. Drainage sub-basins were delineated to determine peak flows at various points within the area. Overall, the analysis shows low water depths and velocities across the majority of the site (with the exception of channelized areas). During a 100-year storm the flood depths across the majority of the project area are less than 0.5 feet with velocities less than 1 foot/second.

Surface Water Quality

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

There are no perennial waterbodies within the solar site and consequently no surface water quality data available. Seven of the twelve ephemeral drainages leaving the project area are tributaries to the Muddy River, a perennial water that would be crossed by the gen-tie line. The Muddy River is fed by springs connected to the regional groundwater system. It is considered impaired and is on Nevada's 303(d) list for exceeding state water quality standards (NDEP 2014).

The entire flow of the Muddy River is derived from discharge from the regional carbonate aquifer except during infrequent precipitation events that increase river flows for up to a few days. Historic flow records indicate that about 51 cubic feet per second (cfs) of groundwater discharge sustain the spring and river flows (Mifflin 2001).

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

3.1.1.2 Ground Water

The water proposed to be used by the ESMSP during construction and operation will be provided by the Band's existing wells located adjacent to the solar site. The bedrock of the Project area is largely composed of Paleozoic carbonate rocks, ancient marine sediments that contain the minerals calcite and dolomite as their primary constituents. Fracture zones and associated solution cavities within these carbonate rocks provide highly transmissive aquifers where they are saturated and such transmissive zones can be continuous over large areas independent of surface topographic basins and ranges. Regional groundwater flow results from these large-scale groundwater interconnections, as is readily demonstrated by uniformity of temperature and discharge at associated springs and by homogeneous chemical characteristics (Mifflin 1968).

Many of the carbonate aquifers throughout the general region are believed to be associated with groundwater flow systems that discharge at large springs. Locally, alluvial aquifers inset into the Muddy Creek Formation occur in the basin along the Muddy River and lower Meadow Valley Wash. Alluvial gravels in upper Moapa Valley extend from about two miles northwest of the Muddy River springs area to the Glendale area, where they are joined by similar alluvial gravels associated with lower Meadow Valley Wash. The alluvial gravels attain thicknesses of about 100 feet beneath the narrow floodplains of these two drainages.

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

The USGS maintains a groundwater monitoring well approximately 20 miles northwest of the project location. This well has been monitored since 1985, and depth to groundwater has been trending deeper, from 390 to 396 feet below land surface during this time period and a groundwater monitoring well approximately six miles west of the Project has also been trending deeper, from 831 to 834 feet below land surface (USGS 2019).

Groundwater quality in the hydrologic basins of the Mojave Desert in California and Nevada is generally acceptable for most uses of groundwater. However, since many of the basin-fill aquifers have closed surface drainage and limited inter-basin flow, aquifers may contain poor quality, saline waters, elements from natural geothermal activity, and/or contaminants from mining or energy operations. Groundwater in the California Wash is generally high in salinity and the water from a well associated with a nearby project is also high in sulfate (up to 290 mg/L). The Total Dissolved Solids (TDS) at that well range between 750 to mid-900 mg/L (BIA 2014a).

3.1.1.3 Water Rights

The Band was issued a 2,500 AFY groundwater right in 1989 by the State Engineer (K Road FEIS 2012) and in a Memorandum of Agreement with Southern Nevada Water Authority and other parties in April 2006 (Moapa Paiute Water Settlement Agreement 2006). It is also permitted with 3,500 AFY of surface

water from Muddy River. The Band's water rights are permitted for "municipal" use. Normally, to use Nevada State water rights for an energy project, the permitted use must be industrial. Because the Band is a sovereign government, it can act as a municipality and provide water throughout the Reservation much like a water district. Therefore, a change in use of the water is not required (K Road FEIS 2012).

3.1.1.4 Jurisdictional Waters, Drainages, and Riparian Areas

The only perennial waterbody that could potentially be affected by the project would be the Muddy River and it would be spanned by the gen-tie. Of the twelve primary ephemeral drainages identified within the solar lease area and along the proposed gen-tie route, seven eventually drain into the Muddy River north of the Project site.

Except for the Muddy River, aquatic resources within the Project area are comprised of dry land fluvial systems. Alluvial fans, bajadas, and alluvial plains within xeric desert environments exhibit a high degree of variability in the specific location of surface flows and often change pathways from storm to storm. The spatial extent of aquatic features was delineated in accordance with US Army Corps of Engineers (USACE or Corps) guidance in published manuals and field guides to identify potentially jurisdictional waters of the United States (WOUS). The delineation was conducted for the dry land fluvial systems within the Project Area in a manner that followed Corps guidance to ensure that the areas that only convey surface flows during 25-year, 50-year, or 100-year storm events were not delineated.

In accordance with Corps' guidelines, primary wash channels and tributaries of these channels were delineated until they degraded to sheet flow or lacked physical evidence of conveying flows during ordinary storm events (i.e., 2- to 5-year storm events). No surface water was observed at the time of investigation and these drainages appear to flow only in response to storm events.

No Traditionally Navigable Waters (TNWs) or wetlands were identified within the Project area. The Muddy River, which would be crossed by the gen-tie route and to which all project-area drainages flow, was the only Relatively Permanent Water (RPW) identified. Some of the ephemeral drainages leaving the solar site and gen-tie corridors could be considered jurisdictional by the Corps while other features, such as erosional gullies and swales, would not be regulated. All potentially jurisdictional drainages on the solar site (drainages 1 - 4) either terminate in a closed basin, or are not connected to potentially jurisdictional drainages downstream so these would not be regulated by the Corps. Drainages 5 – 7 and 9 – 11 that cross the gen-tie corridor all appear to be connected to California Wash and the Muddy River and would likely be regulated by the Corps.

Drainage morphology in the ephemeral features ranges from 2-foot-wide single channels to features up to 80 feet wide (bank to bank). Several drainages lost identifiable flowpath organization as they went downslope and surface characteristics were consistent with impounded water (polygonal cracked crusts, continuous and well-developed upland vegetation, and no definable bed and bank). Seven of these drainages were considered to be potentially jurisdictional waters of the U.S. in accordance with Corps methodology. The full jurisdictional survey report can be found in **Appendix I** and has been submitted to the Corps.

Limited xero-riparian habitats were associated with many of the ephemeral washes in the project area and riparian habitats are found along the Muddy River. Desert wash habitats are associated with the small washes that cross the various portions of the project area. These habitats typically resemble the creosotebush (*Larrea tridentata*)-white bursage (*Ambrosia dumosa*) habitats that dominate the upland

portions of the Project area but have a higher overall density of vegetation as well as a greater abundance of big galleta grass (*Pleuraphis rigida*). Other species may include cholla, (*Cylidropuntia* sp.), beavertail cactus (*Opuntia basilarus*), catclaw (*Acacia greggi*) ephedra (*Ephedra* sp.), and apricot mallow (*Sphaeralcea ambigua*).

A mesquite/tamarisk bosque is located along the margins of the Muddy River. This area is entirely dominated by mesquite (*Prosopis* sp.) and tamarisk (*Tamarix ramosissima*) with no understory species. This vegetation type provides some potential wildlife habitat but the plants appeared to be dead, dying, or in generally poor physical condition. Therefore, potential habitat along the Muddy River is diminishing and will continue to do so unless efforts are undertaken to restore riparian habitats.

3.1.2 Environmental Consequences

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

3.1.2.1 Proposed Action

3.1.2.1.1 Surface Water

Surface water quality can be degraded by increasing rates of erosion and sedimentation, introducing contaminants, violating water quality standards, or otherwise changing the character of surface waters. There is very little precipitation within this part of the Mojave Desert. As described above, the Applicant's emergency response plan (construction phase) and SPCC Plan (operation phase) would minimize impacts from these sources by providing for hazardous material spill prevention and clean-up measures were a spill to occur therefore making potential impacts minor. There would be a potential for increased erosion or sedimentation on- or off-site due to ESMSP construction and O&M activities. It is expected that suspended sediments would be high during significant storm events.

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

Preliminary hydrologic modeling conducted for the project (Westwood 2018) shows that during a 100-year storm, flood depths across the majority of the project area would be less than 0.5 feet with velocities less than one foot/second. By avoiding the development of areas of high flood depths and velocities, the proposed solar development on the site would minimize effects to local hydrology and flood flows as well as the corresponding erosion and sedimentation. In general, flow depths on the site after development of the Project would remain similar or less than pre-development conditions.

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

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

The Applicant would develop and implement erosion and sedimentation control measures to minimize water quality impacts during the life of the project. At a minimum, these controls would include:

- Soil stabilization measures to offset loss of vegetation;
- Biannual and post-storm monitoring of erosion and sedimentation; and
- Adaptive management of actions if erosion and sedimentation control measures are found to be insufficient to control surface water collection on or at the site.

The erosion and sediment control measures and SWPPP would be approved prior to the beginning of construction and the resulting potential impacts on surface waters are expected to be minor.

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

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

3.1.2.1.2 Ground Water

The ESMSP would require up to 200 acre-feet (AF) for the 18-month construction period and up to approximately 20 acre-feet per year (AFY) for O&M activities. Water is needed primarily for dust suppression and soil compaction during construction. During operation, water would only be needed for panel washing, fire protection, dust control, and worker daily consumptive uses. For construction and operation, water would be supplied by the Band via their existing wells located adjacent to the solar site.

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

The Band would provide water to the ESMSP from the wells in the same well field that was analyzed for the Calpine project. Also, the potential groundwater impacts that would be realized from the water withdrawal from these same wells associated with the MSEC Project were evaluated in an updated analysis, the Hydrogeologic and Groundwater Modeling Analysis for the Moapa Solar Energy Center (Mifflin 2013) that was included as Appendix F in the EIS for that project (BIA 2014a). This analysis showed that the use of 30 AFY proposed for the MSEC Project would not impact local water levels or flows at the Muddy River Springs area.

The ESMSP would use small amounts of hazardous materials during construction and operation. Spills of chemicals and petroleum products can degrade groundwater quality such that it is no longer suitable for its intended use. Petroleum spills would be possible while refueling equipment during construction and operation of the project. In addition, transformers would be used and would be located throughout the PV solar array field and at the substation. Transformers would use mineral insulating oil and would be installed with secondary containment.

Groundwater is located around 300 to 500 feet below ground surface. Any hazardous materials or waste produced by ESMSP would be subject to strict regulation as described in the Hazardous Materials and Waste Management Plan that would be prepared for the Project. A Project SPCC Plan would be developed and implemented to protect the environment from petroleum product and other spills during operation. Adequately-sized secondary spill containment would be incorporated with all chemical storage vessels to ensure proper capture and control measures for potential spills. An Emergency Response Plan would also be developed to respond to any emergencies including leaks and spills during construction. Successful implementation of these measures would minimize the potential for a spill and minimize the impact of any spills that occur. This, in combination with the depth to groundwater, makes it unlikely that any surface spill would infiltrate the groundwater so the potential for impacts is low.

Water Rights

The relatively low amount of groundwater water used (200 AFY) and the short duration of use for construction (18 months) would not be expected to impact ground water uses. The use of 20 AFY proposed during operations for the ESMSP would also not be expected to impact local water levels or flows at the Muddy River Springs area as this is only a portion of the 30 AFY evaluated for the MSEC Project that likewise showed no impacts (BIA 2014a). Additionally, the 20 AFY would not cause the Band to exceed their currently issued 2,500 AFY groundwater right.

Jurisdictional Waters, Drainages, and Riparian Areas

As described above and detailed in the jurisdictional survey report (**Appendix I**), there are no jurisdictional WOUS within the ESMSP solar site and it is expected that the USACE would possibly assert jurisdiction over some of the ephemeral drainages located along the gen-tie route. Jurisdictional WOUS crossed by the gen-tie would be impacted primarily from the upgrading of existing roads or the establishment of new access roads to provide the needed access along the ROW. Pole locations for the gen-tie would be located outside defined drainage channels and the drainages (including the Muddy River) would be spanned by the line.

As detailed in **Appendix I**, the amount of WOUS that would be impacted by the gen-tie (gen-tie road crossings) would be minor (0.02 acres of permanent impact associated with one road crossing at drainage ES-12). These impacts would be covered by Nationwide Permits (NWP) 12 – Utility Line Activities. Under this NWP, each separate distinct crossing of a waterbody by a utility line is treated as a separate and complete project and NWP 12 limits impacts to jurisdictional waters to 0.5 acres for each crossing. As indicated above and shown in **Appendix I**, the roads associated with the one gen-tie crossing would impact less jurisdictional WOUS than the 0.5-acre limit for NWP 12.

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

3.1.2.2 Alternative Gen-tie Route

Effects to water resources resulting from implementation of this alternative would be similar to those identified for the proposed ESMSP. The same solar site would be developed and the same BMPs would be employed. This gen-tie alternative would utilize the same construction methods and BMPs as the proposed gen-tie. The location of this route alternative would be similar to the proposed route - located within the same designated utility corridor, parallel and off-set from the proposed route by approximately 0.25 miles. The same potentially jurisdictional WOUS features are present along this alternative route and pole siting and construction would be designed to span local drainages the same as the proposed gen-tie.

However, because this alternative gen-tie route is not immediately adjacent to the other existing lines and associated access roads within the corridor, an access road would need to be developed along its entire length instead of using spur roads as possible with the proposed route. This would result in slightly higher impacts to drainages with three drainages crossed by gen-tie roads (ES-6, 9, and 10) and effects to jurisdictional WOUS estimated to be 0.04 acres of permanent impact for all three crossings combined. These impacts would also be well under the 0.5-acre limit allowed for each crossing under NWP 12.

Therefore, impacts water resources would be minor and short-term by implementing this alternative.

3.1.2.3 No Action

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

3.2 Biological Resources

3.2.1 Affected Environment

Biological resources data for the ESMSP was gathered through a compilation of existing data and field surveys. Existing data included Nevada Department of Wildlife (NDOW) Diversity GIS Data, USGS topographic maps, Nevada Natural Heritage Program (NNHP) database, Clark County Multiple Species Habitat Conservation Plan (MSHCP), and aerial imagery as well as a review of existing reports and studies that were conducted for similar projects at or near the ESMSP site. Field surveys included a biological reconnaissance survey (Newfields 2018a), pre-project desert tortoise surveys (Newfields 2018b), a jurisdictional waters survey (Newfields 2019) and a noxious /invasive weeds survey (Heritage 2019).

3.2.1.1 Ecosystems and Biological Communities

The climate of the Great Basin-Mojave Desert region is varied and extreme, supporting a large complement of wildlife species, including many bird, small mammal, and reptile species that depend on or at least partially use Mojave Warm Desert Scrub habitat, as well as other nearby habitats (NDOW 2006). Common species are: Mojave desert tortoise, coyote (*Canis latrans)*, desert kit fox (*Vulpes macrotisarsipus),* snakes, rabbits, lizards, gophers, mice, bats, and birds, and many insects that are a vital resource for other wildlife and are important as pollinators for a variety of vegetation species. In addition, throughout the Mojave Desert the native understory is being replaced with non-native species such as red brome (*Bromus rubens*), cheatgrass (*Bromus tectorum*), Sahara mustard (*Brassica tournefortii)*, halogeton (*Halogeton glomeratus*), and Russian thistle (*Salsola collina*). Non-native annual grass species such as red brome, cheatgrass, and Mediterranean grass (*Schismus barbatus*) compete with native forage plants on which the desert fauna (e.g., desert tortoise) depends (IWAC 2006). Human population growth, construction, mining, off-road vehicle use, and invasive species are all contributing factors that result in loss or degradation of habitat.

Covertypes within the project area were characterized using the Nevada SynthMap (Peterson 2008) which is primarily based on satellite-derived covertype classifications from the Southwest Regional GAP Analysis Project (USGS 2005). Vegetation within the ESMSP area is composed primarily of Sonoran-Mojave creosotebush-white bursage desert scrub. Disturbed areas, both within and adjacent to the Project area, are associated with multiple dirt roads and off-highway vehicle (OHV) trails, past flooding, existing transmission lines, and an adjacent railroad. **Figure 3-3** shows the distribution of vegetative cover types in the Project area.

Sonoran-Mojave Creosotebush-White Bursage

This community is typically dominated by creosotebush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*), 1.6 - 5 feet tall, widely spaced, usually with bare ground between plants. 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*). This creosotebush scrub is typical of the Mojave Desert and nearly the entire solar site and most of the gen-tie transmission routes are covered by this vegetation community.

White bursage is a pioneer species and provides a stable environment for creosote bush to establish a foothold. White bursage commonly grows on arroyos, bajadas, gentle slopes, valley floors, and sand

dunes growing up to two feet tall and spanning three feet in width. White bursage is of intermediate forage value. The typical growth height for creosotebush is four feet, although some may reach up to 12 feet with an adequate water supply. Many desert animals use creosotebush for shelter with burrows dug around and under creosote bushes by both reptiles and amphibians. Roots of creosotebush stabilize the soil and support burrows of the desert tortoise and kit fox den complexes. Most animals bed in or under the bushes as well as use them for perching or nesting. The foliage, twigs, and seeds are readily consumed as a food source.

North American Warm Desert Riparian Systems

Warm desert riparian systems (also called desert washes) are associated with the small washes that cross the various portions of the project area. These habitats typically resemble the creosotebush-white bursage habitats but have a higher overall density of vegetation as well as a greater abundance of big galleta grass (*Pleuraphis rigida*). Other species may include cholla (*Cylidropuntia* sp.), beavertail cactus (*Opuntia basilarus*), catclaw (*Senegalia greggi*), ephedra (*Ephedra* sp.), and apricot mallow (*Sphaeralcea ambigua*).

North American Warm Desert Riparian Mesquite Bosque

A mesquite/tamarisk bosque is located along the margins of the Muddy River. This area is entirely dominated by mesquite (*Prosopis* sp.) and tamarisk (*Tamarix ramosissima*) with no understory species. This vegetation type provides some potential habitat; however, the plants appeared to be dead, dying, or in generally poor physical condition.

Developed (Low-, Medium-, High-Intensity, Open Space)

Disturbed habitats include all areas with little or no native vegetation as a result of anthropogenic disturbance. These areas include existing roads (paved and unsurfaced), OHV trails, transmission line pole sites, residential and commercial developments, and other areas that have been significantly altered.

Sonoran-Mojave Mixed Salt Desert Scrub

This covertype typically occurs in saline basins (often associated with the margins of playas) in the Mojave and Sonoran deserts. Vegetation is usually dominated by one or more *Atriplex* species; other halophytic plants are often present.

North American Warm Desert Pavement

This habitat is typically unvegetated or only very sparsely vegetated (<2% total cover). Typically found in areas of low topographic relief with high exposure to sun and wind, leading to the production of "desert varnish" on rocks and soils. Occasional creosotebush may be present but in very low density.

North American Warm Desert Badland

This covertype is typically entirely or nearly entirely unvegetated and characterized by highly erosive soils leading to frequent gully erosion. In the Project area, this habitat type is found near the gen-tie crossing of the Muddy River.

Open Water or Aquatic Vegetation

Open water is associated with the Muddy River and is largely unvegetated. Some areas may include non-emergent aquatic vegetation.

North American Warm Desert Bedrock Cliff and Outcrop

This habitat includes areas that are totally or largely unvegetated (<10% cover) and associated with high-relief topographic features such as outcrops, cliffs, talus, and/or scree slopes.

Microphytic Playa Sparse Vegetation

This habitat is associated with playa lakes and is largely or entirely unvegetated (<10% cover). Playa lakes are formed by the evaporation of ephemeral water in closed basins and may lead to soils with high salt contents. Soils may also develop biotic (Microphytic) crusts.

Introduced Riparian Vegetation

A large stand of monotypic tamarisk is located along the margins of the Muddy River. This area is entirely dominated by tamarisk (*Tamarix ramosissima*) with no understory species.

3.2.1.2 Vegetation

The Mojave Desert hosts a wide variety of vegetation, including approximately 250 species of annual herbaceous plants, at least 80 of which are endemic. These plants are typically tolerant of low humidity, prolonged droughts, desiccating winds, high alkalinity or salinity, rocky or very sandy soils, and the periodic influx of high quantities of water in the form of surface flooding (Aiya 2016).

The ESMSP area is dominated by open stands of creosotebush and white bursage with several other covertypes present (largely desert-wash associated habitats and unvegetated areas). Cactus species observed during the biological surveys were the beavertail pricklypear (*Opuntia basilaris*), buckhorn cholla (*Cylindropuntia acanthocarpa*), cottontop cactus (*Echinocactus polycephalus*), and common fishhook cactus (*Mammillaria tetracistra*). These species were generally observed on the Project site at higher elevations and were not observed on the BLM parcel. The majority of the ESMSP project area was homogeneous creosote bush – white bursage with sporadic inclusions of other species. The only species of noxious weed on the Nevada state list that was observed in the gen-tie ROWs was Sahara mustard (*Brassica tournefortii*). It was not abundant and occurred in both disturbed and undisturbed habitats. There were 16 occurrences totaling 26 acres within both corridors. African mustard (*Strigosella africana*) was the most abundant non-native plant species. Other non-native species that were commonly observed include Mediterranean grass (*Schismus* sp.), red brome (*Bromus rubens*), Cheatgrass (*Bromus tectorum*), and Redstem filaree (*Erodium cicutarium*).

3.2.1.2.1 Riparian Habitats

A preliminary jurisdictional determination was conducted in August 2018 in order to identify potential Waters of the U. S. (WOUS) and to provide information regarding jurisdictional status (Newfields 2019). The Project Area does not contain any wetlands, traditionally navigable waters (TNWs), or relatively permanent waters (RPWs). Aquatic resources within the Project Area are limited to swales, erosional features, and non-RPWs (ephemeral washes). The proposed ESMSP site contains twelve primary ephemeral desert washes that represent xeroriparian habitat. Facultative wetland plant species observed included arrowweed (*Pluchea sericea*) and honey mesquite (*Propsis glandulosa*). Other species observed included catclaw acacia (*Senegalia greggii*), tamarisk, cheesebush (*Hymenoclea salsola*) and big galetta grass (*Pleuraphis rigida*) (Newfields 2019).

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

The USFWS's Information for Planning and Consultation (IPAC) online tool was accessed to obtain a species list for the Project area. The species list did not include any Federally-listed or candidate plant species (USFWS 2019).

3.2.1.2.3 State Protected, Regulated, Listed, and BLM Special Status Plant Species

The Nevada state list of fully protected species of native flora (NAC 527.010), or Critically Endangered Species List (NNHP 2013), Nevada Rare Plant Atlas (NNHP 2001) and NNHP Plant and Animal At-risk Tracking List (NNHP 2016) were accessed to obtain a species list for the Project area.

Las Vegas Buckwheat

The Las Vegas Buckwheat (*Eriogonum corymbosum nilesii*) is found in sandy substrates comprised mainly of gypsum. In April 2008, the USFWS considered protecting the Las Vegas buckwheat under the federal Endangered Species Act (ESA) but determined that in Nevada, it does not warrant protection under the ESA. However, it is designated as a sensitive species by the BLM and is listed as "at risk" under the Nevada Natural Heritage Program (NNHP).

In 2009, the Desert Conservation Program (DCP) developed two coarse soil GIS models to understand the distribution of rare plants covered under the Clark County Multiple Species Habitat Conservation Plan (MSHCP) (Hamilton and Kokos 2011). Results of this modeling show potential suitable habitat (gypsiferous soils) for Las Vegas buckwheat near, but not within, the proposed Project area (Hamilton 2019) and it was not observed within the proposed Project area during project surveys (Newfields 2018a).

Mojave Yucca

Mojave yucca is a common inhabitant of the creosote desert flats. This plant provides browse for a number of wildlife species during spring, summer, and fall. The flowerstalks and foliage of Mojave yucca are palatable to rodents and some wild ungulates during much of the year (USDA 2012) and it provides shelter and shade for many mammals, birds and reptiles. There is an obligate, mutualistic relationship between the Mojave yucca and the small white yucca moth (*Tegeticula yuccasella*). The Mojave yucca is protected and regulated by the State of Nevada under Nevada Revised Statute (NRS) and Nevada Administrative Code (NAC) Chapter 527. Mojave yucca is present on the ESMSP solar site and was observed during biological reconnaissance surveys (Newfields 2018a).

Three Corner Milkvetch

Three-corner milkvetch (*Astragalus geyeri* var. *triquetrus*) is a short, spindly, but upright annual forb with pinnately divided leaves that is listed as a State of Nevada Fully Protected Species and BLM sensitive species. The small pea-flowers are white, but the defining character is the three-cornered seedpod (NNHP 2001). According to the Nevada Natural Heritage Program, three-corner milkvetch requires open, deep sandy soil or dunes, generally stabilized by vegetation and/or a gravel veneer and is dependent on sand dunes or deep sand in Nevada. Neither the species nor suitable sandy habitat was observed during the biological reconnaissance surveys of the Project area (Newfields 2018a).

Beaverdam Breadroot

Beaverdam breadroot (*Pediomelum castoreum*) is a BLM sensitive species and is on the NNHP At-Risk Tracking List (G3S3 [NNHP 2016]). Beaver Dam breadroot has been recorded in Nevada at elevations

from 1,280 to 5,000 feet and is found in sand or sandy gravel in open areas and along roadsides (NNHP 2001). Neither the species nor suitable sandy habitat was observed during the biological reconnaissance surveys (Newfields 2018a).

Nye Milkvetch

Nye milkvetch (*Astragalus nyensis*) is not designated a sensitive species by the BLM or protected by the State of Nevada, though it is on the NNHP At-Risk Tracking List (G3S3 [NNHP 2001]). It is found in the foothills of desert mountains, calcareous outwash fans and gravelly flats, and sometimes in sandy soil. Associated plants are creosotebush, white bursage, and cheesebush, which are present throughout the ESMSP area. Nye milkvetch has the potential to be present within the Project area but was not observed within the proposed Project area during project surveys conducted in June 2018 (Newfields 2018a).

Rosy Twotone Beardtongue

The rosy twotone beardtongue (*Penstemon bicolor* ssp. *roseus*) is a perennial herb known in Nevada from Clark and Nye counties. This species is considered BLM sensitive and is on the NNHP At-Risk Tracking List (G3S2 [NNHP 2016]). This species is found on rocky, calcareous, granitic, or volcanic soils in washes, roadsides, scree at outcrop bases, rock crevices, or similar places receiving enhanced runoff in creosote-bursage, blackbrush, mixed-shrub, Joshua tree woodland, and Mojave Desert communities from 1,800 to 4,084 feet. Suitable habitat for this species exists throughout the ESMSP area and it has the potential to be present within the Project area.

White Bearpoppy

The white bearpoppy (*Arctomecon merriamii*) is an evergreen perennial herb that blooms from April through July. This species is considered BLM sensitive and is on the NNHP At-Risk Tracking List (G3 S2 [NNHP 2016]). White bearpoppy is found in Nevada from Clark, Nye, and Lincoln counties on a wide variety of dry to sometimes moist basic soils, including alkaline clay and sand, gypsum, calcareous alluvial gravels, and carbonate rock outcrops in chenopod scrub and rocky Mojave Desert communities from 1,600 to 6,280 feet. Suitable habitat for this species is limited to the badland areas on the western side of the proposed solar site. The biological reconnaissance survey did not detect this species within the ESMSP solar site or along the linear facilities but this species has a potential to be present within the Project solar site (Newfields 2018a).

State Protected and Regulated Cacti Species

Cacti are another type of vegetation common to the ESMSP site. Cacti and yuccas, which are protected under Nevada state law (NRS 527 – Protection and Preservation of Timbered Lands, Trees and Flora), were found throughout the upland portions of the ESMSP site.

3.2.1.3 Wildlife

3.2.1.3.1 Terrestrial

Species observed during the biological surveys included species of birds, mammals, and a variety of reptiles. Commonly observed avian species include: black-throated sparrow (*Amphispiza bilineata*), ash-throated flycatcher (*Myiarchus cinerascens*), black-tailed gnatcatcher (*Polioptila melanura*), loggerhead shrike (*Lanius ludovicianus),* common raven (*Corvus corax*), burrowing owl (*Athene cunicularia*), red-tailed hawk (*Buteo jamaicensis*) and lesser nighthawk (*Chordeiles acutipennis*) (Newfields 2018a, 2018b). Small mammal residents include, kangaroo rats (*Dipodomys* spp.), desert woodrat (*Neotoma lepida*), and white-tailed antelope squirrels (*Ammospermophilus leucurus*). Common larger mammals may

include coyotes (*Canis latrans*), kit fox (*Vulpes macrotis*), and black-tailed jackrabbits (*Lepus californicus*). Reptiles include western whiptail lizards (*Aspidoscelis tigris*), side-blotched lizards (*Uta stansburiana*), horned lizard (*Phrynosoma* sp.), desert iguana (*Dipsosaurus dorsalis*), bull snake (*Pituophis catenifer sayi*), coachwhip (*Masticophis flagellum*), and desert tortoises (*Gopherus agassizii*).

3.2.1.3.2 Aquatic

The nearest perennial water source is the Muddy River, located adjacent to the southern boundary of the Reid Gardner Substation. It is considered impaired and is on the 303(d) list as required by the CWA. Two endemic fish, Virgin River chub (*Gila seminuda*) and Moapa speckled dace (*Rhinichthys ocsulus moapae*) (both Nevada state protected/endangered) occur in the segment of the Muddy River where the proposed gen-tie would cross. Because the Muddy River would be spanned by the ESMSP gen-tie, no aquatic wildlife associated with the river are expected to be impacted by project-related activities. No other aquatic habitat is present within the proposed Project area.

3.2.1.3.3 Federally-Listed Candidate, Threatened or Endangered Animal Species

The USFWS's IPAC System (USFWS 2019) identified three wildlife species with the potential to occur in the analysis area. Two other species were also considered due to proximity to the Project area. **Table 3-2** below identifies the species and the likelihood for them to occur within the proposed Project area based on habitat assessment or observation.

TABLE 3-2 FEDERALLY LISTED AND CANDIDATE THREATENED / ENDANGERED ANIMAL SPECIES IN CLARK COUNTY, NV

Common Name	Scientific Name	Status	Potential to Occur within Project Area
Mojave desert tortoise	*Gopherus agassizii*	Threatened	Occurs
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Low
Yuma Ridgway's rail	*R. o. yumanensis*	Endangered	Low
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened	Low
Moapa dace	*Moapa coriacea*	Endangered	None

Source: USFWS 2019

There is no designated critical habitat for the three species in or near the analysis area. The IPaC species list did not identify the yellow-billed cuckoo (*Coccyzus americanus*) as potentially occurring within the analysis area, but due to the proximity of proposed designated critical habitat along the Muddy River the species is included in the analysis.

Yuma Ridgway's Rail

The Yuma Ridgway's rail was listed as endangered under the Endangered Species Preservation Act (ESA) of 1966 on March 11, 1967 (32 FR 4001). The recovery plan for this species was finalized in 1983 and portions of the Action Plan were initiated over the ensuing years. Critical habitat has not been designated for the species.

This elusive species occupies marsh-like areas around rivers, ponds, and bogs where emergent vegetation such as cattails, bulrush, and reed grass occur (Eddleman 1989; Todd 1977). Densities of rails

are highest in light cattail stands, followed in descending order by light bulrush stands, dense bulrush stands, and dense cattail stands. Field reconnaissance of the Muddy River conducted in September 2014 for the Aiya Solar Project found that there was no suitable habitat for this species in the vicinity (BIA 2016). There is no suitable habitat within the ESMSP area and the closest known occurrences of this species is along the Muddy River within the Overton Wildlife Management Area, over 15 miles from the Project.

Southwestern Willow Flycatcher

The southwestern willow flycatcher (*Empidonax traillii extimus)* was listed by the USFWS as an endangered species within its entire range on February 27, 1995 (FR 60: 10693-10715). Critical habitat for the species was originally established in 1997 (FR 62: 39129-39147) but subsequently vacated and incidental protection provided along the Virgin River and its 100-year floodplain from the Arizona/Nevada border to Halfway Wash in Nevada (FR 65: 4140-4156).

Critical habitat was again proposed on October 12, 2004 (FR 69: 60706-60736), redefined and re-instituted in 2005 (FR 70: 60886-61009; USFWS 1997), and designated in 2013 (USFWS 2013). Critical habitat for the southwestern willow flycatcher in Nevada is currently limited to portions of the Virgin River above its confluence with the Muddy River (FR 70: 60886-61 009). A total of 1,227 river miles across southern California, Arizona, New Mexico, southern Nevada, and southern Utah were included in the final designation. The lateral extent of critical habitat includes areas within the 100-year floodplain of the designated rivers. No designated critical habitat is found along the Muddy River.

The closest known breeding habitat for this species is located along the Muddy River, at Warm Springs Ranch, approximately five miles northwest of the proposed gen-tie crossing and 10 miles north of the Project site. During 2018 surveys, eight southwestern willow flycatcher territories were identified, including three confirmed pairs with nests, during the early nesting season, and one territory was confirmed during the late season (SNWA 2019), though there is no suitable habitat for the species along the Muddy River where the proposed gen-tie would cross the River.

Yellow-billed Cuckoo

On October 3, 2014, the western yellow-billed cuckoo was designated as a threatened species under the ESA (79 FR 59992; USFWS 2014c). The only known nesting sites in Nevada for the western yellow-billed cuckoo are at Warm Springs Ranch Natural Area along the Muddy River in Moapa Valley (NDOW 2007). The western yellow-billed cuckoo proposed critical habitat is more than 7 miles northwest of the northern terminus of the proposed ESMSP gen-tie line.

The only known nesting sites in Nevada for the yellow- billed cuckoo are at Warm Springs Ranch Natural Area along the Muddy River in the Moapa Valley (SNWA 2019), approximately 5 miles northwest of the proposed gen-tie crossing and 10 miles north of the Project site. During 2018 surveys, one probable breeding territory was identified in this area, though there is no suitable habitat for the species along the Muddy River where the proposed gen-tie would cross the River.

Desert Tortoise

The Mojave desert tortoise (desert tortoise) is protected by both the ESA and the State of Nevada, is a covered species under Clark County's Multiple Species Habitat Conservation Plan, and is considered sensitive by the BLM. The Mojave desert tortoise includes those living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, and southwestern Utah, and in the Sonoran (Colorado) Desert in California (USFWS 2011b).

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

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

The proposed ESMSP is primarily within the boundary of the Reservation which is within the Northeastern Mojave Recovery Unit for desert tortoise as designated by the USFWS's "Revised Recovery Plan for the Mojave Population of the Desert Tortoise" (USFWS 2011b). It is not located within designated critical habitat (DCH); the nearest DCH is located approximately 4 miles west of the site.

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

Desert tortoises are herbivores that consume a wide variety of plant materials including dicot annuals, grasses, herbaceous perennials, trees, shrubs, subshrubs/woody vines, and succulents. A study of their food habits in the Mojave Desert found that they used 43 plant species, including 37 annuals and 6 perennials with a general preference for native plants (Jennings 1997). A study on juvenile tortoises (Spangenberg 1995) found a preference for non-native, invasive plant species such as Mediterranean grass (*Schismus barbatus*) and filaree (*Erodium cicutarium*).

To assess the status of the desert tortoise in the ESMSP project area, field surveys were conducted (Newfields 2018b). Data collected within the ESMSP area were analyzed using the USFWS 2018 Protocol equation to determine the estimated number of tortoises. This method utilizes the number of tortoises observed above ground, the probability that a tortoise is above ground (vs below ground), the probability of detecting a tortoise if above ground, and the size of the area. T**able 3-3** describes observations of desert tortoise sign in the ESMSP project area. In addition to tortoise sign, 73 adult and 6 juvenile tortoises were observed during surveys.

TABLE 3-3 DESERT TORTOISE SIGN OBSERVATIONS IN THE ESMSP AREA						
Tortoise Sign Found in Project Area	**Class 1 (Used today)**	**Class 2 (Used this week)**	**Class 3 (Used this season)**	**Class 4 (Old Requires Excavation)**	**Class 5 (Old Collapsed)**	**Total**
Burrow	335	451	469	70	25	1350
Carcass	2	5	5	9	70	91
Pallet	9	35	73	2	2	121
Scat	2	38	22	13	1	76
Other (Eggs, Mating Circle, Etc)	9	-	-	-	-	

Source: Newfields 2018b

Estimates are reported with 95 percent confidence intervals (CI) per USFWS (2018). Confidence intervals represent a range of realistic values for population estimates. With seventy-three (73) live adult tortoises observed within the Project area, the estimated number of tortoise was calculated to be 145, with a 95 percent confidence interval of 76 to 277 adult tortoises (between 10 and 36 tortoises per square mile).

3.2.1.3.4 State Protected, BLM Sensitive Wildlife Species and Migratory Birds

Bats

No bats are currently listed by the USFWS or the NNHP as threatened or endangered in Clark County, Nevada (USFWS 2017, NNHP 2019). The BLM has designated 22 species of bat as sensitive species. BLM policy is to provide these species with the same level of protection as is provided for candidate species in BLM Manual 6840.06 C to "ensure that actions…..do not contribute to the need for the species to become listed". Eight species classified as protected by the State of Nevada may inhabit the analysis area (Nevada Administrative Code 503.030). Bats are only expected to be present within the ESMSP project area during nocturnal foraging events since there are no known or expected roosting locations or hibernacula within the project area or in the immediate vicinity.

Desert Kit Fox

Desert kit fox (BLM-sensitive) are widely distributed throughout the arid southwest and can be found in a variety of habitat types (Meaney et al. 2006). Kit foxes rely on dens throughout the year for rest sites, shelter against harsh weather, as bearing and rearing locations for young, and as an escape from predators. Kit foxes can dig their own dens but will often enlarge existing dens that were made by badgers or rodents. The ESMSP area is dominated by creosote-white bursage and is considered suitable habitat for the desert kit fox. They have been observed in the vicinity of the project, though none were observed during biological surveys; potentially suitable burrows for this species could be present but none were identified (Newfields 2018a, 2018b). Kit foxes are also known to use exposed/protected pipes or smaller culverts that coyotes and other predators cannot enter. These provide protection from predators, harsh conditions and provide temporary and sometimes maternal dens.

Gila Monster

The Gila monster is a BLM sensitive species, a state of Nevada protected reptile, and an Evaluation species under Clark County's Multiple Species Habitat Conservation Plan (MSHCP). The banded Gila monster (*Heloderma suspectum cinctum*) is the subspecies that occurs in Clark, Lincoln, and Nye

counties of Nevada. Found mainly below 5,000 feet, its geographic range approximates that of the desert tortoise and is coincident to the Colorado River drainage. Gila monster habitat requirements center on desert wash, spring, and riparian habitats that inter-digitate primarily with complex rocky landscapes of upland desert scrub. They will use and are occasionally encountered out in gentler terrain of alluvial fans (bajadas). Gila monsters are secretive and difficult to locate, spending greater than 95 percent of their lives underground (NDOW 2012).

The NNHP lists the entire ESMSP site as suitable habitat for this species. Although known from nearby records, Gila monsters were not observed during surveys conducted for the desert tortoise or biological reconnaissance surveys (Newfields 2018a and 2018b).

Desert Iguana

Desert iguana (*Dipsosaurus dorsalis*) is a BLM sensitive species that inhabits creosote bush scrub from below sea level to 3,300 feet. It prefers hummocks of loose sand and patches of firm ground with scattered rocks, as well as desert washes. Habitat on the ESMSP site is present but there is very little loose sand. Desert iguanas were not observed during surveys conducted for the desert tortoise, biological reconnaissance surveys or weed surveys (Newfields 2018a, 2018b; Heritage 2019).

3.2.1.3.5 Migratory Birds

A list of special status migratory bird species for Clark County (**Table 3-4**) to be analyzed was compiled using the Nevada Natural Heritage Program (NNHP) Clark County at risk species list, Clark County Multiple Species Habitat Conservation Plan (MSHCP) and the BLM Nevada Sensitive Species List. Species status, habitat and potential presence is described below.

Golden Eagle

The golden eagle (*Aquila chrysaetos)* is protected under the Bald and Golden Eagle Protection Act as well as the MBTA (USFWS). In Nevada, the only habitats routinely avoided by golden eagles are forests, large agricultural areas, and urban areas. Nests are most often found on rock ledges of cliffs but sometimes in large trees on steep hillsides, or on the ground. Nesting cliffs may face any direction and may be close to or distant from water (NatureServe 2009b).

The entire ESMSP area is considered suitable foraging habitat for golden eagles and the species is likely to occasionally forage within the area. No suitable nesting habitat is present on the proposed ESMSP solar site and no nests are known to be present within the Project area. The nearest suitable nesting habitat is approximately two miles west of the site but is low quality. Targeted surveys have not been performed due to low quality of the habitat and because there is no nesting habitat on or near the site.

Burrowing Owl

Burrowing owls (*Athene cunicularia*) inhabit the Mojave Desert portions of Clark County and is protected under the Migratory Bird Treaty Act (MBTA), considered At-Risk by NNHP, a Bird of Conservation Concern (BCC), a BLM Sensitive species, and a MSHCP proposed species. Burrowing owls in southern Nevada tend to be year-round residents as opposed to migratory (NDOW 2019).

These owls primarily reside and nest in the abandoned burrows of the desert tortoise, although the burrows of kit foxes and other mammals are used as well. These owls will also use man-made burrows, as well as pipes or small culverts, which are often found on construction sites (NDOW 2019).

No burrowing owls were observed during the biological reconnaissance surveys or the preliminary desert tortoise presence/absence surveys (Newfields 2018a, 2018b). The entire project area is considered suitable foraging habitat for burrowing owls and the species could occur on the site and along the linear facilities in very low densities.

Verdin

Verdin (*Auriparus flaviceps)* are considered an At-Risk species by the NNHP. Verdin can be found in areas along washes where thorny vegetation occurs or in desert riparian zones. In Nevada, Verdin are found in areas containing honey mesquite and in upland areas in association with catclaw acacia. No Verdin or their nests were observed during the biological reconnaissance survey or during the field survey for jurisdictional Waters but could occur and potentially nest along ephemeral washes within the Project area.

Loggerhead Shrike

Loggerhead Shrike (*Lanius ludovicianus*) is a BLM Sensitive Species, a Bird of Conservation Concern (BCC), a MSHCP proposed species, and is also protected by the MBTA and NNHP. The Loggerhead Shrike is a year-round resident in Clark County and prefers open habitat with perches for hunting and fairly dense shrubs for nesting. Loggerhead Shrikes were observed in the ESMSP project area during surveys (Newfields 2018a).

Phainopepla

Phainopepla (*Phainopepla nitens*) is a BLM Sensitive Species, is protected by the MBTA and considered At-Risk by NNHP. Phainopepla prefers similar habitats as Loggerhead Shrike (described above) and depend on fruiting desert mistletoe (*Phoradendron californicum*), which parasitizes the same trees used for nesting, and produces a stable, long-lasting supply of berries (Chu et. al 1999). No Phainopepla nests were identified during biological surveys, though the species could nest in the desert wash and mesquite bosque habitats in the vicinity of the Project.

Bendire's Thrasher

The Bendires Thrasher (*Toxostoma bendirei*) is a BLM Sensitive Species, protected by the MBTA, considered At-Risk by NNHP, is a BCC, and is a MSHCP proposed species. The Bendire's thrasher can be found in desert habitats, especially areas of tall vegetation, cholla cactus, creosote bush and yucca, and in juniper woodland. Bendire's thrashers were not observed in the ESMSP project area during surveys (Newfields 2018a, 2018b) though they could occur.

Le Conte's Thrasher

The Le Conte's thrasher (*Toxostoma lecontei*) is protected under the MBTA, is considered At-Risk by NNHP, is a BCC, is a BLM Sensitive species, and is a MSHCP proposed species. Habitat for this species consists of sparsely vegetated desert flats, dunes, alluvial fans, or gently rolling hills having a high proportion of one or more species of saltbush or shadscale and/or cholla cactus 3-6 feet high. This species rarely occurs in habitats consisting entirely of creosote bush such as most of the ESMSP project area. The Le Conte's thrasher is not likely to occur within the area as there is little suitable habitat present and they were not observed on the ESMSP Project site and are not known to occur in the vicinity.

TABLE 3-4 SPECIAL STATUS BIRD SPECIES IN CLARK COUNTY, NV*				
Scientific Name	**Common Name**	**Status**	**Presence**	**Habitat**
Anthus rubescens	American Pipit	NNHP-At Risk	Low potential to migrate through area, limited to areas near Muddy River. No nesting habitat.	Coastal beaches and marshes, stubble fields in fall, and recently-plowed fields in spring; mud flats and river courses preferred. Not analyzed further in this EIS.
Aquila chrysaetos	Golden Eagle	NNHP-At Risk, BLM Sensitive, BGEPA, MSHCP Proposed	Low potential to occur. Potential foraging habitat within the Project area. No nesting habitat present or nearby.	Prefers open country, especially around mountains, hills, and cliffs; use a variety of habitats ranging from arctic to desert, including tundra, shrublands, grasslands, farmland, and areas along rivers and streams. Described below.
Haliaeetus leucocephalus	Bald Eagle	NNHP-At Risk, BCC, BLM Sensitive	Low potential to migrate through area, no foraging or nesting habitat within Project area.	Found near lakes, reservoirs, rivers, marshes, and coasts; scattered breeding occurrences in Northern Nevada. Not analyzed further in this EIS.
Asio otus	Long-eared Owl	NNHP-At Risk	Very low potential to occur in denser vegetation near Muddy River.	Inhabits dense vegetation adjacent to grasslands or shrublands; also, open forests. Elevations range from near sea level to >2,000 m. Reports of forests as main habitat. Nesting in dense or brushy vegetation amidst open habitats in Nevada. Not analyzed further in this EIS.
Athene cunicularia hypugaea	Western Burrowing Owl	NNHP-At Risk, BCC, BLM Sensitive, MSHCP Proposed	High potential to be present within or near Project area. Nesting and foraging habitat present.	Lives in open habitats with sparse vegetation such as prairie, pastures, desert or shrub-steppe, and airports. In parts of their range they are closely associated with prairie dogs and ground squirrels, whose burrows they use for nests; Western Burrowing Owls breed throughout Nevada in salt desert scrub, Mojave shrub, and some sagebrush habitat, as well as in agricultural landscapes; winters most frequently in the southern half of Nevada. Described below.
Auriparus flaviceps	Verdin	NNHP-At Risk	Potential foraging habitat and nesting habitat within and near the Project area.	Inhabits desert regions of the southwestern U.S. and northern Mexico. Found wherever thorny scrub vegetation is present and prefer to nest in acacias (*Acacia* spp.), paloverde (*Cercidium* spp.), smoke

TABLE 3-4 SPECIAL STATUS BIRD SPECIES IN CLARK COUNTY, NV*				
Scientific Name	**Common Name**	**Status**	**Presence**	**Habitat**
				tree (*Dalea spinosa*), mesquite (*Prosopis* spp.*),* or desert lavender (*Hyptis emoryi).* Described below.
Buteo regalis	Ferruginous Hawk	NNHP-At Risk, BLM Sensitive	Very low potential to migrate through Project area, no nesting habitat within Project area.	Preferred habitat includes arid and semiarid grassland regions; open, level, or rolling prairies; foothills or middle elevation plateaus largely devoid of trees; and cultivated shelterbelts or riparian corridors. Not analyzed further in this EIS.
Falco peregrinus	Peregrine Falcon	NNHP, BCC, BLM Sensitive, MSHCP Covered	Very low potential to migrate through Project area. No nesting habitat.	The species breeds in open landscapes with cliffs (or skyscrapers) for nest sites; nesting at elevations up to about 12,000 feet, as well as along rivers and coastlines or in cities; migration and winter in nearly any open habitat, but with a greater likelihood along barrier islands, mudflats, coastlines, lake edges, and mountain chains. Not analyzed further in this EIS.
Gymnorhinus cyanocephalus	Pinyon Jay	NNHP, BCC, BLM Sensitive	No potential to occur; no habitat within Project area.	Species prefers pinyon-juniper woodland, sagebrush, scrub oak, and chaparral communities, and sometimes found in pine forests; specialized for feeding on pine seeds. Not analyzed further in this EIS.
Lanius ludovicianus	Loggerhead Shrike	NNHP, BCC, BLM Sensitive, MSHCP Proposed	Known to occur in Project area, observed during field surveys.	Prefers open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns; frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries; are often seen along mowed roadsides with access to fence lines and utility poles. Described below.
Phainopepla nitens	Phainopepla	NNHP, BLM Sensitive, MSHCP Covered	Potential to occur within or near the Project area.	Found in desert, riparian woodlands, and chaparral; it is territorial, actively defending nesting and foraging sites, while in the woodlands it is colonial, with as many as four nesting pairs sharing one large tree; particularly notable for its enigmatic pattern of breeding twice each year, in two different habitats. Phainopepla prefers similar habitats as Loggerhead Shrike (described above), though in the desert,

TABLE 3-4 SPECIAL STATUS BIRD SPECIES IN CLARK COUNTY, NV*				
Scientific Name	**Common Name**	**Status**	**Presence**	**Habitat**
				Phainopeplas depend on fruiting desert mistletoe (Phoradendron californicum), which parasitizes the same trees used for nesting, and produces a stable, long-lasting supply of berries. Described below.
Psiloscops flammeolus	Flammulated Owl	NNHP, BCC, BLM Sensitive	No potential to occur in Project area, no habitat within Project area.	Found in open pine forest in mountain habitats. Not analyzed further in this EIS.
Setophaga graciae	Grace's Warbler	NNHP	No potential to occur in Project area, no habitat within Project area.	Found in pine-dominated forests of Southern Nevada. Not analyzed further in this EIS.
Spinus pinus	Pine Siskin	NNHP	No potential to occur in Project area, no habitat within Project area.	Primarily found in open coniferous forests. Not analyzed further in this EIS.
Spizella atrogularis	Black-chinned Sparrow	NNHP, BCC	Low potential to migrate through Project area, no nesting habitat within Project area.	In summer it favors rocky slopes of mixed chaparral or sagebrush from near sea level to almost 2,500 m. A partial migrant, in winter it generally moves downslope or south into desert scrub and dry ephemeral washes. Not analyzed further in this EIS.
Spizella breweri	Brewer's Sparrow	NNHP, BCC, BLM Sensitive	Low potential to migrate through the Project area, no potential for nesting.	Breeds throughout Nevada in arid sagebrush steppe; May occur in large openings in piñon-juniper (*Pinus edulus* - *Juniperus* spp.) woodlands or large parklands within coniferous forests. Not analyzed further in this EIS.
Toxostoma bendirei	Bendire's Thrasher	NNHP, BCC, BLM Sensitive, MSHCP Proposed	High potential to occur within or near the Project area, nesting habitat occurs within Project area.	Found in desert habitats, especially areas of tall vegetation, cholla cactus, creosote bush and yucca, and in juniper woodland. Described below.
Toxostoma crissale	Crissal Thrasher	NNHP, BLM Sensitive	Low potential to occur within or near the Project area, limited nesting habitat within	Uncommon in Nevada during all seasons; found in dense brush along desert streams, mesquite thickets; may be found in the dense mesquite

TABLE 3-4 SPECIAL STATUS BIRD SPECIES IN CLARK COUNTY, NV*				
Scientific Name	**Common Name**	**Status**	**Presence**	**Habitat**
			Project area and nesting is unlikely.	thickets along washes, but also in sparse brush in open areas; occurs in dense chaparral, among manzanita and other scrub, in the southwestern mountains. Not analyzed further in this EIS.
Toxostoma lecontei	LeConte's Thrasher	NNHP, BCC, BLM Sensitive, MSHCP Proposed	Moderate potential to occur and nest within or near the Project area.	Found in desert scrub, mesquite, tall riparian brush and chaparral. Described below.
Vireo vicinior	Gray Vireo	NNHP, BCC	No potential to occur, no habitat within Project area.	In Southern Nevada, found in scattered piñons, junipers and dry brushland. Not analyzed further in this EIS.
Buteo swainsoni	Swainson's Hawk	BLM Sensitive	Low potential to migrate through Project area, no nesting habitat within Project area.	Species favor open habitats for foraging; hay and alfalfa fields, pastures, grain crops, and row crops, or perched atop adjacent fence posts and overhead sprinkler systems; they rely on scattered stands of trees near agricultural fields and grasslands for nesting sites. Not analyzed further in this EIS.
Oreoscoptes montanus	Sage Thrasher	BCC, BLM Sensitive	Very low potential to occur or nest within or near Project area.	Breeds exclusively in shrubsteppe habitats; require relatively dense ground cover for concealment, but also some bare ground for foraging and for getting around on their feet, which they often do in preference to flying; use arid or semiarid open country with scattered bushes, grasslands, and open pinyon- juniper woodlands. Not analyzed further in this EIS.

*Habitat data from: The Cornell Lab of Ornithology, Birds of North America. https://birdsna.org.
*Species list and Status from: Nevada Natural Heritage Program (NNHP), Clark County. http://heritage.nv.gov/species/lists.php. BLM Nevada Sensitive Species List, 2017, https://www.blm.gov/download/file/fid/23564.
USFWS, Birds of Conservation Concern, 2008. Clark County NV, Desert Conservation Program (DCP), Clark County Multiple Species Habitat Conservation Plan (MSHCP), http://www.clarkcountynv.gov/airquality/dcp/Pages/about.aspx.

3.2.2 Environmental Consequences

Analysis of impacts to biological resources was conducted by: (1) using information from numerous sources and historical reports in addition to data provided by the Applicant and the Band; and (2) evaluating impacts to habitats and species potentially present within the ESMSP site and within a regional geographic context. The desert tortoise survey results were used to prepare a Biological Assessment (BA) under Section 7 of the ESA for the consultation between the BIA and USFWS.

3.2.2.1 Proposed Action

Vegetation

There are twelve vegetative cover types present within the ESMSP project area as outlined above. Direct and indirect effects, mitigation, and residual effects to vegetation resources are discussed below. **Table 3-5** presents the acreage of long-term and temporary impacts associated with the various project components.

Vegetation would be graded and permanently cleared from roadways, access ways, and at inverter equipment, substations, and O&M facilities, which would cause the direct loss of approximately 120 acres of vegetation, the majority of which is the creosotebush-white bursage desert scrub vegetation community. Approximately 2,165 acres would be temporarily impacted. Vegetation within the solar arrays would be mowed to a height of 18 inches and construction equipment would be allowed to drive and crush that vegetation during construction, which would increase the likelihood and speed at which vegetation would regrow during operations. Grading or permanent clearing would not take place on the majority of the solar site but some mowing would be conducted, taller vegetation would be trimmed, and vegetation would be driven over by equipment during construction, leaving root balls in place. After construction, vegetation within the solar site would be managed and trimmed where needed to maintain movement of the tracking systems, to facilitate maintenance, and reduce fire risk.

Herbicides would be used where needed to treat non-native and invasive species with the use of specific chemicals after approval from the Band, BLM, and/or BIA, as appropriate. Mechanical treatment of weeds is the preferred method for the Project; however, herbicides may be used if necessary. Herbicide use would follow those approved in BLM's and BIA's Programmatic EISs for using herbicides (BLM 2007, BLM 2016, and BIA 2014b). The applicant would implement a Site Restoration Plan and an IWMP 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 IWMP (**Appendix G**) and implemented. The herbicides that may be used in mowed areas, based on those allowed on BLM lands, include aminopyralid, clopyralid, imazapyr, imazapic, glyphosate, metasulfuron methyl, and rimsulfuron. Herbicides that are believed to have deleterious effects on reptiles, such as 2,4-D, would not be allowed. Any herbicide use would be used during the less active tortoise season.

Portions of the site would be rehabilitated after decommissioning. The disturbance would be considered long-term but not permanent. Development of the gen-tie line associated with the ESMSP would result in short term impacts to the local vegetation as the result of construction as well as a small amount of long-term habitat disturbance for the limited footprint of the gen-tie towers and maintenance roads.

After the construction phase, the temporarily disturbed areas not covered by facilities would be reclaimed.

Reduction of native plants and soil disturbance would leave bare areas at risk for the potential spread of non-native, invasive weed species and increased potential for erosion. Weed sources could include construction vehicles if not properly cleaned, imported fill, use of hay bales, and invasion from adjacent lands via natural movement such as wind. Invasive weed species could out-compete native plants for resources such as water and space. The Applicant would implement an approved IWMP to prevent introduction of weed species and control the growth of weeds and other undesired vegetation. A draft of the IWMP is included in **Appendix G** which will be finalized prior to the start of construction.

Indirectly, soil disturbance could reduce the native seed bank and dust generated during construction could potentially affect off-site native vegetation communities by reducing photosynthetic activity. Retention of water onsite is expected to be minimized as the natural drainage is expected to be retained for the most part, minimizing the potential to reduce localized water availability in downstream washes and to affect downstream vegetation. The treatment of noxious/invasive weeds (i.e., herbicide treatments, plant removal) could result in inadvertent injury of native plant species that are in close proximity.

Main access to the ESMSP site for construction and through O&M and decommissioning would be provided via existing roads. No upgrades to these existing roads are expected so no disturbance to vegetation would occur from access to the project site.

Development of the gen-tie line would result in temporary disturbance associated with construction at each structure location and pull sites used to string the conductor into place. Long-term gen-tie impacts would be associated with the access needed for each structure location, if not already existing, and a very small area around each structure. Any access roads developed parallel to the gen-tie alignment and spur roads would not be maintained following construction and would allow for revegetation to occur in these areas. A 125-foot by 50-foot (6,250 square-foot) area would be needed for construction around each of the approximately 99 structure sites (total of 618,750 square-feet). These areas would be temporarily disturbed during the construction period and would be cleared of vegetation only as required for safety and efficiency. Therefore, the gen-tie would result in long-term loss of 5.3 acres of vegetation along the gen-tie line ROW.

The anticipated operational life of the ESMSP would be up to 40 years. The Applicant has developed a draft Site Restoration Plan defining the procedures for the revegetation and rehabilitation of areas temporarily disturbed by the proposed Project (**Appendix J**). This plan would be implemented immediately after construction for the areas that are temporarily disturbed, such as portions of the gen-tie line routes. A Decommissioning and Site Reclamation Plan would be approved by the Band, BIA and BLM prior to decommissioning.

The ESMSP would result in the temporary disturbance of approximately 2,165 acres and long-term loss of approximately 120 acres of vegetative cover types for the operational life of the Project (**Table 3-5**). The increase in vehicular traffic during the construction of the Project could negatively impact vegetation through increased atmospheric dust. Subsequent to implementation of the mitigation measures, it is possible that noxious/invasive weeds could be introduced in the area after construction and during operations phases, but implementation of the IWMP would help prevent the spread of noxious/invasive weeds. The proposed mowing and drive and crush techniques would result in

moderate short-term impacts on vegetation. These techniques are expected to preserve root balls of native vegetation and allow for regrowth of native vegetation after construction is complete. This would reduce the risk of introducing noxious weeds and would allow more wildlife species to utilize the solar site during operations. Implementation of the Decommissioning and Site Reclamation Plan following the life of the Project would reduce the long-term effects to vegetation.

Wildlife

Ground-disturbing activities associated with construction of the ESMSP are potential sources of direct mortality and injury to wildlife. Impacts from equipment and vehicles can occur for slow-moving species, species that have subsurface burrows, or ground-nesting birds. Some nesting birds, large mammals (including kit fox), and reptiles are susceptible to visual and noise disturbances caused by the presence of humans and construction equipment and the generation of dust. Such disturbances could cause wildlife to alter foraging and breeding behavior and avoid suitable habitat (e.g., nesting birds may abandon nests due to these disturbances). Loss of burrows due to construction, ground vibration, or avoidance behavior would cause wildlife to search for and/or dig new burrows.

Wildlife occurring in and around the project area would also be indirectly impacted. The removal and/or modification of natural vegetation communities would reduce forage, shelter, and nesting opportunities to wildlife including multiple special status wildlife species. The long-term loss and/or degradation of approximately 120 acres of wildlife habitat could cause wildlife to rely more heavily on habitat in surrounding areas, but the expected rapid regrowth of the 2,165 acres of temporarily impacted (mowed) vegetation would allow for many species to utilize the solar site during operations. Construction and operation of the ESMSP could directly and adversely impact wildlife by causing wildlife to alter foraging and breeding behavior. For example, increased noise as a result of construction could result in wildlife temporarily avoiding the general area surrounding the proposed Project. If trash is left out, species such as kit fox and common raven could be attracted to the area. BMPs outlined in **Appendix C** and mitigation measures described in the Sensitive Avian Species section describe how these potential impacts would be minimized.

Additionally, removal of resources would add pressure on the food resources in adjacent areas. Ground-disturbing activities and mowing could increase the spread of noxious/invasive weeds, which could potentially out-compete existing annual vegetation that would indirectly and adversely affect the quality of wildlife habitat and forage. Implementation of the IWMP would minimize these impacts from weed species.

TABLE 3-5 IMPACTS TO VEGETATION TYPES BY ESMSP COMPONENTS (ACRES)

Vegetation Community Type	Solar Site		Gen-Tie Route						Project Totals	
	Tribal		Tribal		BLM		Private			
	Long-Term Impact	Temp. Impact	Long-Term Impact	Temp. Impact	Long-Term Impact	Temp. Impact	Long-Term Impact	Temp. Impact	Long-Term Impact	Temp. Impact
Sonoran-Mojave Creosotebush-White Bursage	97.6	2,019	14.6	51.3	0.3	3.9	0.3	15.4	112.8	2,089.6
North American Warm Desert Riparian Systems	0	1.8	0	0	0	0	0	0.4	0	2.2
Mojave North American Warm Desert Riparian Mesquite Bosque	0.3	5.0	0	0	0	0	0	0	0.3	5.0
Developed	0	0	0	0	0	0	0	1.7	0	1.7
Sonoran-Mojave Mixed Salt Desert Scrub	2.4	55.3	0	0	0	0	0	0	2.4	55.3
North American Warm Desert Pavement	0.02	0.9	0	0	0	0	0	0	0.02	0.9
North American Warm Desert Badland	0	0	0	0	0	0	0	0	0	0
Open Water or Aquatic Vegetation	0	0	0	0	0	0	0	0	0	0
North American Warm Desert Bedrock Cliff or Outcrop	0	0	0	0	0	0	0	0	0	0
Microphytic Playa Sparse Vegetation	0.1	3.3	0	0.1	0	0	0	0	0.1	3.4
Introduced Riparian Vegetation	0	0	0	0	0	0	0	0.3	0	0.3
Total Impacts	**100.42**	**2,085.3**	**14.6**	**51.4**	**0.3**	**3.9**	**0.3**	**17.8**	**115.62**	**2,158.4**

Gen-Tie Route values include pole structures, construction area, gen-tie road and pull sites. The numerical values in this tables are shown to two decimal places in some cases. The data used to generate the values was maintained to six decimal places in order to capture small values in the analysis. The resultant outputs are rounded to two decimal places where needed to make the values readable; therefore, totals and subtotals may not appear to be consistent with similar values elsewhere in the document.

ESMSP infrastructure may also indirectly cause mortality to wildlife by increasing the risk of predation on certain species by native predators such as ravens and raptor species. Increased predation would be minimized with the implementation of perch deterrents on the gen-tie structures and as needed around the ESMSP solar site as well. Construction, operation and maintenance of the ESMSP could result in trash and debris that may attract predators such as ravens and coyotes. A Raven Control Plan has been prepared that addresses minimization and avoidance measures that would be taken to reduce the attraction of the ESMSP to common ravens and minimizing impacts to species that ravens prey upon. **Appendix K** contains the Raven Control Plan.

During construction, hazardous waste (solid and liquid) could be generated at the site. Exposure to hazardous waste could be a direct source of wildlife mortality and/or injury through the poisoning of individuals. Spills of hazardous material could also indirectly adversely impact wildlife if the spill of the hazardous material results in the loss of natural vegetation community. The containment and disposal of hazardous waste will be outlined in a Spill Prevention and Emergency Response Plan developed by the construction contractor for the Project would reduce the likelihood that significant spills would adversely affect wildlife.

As mentioned above, the Applicant has developed a Site Restoration Plan defining the procedures for the revegetation and rehabilitation of areas temporarily disturbed by the ESMSP. This plan would be implemented immediately after construction for the areas that are temporarily disturbed such as portions of the gen-tie line routes and access roads. Trimming of vegetation versus grading during development and the revegetation of disturbed areas by re-spreading stockpiled topsoil and the existing seed bank would likely result in the reestablishment of native vegetation as well as the reestablishment of wildlife habitats. Prior to decommissioning, the Decommissioning Plan (**Appendix H**) would be finalized and approved by the Band, BIA and BLM. The Applicant would incorporate the BMPs outlined in **Appendix C** to help avoid or reduce impacts on wildlife species.

In summary, there would be long-term residual effects to wildlife due to the construction of the ESMSP. The solar site would be disturbed to prepare it for construction and operation of the solar field. Where grading is not necessary, vegetation would be trimmed or mowed as needed to allow the surface soils and local drainages to be left undisturbed. This would result in the temporary loss of approximately 2,165 acres and permanent loss of about 120 acres of wildlife habitat as a result of development of the Project. The loss of wildlife habitat would result in a loss of shelter, nesting habitat, and forage for wildlife species and would result in wildlife having to rely more heavily on habitat outside of the Project footprint. Because vegetation will be mowed to 18-inches in height and drive and crush techniques will be implemented during construction, wildlife habitat is expected to recover within the solar arrays and, because the entire site would have a permeable fence, many wildlife species would be expected to return to re-inhabit the site during operations.

Following decommissioning when all facilities would be removed, disturbed areas would be revegetated in accordance with the Decommissioning Plan (**Appendix H**). This would reduce the long-term effects to wildlife and habitats.

Special Status Wildlife Species

The previously discussed biological impacts from construction, O&M, and decommissioning for special status wildlife species are similar to the potential adverse impacts that could occur to general wildlife.

Desert Tortoise

Desert tortoises could be harmed or killed during ground-disturbing activities and as a result of vehicle travel on access roads during construction and operation of the facility. Construction of the ESMSP solar site may result in impacts on up to 73 adult desert tortoises through harassment, direct mortality, and impacts on desert tortoise habitat based on USFWS 2018 calculations (see BA in **Appendix L**). Six desert tortoises were observed within the proposed and alternative gen-tie survey area.

Temporary desert tortoise exclusion fencing would be installed prior to construction and desert tortoise would be relocated via clearance surveys before the construction phase of the project. Relocation of desert tortoise 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 tortoise would be relocated to Tribal lands within the Project area as described in the Project's translocation plan described below. It is expected that all tortoises would be captured and safely released outside the exclusion fence adjacent to the Project site. Tortoises encountered along the gen-tie would be relocated out of harm's way within their home range, within or near the designated utility corridor.

Because the tortoise density is high, the USFWS would require the development of a separate desert tortoise translocation plan for this project. The details of the translocation/relocation effort are described in the Biological Assessment (**Appendix L**). Desert tortoises that are captured within the solar site or associated infrastructure would be relocated in accordance with each individual's Service-approved disposition plan. Prior to relocating some tortoises captured in the solar site, health assessments, which include visual inspection relative to body condition, clinical signs of disease, and collection of biological samples for disease screening (i.e., blood samples to test for antibodies to pathogens), would be completed for each individual in accordance with the most recent Service guidance (USFWS 2013) and a disposition plan would be prepared. All areas to which tortoises would be relocated from the solar site would be approved by the Service prior to the tortoises' release to ensure habitat suitability. After disease screening results, and approval of disposition plans, the Applicant would relocate all desert tortoises to their respective relocation area. Capture and relocation of individual desert tortoises occurring within the solar site may result in accidental death and injury due to stress or disease transmission associated with handling; and stress associated with moving individuals outside of their established home range.

After the initial construction, the use of the site access road as well as operation and maintenance activities both within and outside the solar site could represent a source of ongoing mortality. Biological monitors would accompany ground-disturbing activities in the solar site, along the access road and gen-tie as needed. Monitors would stop construction activities if tortoises are in harm's way. As such, direct take of desert tortoise resulting from these activities is expected to be very low.

Development of the Project solar site would include 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 with a gap at the bottom of the fence. Exclusion fencing would be removed after construction, allowing tortoise to move onto and through the site during operations.

Vegetation would be cleared along solar site 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 over and crush vegetation, preserving the integrity of root balls and allowing it to regrow after construction. Some mowing may be conducted and tall shrubs would be trimmed to allow for installation and operation of panels. Native vegetation would remain in the solar arrays during operations and would provide suitable habitat for tortoise. Herbicide use would occur during periods when desert tortoises are less active to reduce the chance for ingestion of treated vegetation (from June to August and November to March).

A total of approximately 120 acres of occupied desert tortoise habitat would be permanently disturbed and up to approximately 2,165 acres would be temporarily disturbed as a result of Project implementation (**Table 3-6**).

TABLE 3-6 TEMPORARY AND PERMANENT DISTURBANCE

Project Component	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Solar Field and Ancillary Facilities	2,086	100
230kV Gen-Tie Line	79	20
Access Road	0	0
Total	2,165	120

Construction equipment would not operate beyond the fenced boundary with the exception of the access road and the gen-tie ROWs. Roads that are not designated as open by the Applicant and Band are not to be used by project personnel unless accompanied by a biological monitor.

The Project is currently located in an area where desert tortoise movement is generally unrestricted. Topography in the area is gently sloping to rolling with no major barriers to movement. Disturbance resulting from the construction of the gen-tie line may affect tortoise movement via avoidance during construction, but generally would not restrict tortoise movement. The railroad and Interstate 15 to the east and the Arrow Canyon Range likely represent barriers to movement out of the Dry Lake Valley to the east or west. North and/or south movement within the valley is generally unrestricted.

The temporary 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, tortoise would be allowed to move freely through the site. Because vegetation will be mowed to 18-inches in height and drive and crush techniques will be implemented during construction, desert tortoise habitat is expected to recover within the solar arrays allowing them to re-inhabit the site during operations. No permanent exclusionary fencing would be used on the access road or gen-tie line. These areas would experience temporary disturbance that could affect tortoise movement but would not directly restrict it.

Biological monitors would be in place along the access road during construction to minimize any impacts from vehicles. Once exclusion fencing has been installed and clearance surveys are completed, biological monitors would not be required.

Equipment that would cause surface disturbance and otherwise operate during construction will be limited to graders and dozers to grade dirt access roads on the solar site, 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 tortoise. Vibration is unlikely to be noticeable more than 20 or 30 feet beyond the source. Construction taking place near the perimeter edge of the exclusion fence is limited. Activity during operations will be substantially less than during construction of the ESMSP, such that no adverse effects from ground vibration on desert tortoise are expected to occur during operations.

The Project's lighting system would provide operation and maintenance personnel with illumination for both normal and emergency conditions near the main entrance, O&M building, and the Project substation. Lighting will be designed to minimize light trespass on surrounding land so Project lighting is not expected to have a more than negligible effect on desert tortoise.

Introduction of weeds and invasive species would be controlled through implementation of the IWMP, which would prevent or minimize the spread/colonization of weeds and minimize adverse effects on desert tortoise foraging habitat.

Avian predators and scavengers such as the common raven benefit from a myriad of resource subsidies provided by human activities as a result of substantial development within the desert as compared to undeveloped desert landscapes (Boarman et al. 1996). Ravens and other predators may be attracted to elevated structures associated with the proposed Project such as perimeter fencing, gen-tie line poles, and the O&M building. A Raven Control Plan has been developed and would be approved prior to the initiation of construction activities to reduce or eliminate potential impacts from ravens to desert tortoise.

The Applicant has developed a Site Restoration Plan defining the procedures for the revegetation and rehabilitation of areas temporarily disturbed by the ESMSP. This would help the reestablishment of native vegetation as well as the reestablishment of additional desert tortoise habitat. The Applicant has also prepared a Decommissioning and Site Reclamation Plan that would be finalized and approved by the Band, BIA, and BLM prior to decommissioning.

In addition to the BMPs outlined in **Appendix C**, the Project will also comply with any additional terms and conditions of the Project Biological Opinion (BO) which has been developed to comply with Section 7 consultation under the ESA. The BO for the ESMSP is included as **Appendix P** of this EIS. The BO mitigation requirements have also been included as agency-required mitigation measures in **Appendix C**.

In summary, adverse impacts on desert tortoises would occur with the construction of the proposed ESMSP and activities associated with O&M. Impacts to desert tortoise would include the temporary removal of all desert tortoises from the solar site and the long-term loss of 120 acres of suitable desert tortoise habitat. All ROWs would be unfenced and the solar site fencing would be permeable

to desert tortoises (during operations) and allow for unrestricted movement of tortoises following construction. Therefore, impacts to movement corridors and habitat connectivity for the tortoise would be minimal. Temporary impacts would be short-term and localized. While the Project area would not be permanently fenced, desert tortoises could be relocated during construction. In addition to the temporary disturbance of 2,165 acres and long-term loss of 120 acres of suitable desert tortoise habitat that would result from the ESMSP, relocated individuals may have an impact on the fitness of resident desert tortoises that currently occupy the translocation site. To minimize all potential impacts, the Applicant would be required to adhere to all terms and conditions outlined in a Project-specific BO that would result from Section 7 consultation.

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

Yuma Ridgway's rail, yellow-billed cuckoo, and southwestern willow flycatcher do not have suitable habitat on the ESMSP site or nearby areas but there is suitable habitat upstream and downstream of the gen-tie crossing of the Muddy River. Due to the low numbers of these species, there may be discountable impacts to these species if they migrate along the Muddy River corridor. Potential risk would be insignificant and discountable and potential indirect effects would be negligible. Groundwater withdrawals are not expected to result in reductions in flow in the Muddy River and suitable habitats would not be affected. The ESMSP would have no effect on these species or their habitats (see the attached BA in **Appendix L**).

Bats

The protected bat species that have the potential to occur in the ESMSP project area are only expected to be present during nocturnal foraging events. Artificial lighting has the potential to alter the foraging behavior of bat species and the modification or loss of the natural vegetation could decrease the prey availability. Design features incorporated into the Project that would minimize potential impact to bats are described in a Bird and Bat Conservation Strategy (BBCS) included in **Appendix D** and include nighttime light reduction and the potential for impacts to bats would be low.

Gila Monsters

Proposed ESMSP construction and operations activities could result in direct mortality or injury of Gila monsters as a result of encounters with vehicles or heavy equipment. Disruption of Gila monster behavior could occur due to noise or vibration from the heavy equipment during construction. The implementation of the proposed Project Site Restoration Plan (**Appendix J**) would re-establish foraging habitat temporarily disturbed by construction. The BMPs described in **Appendix C** would help avoid or reduce impacts on the Gila monster. Any observations of Gila monsters on non-Tribal lands during field surveys would be reported according to NDOW's reporting protocol (NDOW 2012).

Sensitive Avian Species

Construction of the ESMSP could cause adverse impacts on avian species, including nesting raptors and other sensitive birds. Impacts on these bird species would typically result from activities that would cause nest abandonment or take of chicks or eggs in active nests, mortality of adults due to collision, or reduction of potential forage and nesting habitat. For most species, impacts from the ESMSP would be confined to areas immediately adjacent to and within the solar site boundary and the gen-tie routes. For other species such as raptors that forage over larger distances, the Project could result in a loss of foraging habitat, depending on their foraging requirements.

Active bird nests in shrubs or near the ground would be susceptible to being impacted during ground-disturbing activities. Noise and visual disturbance caused by construction and Project-related traffic, including construction at work sites and traffic along access roads would have the potential to cause nest abandonment or habitat avoidance. The construction of new electric transmission lines could potentially increase the risk of mortality to raptors and non-raptor species by electrocution or collision, though risk would be minimized with implementation of APLIC standards described in **Appendix C** and in the BBCS **(Appendix D**).

Additionally, construction could cause birds to avoid suitable habitat and nest or forage in less suitable habitat. Such impacts would cause potential energetic costs to these birds and could indirectly contribute to stress and eventual mortality. Decreased foraging success could decrease the survivorship of chicks in nests near the ESMSP area.

While no burrowing owls were observed during desert tortoise surveys, this species could potentially occur in the Project area. Construction activity could cause nest abandonment or take of chicks or eggs in active nests, mortality of adults, or reduction of potential forage and nesting habitat. Preconstruction surveys would be conducted prior to any vegetation removal that is conducted during the breeding season (**Appendices C** and **D**).

There is available data on avian mortality resulting from impact with PV solar panels (The Multiagency Avian-Solar Collaborative Working Group 2016). PV solar panels have the potential to attract birds (that mistake the panels for water) and they may collide with panels and be killed as a result of a collision. Avian collision with PV panels was a leading cause of death at PV solar facilities identified in the Multiagency Avian-Solar Coordination Plan (The Multiagency Avian-Solar Collaborative Working Group 2016) but there was considerable variability in mortality rates for carcasses with known project-related causes of death at utility-scale solar energy (USSE) development facilities (LaGory et al. 2016). The level of mortality observed at solar facilities is variable and there still remains uncertainty in the population-level impacts of USSE avian mortality (LaGory et al. 2016). The solar industry is working with Federal and state agencies to fund ongoing research to provide better definition of interactions between avian species and solar facilities. One study on avian impacts at solar facilities has been recently completed by the Argonne National Laboratory and the National Renewable Energy Laboratory (ANL/NREL 2015). Reviewing avian mortality data from several PV solar installations, the ANL/NREL report concludes that additional research is needed to address hypotheses regarding how solar facilities (e.g., lake affect hypothesis) may interact with bird populations including whether some project features may attract birds to the facility and increase risk of mortality (The Multiagency Avian-Solar Collaborative Working Group 2016).

A Site Restoration Plan defining the procedures for the revegetation and rehabilitation of areas disturbed by the ESMSP has also been developed (**Appendix J**). The future removal of project infrastructure, the revegetation of disturbed areas, and the absence of a continual O&M presence would likely result in an increase of foraging and nesting habitat for avian species and a reduction in collision hazards over those present during operation of the Project. The Applicant has incorporated the measures described in the BBCS in **Appendix D** to avoid or minimize impacts on bird species.

Adverse impacts on sensitive bird species and raptors could occur with the construction and decommissioning of the ESMSP and operation and maintenance activities. These impacts would be both short- and long-term and would be localized. To further avoid and reduce impacts, the following mitigation measures would be implemented:

- Preconstruction surveys;
- Biological monitors;
- All transmission towers and poles would be designed to be avian-safe according to APLIC (2006 and 2012);
- Installation of flight diverters;
- Perch deterrents;
- Survey for nests along transmission lines;
- Monitor for avian mortalities;
- Lighting would be focused in toward the solar site and downward to avoid lighting habitats beyond the solar site perimeter;
- Proper disposal and storage of garbage;
- Closing of holes and spaces during construction to prevent entrapment;
- Worker Environmental Awareness Program; and
- Scheduling site disturbing construction activities to avoid avian breeding seasons to the extent practicable.

Bald and Golden Eagles

There is the potential for golden eagles to use the ESMSP project area for foraging. Bald eagles are not expected to use any habitats present in or immediately around the project area. Golden eagles would be susceptible to visual and noise disturbance as described above, potentially resulting in alteration of foraging behaviors. Golden eagles are protected by the BGEPA, which includes the September 11, 2009 Eagle Rule (Rule) 50 CFR parts 13 and 22 and the 2016 revision.

The ESMSP does not contain any nesting habitat for golden eagles. The ESMSP would impact suitable foraging habitat but due to the distance between the proposed Project and the closest suitable nesting habitat (over two miles), it is not expected to impact nesting golden eagles.

Golden eagles would be susceptible to injury and/or mortality from collision or electrocution associated with the gen-tie line that is part of the ESMSP. The new line would represent a small percentage of the existing transmission lines currently in the vicinity of the Project area. The line would be developed in compliance with the *Suggested Practices for Raptor Protection on Power Lines: The State of the Art* in 2006 (APLIC 2006) and *Reducing Avian Collisions with Power Lines* (APLIC 2012) to minimize risks to raptor species including the golden eagle. Adverse impacts to golden eagles are not expected to occur with the implementation BMPs (**Appendix C**) and mitigation measures described above and in the BBCS in **Appendix D**.

3.2.2.2 Alternative Gen-tie Route

Effects to biological resources resulting from implementation of this alternative would be greater than those identified for the proposed ESMSP because the alternative would require construction of a new access road along its entire length and it wouldn't be as close to existing infrastructure as the

proposed gen-tie. The impacts from development of the solar facilities would be the same and the same BMPs would be employed for this gen-tie alternative as for the proposed gen-tie. The alternative gen-tie route would be located in similar vegetation / habitat types and it would be about the same length as the proposed gen-tie, but it would require a longer access road. The alternative gen-tie route would be similar in length and would parallel the proposed gen-tie; however, it would require a new access road along its entire length and would result in 12.6 acres of additional permanent impacts and 4.1 acres of additional temporary impacts. As a result, impacts to vegetation, habitats, and sensitive plant species disturbance would be greater than the proposed gen-tie.

The same BMPs and mitigation measures would be implemented for the gen-tie alternative as for the proposed gen-tie. Impacts to wildlife, including T&E and sensitive species, would be similar to but slightly greater than those identified for the proposed gen-tie.

3.2.2.3 No Action

Under the No Action Alternative, the ESMSP would not be constructed so there would be no effects to vegetation, wildlife, special status species, or other biological resources.

3.3 Cultural Resources

3.3.1 Affected Environment

The area of potential effect (APE) for cultural resources is defined as the area within which resources could be affected by the proposed ESMSP. The APE for direct effects includes all project components (solar field lease area and ROWs as shown in **Figure 2-1**) while the BIA, in consultation with the Nevada State Historic Preservation Office (SHPO), defined the APE for indirect effects to include a 5-mile radius around the solar site and a one-mile radius around the gen-tie routes. This cultural resource study consisted of a literature review for both the direct and indirect APEs. The field inventory only included the direct APE.

The pedestrian field inventory consisted of surveying 2,984 acres of the solar site and 992 acres for the proposed gen-tie route and alternative for a total of 3,976 acres surveyed of the 4,770-acre lease study area. The field archaeologists systematically inspected the direct APE using parallel transects spaced no further than 30-meters apart. No subsurface testing was conducted during the field inventory.

3.3.1.1 Cultural History

Prehistoric sites across the Great Basin and the greater American Southwest exhibit the presence of humans during the late Pleistocene 15,000 years ago. Around 1,500 years ago, the Ancestral Puebloan inhabitants of the greater southwest came into the vicinity. There is clear evidence of Southern Paiute people in the vicinity of the proposed ESMSP area by at least 850 years ago. Historically, the area was settled by Mormon farmers and ranchers in the 1800s.

3.3.1.2 Results of the Literature Review and Field Inventory

The literature search identified a total of 189 cultural resource sites in both the direct and indirect APE. Most of the sites were lithic scatters, historic railroad construction camps, and rock shelters in the indirect APE. Most sites were unevaluated for NRHP eligibility. The direct APE has eight sites previously recorded within it- four sites within the solar lease study area and four sites within the gen-tie corridors. All of these sites were either re-recorded or not relocated.

The proposed ESMSP is located on the Moapa River Indian Reservation which was established in the early 1870s. The APE does not contain sites or resources identified by the Band as having historic, cultural, or religious significance based on tribal consultations.

The pedestrian field inventory recorded ten new sites within the solar site study area. The ten new sites were evaluated for eligibility and the four previously recorded sites were reevaluated for NRHP eligibility and are described in **Table 3-7**. The ten newly identified cultural resource sites are prehistoric lithic scatters. Three of the new sites are recommended as not eligible and seven recommended eligible for inclusion in the NRHP.

The proposed gen-tie route has four previously recorded sites - the NRHP listed Old Spanish Trail/Mormon Wagon Road (26CK3536), the NRHP eligible Union Pacific Railroad (UPRR) (26CK4429), an unevaluated prehistoric artifact scatter, and one not eligible historic era two-track road. Only two of these sites were relocated. The traces of the Old Spanish Trail/Mormon Wagon Road identified along the gen-tie route had loss of integrity from the modern construction and maintenance of large utilities along the corridor as well as off-road use, making the traces non-contributing to the site's status as a NRHP listed site. Likewise, the UPRR has been upgraded and maintained as part of its continued use, making it also non-contributing to its status as NRHP-eligible. The unevaluated prehistoric site and the two-track road were not relocated during the pedestrian inventory. However, the pedestrian inventory identified one additional site within the gen-tie APE - a dismantled telegraph line (26CK10748) that is recommended not eligible for inclusion in the NRHP. The sites associated with the gen-tie APE and their potential eligibility are described in **Table 3-8**.

TABLE 3-7 LISTS OF SITES RECORDED IN THE DIRECT APE OF THE SOLAR FIELD

Site No.	Site Type	Project Location	Previously Recorded	Current NRHP Recommendation
26CK10721	Prehistoric Lithics	Solar Field	No	Not Eligible
26CK10722	Prehistoric Lithics	Solar Field	No	Eligible – Adverse Effect
26CK10723	Prehistoric Lithics	Solar Field	No	Not Eligible
26CK10724	Prehistoric Lithics	Solar Field	No	Eligible – Adverse Effect
26CK10725	Prehistoric Lithics	Solar Field	No	Eligible – Adverse Effect
26CK10726	Prehistoric Lithics	Solar Field	No	Eligible – Adverse Effect

TABLE 3-7 LISTS OF SITES RECORDED IN THE DIRECT APE OF THE SOLAR FIELD

Site No.	Site Type	Project Location	Previously Recorded	Current NRHP Recommendation
26CK10727	Prehistoric Lithics	Solar Field	No	Eligible – Avoided
26CK10728	Prehistoric Lithics	Solar Field	No	Eligible – Avoided
26CK10729	Prehistoric Lithics	Solar Field	No	Not Eligible
26CK10730	Prehistoric Lithics	Solar Field	No	Eligible – Avoided
26CK6354	Prehistoric Lithics	Solar Field	Yes	Eligible – Avoided
26CK7267	Prehistoric Lithics	Solar Field	Yes	Eligible – Avoided
26CK1371	Prehistoric Lithics	Solar Field	Yes	Eligible – Avoided
26CK6528	Prehistoric Rock Rings	Solar Field	Yes	Not Eligible

TABLE 3-8 LIST OF SITES RECORDED IN THE DIRECT APE OF THE GEN-TIE CORRIDORS

Site No.	Site Type	Project Location	Previously Recorded	Current NRHP Recommendation
26CK10748	Historic Era Dismantled Telegraph Line	Gen-Ties Both Proposed and Alternative	No	Not Eligible
26CK3536	Historic Era Old Spanish Trail/Mormon Wagon Road	Gen-Ties Both Proposed and Alternative	Yes	Non-Contributing
26CK4429	Historic Era Railroad	Gen-Ties Both Proposed and Alternative	Yes	Non-Contributing

The lithic scatter sites that are not eligible for the NRHP have been completely recorded so their information potential is exhausted and no further information would be obtained from further studies. These sites are surface sites with no potential for depth. They lie on an eroded surface with caliche and bedrock exposed. The lithic sites that are recommended eligible can provide further information to potentially answer future research questions important to prehistory. The ineligible rock ring site is located on bedrock so no subsurface material is present; therefore its research potential is also exhausted.

Fifteen sites in the indirect effects area were determined to warrant further investigation. Of these 15 sites, eight are eligible for the NRHP. A visual simulation was completed for these eight sites, and this indicated no adverse effect to these sites from the Project. The visual simulation methods are discussed in the visual resources section 3.7.1.2.

3.3.2 Environmental Consequences

3.3.2.1 Proposed Action

The ESMSP solar site includes ten archaeological sites that are currently recommended eligible for inclusion in the NRHP. The project will have an adverse effect on four of those sites. Additionally, six sites have been avoided by either the reconfiguration of the ESMSP solar site boundaries or by project development with installation of permanent protective barriers. The four sites that have not been avoided are sparse lithic scatters that would be mitigated prior to construction. Mitigation would include data recovery and curation with some non-invasive testing on obsidian if necessary.

The Congressionally-designated alignment of the Old Spanish National Historic Trail is located about 4.5 miles east of the solar site and about one mile east of the northern portion of the gen-tie outside the direct effects APE of the Project. The Trail does not have an archaeological site record or designation. It is a Trail managed by the National Park Service. A visual assessment was conducted to determine whether the viewshed from the Trail would be potentially affected by the presence of the ESMSP and visual simulations were developed from two locations on/near the Trail. This analysis indicated that the project could not be seen from the Trail. As discussed in more detail in the visual resources section (3.7.1.2), the assessment concluded that the viewshed from the Trail would not be affected by the ESMSP.

There would be no adverse effect to the UPRR and Old Spanish Trail/Mormon Wagon Road from the gen-tie line. This is because both of these resources are non-contributing to their NRHP eligibility in this area due to their current condition. Therefore, the gen-tie line would not alter the characteristics that make these two resources (trail/road, UPRR) eligible for the NRHP.

Disturbance and/or loss of other currently unidentified sites resulting from the implementation of the ESMSP could add to the cumulative loss of information about our heritage in the area and in the region. Such losses are not expected because an Unanticipated Discoveries Plan would be developed and implemented during construction of the Project. Direct effects to cultural resources are permanent and irreversible. Any direct effect to a historic property that cannot be avoided, including mitigation, would be an adverse effect.

A Memorandum of Agreement (MOA) is being prepared between the Band, BIA, BLM, and SHPO. This MOA will define the steps to be taken to lessen, resolve, and/or mitigate the adverse effects to the properties identified above. A detailed mitigation/monitoring plan would be prepared, discussing mitigation of any NRHP eligible site that would be adversely affected, along with monitoring procedures to ensure that any eligible sites outside the disturbance area are not affected.

3.3.2.2 Alternative Gen-tie Route

Using the alternative gen-tie route would have similar effects as described for the Proposed Action. Four of the same seven cultural resource sites are located within the direct APE of the alternative gen-tie route (see **Table 3-8**). The two eligible sites among these four - the Old Spanish

Trail/Mormon Wagon Road and the UPRR – are non-contributing segments to their NRHP eligibility because of their current condition.

3.3.2.3 No Action

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

3.4 Native American Concerns

Prior to the pedestrian inventory of the ESMSP direct effects APE, the BIA coordinated with the Band to discuss proposed survey methods and arrangements for tribal members to accompany the archaeologists during the survey.

In addition, the BIA sent letters to eight Tribes in the region with traditional interests in the area inquiring if there were any concerns about the effects of the proposed Project on historic properties or areas of traditional or cultural importance. These Tribes included the Las Vegas Paiute Tribe, Kaibab Band of Paiute Indians, Hualapai Indian Tribe, Fort Mojave Indian Tribe, Hopi Tribe, Colorado River Indian Tribes, Chemehuevi Indian Tribe, and Paiute Indian Tribe of Utah. **Appendix M** contains the BIA consultation letters and responses from the SHPO and tribes.

The Southern Paiute have used the Project area for thousands of years and the region is of great cultural significance, as they believe their Creator gave these lands to them. The Project area contains numerous cultural features that contribute to the history and the long-term use of this region by the Southern Paiute and specifically the Moapa Band. They have a deeply rooted spiritual connection to the land that weaves stories and songs into the landscape, connecting all elements of the universe. These connections involve water, trails, flora, fauna, geographic structures, and spiritual, historical, and ceremonial events.

In addition to the Moapa Band's direct involvement in the ESMSP and the archaeological surveys, the Hopi Tribe is the only tribe to formally respond to the consultation request and they provided the letter included in **Appendix M**. They requested continuing consultation including a copy of the cultural resources survey report for review and comment. Any resulting recommendations from the Hopi Tribe will be incorporated into the cultural resource mitigation measures and treatment plans as needed.

No specific concerns have been raised by the Band and other tribes regarding traditional cultural properties (TCPs) or other religious issues.

3.5 Socioeconomics

3.5.1 Affected Environment

The ESMSP would be located on undeveloped lands on the Reservation. The Project area is within the census geographies (census tract [CT]) CT 59.02, as is all of the Reservation. Socioeconomic information is also provided for Clark County and northern Clark County since it physically borders the Reservation and because some of the labor and materials employed in the construction of the ESMSP would be sourced from the surrounding Clark County area.

3.5.1.1 Employment and Income

According to U.S. Census Bureau data, in 2017 there were 1,599 people, 399 households, and 345 families residing in CT 59.02 (Reservation). There were 399 households out of which 48.1 percent had children under the age of 18 living with them, 59.6 percent were married couples living together, 20.5 percent had a female householder with no husband present, and 13.5 percent were non-families. In addition, 12.3 percent of all households were made up of individuals and 3.8 percent had someone living alone who was 65 years of age or older. The average household size was 4.01 and the average family size was 4.33.

Table 3-9 shows the median household income and percentage of the population living in poverty according to estimates for 2017 for the geographic comparison areas. In 2017, the estimated median household incomes for the United States, Nevada, and Clark County were similar at $57,652, $55,434, and $54,882, respectively. The median income for a household in on the Reservation (CT 59.02) was $61,063.

The Reservation had 12.8 percent living below poverty level, Clark County had 14.6 percent living below poverty level, and the State of Nevada had a 14.2 percent poverty rate. These are all lower than or equal to the national poverty status of 14.6 percent. These income data support the conclusion that there are no environmental justice communities defined by income. However, Native American persons residing on the Reservation are considered an eligible environmental justice community as defined by Executive Order 12898.

Clark County median ($54,882) and per capita ($27,719) annual incomes are below the U.S. median, and 14.6 percent of the individuals within the county have incomes that are below the poverty level threshold. According to the US Census Bureau, an impoverished community is defined as one in which more than 20 percent of the population is below the poverty level. For a single person (not a family) the poverty income threshold is $12,488. For a family of four with two children under the age of 18, the poverty income threshold is $24,858. Moapa Indian Reservation (CT 59.02), northern Clark County (CT 56.13), and Clark County's mean incomes are above the current 2017 Department of Health and Human Services poverty threshold.

The Clark County economy is heavily dependent on the leisure and hospitality sector, as well as closely linked supporting sectors in arts, entertainment, and retail trade establishments. In addition, hotel and resort renovation, development, and expansion within Las Vegas have traditionally been a

mainstay of the Clark County economy. **Table 3-10** shows the distribution of employment by industry within Clark County for FY 2017.

TABLE 3-9 POVERTY LEVEL AND MEDIAN HOUSEHOLD INCOME (ESTIMATES) IN 2017

Geographic Area	Median Household Income	Population*	Population Below Poverty Level	Percent Below Poverty Level
United States	$ 57,652	321,004,407	45,650,345	14.6
State of Nevada	$ 55,434	2,887,725	405,263	14.2
Clark County, Nevada	$ 54,882	2,112,436	304,449	14.6
CT 59.02 Moapa Indian Reservation	$ 61,063	1,599	204	12.8

Source: U.S. Census 2013-2017 American Community Survey
*Population for whom poverty status is determined

TABLE 3-10 EMPLOYMENT BY INDUSTRY IN FY 2017

Industry	Nevada	Clark County	CT 56.13 Northern Clark County	CT 59.02 Moapa Indian Reservation
Total All Industries	1,341,358	982,033	1,702	621
Agriculture, forestry, fishing, and hunting, and mining	21,843	2,927	21	5
Construction	85,110	60,671	154	95
Manufacturing	57,681	32,500	26	15
Wholesale trade	27,859	17,910	20	0
Retail Trade	159,110	117,649	62	112
Transportation and warehousing, and utilities	73,135	53,577	196	11
Information	21,423	15,673	33	35
Finance, insurance, real estate, and rental and leasing	76,045	58,529	59	32
Professional, scientific, management, administrative, and waste management services	148,248	112,737	281	53
Education, health and social services	210,560	146,382	362	73
Arts, entertainment, recreation, accommodation and food services	339,668	281,839	245	112
Other services (except public administration)	61,677	45,361	114	14
Public administration	58,999	36,278	129	64

Source: U.S. Census 2013-2017 American Community Survey

3.5.1.2 Unemployment

Table 3-11 shows the comparison between the various state, regional and local unemployment rates in 2017 as well as total reported labor force. The unemployment rate on the Reservation is 7 to 8 percent higher than for Clark County and the State of Nevada.

TABLE 3-11 UNEMPLOYMENT RATES

	Nevada	Clark County, Nevada	Census Tract 56.13 Northern Clark County	CT 59.02 Moapa Indian Reservation
Labor Force	2,292,486	1,667,625	3,306	1,209
Employed	2,109,087	1,529,212	3,051	1,029
Unemployed	183,399	138,413	255	180
Unemployment Rate	8.0	8.3	7.7	14.9

Source: Census Bureau 2013-2017 American Community Survey 5-Year Estimates

3.5.2 Environmental Consequences

This section discusses effects on social and economic resources that may occur with implementation of the ESMSP or alternative gen-tie. The additional jobs created by the ESMSP would be a benefit to the Band and community. In addition to employment benefits, there would also be benefits to Reservation-area businesses (both tribal and private) from the sale of food, gasoline for construction vehicles, water use, and aggregate material during construction of the ESMSP and to a lesser extent during operation. The Band would also benefit from the lease revenues provided by the ESMSP for the life of the Project.

There are no specific Federal thresholds of significance for socioeconomic impact assessment. Significance varies based on the setting of the proposed project (40 CFR 1508.27[a]), but 40 CFR 1508.8 states that indirect effects may include those that are growth-inducing and others related to induced changes in the pattern of land use, population density, or growth rates. In addition, the regulations state, “Effects include….cultural, economic, social, or health, whether direct, indirect, or cumulative.” Effects may also include those resulting from actions that may yield both beneficial and detrimental effects, even if on balance the agency believes that the effect would be beneficial (40 CFR 1508.8).

3.5.2.1 Proposed Action

During the construction phase, the increased spending on wages, materials, and services would have beneficial direct and indirect effects on local businesses, both tribally and privately owned. These indirect impacts are anticipated to continue during the operational phase of the ESMSP but at a lower rate because the facility workforce, payroll, expenditures on materials and services, and tax revenue would be at a lower level than construction. The ESMSP should not result in any long-term change in the population size, number of housing units, transportation, or demand for services in

the Moapa area but employment level and income would increase a small amount associated with the approximately five workers expected to be employed during operations.

Infrastructure / Housing

Construction. The construction phase is expected to have a short-term, negligible impact on the population of Clark County. During the peak construction, the workforce could reach a peak of 750 but the majority of workers would be expected to be local. This small temporary influx of workers could be accommodated by Clark County where infrastructure is designed for seasonal demands and fluctuations from global tourism. Therefore, the Project would not cause a temporary population increase that would necessitate additional local public services or investment in infrastructure capacities that could not be provided from existing resources.

Operations and Maintenance. The operational phase is expected to have no long-term, impact on the area's population level. When construction is completed and the ESMSP is operational, five permanent staff would be required to operate and maintain the facility and provide plant security. Nearly all of these jobs would be expected to be filled by Band members and off-reservation local labor pool.

Decommissioning. When operations are completed, the decommissioning phase is expected to have similar but lesser impact on the area's infrastructure or housing as the construction phase. The activities would be similar but the required workforce, equipment and duration would be less.

Economic Base Impacts: Employment, Earnings & Income

The construction phase would be beneficial to the local and regional economy. Construction spending would provide a short-term economic benefit within Clark County over the construction period. During operations, permanent direct employment, payroll, O&M-related spending, and the lease payments made to the Band for the ESMSP would provide a long-term positive recurring stimulus to the Band and region's economy.

Economic impacts include both direct and indirect effects associated with the linked supply chain and spending from wages. Direct effects are direct expenditures from construction activity such as payroll spending and locally procured supplies and equipment to support the Project. As the direct spending is subsequently re-spent by employees, suppliers and vendors, indirect impacts would be created.

Employment

Construction. The construction phase is expected to have a short-term, beneficial impact on Clark County's and the Reservation's employment levels. Project construction would provide a short-term boost to the local construction sector since the majority of construction workers would be expected to be hired from the local region including the Band. Under the Tribal Employment Rights Ordinance (TERO) agreement between the Band and the Applicant, Tribal members would have first right of refusal for any job positions for which they are qualified. During construction activity, employment would reach an average of 300 workers with a peak not expected to exceed 750 workers at any given time. The construction phase is expected to last approximately 18 months.

As mentioned above, it is likely that most of the workforce would be local and commute from the Clark County/Greater Las Vegas region. Therefore, most of their earnings would be recycled back

into the Clark County regional economy through spending of disposable income. In addition, non-local workers would provide a temporary stimulus to the local economy as they spend per diem money on hotels, meals, and consumables. This direct spending in the area would also indirectly create jobs. Those workers who do not relocate to the area would be expected to spend most of their earnings outside of the region.

The construction jobs are expected to be relatively high-paying. These jobs are clean energy/renewable energy opportunities that are expected to grow at above-average rates and pay above-average wages. The ESMSP would, therefore, help diversify the labor force of Clark County and add capacity and valuable utility-scale solar installation experience to the local labor pool.

Operations and Maintenance. During the operational phase, the ESMSP is expected to employ approximately five full-time workers to operate and maintain the facility and to provide plant security.

Decommissioning. When operations are completed, the decommissioning phase is expected to have similar but lesser impact on local employment as the construction phase. The activities would be similar but the required workforce, equipment and duration would be less.

Unemployment

The construction phase of the Project is expected to have a short-term, minor beneficial impact on unemployment levels in Clark County and on the Reservation. The level of employment impact would be minor in the County and moderate for Band members on the Reservation. As mentioned above, Band members would have first right of refusal for any job positions for which they are qualified. As a result of this agreement, unemployment levels within the Reservation could decrease in the short and long term.

Earnings / Income

The ESMSP is expected to have a positive effect on employee earnings and personal income in Clark County and the Moapa area. Construction is expected to have a positive, short-term impact on Tribal and regional income and the economy of Clark County. The Operation and Maintenance phase is expected to have a long-term, beneficial impact to the Tribal and regional economy and area personal income. During operation, the Project would create approximately five direct full-time equivalent jobs, and less than one indirect job, with a total annual income impact of up to $250,000. For any Band member that would be employed in one of these jobs, the annual salary would be above the average annual salary on the Reservation.

Tribal and Public Revenues

Construction. During construction, the ESMSP would generate a short-term, positive, non-recurring contribution to the Band and non-tribal public revenues. The Band would benefit from the sale of water, rock and cement during the construction phase. In addition, the Band could benefit from increased sales at the Tribal Plaza restaurant and store.

During the construction phase, the local workforce would earn payroll and pay taxes on employee compensation that would flow to Federal, state, and local jurisdictional treasuries. In addition, tax revenues for Clark County would also be generated from the direct and indirect construction expenditures on materials, equipment, and supplies.

Operations and Maintenance. Over the term lease agreement for the ESMSP (up to 40 years), the proposed Project would generate an annual rent to the Band as specified in the lease agreement. This long-term predictable revenue would be used by the Band to expand social programs, economic development, resource protection, or other purposes for the Band. Payments would also be made to the Band by the Applicant in lieu of taxes in accordance with the Tribal Tax Agreement.

In addition, the BLM would collect revenues from the annual rents for ROWs associated with the gen-tie line and use of the existing access road. In accordance with the provisions of P.L. 96-491 that established this part of the corridor on the Reservation – "the Secretary of the Interior shall be responsible for establishing and collecting fees for the use of such right-of-way….and…..Any payment of such fees to the Secretary …….. shall be made for the benefit of the Moapa Band of Paiutes." This will provide additional long-term revenue to the Band.

In addition, the annual O&M expenditures on materials and supplies would generate tax revenues to Clark County during the up to 40-year operating life of the Project. Operational payroll would also generate revenue to Federal, state, and local treasuries.

Decommissioning. At the end of the up to 40-year lease, if the Project does not continue to operate under a lease extension, the solar plant and associated infrastructure would be removed and the impacted areas would be reclaimed. The potential effects on socioeconomic resources from decommissioning would be similar to construction for the duration of the decommissioning period. These activities would also provide a short-term stimulus to the local economy. In addition, the land occupied by the Project would become available for other potential uses, including the historic, traditional desert uses of the property under tribal stewardship.

The Project would have a negligible but positive impact on public revenues during construction and decommissioning and a major beneficial impact to tribal revenues during the long-term operation of the project. Therefore, the ESMSP would have a major beneficial socioeconomic impact to the Band and the local area.

3.5.2.2 Alternative Gen-tie Route

Socioeconomic effects resulting from implementation of the Gen-Tie Alternative would be the same as the Proposed Action.

3.5.2.3 No Action

Under the No Action Alternative, the ESMSP and Alternatives would not be developed and no socioeconomic impacts (adverse or beneficial) would occur.

3.6 Lands and Realty

3.6.1 Affected Environment

3.6.1.1 Existing and Planned Land Uses

The majority of the ESMSP would be located on Tribal lands in the southwestern part of the Reservation. The proposed ESMSP solar site is located in an area designated by the Band for economic development. These lands are currently vacant and surround lands currently used by the Band for a tribal aggregate operation and water production wells. I-15 is approximately 3.3 miles east of the ESMSP site and the Union Pacific railroad is located between the site and I-15.

This site is located near two of the other solar projects also located on the Reservation - the existing K Road Moapa Solar Facility (approximately 1.3 miles away) and the approved Moapa Solar Energy Center site (approximately 1.2 miles away). The ESMSP solar field is immediately adjacent to an existing designated utility corridor. The proposed and alternative gen-tie routes would be located within the designated utility corridor on Reservation land but managed by the BLM. This segment of the utility corridor on Reservation land is administered by the BLM in accordance with Public Law (P.L.) 96-491 (the Moapa Utility Corridor and the Moapa Act) and reserved to the BLM under P.L. 96-491-Dec. 2, 1980. The width of the corridor has been identified legislatively as 3,000 feet.

The proposed gen-tie route would be located within the designated BLM utility corridor for approximately 10.8 miles, enter BLM-administered lands for approximately 0.3 miles, traverse private lands owned by NVE for 1.3 miles, and then terminate at the Reid-Gardner substation. The alternative gen-tie route would be located approximately 0.25 miles northwest of and parallel to the proposed gen-tie at the northwestern edge of the utility corridor. Once on private land, this alternative would follow the same route as the proposed gen-tie to the Reid-Gardner Substation.

The designated utility corridor contains many existing utility lines including several electrical transmission lines connecting to the Reid-Gardner Substation (230kV NVE Harry Allen-Reid Gardner #1 and #2, 345kV NVE Harry Allen-Red Butte, 500kV NVE Crystal-Navajo, and 500kV IPP HVDC Intermountain). Natural gas pipelines owned by Kern River Gas Transmission also occur within the corridor. **Figure 3-4** shows the location of the corridor relative to the proposed ESMSP.

The Reid-Gardner Generating Station, which was shut down in 2017 and is currently being dismantled, is located adjacent to the Reid-Gardner Substation, where the ESMSP gen-tie would interconnect. Multiple gas-fired power plants are located within a 30-mile radius south of the site including the Harry Allen Generating Station, Silver Hawk Generating Station, Chuck Lenzie Generating Station, and Garnet Valley Cogeneration Plant. Additional solar facilities within a 30-mile radius include the existing K Road Moapa Solar Project and proposed MSEC and Aiya solar projects on the Reservation, the proposed Gemini Solar Project on BLM, and the existing Switch Solar Project located on BLM in the Dry Lake Solar Energy Zone (SEZ).

Clark County has implemented land use plans for private lands within the Northeast County which includes the area around the Reservation. Northeast County is an unincorporated planning area administered by Clark County that includes the communities of Bunkerville, Glendale, Logandale,

Moapa, Moapa Valley, Mesquite and Overton. These plans were adopted in February 2012 and indicate the land uses surrounding the Reservation are Open Lands, Industrial and Residential Rural, and Rural Neighborhood.

There are seven registered airfields within approximately 50 miles of the proposed ESMSP (**Figure 3-5)**. These include Perkins Field Airport, Echo Bay Airport, Nellis Air Force Base (NAFB), North Las Vegas Airport, McCarran International Airport, Mesquite Airport, and Temple Bar Airport. NAFB is located 25 miles southwest of the proposed ESMSP. The Base covers more than 14,000 acres, while the total land area occupied by NAFB and its restricted ranges is about 5,000 square miles. An additional 7,700 square miles of airspace north and east of the restricted ranges are also available for military flight operations. NAFB averages 89 flights a day with 100 percent of them being military operations (FAA 2019).

The ESMSP would be located approximately 3.5 miles west of the Union Pacific Railroad (UPRR), which runs near I-15 through Dry Lake Valley and into Las Vegas. The proposed and alternative gen-tie routes would parallel the railroad at a distance of approximately 0.5 to 3 miles, respectively, and would each cross the railroad near the boundary of the Reservation in the vicinity of the Reid-Gardner Substation. This rail line connects Los Angeles-Long Beach with Salt Lake City and Union Pacific's transcontinental line to eastern destinations.

3.6.2 Environmental Consequences

3.6.2.1 Proposed Action

The proposed ESMSP would be constructed on Reservation land and the ROWs for the gen-tie line to the Reid Gardner substation would be located on tribal land within the designated BLM utility corridor, BLM-administered lands and private lands owned by NVE. The ESMSP solar site is located in an area designated by the Band for economic development and nearly all of the gen-tie routes are located within the designated utility corridor set aside for this specific purpose. The small amount of the gen-tie located on private land would be on NVE-owned lands historically and currently used for utility purposes (power generation, substations, transmission).

As a result, the ESMSP would not be inconsistent with or result in impacts to any Federal, state, or local land-use plans or policies, existing BLM land use authorizations, public land disposition, or land tenure adjustments. Below is a discussion of potential impacts to lands and realty as a result of the ESMSP.

Because of the location of the proposed gen-tie relative to the existing utilities within the corridor, there would be no long-term impacts to existing utilities as a result of the proposed ESMSP. Development and operation of the solar field and gen-tie would not affect continued access to existing transmission lines or pipelines by their owners. While the location of the proposed gen-tie route would not affect existing utilities in the designated corridor, it is possible that future lines in the corridor would need to cross the segment of the ESMSP gen-tie that is perpendicular to the general direction of the corridor. This would require coordination between the ESMSP and the other entity but should not negatively affect either project with proper planning.

ESMSP construction and operations would have no impacts to airports or airport operations. The Project is not expected to create hazards for pilots. The profile of the PV technology is low to the ground (up to 20 feet). PV technology does not create significant glare as PV panels are designed to absorb as much light as possible. Also, for the same reasons, the PV technology would not create thermal boundaries that would affect aircraft operations. More discussion of potential glare effects is included in the **Section 3.7** (Visual Resources).

The solar project and the proposed gen-tie line would not require FAA notification. The gen-tie would not be expected to create additional air navigation hazards because there are multiple and larger existing transmission towers in the area.

If pilots from NAFB eject over the ESMSP site, potential damage to the solar field could occur depending on the altitude and direction of the aircraft during an emergency ejection. If ejected pilots land within the solar field, they would not be expected to be affected by the solar components as they would be protected by their flight suits and helmets with glare shields.

The proposed gen-tie route would cross the rail line ROW near the northern border of the Reservation. The rail line would be spanned by the gen-tie and would not interfere with the normal operation of the railroad. There would be no impacts to the railroad as a result of the ESMSP.

3.6.2.2 Alternative Gen-tie Route

The alternative gen-tie route would parallel the proposed gen-tie route approximately 0.25 miles to the northwest and adjacent to, and within the northwestern boundary of the designated corridor. Due to its close proximity to and similarities with the proposed gen-tie, impacts to lands and realty resources would be the same as those described for the proposed gen-tie except for the potential to be crossed by future utility lines within the designated corridor. The location of this route adjacent to the boundary of the corridor eliminates the potential for this gen-tie to be crossed by future utility lines within the corridor. This would eliminate the need for utilities proposing future lines to coordinate and plan for this crossing.

3.6.2.3 No Action

Under this alternative, the ESMSP would not be developed and there would be no effect on land use and realty.

3.7 Visual Resources

The discussion of visual setting for the Federally managed lands is based on the BLM guidelines for visual resource management (VRM). The BLM's VRM system provides a framework for describing visual resources, establishing appropriate management goals for those resources, assessing the impact of an action on those resources, and determining whether such an action would conflict with established management goals. Neither the Band nor the BIA has a visual resource management policy for tribal lands where the solar site would be located.

3.7.1 Affected Environment

3.7.1.1 Visual Resources Inventory

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

The gen-tie line would be located within a BLM-designated utility corridor for most of its length that contains multiple existing high voltage transmission lines, pipelines, and substations. Many of the high voltage electrical lines in this area are associated with the existing Reid-Gardner Substation where the gen-tie line would terminate. As a result, the natural landscape setting has been heavily modified by these exiting utilities. The Crystal and Harry Allen substations and the Harry Allen Power Plant are also visible from the proposed ESMSP solar site.

The proposed ESMSP solar field is located approximately three miles northwest of I-15. At its closest point, much of the terrain between I-15 and the solar site obscures views from the highway. The mountains of the Arrow Canyon Range are visible in the background beyond the ESMSP site from I-15. Where the solar site would be visible from I-15, views would include the other existing man-made features in the viewshed including the multiple existing power lines within the corridor ranging from 230 kV to 500 kV in size, the existing Crystal Substation, and the existing K Road solar facility depending on the viewpoint.

As confirmed in the previous EISs for the other solar projects on the Reservation (Section 3.13 in each of BIA 2012, BIA 2014a, and BIA 2016), the scenic quality of the ESMSP project area is C (low) because the landforms are relatively flat and, though adjacent scenery in the form of mountain ranges add visual interest, there is little variety and contrast in the local vegetation and the landscape color variations are subtle. The landscape is common within the physiographic province and the manmade modifications detract from the natural visual character.

The visual sensitivity level rating for the ESMSP project area would be characterized as low due to the existing utility uses in the area. The primary viewers of the ESMSP area would be travelers on Interstate 15 and the relatively small number of people who work at the existing nearby power facilities (Crystal Substation and K Road solar project). The presence of the existing utility infrastructure dominates the foreground and middleground distance zone from the highway (I-15).

3.7.1.2 Visual Resource Management Classes

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

- Class I Objective. The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
- Class II Objective. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
- Class III Objective. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- Class IV Objectives. The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Figure 3-6 shows the VRM classes on the BLM-administered lands in the Project area that would be crossed by the proposed gen-tie for the Project. The VRM objectives do not apply to Reservation lands.

As shown on **Figure 3-6**, all of the BLM-managed lands that would be affected by the ESMSP gen-tie line are designated as VRM Class IV. This includes the small amount of federal land near the existing Reid-Gardner Substation and associated infrastructure (BLM 1998) and the lands within the designated utility corridor that are located on the Reservation but managed by BLM. While this portion of the utility corridor is not included in BLM's Resource Management Plan (RMP) for the Las Vegas Field Office because of its location on the Reservation, generally BLM manages designated utility corridors as VRM Class IV because of the existing and potential future high level of modification to the landscape in these areas.

3.7.1.3 Visibility

A viewshed analysis was conducted by overlaying the proposed ESMSP components on a Digital Elevation Model (DEM) of local terrain. A height of 20 feet above site grade was used for the solar site to determine the areas from which the solar facility (PV solar modules and associated facilities) could be visible. Transmission structures 100 feet tall were also evaluated in the visibility analysis to identify the areas from which the gen-tie could potentially be seen. The locations of travel routes and historic trails (for example, I-15 and the Old Spanish National Historic Trail) were also overlain on this map. **Figure 3-7** shows the areas from which the solar facility and gen-tie could potentially be visible.

As shown on this figure, the areas from which the Project could be seen are limited to a few locations from I-15 relatively close to the Project area because of intervening topography. The Old Spanish National Historic Trail (OSNHT) is a sensitive resource in the area located approximately 5 miles east and southeast of the proposed solar site at its closest point. The OSNHT is only about 1.3 miles from the proposed gen-tie at its northern end near the Reid-Gardner Substation. As **Figure 3-7** shows, the proposed solar facilities could be potentially visible at a few locations while the gen-tie could be seen from more locations along the OSNHT. A more detailed discussion of the visibility of the Project from the OSNHT is provided below.

3.7.1.4 Key Observation Points

Key Observation Points (KOPs) represent a critical or typical viewpoint within, or along, an identified location. They are used to provide representative views from locations where the project could be visible by people to assess and mitigate visual impacts of a proposed action and to evaluate compliance with designated visual management objectives.

I-15 is the location from which the proposed ESMSP could be potentially be seen by the most people. There are no residences or other high use areas in the immediate area.

KOP locations were selected through consultation with the BIA and NPS and represent views along nearby locations along I-15 and from locations on the OSNHT from which the ESMSP could be seen as identified by the visibility analysis. **Figure 3-7** shows the KOP locations that provide views representative of many locations around the Project area and they are described below:

- KOP 1 – This location is where I-15 and the OSNHT intersect and is the northernmost location along the Trail from which the solar facility could be potentially seen (as shown on **Figure 3-7**). Portions of the gen-tie could also potentially be seen from this location. It is located approximately 5.2 miles east of the solar site. **Figure 3-8** shows the existing view from this location.
- KOP 2 – This is one of the closest locations along I-15 from which the solar facility and part of the gen-tie could potentially be seen. It is located approximately 3.2 miles southeast of the solar site. The viewing area is narrow (and of a short duration for drivers) because of intervening topography near the highway. **Figure 3-9** shows the existing view from this location.
- KOP 3 – This location is where the OSNHT crosses the Valley of Fire Road from which the project could potentially be seen. It provides a representative view from both the trail and the road. It provides a similar narrow viewing angle of the solar facility as KOP 2 but from about 3 miles farther away. **Figure 3-10** shows the existing view from this location.
- KOP 4 – Like KOP 2, this KOP was selected because this is one of the closest locations along I-15 from which the solar facility could potentially be seen. It is located about 3.6 miles south of the solar site. It also has a very narrow viewing area (and short duration for drivers) because of intervening topography near the highway. **Figure 3-11** shows the existing view from this location.
- KOP 5 – This is a slightly elevated location on I-15 from which the solar facility should be visible to north-bound drivers with no intervening topography. It is located about 5.2 miles south of the solar site. **Figure 3-12** shows the existing view from this location.

- KOP 6 – This point is located on the OSNHT at a point near the northern end of the gen-tie line. There is about 1.3 miles between the OSNHT and gen-tie at this location. **Figure 3-13** shows the existing view from this location.

3.7.2 Environmental Consequences

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

3.7.2.1 Proposed Action

The proposed ESMSP is located on terrain that is relatively flat. Views of the project from many locations on I-15 are blocked by intervening topography in several locations as shown on **Figure 3-7** but there are locations on I-15 from which the Project would be visible. The dominant man-made visual features would be the solar field and the gen-tie line. Within the viewshed from I-15 or the Old Spanish National Historic Trail there are other existing built elements that are similar in form, line, color, texture and scale to the proposed ESMSP including the existing Reid-Gardner Power Plant and substation near the north end of the gen-tie line, the existing Crystal Substation on the south end, and the multiple high voltage transmission lines ranging from 230kV to 500kV in size within the designated utility corridor.

The small portion of the gen-tie on BLM-administered land is in close proximity to the Reid-Gardner Power Plant and substation and the multiple high voltage transmission lines that run through the area. The BLM RMP indicates that these BLM lands are designated as VRM Class IV because of the high level of modification to the landscape in this area. Likewise, while not formally classified because it is located on the Reservation, the lands within the BLM-managed designated utility corridor would also be considered to be VRM Class IV similarly to how BLM manages other utility corridors. The gen-tie would be consistent with the VRM Class IV objectives that allow major modifications of the existing character of the landscape, a high level of change to the characteristic landscape, activities that dominate the view and be the major focus of viewer attention.

The ESMSP solar site is located on the Reservation and is not open to public access. Therefore, there is no use by the public. As shown in the viewshed analysis depicted on **Figure 3-7**, the ESMSP solar facility would be visible from I-15 primarily from the south and east. Views of the Project in the southbound direction on I-15 north of the site would be blocked by intervening topography. Views of the project in the northbound direction on I-15 would be limited to very short durations (generally less than one minute) because of the highway speeds at which the viewer is traveling and because the Project would be screened from view intermittently by guardrails or foreground topography that would block the view to the west. This would vary by the lane the vehicle is traveling in and the local topography along the roadway.

Six KOPs were identified in the Project area in consultation with the BIA, BLM, and the NPS. KOPs 1 through 5 are located on the public travel routes in the vicinity of the Project including I-15 and the Valley of Fire Road which were determined to be within the viewshed of the Proposed Project. KOPs

1, 3, and 6 are representative of views from segments of the Congressionally-designated location of the Old Spanish National Historic Trail.

A visual simulation was prepared for each key observation point (KOP) to depict the view of the ESMSP from each location. Simulations were prepared for the solar project using the largest potential PV panel configuration (up to 20 feet high when rotated to their greatest angle) as it would represent the potentially most visible condition (highest panel height) that could occur on the solar site.

To produce the simulations, a three-dimensional (3-D) model was developed for the horizontal tracker technologies and the gen-tie lines which were then superimposed on the digital elevation model (DEM) of the topography of the area. Each KOP was incorporated into the DEM to verify scale and viewpoint location and model renderings were combined with the high-resolution digital photographs. **Figures 3-14** through **3-19** show the existing views and the visual simulations of the ESMSP from KOPs 1 through 6.

KOP 1 is located on I-15 where it crosses the OSNHT about 5.2 miles east of the proposed ESMSP solar field. The view from this location is primarily to the west and a part of the existing K Road solar field is visible on the far left. The visual simulation of the ESMSP from this location is shown on **Figure 3-14** and it shows that the ESMSP solar field would not be visible because subtle intervening topography shields it from view. The southern part of the gen-tie would be faintly visible in the right half of this view. Because of the distance between this KOP and the gen-tie, the visual contrast of the gen-tie poles would be weak and it would be relatively indistinguishable from the multiple existing transmission lines adjacent to it and between it and the viewer.

KOP 2 is located on located on I-15 about 3.2 miles southeast of the solar site. The view from this location is from the north-bound lane of I-15 and is primarily to the northwest and I-15 and the UPRR are in the foreground. The visual simulation of the ESMSP from this location is shown on **Figure 3-15** showing portions of the ESMSP solar field would be visible in the center and left side of the view. The visual contrast for the solar field would be moderate from this location and it would be easily recognizable on the landscape. The southern part of the gen-tie would also be faintly visible from this location but the visual contrast of the gen-tie poles would be weak and it would be relatively indistinguishable from the multiple other existing transmission lines. The duration of the view to travelers on I-15 from this location would be very short due to the speed of travel, the angle of observation being perpendicular to the direction of travel, and the intermittent intervening topography between the highway and ESMSP features.

KOP 3 is located where the OSNHT crosses the Valley of Fire Road about 5.9 miles east of the proposed ESMSP solar facility and the view is to the northwest. The existing K Road Solar Facility can be seen on the right side of this view. The simulation from this view (**Figure 3-16)** shows that the ESMSP solar field would be readily visible in the center of the view. The visual contrast for the solar field would be moderate from this location and it would be easily recognizable on the landscape. The duration of the view to northwest-bound travelers on Valley of Fire Road from this location would be relatively long because the view is in the middle of the direction of travel and there is little intervening topography. The gen-tie would not be visible from this location.

KOP 4 is located on I-15 about 3.6 miles south of the solar site. The view from this location approximates the view of a north-bound traveler on I-15 and is primarily to the north. I-15 is in the foreground and the existing Crystal Substation and multiple transmission lines and the UPRR are visible in the middle-ground. The visual simulation of the ESMSP from this location is shown on **Figure 3-17** showing portions of the ESMSP solar field would be visible in the center left of the view. The visual contrast for the solar field would be strong from this location and it would dominate the landscape. The duration of the view to travelers on I-15 from this location would be moderate (15 to 30 seconds at highway speeds) due to the speed of travel, the angle of observation relative to the direction of travel, and the distances between intermittent intervening topography. The gen-tie would not be visible from this location.

KOP 5 is located on I-15 looking northbound about 5.2 miles south of the solar site. The view from this location approximates the view of a north-bound traveler on I-15 and is primarily to the north. I-15 and an associated guard-rail are in the foreground and multiple transmission lines are visible in the middle-ground. The visual simulation of the ESMSP from this location (**Figure 3-17**) shows the ESMSP solar field would be visible in the center background of the view. The visual contrast for the solar field would be moderate from this location and it would be easily recognizable on the landscape. The duration of the view to travelers on I-15 from this location would be relatively long (up to one to two minutes at highway speeds) due to the angle of observation relative to the direction of travel and the relative lack of intervening topography. The gen-tie would not be visible from this location.

KOP 6 is located on the OSNHT near the northern portion of the gen-tie at a distance of only about 1.3 miles. The proposed gen-tie line would be visible as shown in the visual simulation from this location (**Figure 3-19**). However, the visual contract would be weak and the gen-tie would not dominate the view from this location because the existing high-voltage lines within the utility corridor are readily visible and between the gen-tie line and this KOP location.

Although the ESMSP project would be located near an interstate highway, the topography near the highway would obstruct views of the proposed ESMSP solar field from most viewpoints on I-15. Development of the proposed ESMSP would not be expected to substantially degrade the existing visual character of the site and its surroundings.

The proposed ESMSP solar site is located on the Reservation. The Arrow Canyon Mountain and Muddy Mountains Wilderness Areas are located on BLM-managed lands in the general vicinity but the ESMSP would not be readily visible from these locations because the Arrow Canyon Mountain Wilderness is located 6 to 15 miles north of the ESMSP site where views are blocked by intervening topography and the Muddy Mountains Wilderness is located approximately 12 miles southeast of the site. Therefore, development of the ESMSP would not have a direct or indirect effect on identified areas of public concern for scenic quality.

As shown on **Figure 3-7**, the ESMSP solar facility could be viewed from short segments of the OSNHT near I-15 but at distance of over five miles. The northern portions of the ESMSP gen-tie would be visible from portions of the OSNHT near Reid-Gardner but would not be discernable due to the existing built elements (transmission lines) in the area with similar form, line, and texture. The visual simulations prepared for KOPs 1, 3, and 6 confirm that visibility of the ESMSP to the OSNHT would

be minor because of distance, the presence of existing transmission lines within the utility corridor, and intervening topography.

Light and Glare

Light. The proposed ESMSP solar field is located on the Reservation. There is currently no source of light or glare within the project footprint. Lighting could be used during construction if needed. During operations, sources of light would be located on the solar site primarily in the area of the O&M building or substation area. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be downward-facing and shielded to focus illumination on the desired areas only. Therefore, the proposed ESMSP is not anticipated to create a new source of substantial light which would adversely affect nighttime views in the area and would not impact users of the nearby areas (e.g., campers, stargazers, and recreational users of the desert).

Glare. PV modules are designed to absorb as much light as possible to maximize efficiency. In addition, PV modules generally use anti-reflective coatings to decrease reflection and increase conversion efficiency. The time and duration of any potential reflections from the panels are determined by the orientation of the panels and the position of the observer in relation to those panels. PV solar projects use single-axis tracking mounting structures to rotate the panels throughout the day to keep the panels perpendicular to the sun to maximize solar absorption and energy output. This consistent orientation of the panels towards the sun results in the majority of incoming light being reflected back into the sky.

The amount of light reflected upwards would not be expected to potentially affect the training conducted at Nellis Air Force Base (NAFB) or other air traffic in the area. Two factors are relevant to the intensity of reflected light – the amount reflected and the distance from the source. Only 2 to 10 percent of ambient light is reflected by PV solar panels (Newton, 2007) and the index of refraction for the glass that covers most panels is generally the same as the windshield of a car since it is made of the same material. Therefore, the intensity of the reflected light would be low. Also, light intensity decreases with distance from the source so the intensity of light reflected from the PV solar panels at locations any distance from the source would be a small fraction of its original intensity. In addition, any viewers who could see the reflected light would also be exposed to significantly brighter ambient light.

The proposed ESMSP would not use materials such as fiberglass, or vinyl/plastic siding and brightly painted steel roofs, which have the potential to create on-and off-site glare. Therefore, future development of the project site is not anticipated to create a significant new source of glare that would adversely affect daytime views in the area or affect local aviation / training.

3.7.2.2 Alternative Gen-tie Route

Effects to visual resources resulting from implementation of this alternative would be similar to those identified for the proposed ESMSP. The same solar site would be developed and the same BMPs would be employed as for the proposed ESMSP. Within the designated utility corridor, the gen-tie alternative would be located in a similar location (parallel to the proposed gen-tie route but about 0.25 miles northwest), would cross similar land forms, and would utilize the same structure

types, materials, construction methods, and mitigation as the proposed gen-tie. While this route alternative would be slightly shorter, visual impacts would be approximately the same as the proposed gen-tie because it also would be located in an area where there are multiple existing and larger transmission lines. The portion of the line on BLM-administered lands and private lands would be essentially the same as the proposed gen-tie.

3.7.2.3 No Action

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

3.8 Cumulative Impacts

This section analyzes cumulative impacts of the proposed ESMSP in conjunction with other development that affect or could affect the area. Under NEPA, a cumulative impact is the impact on the environment that results from the incremental impact of the project when added to other past, present, and reasonably foreseeable future actions (40 CFR Section 1508.7). In order to facilitate the cumulative analysis, a cumulative scenario has been developed that identifies and evaluates projects that already exist within the vicinity of the proposed ESMSP, that are reasonably foreseeable, or would be constructed or commence operation during the timeframe of activity associated with the proposed Project.

3.8.1 Cumulative Projects

The cumulative scenario includes projects within the same geographic and temporal scope as the ESMSP. For the purpose of this study, the geographic scope for cumulative effects has been defined as within the Muddy River and California Wash watersheds within five miles of the Project area for physical and biological resources (water resources, biological resources, cultural resources, lands/realty) as this area provides natural boundaries for these resources. The geographic scope for socioeconomic impacts (employment, income, services, resource use patterns, etc.) is within the local community or county. The cumulative effects area for visual resources would be ten miles. Nearly all current or foreseeable projects that could take place within the area would be located on the Reservation or BLM-managed land respectively, so would be subject to NEPA and would also evaluate local cumulative impacts.

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

The cumulative scenario includes renewable energy projects, transportation projects, infrastructure improvement projects, pipeline and electric transmission projects, and other projects that meet the following criteria:

- Projects that are closely-related and completed past projects;

- Projects approved and under construction;
- Projects approved but not yet under construction; and
- Projects that have been proposed but not approved.

Projects included in this cumulative analysis can be found in **Table 3-12**. This analysis evaluates the past, pending and current/future projects and are summarized in the sections below.

TABLE 3-12 CUMULATIVE PROJECTS IN THE PROJECT AREA

Project Name	Project Type	Approximate Size	Status
Gemini Solar Project (690-MW)	Energy	7,100 acres	DEIS Public Review concluded Sept. 5, 2019
Southern Bighorn Solar (300-MW)	Energy	2,600 acres	Predevelopment phase
Harry Allen Solar Energy Center Project (130-MW)	Energy	715 acres	Operational by the end of 2020.
Apex Solar Project (20-MW)	Energy	156 acres	Constructed
Playa Solar Project (200-MW)	Energy	1,700 acres	Constructed
Nellis Air Force Base Area III Solar Project (14.2-MW)	Energy	140 acres	Constructed
Nellis Air Force Base Area I Solar Project (15-MW)	Energy	160 acres	Constructed
Moapa Solar Project [K Road] (250-MW)	Energy	2,000 acres	Constructed
Moapa Solar Energy Center (200-MW) – plans to increase to 300MW (Arrow Canyon)	Energy	850 acres	Not constructed
Dry Lake Solar Energy Center Project (150-MW)	Energy	694 acres	Predevelopment phase
Dry Lake Solar Energy Center at Harry Allen (20-MW	Energy	155 acres	Construction will occur over 12 to 24 months; Predevelopment phase
Dry Lake East Solar Designated Leasing Area Project	Energy	1,800 acres	FONSI issued July 2019
Aiya Solar Project (100-MW)	Energy	900 acres	Project is paused due to lack of financing; Construction will occur over 12 months
TransWest Express Transmission Project	Transmission	725 miles	Construction will occur from 2020 to 2022

3.8.2 Cumulative Impacts by Resource

For this analysis, cumulative resource impacts are the combined direct and indirect effects of the present and reasonably foreseeable future actions, plus the direct and indirect impacts of both alternatives. For the resources identified in **Table 3-1** where the direct or indirect impacts were considered to be none or negligible as a result of the Proposed Action or Gen-tie Line Alternative, there would be no contribution to the resources' cumulative impacts and therefore no further

discussion has been included in this section. It is anticipated that the resources identified in **Table 3-1** as having minor short- or long-term impacts (Invasive Species and Noxious Weeds, Soil, Topography and Geology, Traffic and Transportation, and Waste, Hazardous or Solid) would also result in a minor cumulative impact when combined with the identified past, present, and reasonably foreseeable future projects and are not described in detail below.

3.8.2.1 Water Resources

The ESMSP would not substantially affect surface water resources as the major drainages on the solar site would be avoided, the project area has limited potential jurisdictional waters along the gen-tie corridor. Therefore, cumulative effects are focused on groundwater quantity and quality. Over time, the amount of water available regionally could be affected by climate change. While the general area is largely undeveloped, ongoing and foreseeable development could use groundwater and have the potential to impact groundwater resources.

The proposed ESMSP would use up to 200 AFY during 18 months of construction and up to 20 AFY of groundwater during its proposed up to 50-year operation. Two recent studies show that pumping at this rate for 75 years would result in drawdowns of only 0.5 to 2.0 feet and would not result in observable flow differences in the Muddy River springs area [refer to **Section 4.15.4.3** in the Moapa Solar Energy Center FEIS (BIA 2014a)].

The potential for groundwater resources in the area to be impacted by cumulative projects withdrawing water from the local aquifers was the driver for development of a Memorandum of Agreement (MOA) and the *Intra-Service Programmatic Biological Opinion* (PBO) for the Moapa dace. The MOA and PBO were developed through intra-service consultation and identifies the monitoring and mitigation measures that must be undertaken to address the potential impacts from cumulative groundwater withdrawals. The conclusion of this analysis was that use of the Band's entire 2,500 AFY water right would not negatively affect flows in the Virgin River. Detailed information on the MOA and PBO is included in **Section 4.8.4.1.2** in the MSEC FEIS (BIA 2014a).

Therefore, this Project would have a negligible contribution to potential cumulative impacts and the potential overall cumulative impacts to groundwater in this area will be dependent on the number of water development projects that are implemented and their schedule for implementation. In addition, the cumulative impacts to groundwater could also be accelerated by the contribution of climate change to the reduction of precipitation in the basin and its contribution to groundwater recharge.

All identified cumulative projects would be subject to the implementation of spill prevention measures and any potential release from either the ESMSP or any current or foreseeable proposed projects would not be expected to have measurable effects to groundwater quality because of the depth to groundwater in the area and requirements for spill prevention and cleanup. Therefore, this Project when combined with the other actions in the area is not anticipated to negatively affect groundwater quality.

3.8.2.2 Biological Resources

Mojave Desert scrub/shrub vegetation makes up the majority of all vegetation within the entire Mojave Desert. Like the proposed ESMSP, many of the cumulative projects would affect this same type of habitat as well as the sensitive wildlife species that occur within this region and habitat. The nature of the cumulative conditions can be separated into long-term effects and temporary and short-term effects. Some proposed solar projects would result in relatively long-term loss of thousands of acres of vegetation and habitat for a variety of wildlife species including the desert tortoise. However, the proposed ESMSP would employ grading only where necessary and permanently impact much less habitat than previous projects and will have permeable fencing to allow for desert tortoise and other wildlife to reoccupy the site during and after operations.

The linear utility projects in the cumulative effects study area would have a short-term effect on vegetation during the construction phase but would be allowed to revegetate or be restored and species such as desert tortoise would be able to reutilize the area. Implementation of the ESMSP and other cumulative projects could impact native species and habitats by increasing the spread of weeds on the Reservation and within the utility corridor where weed species already occur. This increase in weedy species would increase wildfire potential on project lands and adjacent lands.

Some of the anticipated cumulative projects would also potentially impact desert tortoise habitat. As indicated in Table 3-12, the local solar projects on and nearby the Reservation would impact up to 15,000 acres. To mitigate any direct effects or potential cumulative effects, the ESMSP and other cumulative projects would develop and implement desert tortoise mitigation plans in consultation with the USFWS. These mitigation measures would reduce the impacts that projects would have upon the desert tortoise.

Long-term impacts to yucca and cacti species would occur as a result of cumulative effects of multiple projects. The BLM also manages sensitive species as part of their review of the ROW agreements for transmission, pipelines, and utility roads within the existing utility corridor as well as large-scale projects on BLM lands. Mitigation measures would ensure that only minimal cumulative impacts to native and sensitive vegetation would occur as a result of the current and foreseeable projects.

Some of the projects considered for cumulative impacts would affect suitable foraging habitat for raptors including golden eagles. Loss of foraging habitat could impact foraging behaviors which could cause adverse impacts to the fitness of populations within known nesting grounds. The proposed and existing transmission lines would be located near one another in or near the utility corridor. The existing lines have been in place for many years and raptor foraging flight patterns have most likely adapted to their presence. Potentially adding another line to this corridor (such as the ESMSP gen-tie) could increase the potential for the electrocution of raptors/eagles. To mitigate any direct effects or potential cumulative effects, the ESMSP and other projects would implement APLIC guidelines to reduce the impacts that cumulative projects would have to raptors.

3.8.2.3 Cultural Resources

Disturbance and/or loss of unidentified sites or artifacts from the implementation of the proposed ESMSP and other existing or reasonably foreseeable actions in the Project area could add to the cumulative loss of information about our heritage. The ESMSP is not expected to affect the viewshed from the designated location of the Old Spanish National Historic Trail.

Existing developments in the vicinity of the proposed ESMSP include the transportation corridors such as I-15 and the Union Pacific Railroad to the south and east, the utilities within the designated utility corridor, and the existing Reid-Gardner Power Plant and substation to the north. Recent past projects include the existing K Road Solar Facility and the solar projects within the Dry Lake SEZ. Reasonably foreseeable developments in the general area of the ESMSP include other potential solar projects (Gemini, Big Horn, and Arrow Canyon) and their associated utility lines and electric substations. Each of these projects have or could impact cultural resources.

The ESMSP would adversely affect eligible historic properties. Mitigation requirements for impacts to these properties would be addressed in an MOA developed between the Band, BIA, BLM, and SHPO and would minimize potential effects. Therefore, impacts to cultural resources resulting from the ESMSP would not be expected to have a major contribution to cumulative impacts to cultural resources. Likewise, the other cumulative projects that would be under BLM, BIA, or other federal jurisdiction would also be subject to the same Section 106 requirements that would require similar mitigation and impact minimization.

3.8.2.4 Socioeconomics

The socioeconomic impacts from the Prosed Action would be limited to the local and regional area (county) surrounding and including the Reservation and Las Vegas. The ESMSP would have short-term and long-term beneficial impacts during construction, operations, and decommissioning activities.

All current and foreseeable projects would also contribute short-term and potentially long-term beneficial cumulative impacts to employment, housing, and local/regional tax base and sales. The type of proposed projects (renewable energy and corridor construction projects) would have a specific short-term socioeconomic impact during construction as large numbers of employees would be needed and a much smaller number during operations of the facilities.

Most employees would come from the current employment pool including tribal members. Local employment would result in local spending while employment of special trades from outside the area would boost hotel occupancy. The projects would also use local resources, materials, and commodities from local suppliers during construction having a short-term effect. The Band would benefit from the lease and ROW payments from the ESMSP and the use of their Travel Plaza for fuel, food and other supplies.

Construction of ESMSP in conjunction with the current and foreseeable projects would result in a beneficial, cumulative impact on the local, tribal, and regional economy and would increase

employment during the periods of construction and decommissioning, and to a smaller extent, during operations.

If more than one solar project were to be built on the southern portion of the Reservation and/or nearby lands at the same time, they would utilize the same primary access routes and would likely have cumulative effects on traffic at the I-15 / Highway 93 intersection and on North Las Vegas Boulevard. These effects would be mitigated by the development and implementation of a detailed traffic mitigation plan that would be developed for each project in coordination with the Nevada Department of Transportation (NDOT).

3.8.2.5 Visual Resources

Cumulative impacts to visual resources could occur if multiple projects are developed in the same viewshed and significantly changes the natural surroundings. The terrain of the Project area is relatively flat with the Arrow Canyon Range Mountains in the background from views along I-15 which is the location from which most people would see it. Vegetation on the ESMSP and the surrounding area in all directions is primarily desert scrub/shrub and can be described as industrialized open desert land. Many electric transmission lines and pipelines traverse the area and several power plants and electric substations are visible throughout the area as well. I-15 and the UP railroad are also obvious man-made features in the area.

Planned development for the area that would have cumulative effects on visual resources would include additional solar projects and electric transmission lines. These projects would have low to moderate long-term effects to the visual setting while other projects such as pipelines would have a short-term cumulative effect if construction took place at the same time as other foreseeable projects.

Given the high number of existing transmission lines currently within the immediate area, future lines would likely blend together from most viewpoints therefore the addition of this gen-tie line would not stand out and would be indistinguishable from the existing utility corridor features. The K Road Moapa Solar project is located approximately one mile east of the ESMSP and could be seen within the same viewshed as the proposed ESMSP from a few specific vantage points. The ESMSP would add another man-made feature to the viewshed in these areas.

3.9 Unavoidable Adverse Impacts

The following section describes the unavoidable adverse impacts that would occur as a result of the construction, O&M, and decommissioning activities associated with the ESMSP. This section also includes a discussion of the irreversible and irretrievable commitments of resources associated with the Project.

As discussed in **Section 3.1.2**, the primary drainages on the solar site would not be affected but smaller drainages along the gen-tie line would be affected and erosion and sediment flow could be increased temporarily during and after construction. While these impacts would occur, due to the implementation of BMPs, the unavoidable adverse risk of flooding and sediment production would

be negligible. The ESMSP would also withdraw water for construction and O&M from an existing well on the Reservation.

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

The loss of 120 acres of habitat by implementing the ESMSP would result in an unavoidable adverse impact to vegetation and wildlife habitat for the life of the project. The loss of this amount of native vegetation would not be expected to cause an irreversible and irretrievable commitment of the resource on a regional basis.

Localized and long-term, unavoidable, adverse impacts on wildlife, including special status species, would occur. Unavoidable impacts to desert tortoise would occur and would be mitigated by the terms of the take permit that would be issued for Project.

Construction of the ESMSP would affect properties eligible for listing on the NRHP. Any loss or damage to these resources would be adverse and could potentially be irreversible. However, such losses are not expected because avoidance and appropriate mitigation measures would be implemented. Any recovery of data at sites affected by the Project would remove the artifacts from their current location. Also, in the event that ground disturbance causes the inadvertent discovery of previously unidentified subsurface cultural resources, these would be managed based on guidance from the appropriate agency and the Band. Therefore, there would be irreversible impacts to cultural resources but no irretrievable impacts to cultural resources are anticipated.

The Project is expected to create an average of 300 and up to 750 construction jobs for a period of up to 18 months. After the ESMSP is commissioned, up to 5 full time-equivalent positions would be required to operate and maintain the facility and provide plant security. This employment would have a beneficial impact on the local economy. The Project would provide long-term lease and ROW revenues to the Band and increase local spending which would also be beneficial. Therefore, there would be no unavoidable adverse impacts or irreversible and irretrievable commitments of the economic resources.

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

The ESMSP would limit future use of approximately 2,200 acres of the Reservation and nearby BLM lands for other uses for the life of the ESMSP. This would not irreversibly and irretrievably commit the land resource as the use could change after Project decommissioning.

Views of the Project area from I-15 are blocked by intervening topography in most locations but there are some locations on I-15 from which the ESMSP would be visible. The dominant man-made visual feature would be portions of the solar field and the gen-tie line. Existing views of the Project area from I-15 or the Old Spanish National Historic Trail include the other man-made features in the

viewshed including multiple high voltage transmission lines, substations, and power plants varying by viewpoint location. Construction of the ESMSP would cause unavoidable, short-term and long-term, adverse impacts on visual resources by adding additional man-made features to the viewshed. However, this impact would not be irreversible or irretrievable commitment of visual resources as these features would be removed during Project decommissioning.

Because the solar project would be the same and the gen-tie alternative would affect the same types and similar amounts of resources, the unavoidable adverse impacts associated with the Proposed Project and the alternative gen-tie would be essentially the same.

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

Construction, operation, and maintenance of the ESMSP would result in the loss of resources over the life of the Project. Impacts to water, biological, and visual resources would occur. While there would be irreversible and irretrievable commitments of some resources, as noted above, there would be no permanent loss of the overall productivity of the environment due to the proposed ESMSP.

CHAPTER 4
List of Preparers and Consultation/Coordination

4.1 List of Preparers and Reviewers

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

Name	Responsibility
Bureau of Indian Affairs, Western Regional Office	
Chip Lewis	BIA Project Lead / Regional Environmental Protection Officer
Garry J. Cantley	Regional Archeologist
Tamera Dawes	Realty Specialist
BIA Southern Paiute Agency	
Jim Williams	Agency Superintendent
Christina Varela	Realty Specialist
Department of the Interior, Office of the Solicitor	
Christopher Ruedas	DOI Solicitor
Moapa Band of Paiutes	
Vickie Simmons	Chairman
Terry Bohl	Director of Business Enterprises
BLM Las Vegas Office	
Augrelio Herman Pinales	Renewable Energy Project Manager
Kimberly Sullivan	Planning and Environmental Coordinator
Lara Kobelt	Botanist
Corey Lange	Biologist
Kimberly Mangum	Archaeologist, Tribal Liason
Eric Benavides	Realty Specialist
US Environmental Protection Agency	
Karen Vitulano	Environmental Review
US Fish and Wildlife Service	
Carla Wise	Threatened and Endangered Species
Roy Averill-Murray	Desert Tortoise Recovery Coordinator
Nevada Department of Wildlife	
Brad Hardenbrook	Supervisory Habitat Biologist

Name	Responsibility
EIS Consultant	
Randy Schroeder	Project Manager
Patrick Golden	APM, Biological Assessment
Scott Yanco	Biological Resources
Matt Schweich	Noxious Weeds
Will Van Vleet	Physical Resources, Biology
Mark Button	Visual Simulations
Emily Critchfield	Socioeconomics, Land Use
Jeud Perez	Biological Resources
Rachel Clark	GIS Mapping
AJ Thompson, Knight & Leavitt	Cultural Resources
Andrew Butsavich, Newfields	Biological Resources
OTHERS	
Patricia McCabe, Logan Simpson	Consultant to BIA
Diane Simpson-Colebank, Logan Simpson	Consultant to BIA
Chris Bockey, Logan Simpson	Consultant to BIA
Ian Tackett, Logan Simpson	Consultant to BIA
Mary Barger	Consultant to BIA

4.2 Consultation and Coordination

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

4.2.1 Public Scoping

The Notice of Intent (NOI) to prepare an EIS was published in the Federal Register on February 4, 2019. Federal, state, and local agencies that could be interested or may be affected by the Proposed Project were contacted to request their participation.

In addition, over 70 scoping letters were sent by the BIA to other various non-governmental organizations and other interested stakeholders. The scoping letter briefly explained the project (including maps), outlined the federal review process, announced the public scoping meetings, and described the various ways to provide comments. A project website: http://www.ESMSolarProjectEIS.com/ was also available to the public and provided project information as well as an online comment form.

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

meetings – one on the Moapa River Indian Reservation and the other in Las Vegas – on March 5 and 6, 2019.

Details about the public scoping process and the input received can be found in the Scoping Report (**Appendix B)** in Volume 2 of this EIS.

4.2.2 Consultation with Others

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

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

4.2.2 Non-Governmental Organizations

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

- The Nature Conservancy
- Lahontan Audubon Society
- Red Rock Audubon Society
- Desert Tortoise Council
- Friends of Nevada Wilderness
- Nevada Wilderness Project
- Sierra Club
- Center for Biological Diversity
- Sierra Nevada Alliance
- Nevada Clean Energy Campaign
- Center for Energy Efficiency and Renewable Technologies
- Desert Tortoise Council
- Great Basin Resource Watch
- Nevada Wildlife Federation
- Nevada Natural Resource Education Council
- Natural Resources Defense Council
- Nevada Conservation League
- Western Resource Advocates
- Environmental Defense Fund
- Conservation District of Southern Nevada
- Sierra Nevada Alliance
- Friends of Gold Butte
- Union Pacific Railroad Company
- Kern River Pipeline

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

4.2.3 Native American Tribes

The following Tribes were given notice of the Proposed Project by BIA:

- Las Vegas Paiute Tribe
- Kaibab Band of Paiute Indians
- Hualapai Indian Tribe
- Fort Mojave Indian Tribe
- Hopi Tribe
- Colorado River Indian Tribes
- Chemehuevi Indian Tribe
- Paiute Indian Tribe of Utah