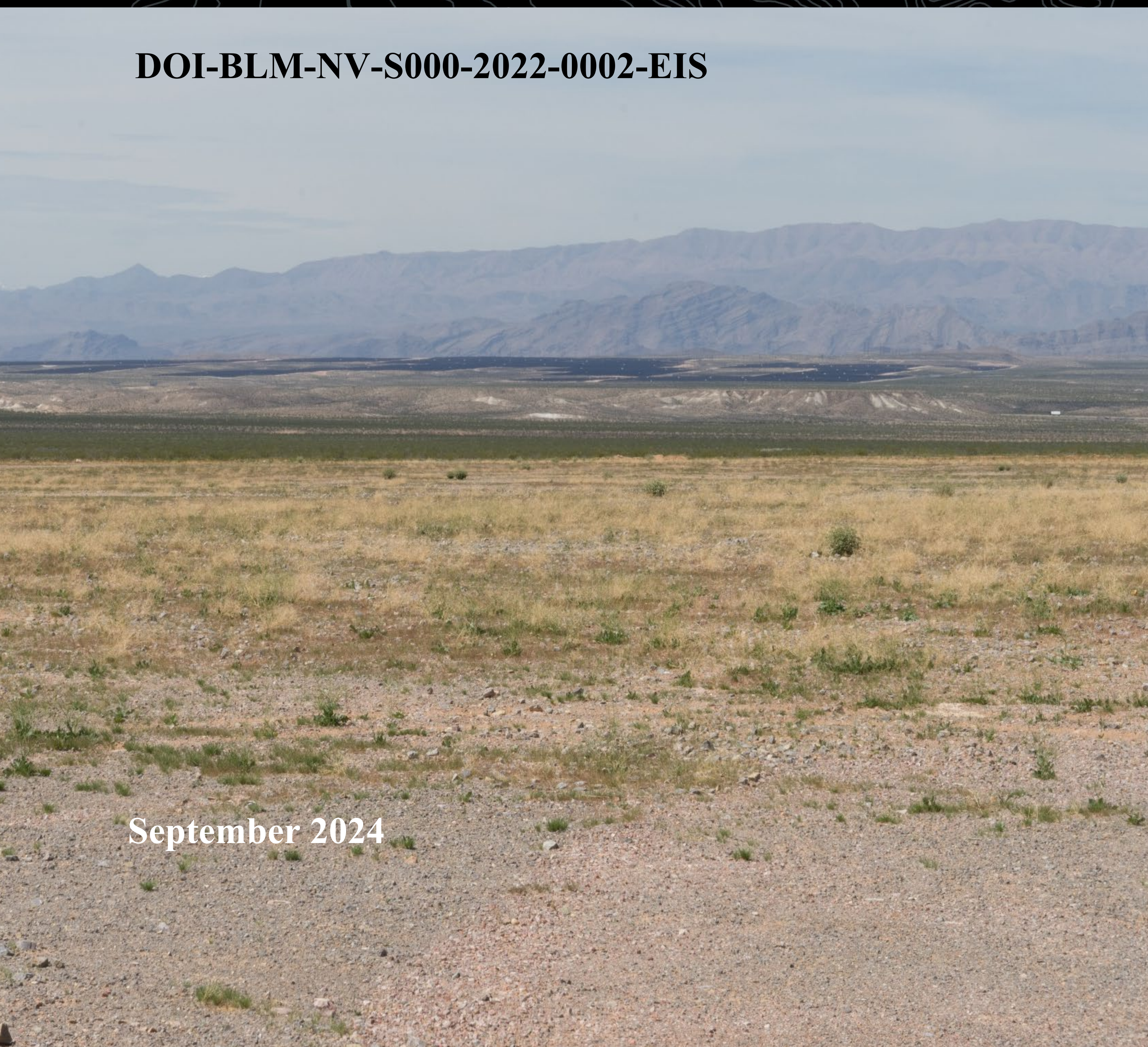
Bonanza Solar Project

Draft Environmental Impact Statement/ Resource Management Plan Amendments

DOI-BLM-NV-S000-2022-0002-EIS



September 2024

DRAFT ENVIRONMENTAL IMPACT STATEMENT/RESOURCE MANAGEMENT PLAN AMENDMENTS

DOI-BLM-NV-S000-2022-0002-EIS

Bonanza Solar Project

Clark County and Nye County, Nevada

Prepared by

US Department of the Interior
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September 2024

MISSION STATEMENT

The Bureau of Land Management is responsible for the stewardship of our public lands. The BLM is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people. Management is based upon the principles of multiple use and sustained yield of our Nation's resources within the framework of environmental responsibility and scientific technology. These resources include recreation, rangelands, timber, minerals, watershed, fish and wildlife habitat, wilderness, air, and scenic quality, as well as scientific and cultural values.

Draft Environmental Impact Statement and Resource Management Plan Amendments for the Bonanza Solar Project

Responsible Agency: U.S. Department of Interior, Bureau of Land Management

Document Status: Draft (X) Final ( )

Abstract:

Bonanza Solar, LLC (the Applicant), has filed an application with the Bureau of Land Management (BLM) for a right-of-way (ROW) authorization for the Bonanza Solar Project (Project). The Project includes a 300-megawatt alternating current solar photovoltaic power generating facility with an up to 300-megawatt battery energy storge system within the 5,133-acre Application Area (Project Area) in Clark County, Nevada. Additionally, the Project Area includes an up to 5.4-mile generation interconnection transmission line that would tie into the existing GridLiance Innovation Substation in Nye County, Nevada.

The Project is located approximately 5 miles west of Indian Springs and approximately 30 miles northwest of Las Vegas, in Clark and Nye Counties, Nevada, on public land under the jurisdiction of the BLM. The Project would not be in conformance with certain planning decisions outlined in the 1998 Las Vegas Resource Management Plan (RMP). Specifically, potential amendments to the Las Vegas RMP would include the realignment of the 1998 Las Vegas Utility Corridor and the reclassification of Visual Resource Management Class III area to Class IV area, which would allow for management activities that require major modifications of the existing landscape character.

The BLM has prepared this Draft Environmental Impact Statement (EIS) and Resource Management Plan Amendments (RMPA) (EIS/RMPA) with input from the public, cooperating agencies, stakeholders, and Native American Tribes to address the direct, indirect, and cumulative impacts of the Project. This EIS/RMPA evaluates the Proposed Action, three alternatives to the Proposed Action, and the No Action Alternative. Major environmental and planning issues addressed include impacts on special status plant and animal species, including the federally listed threatened Mojave desert tortoise.

Review Period: Comments on the draft EIS/RMPA for the Project will be accepted for 90 calendar days following publication of the U.S. Environmental Protection Agency's Notice of Availability in the *Federal Register*. Comments can be submitted through the ePlanning website (https://eplanning.blm.gov/eplanning-ui/project/2020905/510), via email (Bonanzasolar@blm.gov), or through physical mail or hand delivery at the address provided below. All comments must be received or postmarked no later than the end of December 5, 2024.

For further information, please contact:

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EXECUTIVE SUMMARY

Introduction

Bonanza Solar, LLC (the Applicant), has filed an application with the Bureau of Land Management (BLM) for a right-of-way (ROW) authorization for the Bonanza Solar Project (Project). The Project includes a 300-megawatt (MW) alternating current solar photovoltaic (PV) power generating facility with an up to 300-MW battery energy storge system within the 5,133-acre Application Area (Project Area) in Clark County, Nevada. Additionally, the Project Area includes an up 5.4-mile generation interconnection transmission line that would tie into the existing GridLiance Innovation Substation in Nye County, Nevada.

The proposed facilities would be located entirely on lands administered by the BLM's Southern Nevada District Office (SNDO), specifically within the Las Vegas and Pahrump Field Office. The Project is located approximately 5 miles west of Indian Springs and approximately 30 miles northwest of Las Vegas, in Clark and Nye Counties, Nevada (see Appendix A, Figure A-1).

The 5,133-acre Application Area is on lands identified as "Variance Areas" in the 2012 Solar Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States (BLM and Department of Energy 2012). Upon completion of a solar variance review, a variance concurrence memorandum was signed in April 2023, allowing the Project to move forward with the National Environmental Policy Act (NEPA) process. This process began on June 5, 2023, with the publication of a Notice of Intent (NOI) to prepare an EIS in the Federal Register.

The Applicant also requested to become a "covered project" under Title 41 of the Fixing America's Surface Transportation Act (FAST-41) by submitting an initiation notice on July 28, 2021.

This Environmental Impact Statement (EIS) and Resource Management Plan Amendments (RMPA) (EIS/RMPA) analyzes the environmental impacts of construction, operations and maintenance (O&M), and decommissioning of the solar facility and ancillary components on BLM-administered land.

Purpose and Need

The BLM's purpose is to respond to the Applicant's request for a new ROW, under Title V of Federal Land Policy and Management Act (FLPMA; 43 United States Code 1761). The need for this action is established by the BLM's responsibilities under FLPMA and its ROW regulations to consider the application. The BLM is required by FLPMA to manage public lands for multiple uses that consider the long-term needs of future generations for renewable and non-renewable resources. The BLM is authorized by the Secretary of the Interior to grant ROWs on public lands for systems of generation, transmission, and distribution of electric energy (43 United States Code 1761(a)(4)). The Proposed Action and Action Alternatives have been evaluated for conformance with the 1998 Las Vegas RMP. Two plan amendment alternatives have been identified for the Las Vegas RMP and are discussed in detail in this EIS/RMPA Chapter 4.

Furthermore, the BLM's need for this action is directed by Secretarial Orders 3285 and 3399, making the production, development, and delivery of renewable energy top priorities for the Department of Interior, and by Executive Order 14008, establishing the policy of achieving net-zero emissions economy-wide by 2050. In addition, the Inflation Reduction Act of 2022 prioritizes the reduction of U.S. greenhouse gas emissions through the creation of tax incentives for the development of renewable energy.

Applicant's Proposal

The Applicant's proposal is to construct, operate, and maintain an efficient, economic, reliable, safe, and environmentally sound solar-powered generating facility that would provide up to 300 MW of solar generated electricity, utilizing the capacity for generation at the GridLiance Innovation Substation, and help meet near-term market and state demands for cost-effective renewable energy. The Project would also support various state and federal renewable energy efforts. The Applicant executed a power purchase agreement with Southern California Public Power Authority on February 27, 2024. The Applicant also executed a Large Generator Interconnection Agreement with the California Independent System Operator, identified as queue number Q1649, to connect to the grid via the GridLiance Innovation Substation with a commercial operation date (COD) by December 2026.

Decision to be Made

The BLM will decide whether to deny the proposed ROW, grant the ROW, or grant the ROW with modifications. The BLM will also decide whether to approve or not approve the RMP amendments associated with the proposed Project. The BLM may include any terms, conditions, and stipulations it determines to be in the public interest and may include modifying the proposed use or changing the location of the proposed facilities (43 Code of Federal Regulations 2805.10(b)(1)).

Consultation, Coordination, and Scoping

The purpose of consultation, coordination, and public involvement is to encourage interaction between the BLM and other federal, state, and local agencies; Native American Tribes; and the public. The BLM has made formal and informal efforts to involve, consult with, and coordinate with these entities to ensure that the most appropriate data have been gathered and analyzed and that agency policy and public sentiment and values are considered and incorporated. Agencies and organizations that have jurisdiction and/or special expertise in the Bonanza Solar Project Application Area were contacted prior to scoping, at the start of scoping, during resource inventory, and before the publication of the EIS/RMPA (see Chapter 5 and Appendix I). The BLM began conducting consultation (including National Historic Preservation Act [NHPA] Section 106 consultation, government-to-government consultation, Tribal coordination, etc.), coordination, and public participation in preparation for drafting this EIS/RMPA prior to the start of the official NEPA process (i.e., publishing of the NOI), continued after the start of NEPA, and will continue throughout the EIS process.

Scoping

Pre-NOI activities began in August 2022 as part of the variance process with agency and public meetings; coordination and consultation engagement with federal, state, local, and Tribal governments; consulting party meetings; an internal BLM interdisciplinary meeting; and a site visit. The comments received during these activities assisted in identifying resource considerations and Project design elements.

The BLM initiated the public scoping process with the publication of an NOI in the *Federal Register* on June 5, 2023. The public comment period was open for 45 days and closed on July 20, 2023. The BLM mailed 229 scoping notices to an initial mailing list and hosted one virtual and two in-person public scoping meetings.

Issues

After evaluating the comments received during the public scoping period, several key issues were identified. The issues were synthesized into topical areas that represent the most frequent public concerns about the proposed Project. These issues and topical areas defined the focus of the NEPA analyses in this EIS/RMPA and are summarized herein.

Action Alternatives

Alternative 1, which reflects the SNDO's Resources Integration Alternative, would allow for grading of up to 482 acres or 20% of the Buildable Areas (totaling 2,413 acres). Outside of graded areas, a vegetation cover standard of 75% of reference perennial vegetation conditions would be applied. This cover standard would be required to be met within two years of construction completion. If the cover standard is not met within two years post-construction, restoration actions would be initiated to meet the 75% vegetation cover standard with a goal of meeting those standards in no less than two years after the two-year natural recovery period. Additional features are included to facilitate Mojave desert tortoise passive reoccupation of the site, including limiting some road widths and not channeling drainages. See EIS/RMPA Section 2.3 and Appendix D for more information about the SNDO's Resource Integration Alternative.

Alternative 2 would allow for grading of up to 592 acres or 25% of the Buildable Areas (2,413 acres). Outside of graded areas, a vegetation cover standard of 65% of reference perennial vegetation conditions would be required to be met within three to five years of construction completion. If the cover standard is not met within two years post-construction, restoration actions would be initiated to meet the 65% vegetation cover standard with the restoration goal of meeting the standard within three to five years. Additional features are included to facilitate Mojave desert tortoise passive reoccupation of the site. Vegetation would need to meet vegetation cover standards determined appropriate by the BLM and U.S. Fish and Wildlife Service before Mojave desert tortoises are permitted back into the site. Adaptive management would be used to determine what the appropriate vegetation cover is, but current recommendations are that perennial cover is no less than 75% of reference site conditions.

Alternative 3 would provide a modified layout of the Buildable Areas. Alternative 3 would allow for grading up to 648 acres or 25% of the Buildable Areas, which would total 2,590 acres. As with Alternative 2, a vegetation cover standard of 65% of reference perennial vegetation conditions would be required outside graded areas to be met within three to five years of construction completion. If the cover standard is not met within two years post-construction, restoration actions would be initiated to meet the 65% vegetation cover standard with the restoration goal of meeting the standard within three to five years. Additional features are included to facilitate Mojave desert tortoise passive reoccupation of the site. Vegetation would need to meet vegetation cover standards determined appropriate by the BLM and U.S. Fish and Wildlife Service before Mojave desert tortoises are permitted back into the site. Adaptive management would be used to determine what the appropriate vegetation cover is, but current recommendations are that perennial cover is no less than 75% of reference site conditions. Alternative 3 would avoid a Tribally identified trail.

All Action Alternatives would include two plan amendments for the Las Vegas RMP and are discussed in detail in Chapter 4 of this EIS/RMPA.

No Action Alternative

Under the No Action Alternative, the BLM would not grant a ROW for the Project and the BLM would not amend the relevant RMP. The PV solar facility would not be constructed, operated, maintained, or decommissioned. There would be no ground disturbance or loss of habitat and existing land uses and present activities in the Project Area would continue.

Summary of Environmental Consequences

To properly and meaningfully evaluate the potential impacts of each alternative, the impacts of each action alternative are measured against the impacts projected to occur under the No Action Alternative. The No Action Alternative is the baseline for purposes of comparison of the alternatives to one another. For all resources listed below, it is anticipated under the No Action Alternative, that current land uses and trends would continue to occur. There would be no Project-related impacts to these resources and they would continue to exist within with current land use and conditions.

Table ES-1 provides a summary of impacts from each alternative analyzed in detail.

Table ES-1. Comparison of Alternatives, by Resource/Use and Impacts

Resource/ Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Vegetation	No impact	Approximately 1,027 acres of vegetation within the Buildable Areas would be permanently impacted using the clear and cut with soil removal construction method (D-3). Direct impacts from D-3 heavy surface disturbance would result in the removal of vegetation, roots, and soils; loss of the seedbank; reduced biodiversity; and high levels of soil compaction. Vegetation cover standard: 50% of reference perennial vegetation cover and 65% of vegetation density within the Buildable Areas.	**Less compared to the Proposed Action and the other Action Alternatives.** Approximately 482 acres of vegetation would be subject to the clear and cut with soil removal construction method (D-3), resulting in heavy surface disturbance through grading, soil removal, and loss of vegetation. Vegetation cover standard: 75% of reference perennial vegetation within Buildable Areas. Approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east boundary of the Application Area. This mineral material relocation site would result in a long-term adverse impact to (removal of) vegetation when fully developed, similar to the Proposed Action impacts associated with D-3 disturbance.	**Less compared to the Proposed Action and Alternative 3, more compared to Alternative 1.** Approximately 592 acres of vegetation would be subject to the clear and cut with soil removal construction method (D-3), resulting in heavy surface disturbance through grading, soil removal, and loss of vegetation. Vegetation cover standard: 65% of reference perennial vegetation within the Buildable Areas. Alternative 2 is the same as Alternative 1 for the relocation of the NDOT mineral material sites.	**Less compared to the Proposed Action, more compared to Alternative 1 and Alternative 2.** Approximately 648 acres of vegetation would be subject the clear and cut with soil removal construction method (D-3), resulting in heavy surface disturbance through grading, soil removal, and loss of vegetation. Alternative 3 is the same as Alternative 2 for the vegetation cover standard. The NDOT mineral material sites that overlap the proposed Project would be relocated and replaced with a 93-acre site on the eastern Application Area boundary.
Wildlife, Migratory Birds, and Special Status Species	No impact	Approximately 1,027 acres of species habitat would be removed due to permanent ground disturbance from construction activities (D-3 disturbance). Permanent disturbances would result in the permanent loss of nesting, foraging, and refuge habitat, and would reduce connectivity for the life of the Project. Vegetation cover standard: 50% of reference perennial vegetation cover and 65% of vegetation density within the Buildable Areas.	**Less compared to the Proposed Action and the other Action Alternatives.** Approximately 482 acres of species habitat would be removed due to permanent ground disturbance from construction activities (D-3 disturbance). Vegetation cover standard: 75% of reference perennial vegetation within Buildable Areas. The 120-acre mineral material relocation site would result in a long-term adverse impact to (removal of) wildlife, migratory bird, and special status species habitat when fully developed, similar to the Proposed Action impacts associated with D-3 disturbance.	**Less compared to the Proposed Action and Alternative 3, more compared to Alternative 1.** Approximately 592 acres of species habitat would be removed due to permanent ground disturbance from construction activities (D-3 disturbance). Vegetation cover standard: 65% of reference perennial vegetation within Buildable Areas. Alternative 2 is the same as Alternative 1 for the relocation of the NDOT mineral material sites.	**Less compared to the Proposed Action, more compared to Alternative 1 and Alternative 2.** Approximately 648 acres of species habitat would be removed due to permanent ground disturbance from construction activities (D-3 disturbance). Alternative 3 is the same as Alternative 2 for the vegetation cover standard. The NDOT mineral material sites that overlap the proposed Project would be relocated and replaced with a 93-acre site on the eastern Application Area boundary.

Resource/ Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Federally Listed Species	No impact	Approximately 1,027 acres would be subject to permanent ground disturbance from construction activities (D-3 disturbance), resulting in a long-term adverse impact to Mojave desert tortoise connectivity habitat (D-3 disturbance). Vegetation cover standard: 50% of reference perennial vegetation cover and 65% of vegetation density within the Buildable Areas. Migrating individuals of southwestern willow flycatcher, yellow-billed cuckoo, and Yuma Ridgway's rail may collide with PV solar modules (also known as "lake effect") and other Project components, or electrocution associated with the gen-tie. Estimated water use up to 615 acre-feet of water for the life of the Project would contribute to unmeasurable groundwater level decline and adverse habitat impacts at Devils Hole and Ash Meadows National Wildlife Refuge.	**Less compared to the Proposed Action and the other Action Alternatives.** Approximately 482 acres of would be subject to permanent ground disturbance from construction activities, resulting in a long-term adverse impact to Mojave desert tortoise connectivity habitat (D-3 disturbance). Vegetation cover standard: 75% of reference perennial vegetation within Buildable Areas. Alternative 1 impacts to federally protected bird species and groundwater dependent species at Ash Meadows NWR is the same as the Proposed Action. The NDOT mineral material relocation sites overlap 120 acres of Priority 1 connectivity habitat and would result in a long-term adverse impact to Mojave desert tortoise habitat and connectivity when fully developed similar to the Proposed Action impacts associated with D-3 disturbance.	**Less compared to the Proposed Action and Alternative 3, more compared to Alternative 1.** Approximately 592 acres would be subject to permanent ground disturbance from construction activities, resulting in a long-term adverse impact to Mojave desert tortoise connectivity habitat (D-3 disturbance). Vegetation cover standard: 65% of reference perennial vegetation within Buildable Areas. Alternative 2 impacts to federally protected bird species and groundwater dependent species at Ash Meadows NWR is the same as the Proposed Action. Alternative 2 is the same as Alternative 1 for the relocation of the NDOT mineral material sites.	**Less compared to the Proposed Action, more compared to Alternative 1 and Alternative 2.** Approximately 648 acres would be subject to permanent ground disturbance from construction activities, resulting in a long-term adverse impact to Mojave desert tortoise connectivity habitat (D-3 disturbance). Alternative 3 is the same as Alternative 2 for the vegetation cover standard. Alternative 3 impacts to federally protected bird species and groundwater dependent species at Ash Meadows NWR is the same as the Proposed Action. The NDOT mineral material sites that overlap the proposed Project would be relocated and replaced with a 93-acre site on the eastern Application Area boundary.

Resource/ Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Earth Resources	No impact	Approximately 1,027 acres of ground disturbance would cause erosion, soil compaction, and loss of vegetation which would adversely impact soils (D-3 disturbance). Vegetation cover standard: 50% of reference perennial vegetation cover and 65% of vegetation density within the Buildable Areas. Approximately 120 acres of overlapping NDOT mineral sites would no longer be available for use with no proposal by the Applicant to replace the mineral material sites. NDOT would lose access to their existing material sites permanently. This is a long-term, adverse effect to mineral resource uses. Continued operation of existing mineral material sites outside of the Application Area would not be hindered by construction activities.	**Less compared to the Proposed Action and the other Action Alternatives.** Approximately 482 acres of ground disturbance would cause erosion, soil compaction, and loss of vegetation which would adversely impact soils (D-3 disturbance). Vegetation cover standard: 75% of reference perennial vegetation within Buildable Areas. The NDOT mineral material sites that overlap the proposed Project would be relocated and replaced with a 120-acre site on the eastern Application Area boundary.	**Less compared to the Proposed Action, more compared to Alternative 1, and less compared to Alternative 3.** Approximately 592 acres of ground disturbance would cause erosion, soil compaction, and loss of vegetation which would adversely impact soils (D-3 disturbance). Vegetation cover standard: 65% of reference perennial vegetation within Buildable Areas. The NDOT mineral material sites that overlap the proposed Project would be relocated and replaced with a 120-acre site on the eastern Application Area boundary.	**Less compared to the Proposed Action, more compared to Alternative 1 and Alternative 2.** Approximately 648 acres of ground disturbance would cause erosion, soil compaction, and loss of vegetation which would adversely impact soils (D-3 disturbance). Alternative 3 is the same as Alternative 2 for the vegetation cover standard. The NDOT mineral material sites that overlap the proposed Project would be relocated and replaced with a 93-acre site on the eastern Application Area boundary.
Water Resources	No impact	Direct impacts to surface water features would occur within 1,027 acres of grading and soil removal, including hydrologic controls within the graded areas. During construction, there is potential for the release of hazardous materials such as fuel, herbicide, and other chemical spills. Any potential spills would be a surface water quality concern. Direct impacts to groundwater include the loss of approximately 615 acre-feet of water through the use of an on-site water well or off-site water source for the life of the Project. Drawdown calculations are estimated to be less than 5 feet at the on-site well and 1 foot at distance of 7,850 feet from the well. Annual groundwater level decline during O&M was estimated to be less than 0.1 foot at the well. The Project would result in unmeasurable contributions to groundwater level decline at Devils Hole.	**Less compared to the Proposed Action and the other Action Alternatives.** Direct impacts to surface water features would occur within 482 acres of grading and soil removal, which would disrupt natural water flow within the Buildable Areas. No hydrologic controls would be allowed under Alternative 1, with the aim of maintaining natural surface water conditions to the extent possible. Under Alternative 1, 120 acres of NDOT mineral material sites would be relocated to the eastern boundary of the Application Area, disturbing natural surface water flow. Groundwater impacts would be the same as the Proposed Action.	**Less compared to the Proposed Action and Alternative 3, more compared to Alternative 1.** Direct impacts to surface water features would occur within 592 acres of grading and soil removal, which would disrupt natural water flow within the Buildable Areas. No hydrologic control would be allowed under Alternative 2, with the aim of maintaining natural surface water conditions to the extent possible. NDOT mineral material site relocation would be the same as Alternative 1. Groundwater impacts would be the same as the Proposed Action.	**Less compared to the Proposed Action, more compared to Alternative 1 and Alternative 2.** Direct impacts to surface water features would occur within 648 acres of grading and soil removal, which would disrupt natural water flow within the Buildable Areas. Under Alternative 3, hydrologic controls, such as detention basins, would be used within the D-3 disturbance areas. Under Alternative 3, 93 acres of NDOT mineral material sites would be relocated to the eastern boundary of the Application Area, disturbing natural surface water flow. Groundwater impacts would be the same as the Proposed Action.

Resource/ Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Cultural Resources and Native American Concerns	No impact	Ten cultural resources were identified within the Class III Cultural Resources Analysis Area and two historic properties were identified within the Class I Cultural Resources Analysis Area. Nine of the resources are determined or recommended ineligible for the National Register of Historic Places, while one Tribally identified trail (26CK11556) remains unevaluated pending further consultation. Project construction activities, including ground disturbance, modification of the slope of the natural terrain, compacting of soils, and removal of vegetation, would cause effects to unidentified historic properties if such resources are found. Resource 26CK11556 would be physically affected by the overlapping solar development. Effects would include destruction of the trail, displacement of associated resource components, and making the trail no longer useable for cultural purposes. Effects to 26CK11556 and/or unidentified historic properties could include illegal artifact collection, vandalism, or looting due to new or increased access to sites or increased visibility of sites.	**More compared to the Proposed Action and Alternative 3; same as Alternative 2.** Same as Proposed Action plus the 120-acre NDOT mineral material relocation site would overlap the Tribally identified trail (26CK11556), resulting in physical effects including destruction of the trail, displacement of associated resource components, and making the trail no longer useable for cultural purposes.	**More compared to the Proposed Action and Alternative 3; same as Alternative 1.** Same as Proposed Action plus the 120-acre NDOT mineral material relocation site would overlap the Tribally identified trail (26CK11556), resulting in physical effects including destruction of the trail, displacement of associated resource components, and making the trail no longer useable for cultural purposes.	**Less compared to the Proposed Action, Alternative 1, and Alternative 2.** The Tribally identified trail (26CK11556) would be avoided by the revised layout of the Buildable Areas and revised location of the 93 acres of NDOT mineral material sites. Other construction effects to 26CK11556 would also include temporary increased dust and audible effects. Effects to 26CK11556 and/or unidentified historic properties could include illegal artifact collection, vandalism, or looting due to new or increased access to sites or increased visibility of sites.

Resource/ Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Air Quality, Climate Change, and Greenhouse Gas Emissions	No impact	Annual criteria air pollutants and hazardous air pollutants emitted from Project construction would be less than 0.50% of the individual counties' 2020 annual emissions and less than 0.20% of Clark and Nye Counties' combined total 2020 annual emissions. Temporary greenhouse gas emissions would occur over a large area, resulting in negligible impacts at any given location. Air quality in the region could be improved in the long term because additional renewable generation would offset emissions from fossil-fuel-generated energy sources.	Same as Proposed Action, with a potential for reduced fugitive dust due to less grading and soil removal (D-3 surface disturbance) under this alternative. The 120-acre NDOT mineral material site would contribute to fugitive dust emissions of particulate matter 10 microns in diameter or smaller (PM_{10}) and particulate matter 2.5 microns in diameter or smaller ($PM_{2.5}$).	Same as Proposed Action, with a potential for reduced fugitive dust due less grading and soil removal (D-3 surface disturbance). The 120-acre NDOT mineral material site would contribute to fugitive dust emissions of PM_{10} and $PM_{2.5}$.	Same as Proposed Action, with a potential for reduced fugitive dust due to an increase of vegetation, and grading and soil removal (D-3 surface disturbance) would be reduced compared to the Proposed Action. The 93-acre NDOT mineral material site would contribute to fugitive dust emissions of PM_{10} and $PM_{2.5}$.
Land Use and Realty	No impact	Five NDOT mineral material sites would no longer be available for use. There is no proposal to relocate the approximately 120 acres of NDOT mineral material sites. Four transmission lines, two fiber optic lines, one highway, and one substation that includes an access road have been authorized and coordination would occur with the existing ROW holder prior to construction. Impacts associated with construction activities would primarily be associated with vehicle and equipment access to the Project from U.S. 95. Intermittent temporary lane closures for U.S. 95 may be required for improvements to U.S. 95.	**Less compared to the Proposed Action, same as Alternative 2, more than Alternative 3.** Five NDOT mineral material pits would be replaced. Up to 120 acres of NDOT mineral material sites would be relocated.	**Less compared to the Proposed Action, same as Alternative 1, more than Alternative 3.** Five NDOT mineral material pits would be replaced. Up to 120 acres of NDOT mineral material sites would be relocated.	**Less compared to the Proposed Action, Alternative 1, and Alternative 2.** Four mineral material pits would be replaced. Up to 93 acres of NDOT mineral material sites would be relocated.

Resource/ Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Visual Resources	No impact	The existing landscape character, scenic quality, and potential viewers at key observation points would be affected by the Project from the removal of vegetation, fugitive dust, movement and presence of heavy equipment, and the introduction of forms, lines, colors, textures, lighting, and glint and glare that are not currently in the existing landscape. Elevated repeating solar panels and other Project elements would be in contrast with the existing flat valley. Grading and vegetation removal would introduce exposed soils of colors of reddish browns. Long-term impacts include the presence of geometrical shapes of the solar panels and Project facilities, which would present weak to moderate contrasts in form, line, color, and texture. For key observation points (KOPs), the degree of contrast would vary depending on the KOP. The Project components would lack scale or spatial dominance in the landscape and the valley and the mountain terrain surrounding the area would remain visually dominant. The Project would not conform with VRM Class III objectives as defined by the Las Vegas RMP (BLM 1998a).	Same as Proposed Action with a potential for reduced visual resource impacts due to less grading and soil removal (D-3 surface disturbance) under this alternative. The 120-acre NDOT mineral material site would increase the amount of visual contrast resulting in marginal, long-term adverse impacts to visual resources.	Same as Proposed Action with a potential for reduced visual resource impacts due to less grading and soil removal (D-3 surface disturbance) under this alternative. The 120-acre NDOT mineral material site would increase the amount of visual contrast resulting in marginal, long-term adverse impacts to visual resources.	Same as Proposed Action with a potential for reduced visual resource impacts due to less grading and soil removal (D-3 surface disturbance) under this alternative. The 93-acre NDOT mineral material site would increase the amount of visual contrast resulting in marginal, long-term adverse impacts to visual resources.

Resource/ Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Socioeconomics and Environmental Justice	No impact	The number of construction workers would average 280, peaking at approximately 500. Worker-related impacts to demographics, labor markets, housing markets, demand for public services, or community cohesiveness in Clark and Nye Counties are not anticipated. Property value impacts are not anticipated. Project-related purchases are not expected to change the availability of goods and services. Grid reliability or transmission capability impacts are not anticipated during construction. Construction activity related to solar generation and electricity storage capacity in Clark County may encourage development of transmission infrastructure, increasing linkages between Clark County and demand centers. Operation would enhance electric grid flexibility and would reduce the probability of blackouts or brownouts, and the social costs associated with those events. The Project is approximately 4 miles from the nearest community. It is anticipated that most workers would reside in Las Vegas and materials would be transported primarily along U.S. 95. Given the size of U.S. 95 and the population of Las Vegas, impacts related to transportation/commuting and or an influx of workers are not anticipated. An increase in transportation activities through the Pahrump Valley could affect EJ populations.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.

Resource/ Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Public Health and Safety	No impact	Occupational hazards may be encountered. A health and safety risk to workers and the general public during construction is the inhalation of the fungal spores that cause Valley Fever. Any naturally occurring asbestos that could be present at the Project would also be released through ground-disturbing activities and the production of fugitive dust. Public exposure to electric and magnetic fields from the Project would be limited due to the closest residences being 5 miles from the gen-tie. Project could be a target for intentionally destructive acts. Noise would be generated. The maximum noise level of the equipment to be used at the Project ranges from 72 to 92 decibels (dB) from 50 feet away. At the Temple of Goddess Spirituality, the maximum noise level from construction would be 34 dB. The sound generated during O&M would be at the same level or below the level of construction. The probability of a wildfire would be low due to the low wildfire threat rating in the Project Area, low-risk site conditions, low-level risk associated with the O&M activities, and the Applicant's commitment to maintaining fire suppression measures on-site. Potential releases of existing hazardous substances during construction would be unlikely. There would be minimal hazardous and non-hazardous waste at the site.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.

Resource Management Plan Amendments

The Proposed Action and Action Alternatives have been evaluated for conformance with the 1998 Las Vegas RMP. First, the RMP was reviewed for potential conflicts between the proposed Project and BLM management decisions contained within the RMP. Then, follow-up meetings were held with BLM staff to evaluate the potential conflicts with the RMP management decisions.

The evaluation process concluded that the proposed Project would not be in conformance with the RMP due to two conditions.

- The Project would not comply with Visual Resource Management Class III objectives.
- The Project ROW would cross areas designated in the RMP as a Legacy Locally Designated Corridor named the U.S. Highway 95/Crater Flat Corridor and West Wide Energy Corridor 223-224.

Plan amendment(s) would be required for alternatives where no conforming alternatives could be developed that would meet the purpose of and need for the Project. Two plan amendment alternatives have been identified for the Las Vegas RMP and are discussed in detail in this EIS/RMPA.

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TABLE OF CONTENTS

List of Appendices

List of Tables

LIST OF ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
2016 GHG Guidance	Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews
AC	alternating current
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
AFR	altered fire regime
AFY	acre-feet per year
AIM	Assessment, Inventory, and Monitoring
AJD	approved jurisdictional delineation
AML	appropriate management level
amsl	above mean sea level
APE	area of potential effects
APM	applicant-proposed measures
APLIC	Avian Power Line Interaction Committee
Applicant	Bonanza Solar, LLC
AQI	air quality index
BAPC	Bureau of Air Pollution Control and Air Quality Planning
BCC	birds of conservation concern
BESS	battery energy storage system
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	best management practice
BRTR	Biological Resources Technical Report
CAA	Clean Air Act
CCDCP	Clark County Department of Comprehensive Planning
CDC	Centers for Disease Control and Prevention
CEAA	Cumulative Effects Analysis Area
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane

CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COD	commercial operation date
CRAA	Cultural Resources Analysis Area
CWA	Clean Water Act
DAQ	Clark County Division of Air Quality
DC	direct current
dB	decibel
DOE	U.S. Department of Energy
DoD	Department of Defense
DOI	U.S. Department of the Interior
DZ	distance zone
EA	environmental assessment
EI	emissions inventory
EIS	Environmental Impact Statement
EJ	environmental justice
EMF	electric and magnetic field
Energy Act of 2020	Clean Energy Innovation and Deployment Act of 2020
EO	Executive Order
ERMA	Nevada Extensive Recreation Management Area
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAST-41	Fixing America's Surface Transportation Act
FEMA	Federal Emergency Management Agency
FIWG	Federal Interagency Working Group on Environmental Justice and NEPA Committee
FLPMA	Federal Land Policy and Management Act
FR	*Federal Register*
FRASM	Fire Risk Assessment Story Map
gen-tie	generation interconnection transmission line
GHG	greenhouse gas
GIS	geographic information system
GMU	game management unit
GWP	global warming potential
HAP	hazardous air pollutant

Heritage	Heritage Environmental Consultants
HMA	herd management area
HUC	hydrologic unit code
I-11	Interstate 11
IPaC	Information for Planning and Consultation
IPCC	Intergovernmental Panel on Climate Change
ISVB	Indian Springs Valley Basin
ISWC	Indian Springs Water Company
IVR	Integrated Vegetation Survey Report
IWG	Interagency Working Group
KINS	Creech Air Force Base
km	kilometer
KOP	key observation point
kV	kilovolt
LEP	limited English proficiency
LVVSZ	Las Vegas Valley Shear Zone
MBTA	Migratory Bird Treaty Act
MMT	million metric tons
MOVES4	Motor Vehicle Emission Simulator
MW	megawatt
NAAQS	national ambient air quality standards
NAC	Nevada Administrative Code
NCA	National Conservation Area
NCEI	National Centers for Environmental Information
NDA	Nevada Department of Agriculture
NDEP	Nevada Division of Environmental Protection
NDNH	Nevada Division of Natural Heritage
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NH_3	ammonia
NHPA	National Historic Preservation Act
NNHP	Nevada Natural Heritage Program

NNSS	Nevada National Security Site
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NOI	Notice of Intent
NO_x	oxides of nitrogen
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statutes
NTP	Notice to Proceed
NWR	National Wildlife Refuge
O_3	ozone
OHV	off-highway vehicle
O&M	operations and maintenance
OSHA	Occupational Safety and Health Administration
Pb	lead
PEIS	Programmatic Environmental Impact Statement
PM	particulate matter
$PM_{2.5}$	particulate matter 2.5 microns in diameter or smaller
PM_{10}	particulate matter 10 microns in diameter or smaller
POD	Plan of Development
PPA	Power Purchase Agreement
ppb	parts per billion
ppm	parts per million
Project	Bonanza Solar Project
PSD	prevention of significant deterioration
PV	photovoltaic
RCRA	Resource Conservation and Recovery Act of 1976
RFFA	reasonably foreseeable future actions
RMP	resource management plan
RMPA	Resource Management Plan Amendments
ROD	Record of Decision
ROW	right-of-way
RV	recreational vehicle
SC-GHG	social cost of greenhouse gas
SCOTUS	Supreme Court of the United States

SF_6	sulfur hexafluoride
SGCN	species of greatest conservation need
SHPO	State Historic Preservation Office
SIP	state implementation plan
SLRU	sensitivity level rating unit
SNDO	Southern Nevada District Office
SO_2	sulfur dioxide
SoCP	species of conservation priority
SPCC	spill prevention, control, and countermeasures
SQRU	scenic quality rating unit
SWReGAP	Southwest Regional Gap Analysis Project Land Cover Descriptions
TBD	to be determined
TCA	Mojave desert tortoise conservation area
TCP	traditional cultural property
THPO	Tribal Historic Preservation Officer
tpy	tons per year
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
U.S. 95	U.S. Highway 95
Visual Resources Report	*Bonanza Solar Project Visual Resources Study*
VOC	volatile organic compound
VRI	visual resource inventory
VRM	Visual Resource Management
WBWG	Western Bat Working Group
WEAP	Worker Environmental Awareness Program
Western Solar Plan	Final Solar Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States
WOTUS	waters of the United States
WWEC	West Wide Energy Corridor

Chapter 1 Introduction, Applicant's Goals, and Purpose of and Need for the Action

1.1 Introduction

On December 1, 2020, EDF Renewables Development, Inc., doing business as Bonanza Solar, LLC (the Applicant), filed an Application for a Transportation, Utility Systems, Telecommunications, and Facilities on Federal Lands and Property (Standard Form 299) and a Preliminary Plan of Development (POD) with the Bureau of Land Management (BLM) Southern Nevada District Office (SNDO) for a right-of-way (ROW) authorization for the Bonanza Solar Project (Project) (NVNV105848474). The Project includes a 300-megawatt (MW) alternating current (AC) solar photovoltaic (PV) power generating facility with an up to 300-MW battery energy storge system within the 5,133[1]-acre Application Area (Project or Project Area) in Clark County, Nevada. Additionally, the Project Area includes up to a 5.4-mile generation interconnection transmission line (gen-tie) that would tie into the existing GridLiance Innovation Substation in Nye County, Nevada.

The proposed facilities would be located entirely on lands administered by the BLM's SNDO, specifically within the Las Vegas and Pahrump Field Offices. The Project is located approximately 5 miles west of Indian Springs and approximately 30 miles northwest of Las Vegas, in Clark and Nye Counties, Nevada (Appendix A, Figure A-1). If approved, the ROW for the Project would be issued for a 50-year initial term, with the option to renew. The 50-year term of the ROW grant would include the 40-year life of the project, decommissioning, and restoration activities.

The BLM is responsible for managing public land in the Project Area in accordance with the Federal Land Policy and Management Act (FLPMA) (1976) and in conformance with the BLM 1998 Las Vegas Resource Management Plan (RMP) (BLM 1998a). In accordance with FLPMA, public lands are to be managed for multiple uses in a manner that uses the lands in a combination that would best meet the present and future needs of the people. The BLM is authorized to grant a ROW on public lands for facilities that are in the public interest and that require a ROW over, upon, under, or through such lands (FLPMA Section 501(a)(7)).
The Proposed Action and Action Alternatives have been evaluated for conformance with the 1998 Las Vegas RMP. Two RMP amendments (RMPA) have been identified for the Las Vegas RMP and are discussed in detail in this EIS/RMPA Chapter 4.

The 5,133-acre Application Area is on lands identified as "Variance Areas" in the 2012 Final Solar Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States (Western Solar Plan; BLM and U.S. Department of Energy [DOE] 2012). The BLM has satisfied the requirements of the Western Solar Plan for evaluating this application

[1] For reference, the term "Application Area" refers to the Standard Form 299 5,133-acre Application Area submitted by the Applicant to BLM on December 1, 2020. This original acreage does not include the acreage for permanent ROW associated with the gen-tie. The permanent and temporary ROW requested is 5,258 acres, which includes the solar site, gen-tie corridor and associated gen-tie access spur roads, access roads from U.S. Highway 95, and temporary ROW for use of the existing access road associated with the Valley Electric Association 138-kilovolt line and gen-tie pull sites that extend beyond the permanent gen-tie corridor ROW (Dudek 2024a:4).

through the solar variance review process, including preliminary meetings and public outreach. On August 22, 2022, the BLM initiated a 30-day public input period for the variance process, which ended on September 22, 2022. During that period, the BLM hosted three virtual information sessions, one for agencies and Tribal Nations on September 1, 2022, and two for the public on September 7 and 8, 2022. The BLM received approximately 35 comments during the public input period.

The BLM Director signed a variance concurrence memorandum on April 26, 2023, which allowed the Project to move forward with the National Environmental Policy Act (NEPA) process (BLM 2023a).

On December 12, 2022, the BLM published a Notice of Land Segregation in the Federal Register, which segregated the lands within the Application Area from appropriation under the public land laws, including the Mining Law, but not the Mineral Leasing or Material Sales Acts, for a period of two years, subject to valid existing rights (87 Federal Register [FR] 76081-76082).

The Applicant also requested to become a "covered project" under Title 41 of the Fixing America's Surface Transportation Act (FAST-41) by submitting a FAST-41 initiation notice on July 28, 2021. The U.S. Department of the Interior (DOI) responded on August 13, 2021, that the Project meets the definition of a "covered project" under 42 United States Code (USC) 4370m(6). As a result, the Project will adhere to a federal permitting schedule that will be publicly posted on the FAST-41 permitting dashboard to promote transparency.

This Draft Environmental Impact Statement/Resource Management Plan Amendments (EIS/RMPA) has been prepared by the DOI in accordance with the revised Council on Environmental Quality (CEQ) NEPA Revised Regulations (Revised 87 FR 23453) (May 20, 2022). This EIS/RMPA also complies with the BLM's NEPA implementation requirements, which are outlined in the DOI NEPA regulations (43 Code of Federal Regulations [CFR] 46) and the BLM NEPA Handbook (H-1790-1). The NEPA process for evaluating the Project began on June 5, 2023, with the publication of a Notice of Intent (NOI) to prepare an EIS in the *Federal Register*.

The EIS/RMPA includes the following documents:

- Front matter, executive summary, Chapters 1–5, literature cited
- Appendix A. EIS Figures
- Appendix B. Design Features, Mitigation Measures, Required Plans and Programmatic Design Features
- Appendix C. Issues Analyzed in Brief and Issues Dismissed from Detailed Analysis
- Appendix D. Resources Integration Alternative
- Appendix E. Supporting Material for Air Quality Analysis
- Appendix F. Cumulative Effects Analysis Areas and Reasonably Foreseeable Future Actions

- Appendix G. List of Preparers
- Appendix H. NHPA Section 106 Materials
- Appendix I. Major Authorizing Laws and Regulations and List of Cooperating Agencies
- Appendix J. Alternatives Considered and Eliminated from Detailed Analysis
- Appendix K. Evaluation of Cactus Springs Area of Critical Environmental Concern (ACEC) Nomination

In accordance with the regulations established by the Advisory Council on Historic Preservation (ACHP) under Section 106 of the National Historic Preservation Act (NHPA), 54 USC 306108, the BLM has elected to comply with NHPA Section 106's requirements through the NEPA process (36 CFR 800.8(c)). Although the legal obligations of federal agencies under NEPA and NHPA are distinct, integrating the processes improves efficiency, encourages accountability and transparency, and supports a thorough discussion of effects on the human environment. The "substitution process" allows the BLM to take cultural resources into account early in the planning stages as part of a thorough NEPA process by using the EIS/RMPA to comply with NHPA Section 106. Instead of preparing a separate Memorandum of Agreement or Programmatic Agreement, the resolution of adverse effects will be documented as conditions of granting/permitting ROW approval in the legally binding Record of Decision (ROD). As a result, the BLM is satisfying the requirements set forth in the Section 106 regulations and has already informed the ACHP and the Nevada State Historic Preservation Office (SHPO) of its intention to use the substitution process.

This EIS/RMPA analyzes the environmental impacts of construction, operations and maintenance (O&M), and decommissioning of the solar facility and ancillary components on BLM-administered land. While the EIS/RMPA contains sufficient information to allow the BLM to choose among alternatives, in some instances cooperating agencies may require additional information related to specific resources or uses within their jurisdiction. The BLM has designated these organizations, as well as non-federal organizations and/or municipalities, as cooperating agencies in this NEPA process because of their special expertise in the resource/use issue(s) covered by the NEPA analysis or because of their jurisdictional authority over them.

The BLM decision-making process will also incorporate and take into account federal legislation and policies, such as the Clean Energy Innovation and Deployment Act of 2020 (Energy Act of 2020) and Executive Order (EO) 14008, Tackling the Climate Crisis at Home and Abroad, issued in January 2021. The Energy Act of 2020 establishes a federal program to promote clean energy innovation and deployment in order to achieve 100% zero-emission electricity by 2050. Title 3 of the Energy Act of 2020 directs the Secretary of the Interior to permit at least 25 gigawatts of electricity from wind, solar, and geothermal projects by 2025, which has already been achieved. This Project would support the Biden Administration's goal of clean energy deployment to achieve a carbon pollution-free power sector by 2035. According to EO 14008, among other strategies, the federal government must take steps to accelerate clean energy and transmission projects that are subject to federal permitting and siting procedures.

1.2 Bureau of Land Management's Purpose and Need

The BLM's purpose is to respond to the FLPMA ROW application submitted by the Applicant to construct, operate, maintain, and eventually decommission a solar PV electric generating facility and associated facilities that would generate 300 MW of electricity under Title V of FLPMA (43 USC 1761).

The need for this action is established by BLM's responsibilities under FLPMA and its ROW regulations to consider the application. The BLM is required by FLPMA Section 103(c) to manage public lands for multiple uses that consider the long-term needs of future generations for renewable and non-renewable resources. The BLM is authorized by the Secretary of the Interior to grant ROWs on public lands for systems of generation, transmission, and distribution of electric energy (43 USC 1761(a)(4)). The Proposed Action and Action Alternatives have been evaluated for conformance with the 1998 Las Vegas RMP. Two plan amendment alternatives have been identified for the Las Vegas RMP and are discussed in detail in EIS/RMPA Chapter 4.

Furthermore, the BLM's need for this action is directed by Secretarial Orders 3285 and 3399, making the production, development, and delivery of renewable energy top priorities for the DOI, and by EO 14008, establishing the policy of achieving net-zero emissions economy-wide by 2050. In addition, the Inflation Reduction Act of 2022 prioritizes the reduction of U.S. greenhouse gas (GHG) emissions through the creation of tax incentives for the development of renewable energy; the DOE estimates that the United States will achieve a 40% reduction in GHG emissions below 2005 levels by 2030 with the provisions outlined in the Inflation Reduction Act (DOE 2022).

1.3 Applicant's Proposal

The Applicant's proposal is to construct, operate, and maintain an efficient, economic, reliable, safe, and environmentally sound solar-powered generating facility that would provide up to 300 MW of solar generated electricity. The Project would utilize the capacity for generation at the GridLiance Innovation Substation, help meet near-term market and state demands for cost-effective renewable energy, and create an economy of scale that allows the Project to sell electricity at a competitive, low-cost price. Additionally, the Project would support the following state and federal efforts:

- Nevada SB358 – 50% Renewable Portfolio Standard requirement by 2030, and 100% by 2050 (Nevada Public Utilities Commission 2021)
- Energy Act of 2020 – Directs the Secretary of Interior to permit 25 gigawatts of electricity from wind, solar, and geothermal projects on public lands by 2025
- EO 14008 – Establishes a policy of achieving net-zero emissions economy-wide by 2050, calls for increasing renewable energy production on public lands, and calls for a federal procurement strategy that achieves or facilitates a "carbon pollution-free electricity sector no later than 2035" (86 CFR 19)
- Secretarial Order 3285A1 – Establishes the development of environmentally responsible renewable energy as a priority for the DOI

The Applicant executed a power purchase agreement with Southern California Public Power Authority on February 27, 2024. The Applicant also executed a Large Generator Interconnection Agreement with the California Independent System Operator, identified as queue number Q1649, to connect to the grid via the GridLiance Innovation Substation with a commercial operation date (COD) by December 2026. This land was selected due to capacity and proximity to the GridLiance Innovation Substation, compatibility with the goals of the Solar PEIS (BLM and DOE 2012), the availability of access from U.S Highway 95 (U.S. 95) from existing exits and roads, and suitable topography. According to the Solar PEIS published by BLM and DOE, the Project would be located within a Solar Variance Area, and thus may be considered appropriate for utility-scale solar development (BLM and DOE 2012).

1.4 Decision to be Made

The purpose of the BLM's action is to respond to the Applicant's request for a new utility ROW for use of BLM-administered land. The BLM will decide whether to deny the proposed ROW, grant the ROW, or grant the ROW with modifications. The BLM will also decide whether to approve or not approve the RMP amendments associated with the proposed Project. The BLM may include any terms, conditions, and stipulations it determines to be in the public interest; these may include modifying the proposed use or changing the location of the proposed facilities (43 CFR 2805.10(b)(1)).

1.5 Project Relationship to Documents

This EIS/RMPA incorporates by reference, and/or is tiered to, the following documents:

- The BLM's Final Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States (Western Solar Plan or Solar PEIS) analyzes programmatic design features for utility-scale solar energy development generating 20 MW or more on public land (BLM and DOE 2012).
- The 2007 Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Herbicides in 17 Western States analyzes the effects of using herbicides for treating vegetation on public lands in the western U.S. (BLM 2007).
- The 2016 Final Programmatic Environmental Impact Statement for Vegetation Treatment Using Herbicides in 17 Western States analyzes three herbicides (aminopyralid, fluroxypyr, and rimsulfuron) and additional treatment methods including new risk assessment documents on BLM-administered land (BLM 2016a).
- POD for Bonanza Solar Project NVNV105848474, including appendices, dated April 2024 (Dudek 2024a).

1.6 Land Use and Management Plan Conformance

In accordance with 43 CFR 1610.5-5(b), the BLM must consider existing RMPs in the decision to issue a ROW grant for the lands they administer. RMPs provide public land and resource management direction. Therefore, any actions approved or authorized by the BLM must conform with the approved RMP for each BLM Field or District Office (43 CFR 1610.5-3). If a proposed project is not in conformance, the BLM can choose to deny the project, adjust the project to conform to the RMP, or amend the RMP to address nonconformance (BLM 2005).

The Project is located on public land under the jurisdiction of the BLM SNDO, specifically within the Pahrump and Las Vegas Field Offices. The 1998 Las Vegas RMP, as amended (BLM 1998a), provides management guidance for these field offices.

The Project would not be in conformance with certain planning decisions outlined in the Las Vegas RMP. If the BLM approves the Project, the Las Vegas RMP would need to be amended to include the realignment of the 1998 Las Vegas Utility Corridor and the reclassification of Visual Resource Management (VRM) Class III areas to Class IV areas. The proposed amendments are analyzed in this EIS/RMPA as discussed in Chapter 4 Resource Management Plan Amendments.

1.7 Major Authorizing Laws, Statutes, and Regulations

FLPMA and its accompanying regulations provide the legal framework within which the BLM manages public lands and assesses the effects of its management actions. FAST-41 provides the mechanism for infrastructure "covered projects" to undergo a streamlined environmental review and permitting process. This EIS/RMPA is being prepared in accordance with the May 2022 CEQ NEPA Regulations (85 FR 43304, 87 FR 23453) as well as the applicable DOI policies and manuals. To implement any of the alternatives analyzed in this EIS/RMPA, the Applicant must acquire applicable federal, state, county, and local permits and approvals, as necessary. Major authorizing laws, statutes, and regulations, including potentially applicable permits or approvals are listed in Appendix I.

1.8 Lead Agency and Cooperating Agencies

CEQ regulations (40 CFR 1501.5) state a Lead Agency shall supervise the preparation of an EIS when the agency is involved in a federal action. The BLM is the lead federal agency responsible for preparing this EIS and for compliance with Section 106 of the NHPA (36 CFR 800.2(a)(2)). Further information about Section 106 compliance as it relates to the NEPA timelines is addressed in Section 3.7, Cultural Resources and Native American Concerns, and Section 5.2.2, Section 106 Consultation.

On August 13, 2021, the Project became a covered project under FAST-41 and the BLM invited various federal agencies to participate as a FAST-41 Cooperating Agency and FAST-41 Participating Agency (see Appendix I). Refer to EIS/RMPA Chapter 5 for a summary of consultation and coordination activities.

CEQ regulations (40 CFR 1501.6) require the Lead Agency to request participation in preparing NEPA analyses and documentation in cooperation with state, local, and other agencies with jurisdiction by law or special expertise. The BLM invited various federal, state, and county agencies and Tribal governments to participate as cooperating agencies beginning in June of 2023 (Table I-2 in Appendix I). In addition, the ACHP and Nevada SHPO were invited to be cooperating agencies under NEPA and consulting parties under NHPA.

By working together, these agencies provide comments and recommendations that the BLM takes into account when making project decisions, and information necessary to satisfy the environmental and public review processes related to those decisions is included. The cooperating agencies assist the BLM by identifying the issues that need to be addressed, providing relevant data or feedback, helping develop alternatives, and reviewing and providing feedback on the NEPA document.

1.9 Public Scoping

In addition to cooperating with other agencies and parties, the BLM, as the lead federal agency, is responsible for engaging the public throughout the NEPA process. This scoping process provides an opportunity for members of the public and agencies to learn about the proposed Project and share their concerns. Input from the scoping process was used to determine the issues requiring analysis in the EIS/RMPA and potential alternatives to the Proposed Action.

Pre-NOI activities began in August 2022 as part of the variance process with agency and public meetings; coordination and consultation engagement with federal, state, local, and Tribal governments; consulting party meetings; an internal BLM interdisciplinary meeting; and a site visit. The comments received during these activities assisted in identifying resource considerations and Project design elements.

The BLM initiated the public scoping process with the publication of a NOI in the Federal Register on June 5, 2023. The public comment period was open for 45 days and closed on July 20, 2023. The BLM mailed 229 scoping notices to an initial mailing list and hosted one virtual and two in-person public scoping meetings. The virtual meeting was held on June 27, 2023. The two in-person meetings were held on June 28, 2023, at the Centennial Hills Library Multipurpose Room at 6711 North Buffalo Drive in Las Vegas, Nevada, and on June 29, 2023, at the Indian Springs Community Center at 715 Gretta Lane in Indian Springs, Nevada. Additional details regarding the scoping process, Scoping Report, and reference reports are available on the BLM National NEPA Register website: https://eplanning.blm.gov/eplanning-ui/project/2020905/510.

1.9.1 Issues Identified During Scoping

In total, 73 comment submittals, i.e., emails, forms, or letters were submitted during the 45-day public scoping period, comprising 339 substantive comments. Of the 73 submittals, 41 were submitted by individuals, 20 were submitted on behalf of non-governmental organizations, and six were submitted by federal agencies.

After evaluating the comments received during the public scoping period and during Tribal consultation meetings, several key issues emerged. The issues were synthesized into topical areas that represent the most frequent public concerns about the proposed Project. These issues and topical areas defined the focus of the NEPA analyses in this EIS/RMPA and are summarized in Table 1-1.

According to the BLM's NEPA Handbook Section 6.4 (2008:40), "for the purposes of BLM NEPA analysis, an 'issue' is a point of disagreement, debate, or dispute with a Proposed

Action, based on some anticipated environmental effect. While many issues are identified during the scoping process, not all identified issues warrant analysis in the EIS/RMPA. Issues identified in scoping warrant inclusion in the EIS/RMPA if analysis of the issue is necessary to make a reasoned choice among the alternatives; if the issue is associated with a direct, indirect, or cumulative impact; or if analysis of the issue is necessary to determine the significance of the impacts. The issues identified for analysis have been included in each resource/use analysis section in Chapter 3. Resources/uses not present and issues not carried forward for detailed analysis are included in Appendix C. These issues are analyzed, but not at a level of detail required to make a reasoned choice between alternatives or to determine significance (BLM 2008).

During public scoping, the BLM received a nomination package for the Cactus Springs ACEC. The BLM has prepared the relevance and importance evaluation report for the nomination (BLM 2024a). The report includes temporary management and implementation actions that will be implemented as part of the proposed Project (BLM 2024a). See Appendix K for more information.

Table 1-1. Issues/Resource Topics Cross-Referenced by EIS/RMPA Section

Issue/Topic	EIS/RMPA Section or Appendix
Alternative(s)	Chapter 2
Air Quality	Section 3.8
Areas of Critical Environmental Concern	Appendix C and Appendix K
Climate Change and Greenhouse Gas Emissions	Section 3.8
Cultural Resources and Native American Concerns	Section 3.7
Cumulative Effects	Section 3.13
Hazardous Materials and Solid Waste	Section 3.12
Lands and Realty	Section 3.9
Mitigation	Chapter 3 and Appendix B
Paleontological Resources	Appendix C
Public Health and Safety	Section 3.12
Recreation	Appendix C
RMPA	Chapter 4
Socioeconomics and Environmental Justice	Section 3.11
Soil Resources	Section 3.5
Transportation	Appendix C
Vegetation*	Section 3.2
Visual Resources	Section 3.10
Water and Wetland Resources*	Section 3.6
Wild Horse and Burro Herd Management Areas	Appendix C
Wildlife, including Mojave desert tortoise*	Sections 3.3 and 3.4

*Native American concerns identified during Tribal consultation include, but are not limited to, natural resource impacts to Mojave desert tortoise, native vegetation, water resources.

Chapter 2 Proposed Action and Action Alternatives

This chapter summarizes the construction, operation, maintenance, and decommissioning of the proposed Project. The POD provides a detailed description of the Proposed Action and associated components (Dudek 2024a). This chapter also provides a description and comparison of both the Proposed Action and the Action Alternatives. In this context, "Action Alternatives" refers to the alternatives that require the construction, operation, and eventual decommissioning of the Project.

2.1 Development of Alternatives

In accordance with the CEQ NEPA Regulations (40 CFR 1502.14), an EIS must present the environmental impacts of a proposed action, no action alternative, and other reasonable action alternatives, as well as provide a comparison of the impacts between alternatives. The EIS must define the issues such that they can be readily understood by the public and decision-makers, thus contributing to a basis for an informed and reasoned decision.

Reasonable alternatives to the Proposed Action were developed by the BLM to avoid or reduce various resource conflicts and meet the purpose and need, per BLM NEPA Handbook Section 6.6.1 (BLM 2008:49–50). Key resource constraints include habitat connectivity for the Mojave desert tortoise (Gopherus agassizii) and limited, sensitive groundwater resources.

Three Action Alternatives in addition to the Proposed Action were identified for detailed analysis in this EIS/RMPA. The Action Alternatives were designed to minimize grading and ground disturbance as well as reduce impacts to vegetation cover. The actions related to reduced ground disturbance and retention of vegetation were designed to increase the potential to allow Mojave desert tortoises to passively reoccupy the Buildable Areas post-construction. All vegetation standards would be measured against both pre-disturbance data and reference site conditions and represent a percentage of existing conditions (either vegetation density or cover). Reference sites for vegetation standards would be located in the Indian Springs Valley corridor, at least 3,300 feet from the Project boundary, within similar elevations as the Project, and within Mojave desert tortoise connectivity habitat.

The Action Alternatives analyzed in detail in this EIS/RMPA consist of the following:

- Proposed Action, as described in the Applicant's POD (Dudek 2024a), would allow for grading or disc and roll of up to 1,027 acres or 20% of the Application Area or 43% of the Buildable Areas (totaling 2,368 acres). The vegetation cover standard would be 50% vegetation cover and 65% of vegetation density within the solar panel fields only in areas that are not graded. If the vegetation cover standard is not met within 10 years of post-construction, restoration would be implemented.
- Alternative 1, which reflects the SNDO's Resources Integration Alternative, would allow for grading of up to 482 acres or 20% of the Buildable Areas (totaling 2,413 acres). Outside of graded areas, a 75% (of reference conditions) perennial vegetation cover standard would be required to be met within two years of the construction completion date. If the cover standard is not met within two years post-construction, restoration actions would be initiated to meet the 75% vegetation cover standard with a goal of

meeting those standards in no less than two years after the initial two-year natural recovery period (not more than four years after the construction completion date). Additional features are included to facilitate Mojave desert tortoise reoccupation of the site, including limiting some road widths and not channeling drainages. See EIS/RMPA Section 2.3 and Appendix D for more information about the SNDO's Resource Integration Alternative.

- Alternative 2 would allow for grading of up to 592 acres or 25% of the Buildable Areas (2,413 acres). Outside of graded areas, a 65% (of reference conditions) perennial vegetation cover standard would be required to be met within three to five years of construction completion. If the cover standard is not met within two years post-construction, restoration actions would be initiated to meet the 65% vegetation cover standard within the restoration goal of meeting the standard within three to five years. Additional features are included to facilitate Mojave desert tortoise reoccupation of the site. Vegetation would need to meet vegetation cover standards determined appropriate by the BLM and U.S. Fish and Wildlife Service (USFWS) before Mojave desert tortoises are permitted back into the site. Adaptive management would be used to determine what the appropriate vegetation cover is, but current recommendations are that perennial cover is no less than 75% of reference site conditions.
- Alternative 3 would provide a modified layout of the Buildable Areas to address comments provided by Tribes and public scoping comments specific to a Tribally identified trail. Alternative 3 would allow for grading up to 648 acres or 25% of the Buildable Areas, which would total 2,590 acres. Similar to Alternative 2, the perennial vegetation cover standard for areas outside of the graded areas would be 65% (of reference conditions) and would be required to be met within three to five years of construction completion. If the cover standard is not met within two years post-construction, restoration actions would be initiated to meet the 65% vegetation cover standard within the restoration goal of meeting the standard within three to five years. Additional features are included to facilitate Mojave desert tortoise reoccupation of the site. Vegetation would need to meet vegetation cover standards determined appropriate by the BLM and USFWS before Mojave desert tortoises are permitted back into the site.

Several other alternatives were identified and considered but were eliminated from detailed analysis, as described in Appendix J.

2.1.1 Construction Definitions

This EIS/RMPA categorizes disturbance types based on the results of construction methods when it comes to resources, particularly soils and vegetation (see Appendix D). These are abbreviated with a "D" for disturbance, followed by the severity of disturbance. Table 2-1 provides more information about the outcomes associated with each disturbance level, and their typical construction methodology. The disturbance intensity increases with each corresponding level; D-0 represents no disturbance and D-3 represents maximum disturbance. There are four disturbance levels (D-0, D-1, D-2, D-3) which correspond to specific construction methods. D-3 is associated with traditional solar development in the solar panel arrays and associated with construction of other solar facility components (e.g., designated access roads, inverters, substation).

The BLM's alternatives in this EIS/RMPA include a combination of D-1 and D-2 disturbances, with D-3 disturbance where necessary. The goal of using a combination of lower-impact development methods for construction is to leave vegetation under solar panel arrays within the Buildable Areas. This approach is expected to improve the retention of native vegetation, wildlife habitat, soils, seed banks, and biological soil crusts while minimizing air quality (fugitive dust) and water resource impacts. Disturbance category D-1 is intended to "minimize impacts by limiting the degree or magnitude of the action and its implementation" (BLM 2008:61).

Table 2-1. Disturbance Definitions

	D-0	D-1	D-2	D-3
Definition	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Examples/ Construction Types/ Construction Equipment	Not applicable	Accessing panel arrays using rubber-tired or rubber-tracked vehicles (tractors, side-by-sides, forklifts); could include minimal mowing	Front-end loader or similar used to clear vegetation; any repeated vehicle traffic that completely crushes vegetation	Disc and roll, grading and filling, trenching
Soils	No anticipated effects from construction	Soils are left in place; slight soil compaction	No soil removal or restructuring; soil is very compacted	Soils are removed, restructured, and extremely compacted
Vegetation	No anticipated effects from construction	If vegetation is crushed, no more than half of the plant is crushed and at least half of the plant remains intact such that it has the ability to survive and continue growing; seedbank is left in place*	No vegetation remains above soil surface; vegetation is scraped off soil surface or crushed; seedbank remains in place, albeit compacted	Vegetation is displaced; seedbank is displaced
Cacti and Yucca	No anticipated effects from construction	Some cacti and yucca may be able to survive where only minimally impacted.	All cacti and yucca removed	All cacti and yucca removed

* Vegetation is frequently able to survive some passes of a vehicle, although the number of passes depends on the vegetation type, the weight of the vehicle, and other factors.

2.1.2 Additional Definitions

Additional definitions for construction techniques are provided below, with Appendix A, Figure A-2 showing the various definitions as they are proposed to be implemented.

<u>Access Roads</u>: Internal bladed or compacted roads that would be used to enter or cross the panel arrays or blocks. Access roads would be used throughout the life of the Project, but only as absolutely necessary.

<u>Application Area</u>: The area applied for in the ROW application.

<u>Avoidance Areas/Avoided Features</u>: Areas within the Application Area where solar field development is avoided by site design, such as large drainage features or sensitive habitats, or where linear infrastructure may be existing or proposed between Buildable Areas (e.g. road, connector lines, etc.).

Buildable Area(s): Buildable Areas identified within the Application Area where solar development is planned. Buildable areas include internal access roads and collector lines; however, external access roads and the proposed gen-tie are outside of the Buildable Areas (see Appendix A, Figures A-3, A-4, and A-5 for Buildable Areas by alternative).

Drive and Crush Paths: Travel paths used to construct the solar panel rows that would use drive and crush to construct the routes. BLM recommends blocking access to these unless necessary during O&M.

Solar Panel Arrays or Blocks: Groups of solar panel rows within the Buildable Area.

Solar Panel Rows: The linear alignments of solar panels following torque tube alignments.

2.2 Proposed Action

The Applicant filed an application to construct, operate, maintain, and decommission the Bonanza Solar Project, consisting of up to a 300-MW PV solar generating facility and ancillary facilities on BLM-administered land in southern Nevada. The Applicant is seeking a ROW grant (NVNV105848474) for the Project within a 5,133-acre Application Area (Proposed Action). The BLM, in coordination with the Applicant, evaluated Buildable Areas within the 5,133-acre Application Area for siting of the PV solar arrays and other Project facilities (Appendix A, Figure A-3).

2.2.1 Project Components

The Project consists of five primary types of facilities: 1) PV solar panels within three Buildable Areas; 2) an on-site substation; 3) an AC-coupled battery energy storage system (BESS); 4) O&M facilities; and 5) linear facilities (including access roads and a 230-kilovolt [kV] gen-tie) (see Appendix A, Figure A-3). The associated temporary and permanent disturbance acreages for the facilities would be constructed using a range of construction techniques associated with the assigned disturbance definitions in Table 2-1. Table 2-2 itemizes the Project components by disturbance definition, as presented in the POD (Dudek 2024a:19-20).

Under the Proposed Action, the Applicant would work to maintain 50% of perennial vegetation cover and 65% of perennial vegetation density, as compared to reference sites, within the solar array fields[2]. These vegetation cover standards would not apply to facilities outside of the array areas such as the BESS, O&M building, substation, and exterior roads or areas that require spot-grading within the arrays. If the vegetation cover and density thresholds are not met within 10 years of completion of construction (or a longer period as determined by the BLM Authorized Officer in the case of drought), restoration would be implemented pursuant to an agency-approved Site Restoration Plan.

Table 2-2 summarizes the Project disturbance levels, by Project component, as described in POD Version 4. Table 2-3 summarizes the acres of disturbance associated with the Proposed Action,

[2] The Applicant's POD does not specifically refer to "perennial" vegetation when defining vegetation cover and vegetation density metrics on POD page 57. However, BLM assumes the intention of the Applicant was to use perennial vegetation and associated reference sites to determine when the vegetation standards are met.

by disturbance category. Under the Proposed Action, the Applicant would attempt to limit the D-3 disturbance category to no more than 863 acres or 35% of the total acreage of the Buildable Areas (2,368 acres); however, this target may be exceeded due to site conditions or other considerations during final design (see Table 2-2) (Dudek 2024a:58). The Applicant would limit the D-3 disturbance category to 1,027 acres or 43% of the total acreage for the Buildable Areas (2,368 acres) as shown in Table 2-3.

Table 2-2. Project Disturbance Footprints

Project Components	Avoidance (D-0)	Restricted and Single Pass (D-1)*	Multi-Pass Drive and Crush (D-2)	Clearing, Grading, Compaction (D-3)†
Buildable Areas (total acreage: 2,368)				
Solar array fields (Buildable Areas)				
• Roads for construction and maintenance				62
• Array access for construction and maintenance			392	
• Area covered by at-grade items (footprint of piles, collection system, transformer, inverters, PV combining switchgear), graded or spot-graded during construction, and grading related to flood control and drainage features				679
• Fence line				1
• Native vegetation areas		1,107		
• Perimeter road (inside the fence)				47
• Laydown areas			40	
O&M building and parking				5
On-site substation				5
BESS				30
Total within Buildable Areas		**1,107**	**432**	**829**
Outside Buildable Areas				
Gen-tie corridor (140 feet wide)				
• Access road				27 (existing)
• Spur roads				10
• Pole structures				3
• Temporary construction laydown yards/pull sites			10	
Collector and access road between Buildable Areas (~1.5 miles of collector corridor)				18
Access roads from U.S. 95				3
Avoidance areas	2,720			
Total outside Buildable Areas	**2,720**		**10**	**34‡**
Total within Project Area	**2,720**	**1,107**	**442**	**863‡**

* These are areas within the solar panel field that would have restricted disturbance as determined in the final design of the Project and through the Access Management Plan. This category also includes areas that would be subject to disturbance category D-1, as described in EIS/RMPA Section 2.1, Development of Alternatives.

† Disturbance acreages shown at times overlap and are inclusive, not additive.

‡ Does not include the existing 27 acres associated with the existing gen-tie access road.

Source: Dudek 2024a:19–20.

Table 2-3. Proposed Action Acreages, by Disturbance Category

Disturbance Category*	Avoidance Areas (avoidance areas or avoided features)	Panel Array Block Construction (includes grading within panel array blocks such as spot-grading, inverter pads, etc.)	Facilities, Substation, Laydown Areas, Roads	Total
D-0 (avoidance)	2,720 acres			2,720 acres
D-1 (overland travel)		944 acres		944 acres
D-2 (clear and cut/ drive and crush)		392 acres	50 acres	442 acres
D-3 (clear and cut with soil removal)		827 acres	200 acres	1,027 acres†
Total	2,720 acres	2,163 acres	250 acres	5,133 acres

* Disturbance categories are defined in EIS/RMPA Section 2.1.

† Maximum D-3 acreage is shown in this table. "Applicant will work to achieve a maximum of 20% grading within the original Application Area, which would equate to a maximum of 1,027 acres over the entire project. Grading within the Buildable Areas would be targeted to not exceed 35%." (Dudek 2024a:58).

Solar Arrays

- Three Buildable Areas totaling approximately 2,368 acres in size would be used to construct solar array blocks located in the northwest (approximately 975 acres), the northeast (approximately 869 acres), and the southeast (approximately 524 acres) portions of the 5,133-acre Application Area.
- Within each Buildable Area, a field of PV modules (also called solar panels) would consist of repeating solar array blocks approximately 18 acres in size, measuring 600 feet wide by 1,300 feet long producing up to 4.2 MW.
- Each solar array block would be composed of multiple rows of PV modules with up to two inverters set along the internal access road and within the middle of the solar array block. Each inverter site would be graded and measure approximately 3,000 square feet. The array blocks would be separated by internal access roads in either north-south or east-west directions, up to 28 feet wide.
- Each solar array row would consist of 64 to 96 modules arranged into multiple strings orientated along a north-south axis, rotating from east to west throughout the day.
- PV solar modules would be mounted on single-axis, horizontal tracker mounting systems supported by driven vertical H-pile galvanized steel beams and attached to concrete ballasts. At the highest point of rotation, the edge of the solar panel as mounted on the tracker could be up to 12 feet high (Dudek 2024a:28). The bottom edge of the solar panels is estimated to be a minimum 18 inches above the ground surface.
- PV modules would be bifacial, able to absorb light from both sides of the module. The final module specification has not been selected at this stage, but examples include crystalline silicon, cadmium telluride, or copper indium gallium selenide modules.
- Direct current (DC) collection system and inverter stations would collect power from the array blocks and transmit it to the on-site substation (Dudek 2024a:29).

- PV collector system would transport solar energy from the panels within the three Buildable Areas to the on-site substation underground in trenches measuring 3 feet deep by 3 to 6.5 feet wide.
- The internal collector system and access roads would be within a 100-foot-wide corridor. The connector access road would be a maximum of 25 feet wide and would be permanently disturbed. The remaining portion of the 100-foot-wide collector corridor, approximately 75 feet wide, would be disturbed at a D-3 level of disturbance for the trenching of the collector systems, but would be reclaimed and reseeded (Dudek 2024a:19).
- An interior perimeter road, up to 30 feet wide, separating the solar panel arrays from the perimeter fence would be constructed within each Buildable Area. The roads would be constructed to allow fire and maintenance vehicle access.

BESS, Substation, and Other Ancillary Components

- A single, on-site substation covering an approximate 5-acre area and co-located with the AC-coupled BESS and O&M building would be centrally located along the southern boundary of the northwest Buildable Area. Due to high voltage, the substation would be surrounded by up to 12-foot-high security fencing and locked gates.
- An up to 300-MW BESS (AC-coupled) facility composed of multiple containers. Each container, measuring 53 feet long by 8 feet wide by 12 feet high and containing batteries connected in strings housed on racks, would be placed on a piling or concrete foundation for a total approximate area of 30 acres. The BESS would be co-located with the on-site substation centrally located along the southern boundary of the northwest Buildable Area.
- An O&M building, up to 3,600 square feet, approximately 60 feet wide by 60 feet long placed on a cement foundation with the highest point not exceeding 35 feet tall and would cover an approximately 5-acre area. Located outside and adjacent to the O&M building would be a parking lot, a water holding tank (10,000 to 15,000 gallons), a septic system, and storage containers.
- A staging area would include temporary trailers, parking area, portable toilets, and site security facilities located within the footprint of the O&M and substation/BESS area.
- If needed, a temporary 2-acre concrete batch plant would be installed within a temporary laydown area.
- Temporary staging areas for material laydown would be located throughout the Buildable Areas and would be subsumed by the buildout of the PV arrays.

Linear Facilities

<u>Infrastructure</u>

- Two access roads from U.S. 95, up to 59 feet wide during construction and then restored to a width of 40 feet wide after construction is completed, would be improved, graded, and covered with aggregate.

- Permanent security perimeter fencing up to 8 feet high, no more than 12 feet high from the bottom to the top of the barbed wire with a 10-foot-wide fire break would be installed around the exterior. The fence may have three strands of barbed wire mounted on 45-degree extension arms.

Gen-Tie/Transmission System

- Energy collected at the on-site substation would be stepped-up from 34.5 kV to 230 kV and carried 5.4 miles west on the single-circuit or double-circuit 230-kV gen-tie to the existing GridLiance Innovation Substation in Nye County, Nevada.
- The 5.4-mile ROW for the gen-tie would be 140 feet wide. At the GridLiance Innovation Substation, the power would enter a ring bus and be delivered into the electrical grid.
- The gen-tie would require up to 42 steel monopoles approximately 60 to 135 feet tall, with typical spans between poles of 900 to 1,100 feet installed at depths of 20 to 30 feet. Self-weathering steel would be used for the monopoles, which are intended to blend with the surrounding mountains.
- Anti-perching/nesting deterrents would be installed on each monopole.
- Tower pole installation would require a work area of approximately 1 acre and pulling and tensioning sites measuring 150 by 400 feet (60,000 square feet) of temporary disturbance at each location.
- Access to the gen-tie towers would be along new spur roads that extend from the existing dirt road near the proposed gen-tie ROW.

Communications System Requirements

- Fiber optic communication lines supporting the on-site telecommunication equipment would be located on the gen-tie monopoles. Certain locations may require underground communication line installation due to on-site specific constraints.
- Telecommunication equipment for the Project would reside within the on-site substation and include the power generation control and relaying equipment, station batteries, communication systems, and the supervisory control and data acquisition system.
- A 14-foot by 20-foot equipment shelter no taller than 14 feet high would house portions of the communication system components within the fenced substation area.
- Radio equipment would be located within the equipment shelter or in the substation enclosure, connected via coaxial or fiber optic cables.
- One meteorological station using up to 15-foot-high-tripod with a cross-arm and mounted solar equipment would be in a separate enclosure on the ground.

2.2.2 Construction

The following is a description of the Project's general construction methods and sequence. An overview of the proposed heavy equipment and delivery vehicles is provided in Table 2-4 and Table 2-5.

Construction would commence with pre-construction surveys and the construction of the two main access roads. Following this, construction would begin with pre-construction surveys; installation of Mojave desert tortoise exclusion fencing and security fencing around the solar site; clearing and construction of a laydown yard inside the permanent security fence; site mowing, grading, and preparation; and construction of the O&M building, parking area, and pad mounts for transformers. Construction would continue with the installation of on-site access ways, the Project substation, and assembly of solar panel blocks and wiring within the three Buildable Areas. Construction of the gen-tie and the associated access roads would begin after the construction of the Project has already commenced. The exact timing of construction would be subject to interconnection requirements and the engineering, procurement, and construction contractor.

Construction Schedule and Personnel Requirements

Pre-construction activities are anticipated to commence mid- to late 2025. The total construction schedule would be expected to be up to 18 months and the COD is anticipated in December 2026. The Project may or may not be phased and the exact timing of construction would be subject to interconnection requirements and the engineering, procurement, and construction contractor.

The on-site workforce would consist of laborers, craftspeople, supervisory personnel, supply personnel, and construction management personnel largely recruited from Clark County, Nevada. The on-site workforce is expected to reach its peak at approximately 500 individuals with an average construction-related on-site workforce of 280 individuals, consisting of craftspeople and supervisory, support, and construction management personnel on-site during construction (Dudek 2024b). This would be in addition to any cultural, biological, and/or Tribal monitors required on-site.

Generally, construction work schedules are expected to be 12 hours per day seven days a week. Typically, the workday would consist of shifts beginning as early as 5:00 a.m. and ending as late as 7:00 p.m. The work schedule may be modified throughout the year to account for the changing weather conditions. For instance, during hot weather, it may be necessary to start work earlier to avoid pouring concrete during high ambient temperatures and for the health and safety of workers. Additional hours or nighttime work may be necessary to make up schedule deficiencies, or to complete critical construction activities. During the startup phase of the Project, some activities might be performed over the weekend.

Table 2-4. Machinery and Vehicles Needed for Construction

Item	Units	Duration (months)	Purpose
Water Truck	14	20	Dust control
Front-End Loader	14	20	Material movement
Scrapers	24	18	Grading
Bulldozers	10	18	Grading
Graders	24	18	Grading
Hydraulic Ram	46	18	Foundation installation

Item	Units	Duration (months)	Purpose
Forklifts	36	20	Material staging
Backhoes	36	18	Excavation
Crane	10	20	Inverter/BESS placement
Tractor With Trailer	28	20	Materials staging
Pickup Truck	139	20	Transportation
All-Terrain Vehicle	185	20	Transportation
Pile Driver	46	18	Post installation
Trencher	10	18	Underground work (AC/DC/fiber)
Small Sheepsfoot Roller	18	20	Compaction
Power Screener	14	12	Soil processing
Cable Plow	4	18	Underground cable installation

Table 2-5. Material Delivery Vehicles

Item	Truck Deliveries (Number)	Delivery Vehicle	Deliveries Per Day	Duration (months)
Modules	9,852	53-foot flatbed	10–12	15
Water*	10,887	4,000-gallon water truck	25–26	20
Foundation Posts	1,723	48-foot flatbed	3–4	13
Racking	2,178	48-foot flatbed	3–4	13
BESS Containers	TBD	Not available	TBD	TBD
Cable	226	53-foot flatbed	0–1	9
Inverters	412	48-foot flatbed	0–1	15
Transformer	3	53-foot flatbed	0–1	1
Concrete	654	Concrete mixer	3–5	8
Trash (haul off)	238	40-yard roll-off Dumpster	1–2	20
Fencing	100	48-foot flatbed	0–2	3
Electrical Equipment	158	48-foot flatbed	0–2	20

Note: TBD = to be determined.

* Off-site water truck trips are added as an optional component contingent on finalizing the water sourcing location.

Site Preparation

Prior to any construction work commencing in the Project Area, final boundary surveys and construction staking would be completed, and security and Mojave desert tortoise exclusion fencing would be installed. Site preparation would then consist of trimming some vegetation within the construction area to a height of 18 inches, then performing drive and crush with construction vehicles. Vegetation would be permanently cleared only from the areas indicated as D-3 disturbance areas in Table 2-2 and Table 2-3. Within the solar arrays, native vegetation would be managed through trimming or drive and crush as practical.

Any mowing or trimming of vegetation would utilize methods that allow for the Project disturbance thresholds to be maintained (see Table 2-3). Mowing that would occur within acres allocated D-1 would be “minimal mowing” as defined in Table 2-1. The Applicant would limit vegetation trimming to areas where it is necessary for solar array functionality. Additional detail for mowing or trimming would be provided in the Access Management Plan.

Grading would occur in the areas identified as D-3 disturbance areas (see Table 2-2 and Table 2-3). Grading would be limited to the PV areas, roads, inverter pad locations, BESS, substation, O&M building, parking area, water storage tank, septic field, and laydown area. Excavation would be limited to the trenches for the collection system, inverter pads, and ancillary facility foundations.

Any grading in the solar panel field that is not for a permanent facility, such as a road/inverter or within a tracker array row, or that is necessary for the proper functioning of solar array tracking systems (i.e., spot-grading) would be subject to decompaction and topsoil replacement or reseeding. The Applicant would restore all temporarily disturbed areas according to the Site Restoration Plan, as required by BLM and developed prior to construction.

Except for the inverter and substation areas, solar field development would maintain sheet flow where feasible, with water exiting the site in existing natural contours and flows. In addition, impervious groundcover would be limited to the PV panel foundations (if necessary), inverter and transmission cement pad, a small parking area, the O&M building, and the Project substation. Natural sheet flow and infiltration would be maintained throughout the PV panel field. The Project would be designed to protect against the 100-year, 24-hour flood event. The Project civil design would incorporate layout and construction techniques that would minimize disturbance to the desert washes. Existing ephemeral washes may be diverted and channelized to allow for the installation of equipment and consolidation of panels. Larger washes would be avoided to the extent feasible; however, some protections, such as berms or ditches, may be used where necessary. Where roads cross smaller washes, localized grading of the channel bank could occur to allow vehicles to cross the wash (Dudek 2024a:37).

Solar Modules/Array Installation

After the site is prepared and graded to the limited extent required, the panel field would be laid out by installing the vertical H-pile galvanized steel beams directly into the ground using a small pile driver. Soil tests would be required to validate the foundation requirements. If tests conclude that further foundations are required, then the vertical H-pile galvanized steel beams would be attached to concrete ballasts. Once the foundations are secure, trenching would be dug along the perimeter of the units to tie the inverter blocks together and the electrical conduit and wires would be laid down. Trenches would be approximately 3 feet deep and approximately 3 to 6.5 feet wide. Next, the framing would be bolted to the vertical support beams. Once framing is complete, panels would be delivered to the site and installed on the frames. In most cases, H-beams would be driven, and the inverters would be secured to the tops of the H- beams; however, pre-poured concrete inverter pads could also be used. Pre-poured concrete inverter pads would be delivered and laid down, inverters would be secured to the pads, and the electrical wiring would be completed.

BESS, Substation, and O&M Building

Once the BESS area is graded, level concrete pads would be poured for the battery containers. The battery containers would be placed and connected to the grounding grid. An underground conduit would be installed to connect the batteries and inverters to the control house inside the substation. Medium-voltage conductors from the inverters would be connected to the substation medium-voltage busbar.

The construction of the on-site substation would begin early in the construction process. Heavy concrete foundations would be poured for the equipment pads.

Lighting

Lighting during construction would be limited to the staging area for the construction trailers, parking area, and site security facilities. It would be focused downward, shielded, and directed toward the interior of the site to minimize light exposure to areas outside the construction area. Low-pressure sodium lamps and fixtures of a non-glare type would be specified. Lighting in high-illumination areas, where it would not be required on a continuous basis, would be controlled by switches and motion detectors to light the areas only when required. Nighttime lighting would be limited to areas required for operation, safety, or security, and would be shielded from roadways and observers.

The Project is in the vicinity of several Department of Defense (DoD) or DOE operating areas: Creech Air Force Base (KINS) Airport (approximately 5 miles east), the Nevada National Security Site (approximately 30 miles northwest), and Nellis Air Force Base (approximately 45.5 miles southeast). Due to proximity of the Project to DoD- or DOE-managed facilities, the Applicant prepared a glint and glare study (Dudek 2024c) that followed recommended siting criteria established by the Federal Aviation Administration (FAA) for developing solar technologies on airports (including U.S. Air Force [USAF] bases under the jurisdiction of the DoD).

In May 2021, the Applicant consulted with the DoD, which resulted in a letter stating that the Bonanza Solar Project would have minimal impact on military operations in the area (see Chapter 2.10 of the POD for more information) (Dudek 2024a). The Applicant would continue to consult with the DoD through the agency's Military Aviation and Installation Assurance Siting Clearinghouse to ensure there are no significant conflicts with military operations in the region and would implement appropriate mitigation measures.

230-kV Gen-Tie

Access to the gen-tie would be along an existing unpaved access road that provides access to other transmission lines and the GridLiance Innovation Substation located west of the proposed Buildable Areas (see Appendix A, Figure A-3). The existing access road is maintained by the current ROW holders; therefore, no major improvements are proposed by the Applicant. There is potential for an additional temporary access road ROW to improve the existing access road. Activities within this temporary access road ROW would be limited to roadway improvements and maintenance (e.g., filling potholes and minor grading) within the existing access roadway ensure that the road would meet the Applicant's gen-tie access needs.

Short spur roads would be constructed from the existing access road to each gen-tie structure, which would be restored post-construction. Crews would work continuously along the gen-tie alignment to construct the proposed gen-tie. Construction of the line would include clearing and grading of spur roads and pole sites (if required), foundation preparation and pole installation, conductor installation, and cleanup and site restoration. Construction of the gen-tie and the associated access roads would begin after the construction on the Buildable Areas has already commenced.

Excavations for the monopole towers would use gravel or concrete backfill following installation. Additionally, pulling and tensioning sites, measuring 250 by 600 feet of temporary disturbance at each location would be used at dead-end structures and most angle structures. These sites would be subject to Site Restoration Plan requirements following construction.

Water Use

The Applicant proposes to drill a water well to serve as the primary water source during construction and operation of the Project. If necessary, water could be trucked onto the site. Trucked water could come from nearby water systems, such as the Indian Springs Water Company or could be imported from outside the Indian Springs Valley Hydrographic Area (Basin Number 10-161) (Dudek 2024a:36). Regardless of the source of water, all water use is allocated by the Nevada State Water Engineer. In order for the Applicant to develop an on-site well, the Indian Springs Water Company filed point of diversion applications for the Bonanza Solar Project with the Nevada State Water Engineer in March 2024 (Nevada Division of Water Resources [NDWR] 2024a, 2024b). No new water allocation has been requested by the Applicant.

During the 20-month construction period, an estimated 250 to 325 acre-feet of water would be needed for such uses as soil compaction, dust control, and sanitary needs for construction workers (Table 2-6).

Table 2-6. Project Water Requirements

Water Consumption Requirements	Approximate Consumption during Construction	Approximate Consumption during Operation	Approximate Consumption during Decommissioning
Daily (gallons per day)	188,005–244,407	Not applicable	188,005
Annual (acre-feet per year)	150–195	1	150
Total (acre-feet)	250–325	40	250

Source: Dudek (2024a:36, 86).

Permanent aboveground water storage tanks would be used for O&M tasks and facilities, including on-site fire suppression. If needed, permanent water storage tanks would be elevated steel portable water tower type tanks. These tanks can be towed to appropriate locations and elevated to provide water pressure as well as clearance. Permanent water storage tanks would be enclosed. The typical size would be 10,000 to 15,000 gallons, with dimensions of approximately 42 feet long by 8 feet wide and 13.5 feet tall.

Portable bathrooms would be provided during construction, as needed, and would be emptied off-site per regulations. Therefore, water would not be used on-site for the portable bathrooms. However, water would be utilized for handwashing and hygienic purposes.

Bottled drinking water would provide potable water. Non-potable water would be provided to the O&M building via an on-site well or trucked in and stored in the aboveground water storage tanks. Operational water usage is estimated at 1 acre-foot per year for general maintenance activities. During operations, wastewater would be generated from bathroom and shower facilities located within the O&M building. Domestic wastewater would be treated and disposed of at the site using a septic disposal system consisting of septic tanks and leach field.

2.2.3 Operations and Maintenance

Following construction, operation of the Project could require up to 12 permanent employees to provide technical oversight of plant management and operations. Security personnel would be on-call for maintaining Project security. The maintenance program would be conducted in accordance with the annual maintenance requirements, vendor technical manuals, and good engineering practices. Scheduled maintenance periods would be planned and coordinated with the utility in accordance with the Power Purchase Agreement and unscheduled corrective maintenance would be decided on a case-by-case basis.

Vegetation would be allowed to regrow within the solar panel field to the extent that it would not interfere with the panels. Vegetation maintenance would consist of trimming vegetation within the Project Area to a height of 18 inches, as needed to allow for proper operation of the solar panels. Any mowing or trimming of vegetation would utilize methods that allow for the Project disturbance thresholds to be maintained (see Table 2-3). Mowing that would occur within acres allocated D-1 would be "minimal mowing" as defined in Table 2-1. The Applicant would limit vegetation trimming to areas where it is necessary for solar array functionality. Additional detail for mowing or trimming would be provided in the Access Management Plan.

If vegetation standards described in EIS/RMPA Section 2.2.1, Project Components, are not met within 10 years of completion of construction (or a longer period as determined by the BLM Authorized Officer in the case of drought), restoration would be implemented pursuant to an agency-approved Site Restoration Plan. Vegetation within the Buildable Areas would be managed through a combination of trimming and mowing native species and herbicide application for non-native species performed in accordance with the Project's approved Weed Management Plan, which would be written and approved by the BLM prior to issuance of the Notice to Proceed (NTP). Roads would be maintained to minimize fugitive dust and prevent erosion from rain events. Additional gravel or surface treatments on the dirt access roads may be required. See Table 2-6 for Project water requirements during operations.

2.2.4 Decommissioning and Site Reclamation

The ROW would be granted for a 50-year term, with the option to renew. The expected Project operational lifecycle is 40 years (Dudek 2024a:60) with 10 additional years for decommissioning and restoration. However, depending on economic or other circumstances, the real life of the Project could be longer or shorter. Prior to receiving an NTP from BLM, the Applicant would draft the Site Restoration Plan, which would include preliminary decommissioning details. Procedures would be designed to ensure public health and safety, environmental protection and compliance with all applicable laws, ordinances, regulations, and standards. Closure may range from short-duration closure to complete removal of equipment and restoration of the land to BLM-approved specifications.

Decommissioning would begin as soon as the Project is no longer operational. Decommissioning would generally include the following:

- Removal of aboveground and belowground infrastructure within 3 feet of final grade, unless converted to other uses.
- Restoration of the lines and grades in the disturbed area to match the natural gradients of the site.
- Reestablishment of native vegetation in the disturbed areas.

The Site Restoration Plan would provide details regarding the removal of all Project components, reuse of materials to the extent feasible, and site restoration activities to pre-Project specifications.

2.2.5 Project Design Features

The environmental analysis in EIS/RMPA Chapter 3 assumes that all applicable design features in the Solar PEIS (BLM and DOE 2012), applicant-proposed measures (APMs), and standard agency permit requirements would be implemented under any of the Action Alternatives.

The Project design features would be used in the environmental analysis of this EIS/RMPA to determine the potential impacts from Project activities. Revised language and additional measures may be added to final work plans as necessary; however, any modifications or revisions to Project design would require approval from the BLM and any and all applicable permitting agencies. Any modifications or revisions to Project design would need to provide greater or equal protection to environmental resources in order to meet conditions of approval. APMs, mitigation measures, Solar PEIS design features, and required plans are listed in Appendix B.

2.3 Alternative 1 (Resource Integration Alternative)

Under Alternative 1, the Resources Integration Alternative, there are higher requirements for soil and vegetation retention, with the goal of allowing passive reoccupation of Mojave desert tortoise into the facility based on coordination with BLM and USFWS. More information about the Resources Integration Alternative can be found in EIS/RMPA Appendix D.

Alternative 1 would have the same Project components, construction phases, operation phase, and decommissioning phase as the Proposed Action, unless otherwise noted, with these primary differences:

- **Vegetation Standards:** The Applicant would maintain a vegetation cover standard of 75% of reference perennial vegetation cover within the Buildable Areas. These vegetation cover standards would not apply to facilities outside of the array areas such as the BESS, O&M building, substation, and exterior roads or areas that require spot-grading within the arrays.

- If the vegetation cover threshold is not met within two years of completion of construction (or a longer period as determined by BLM Authorized Officer in the case of drought), restoration would be implemented to reach the 75% of reference site perennial vegetation cover pursuant to an agency-approved Site Restoration Plan.
- If restoration is required to meet the cover standard, actions in the Site Restoration Plan would be designed with the goal of reaching the cover standard within two years of the initial two-year natural recovery period. The goal would be for the site to have reached the 75% of reference site conditions within a maximum of four years from construction completion.

- **Soil-Disturbing Activity Limitations:** grading or disc and roll construction (D-3 disturbance) would be limited to 482 acres or 20% of the total acreage for the Buildable Areas (2,413 acres).
- **Road Widths and Surfacing:** perimeter roads would only be incorporated into the site design if required in writing by Clark County Fire Department. If required, perimeter roads would be no more than 14 feet wide. This would allow one-way vehicle traffic for emergency access. There would be no disturbance permitted on the exterior of the fence. Within the solar facility, internal roads would be compacted native materials.
- **Fencing:** Security fencing would be installed 8 to 10 inches above the ground, in line with the Mojave desert tortoise fencing. Mojave desert tortoise fencing would be installed using bend-and-pin methods to reduce ground disturbance and to facilitate the Mojave desert tortoise fencing removal during construction. Standard wildlife escape holes would be established as described in measure Gen-1 (see Appendix B, Table B-2). After construction, once vegetation cover standards have been met, as determined in coordination with USFWS and BLM biologists, the Mojave desert tortoise fencing would be removed so that Mojave desert tortoises could passively reoccupy the solar facility.
- **Hydrologic Flow Controls:** No detention basins would be incorporated into the Project design. Ephemeral washes would not be channelized or otherwise modified. Surface water flow would be allowed to continue in natural flow patterns across the site. No septic system would be permitted. Roadways would be contoured along natural topography and water flows would be allowed to cross roadways. Use of riprap or gravel of any kind anywhere would need prior approval from the BLM and USFWS to ensure riprap meets specifications to avoid entrapment of Mojave desert tortoise.
- **Nevada Department of Transportation (NDOT) Mineral Material Site:** Up to 120 acres of NDOT mineral material sites would be relocated to the northeast corner of the Application Area to replace the five existing NDOT mineral material sites (Mineral and Land Record System [MLRS] easement serial numbers NVNV105962115, NVNV106257420, NVNV106124991, NVNV105959733, and NVNV106183711) that overlap with the Application Area. The relocated 120-acre NDOT mineral material site

would be immediately adjacent to the existing NDOT mineral material pit located as shown in Appendix A, Figure A-4.

Under the Resources Integration Alternative, the Project would be constructed primarily using methods that minimize disturbance to topography, soils, and vegetation, and the alternative is expected to improve the retention of native vegetation, wildlife habitat, soils, seed banks, and biological soil crusts while reducing air quality (fugitive dust) and water quality impacts (Table 2-7).

Table 2-7 summarizes the Project disturbance levels, by Project component, which cap the D-3 disturbance category at 482 acres or 20% of the total acreage for the Buildable Areas (2,413 acres).

Table 2-7. Alternative 1 Acreages, by Disturbance Category

Disturbance Category*	Avoidance Areas (avoidance areas or avoided features)	Panel Array Block Construction (includes grading within panel array blocks such as spot-grading, inverter pads, etc.)	Facilities, Substation, Laydown Areas, Roads	Total
D-0 (avoidance)	2,720 acres			2,720 acres
D-1 (overland travel)		1,449 acres†		1,449 acres
D-2 (clear and cut/ drive and crush)		482 acres‡		482 acres
D-3 (clear and cut with soil removal)		272 acres	210 acres§	482 acres
Total	2,720 acres	2,203 acres	210 acres	5,133 acres

* Disturbance categories are defined in EIS/RMPA Section 2.1, Development of Alternatives.

† Equals 75% of the Buildable Area that is not being graded.

‡ Equals 25% of the Buildable Area that is not being graded.

§ Roads (127 acres), substation (5 acres), BESS (30 acres), O&M building and parking (5 acres), miscellaneous (3 acres), laydown area (40 acres).

2.3.1 Construction

Clear and cut with soil removal (D-3): Traditional Construction Methods

The areas of disc and roll, scraping, grading, and leveling would be minimized by limiting use of these methods to the designated main access road, on-site substation, O&M facilities, temporary laydown areas, equipment pads (e.g., inverters, battery enclosures), and limited areas of spot-grading within the solar field. The maximum disturbance threshold for D-3 activities would be set at 20% of the total Buildable Area(s) (e.g., panel array blocks, access roads, O&M facilities, battery storage), including spot-grading needed for topographical constraints.

As described in the POD (Dudek 2024a), any grading in the solar panel field that is not for a permanent facility, such as a road/inverter or within a tracker array row, or that is necessary for the proper functioning of solar array tracking systems (i.e., spot-grading) would be subject to decompaction and topsoil replacement or reseeding per the Site Restoration Plan.

Panel Array Blocks: 75% Overland Travel (D-1), 25% Drive and Crush (D-2)

Within each block of panel arrays, topography, soils, and vegetation would be left in place, and installation of solar array components would occur over these existing resources and features.

Within the panel array blocks, a mixture of overland travel and drive and crush techniques would be used for construction. Drive and crush effects are anticipated where multiple vehicle trips along the same path are made. A maximum of 25% of perennial vegetation cover would be impacted through drive and crush techniques. Seventy-five percent of the vegetation cover is required to be maintained; if vegetation is crushed through overland travel in these areas, it should allow the vegetation to recover.

If spot-grading is needed within the panel array block, that spot-grading would be counted towards the maximum disturbance threshold of 20%. However, graded areas would not be included in sampling of the impacted perennial vegetation within each panel array block.

These percentages were obtained through several means. Seventy-five percent is used as the minimum success standard for vegetation recovery in BLM's Restoration Plan Template. To allow for expanded construction activity within a solar site, the BLM is considering only vegetation cover in the 75% standard for within panel array blocks. Recommended practices to achieve the standard are provided in EIS/RMPA Appendix D.

Access Management Plan

An Access Management Plan would describe planned activities requiring access, define the drive and crush paths within panel arrays for each planned activity and proposed access routes or travel paths to meet the standards outlined herein. The plan would be submitted to BLM for review and approval prior to (Limited) NTP. BLM would provide best practices based on experience with other projects and adaptive management techniques for access for recommended inclusion in the Access Management Plan.

Drive and Crush Access Routes

Internal travel paths or turnouts from large equipment would be minimized during construction to limit unnecessary disturbance to vegetation. If not needed during O&M, travel paths and turnouts would be decompacted after construction to facilitate restoration.

2.3.2 Operations and Maintenance

During O&M, the drive and crush paths identified in the Access Management Plan and used during construction within the panel arrays would continue to be used to access the site and equipment. Vehicle trips between panel array blocks would be limited to the established access roads and vehicular access would occur in the smallest possible vehicle to complete the activity, or when possible, on foot. Vehicle traffic would avoid any vegetated areas to the maximum extent possible. If vegetation reaches a height where it is interfering with panel operation, it may be trimmed back to no lower than 18 inches.

2.3.3 Decommissioning

Decommissioning would consist of removing all materials from the site. The drive and crush paths through the panel arrays would be used to transport materials out of the panel arrays, to the maximum extent possible. The minimum disturbance guidance and prescriptions for construction of the site also applies to decommissioning of the site. If more effective prescriptions are available at the point of decommissioning, these would be used to further minimize disturbance to the site. Additional information on decommissioning would be included in the Site Restoration Plan.

2.3.4 Site Restoration Plan

Protocols for inventorying the percentage of vegetation crushed during construction and decommissioning would be included in the Site Restoration Plan. Vegetation would have up to two years to recover within each panel array block after construction is completed or commercial operations for an area commence (whichever is shorter), which would allow time for vegetation to resprout and regrow after being crushed.

The intent of this alternative is to minimize disturbance during construction such that restoration within the panel array blocks is not necessary. However, if more than 25% of the perennial vegetation cover is impacted, restoration would be required to restore perennial vegetation cover within each array block to 75% of reference site or baseline conditions. This could include outplanting perennial vegetation or seeding.

If there is a documented drought during the two-year period, the BLM Authorized Officer would evaluate extending the restoration time period, if success standards are not being met, to allow for natural recovery of the site.

To monitor restoration success within solar panel arrays, given the large Project Area and the site variability within the area, a robust sampling design would be implemented to evaluate success criteria within each panel array block after the two-year interim period. Alternatively, with BLM permission for sampling and imagery analysis techniques, drone imagery could be used to determine perennial vegetation survival.

2.3.5 Bureau of Land Management Compliance and Monitoring

The Resources Integration Alternative requires quantifiable and measurable disturbance outcomes to be achieved and maintained for the life of the Project. The POD and final engineering prior to the NTP must include documentation of how the disturbance outcomes would be accomplished, specifically information on construction methods and access, as documented in an Access Management Plan, for BLM review and approval.

Grading and Discing (D-3 Disturbance) Limits

Construction methods that result in D-3 disturbance levels would be allowed for discrete facilities as described in the POD (Table 2-8). A maximum D-3 disturbance threshold (including for all discrete facilities and spot-grading within panel array blocks) of 20% of the Buildable

Areas would be established, tracked over time geospatially by the Applicant, and field-verified by the BLM, at minimum, quarterly during construction.

Table 2-8. Grading Limits Resources Integration Alternative Compliance Requirements

Requirement Timing	Requirement Description
Prior to NTP	The Applicant shall provide the BLM with a Site Grading Plan that reflects a total D-3 acreage that does not exceed the maximum grading permitted for the Project (no more than 20%).
	The Applicant shall provide the BLM with a GIS shapefile for the Site Grading Plan, including all facilities, roads, and any necessary spot-grading.
Construction, Operation, and Decommissioning	Unauthorized D-3 level of disturbance in areas that were not approved and therefore would likely exceed the allowed limitations during construction of the Project shall immediately result in a stop work order from the BLM. The BLM Authorized Officer may consider additional acres of D-3 disturbance with adequate justification, which would necessitate restoration prescriptions.
	Any D-3 disturbance during operations or decommissioning shall not surpass the maximum 20% disturbance threshold. Minor deviations would need to be considered and approved by the Authorized Officer.

Note: GIS = geographic information system.

Maintain 75% of Perennial Vegetation Cover in Panel Array Blocks

A maximum disturbance threshold, using perennial vegetation cover as a metric, would be established across each panel array block (Table 2-9). This threshold does not include areas that are graded within the panel array block. If more than 25% of the existing perennial vegetation cover is impacted within each block of panel arrays, restoration would be required to restore perennial vegetation cover within each array to 75% of reference site or baseline conditions.

Table 2-9. Alternative 1 Vegetation Cover Standard Compliance Requirements

Requirement Timing	Requirement Description
Prior to ROW Grant	Include statistically robust sampling methodology to measure vegetation cover within the solar array blocks in the Site Restoration Plan (the BLM shall review and approve methodology).
Construction	The Applicant shall conduct qualitative, or quantitative as appropriate, monitoring of vegetation during construction to evaluate if the requirement of at least 75% relative perennial vegetation cover in the solar array blocks may not be met and report to the BLM monthly.
	The Applicant shall conduct adaptive management and enforce corrective actions where the Access Management Plan is not sufficient to meet the vegetation cover standards or where it is not being followed.
	If the BLM notifies the Applicant that areas appear to not be managed in a way that would allow them to meet the vegetation cover standard, the Applicant shall establish corrective actions immediately.
Post-construction	No more than two years after construction is completed, the Applicant shall implement the sampling methodology in the Site Restoration Plan within the solar array blocks. The Applicant shall document the data and results and deliver those to the BLM in a report no later than one month after completing the sampling.
	If the Project is not meeting the restoration standards in any panel array block, then the Applicant shall: • Begin supplemental restoration, within three months of sampling, as described in the Site Restoration Plan, to meet the cover standard. • Conduct supplemental restoration with the goal of achieving the cover standard in one to two years. • The BLM would approve restoration methodology and shall provide and require adaptive management if the restoration is not anticipated to meet reference site conditions within one to two years.

Requirement Timing	Requirement Description
	The Applicant shall continue monitoring until the cover standard has been met, at which point the BLM shall formally recognize release of the Project from additional monitoring.
Operation	The Applicant shall allow vegetation regrowth within the facility, only trimming vegetation where vegetation directly interferes with panel operations, and shall not trim any perennial vegetation lower than 18 inches.
	The Applicant shall continue to manage the site during operations to minimize further impacts to perennial vegetation within the facility (including but not limited to limiting driving on non-essential travel paths, preventing driving off-road).
Decommissioning	The Applicant shall minimize perennial vegetation impacts during decommissioning to maintain a minimum of 75% perennial vegetation cover throughout the panel array blocks and continue to follow the Access Management Plan, which would facilitate restoration of the site after decommissioning.

Access Management Plan

An Access Management Plan must be prepared and submitted to the BLM for review and approval prior to any NTP. The Access Management Plan would include access planning and management and must reflect how the required outcomes would be achieved through implementation of access strategies that correlate with the construction methodologies used.

2.4 Alternative 2 (Bureau of Land Management Preferred Alternative)

Alternative 2 would have the same Project components, construction phases, operation phase, and decommissioning phase as the Proposed Action, as modified by Alternative 1, with these primary differences:

- **Vegetation Standards:** The Applicant would maintain 65% of reference conditions for perennial vegetation cover within the Buildable Areas. These vegetation cover standards would not apply to facilities outside of the array areas such as the BESS, O&M building, substation, and exterior roads or areas that require spot-grading within the arrays.
  - If the vegetation cover threshold is not met within two years of construction (or a longer period as determined by the BLM Authorized Officer in the case of drought), restoration would be implemented to reach the 65% of reference site perennial vegetation cover pursuant to an agency-approved Site Restoration Plan.
  - If restoration is required to meet the cover standards, actions in the Site Restoration Plan would be designed with the goal of reaching the cover standard within three to five years of the end of the initial two-year natural recovery period. The goal would be for the site to have reached the 65% of reference site conditions within a maximum of seven years from construction completion.
  - The compliance metrics described in Table 2-8 and Table 2-9 under Alternative 1 would still apply to Alternative 2, with modifications made for the vegetation cover and grading percentages.
- **Soil-Disturbing Activity Limitations:** Grading or disc and roll construction (D-3 disturbance) would be limited to 592 acres or 25% of the total acreage for the Buildable Areas (2,413 acres).

Table 2-10 summarizes the Project disturbance levels, by Project component, which cap the D-3 disturbance category at 592 acres or 25% of the Buildable Areas.

Table 2-10. Alternative 2 Acreages, by Disturbance Category

Disturbance Category*	Avoidance Areas (avoidance areas or avoided features)	Panel Array Block Construction (includes grading within panel array blocks such as spot-grading, inverter pads, etc.)	Facilities, Substation, Laydown Areas, Roads	Total
D-0 (avoidance)	2,720 acres			2,720 acres
D-1 (overland travel)		1,184 acres†		1,184 acres
D-2 (clear and cut/ drive and crush)		637 acres‡		637 acres
D-3 (clear and cut with soil removal)		382 acres	210 acres§	592 acres
Total	2,720 acres	2,203 acres	210 acres	5,133 acres

* Disturbance categories are defined in EIS/RMPA Section 2.1, Development of Alternatives.

† Equals 65% of the Buildable Area that is not being graded.

‡ Equals 35% of the Buildable Area that is not being graded.

§ Road (127 acres), substation (5 acres), BESS (30 acres), O&M building and parking (5 acres), miscellaneous (3 acres), laydown area (40 acres).

2.5 Alternative 3 (Modified Layout Alternative)

Alternative 3 was developed to avoid a Tribally identified trail[3] within the Application Area. Alternative 3 would have the same Project components, construction phases, operation phase, and decommissioning phase as the Proposed Action, as modified by Alternative 1, with the primary differences listed below and shown in Appendix A, Figure A-5:

- **Cultural Resource:** Alternative 3 would avoid a Tribally identified trail within the Application Area.
- **Buildable Areas:** Under Alternative 3, the Applicant would construct five Buildable Areas that would total 2,590 acres to allow for wider spacing between panel rows.
- **Vegetation Standards:** The Applicant would maintain 65% of reference conditions for perennial vegetation cover within the Buildable Areas. These vegetation cover standards would not apply to facilities outside of the array areas such as the BESS, O&M building, substation, and exterior roads or areas that require spot-grading within the arrays.
    - Vegetation would be trimmed or mowed, only as necessary, to no lower than 18 to 24 inches.
    - If the vegetation cover threshold is not met within two years of construction (or a longer period as determined by the BLM Authorized Officer in the case of drought), restoration would be implemented to reach the 65% of reference site perennial vegetation cover pursuant to an agency-approved Site Restoration Plan.

[3] The trail is unevaluated pending further consultation with Tribes. NHPA Section 106 consultation on resource evaluations is ongoing until finalization of the EIS/RMPA. Results of Tribal consultation will be provided in the Final EIS/RMPA.

  - If restoration is required to meet the cover standards, actions in the Site Restoration Plan would be designed with the goal of reaching the cover standard within three to five years of the end of the initial two-year natural recovery period. The goal would be for the site to have reached the 65% of reference site conditions within a maximum of seven years from construction completion.
  - The compliance metrics described in Table 2-8 and Table 2-9 under Alternative 1 would still apply to Alternative 3, with modifications made for the vegetation cover and grading percentages.
- **Soil-Disturbing Activity Limitations:** Grading or disc and roll construction (D-3 disturbance) would be limited to 648 acres or 25% of the total acreage for the Buildable Areas (2,590 acres).
- **Road Widths and Surfacing:** Interior perimeter roads would only be incorporated into the site design if require in writing by Clark County Fire Department. If required, perimeter roads would be no more than 14 feet wide.
- **Hydrologic Flow Controls:** Flood control features, such as detention basins, would be incorporated into the Project's final design. These flood control features would occur within the fenced Buildable Areas and would fall within the D-3 disturbance category acreage listed in Table 2-11.
- **NDOT Mineral Material Site:** Up to 93 acres of overlapping NDOT mineral material sites would be relocated to replace the four existing NDOT mineral material sites (MLRS easement serial numbers NVNV106257420, NVNV106124991, NVNV105959733, and NVNV106183711) that overlap with the Application Area. The relocated 93-acre NDOT mineral material site would avoid the linear cultural feature and is shown in Appendix A, Figure A-5.

Table 2-11 summarizes the Project disturbance levels, by Project component, which cap the D-3 disturbance category at 648 acres or 25% of the Buildable Areas (2,590 acres).

Table 2-11. Alternative 3 Acreages, by Disturbance Category

Disturbance Category*	Avoidance Areas (avoidance areas or avoided features)	Panel Array Block Construction (includes grading within panel array blocks such as spot-grading, inverter pads, etc.)	Facilities, Substation, Laydown Areas, Roads	Total
D-0 (avoidance)	2,543 acres†			2,543 acres
D-1 (overland travel)		1,262 acres‡		1,262 acres
D-2 (clear and cut/ drive and crush)		680 acres§		680 acres
D-3 (clear and cut with soil removal)		438 acres	210 acres¶	648 acres
Total	2,543 acres	2,380 acres	210 acres	5,133 acres

* Disturbance categories are defined in EIS/RMPA Section 2.1, Development of Alternatives.

† Alternative 3 Buildable Areas would total 2,590 acres. Therefore, the D-0 avoidance area is reduced to 2,543 acres.

‡ Equals 65% of the Buildable Area that is not being graded.

§ Equals 35% of the Buildable Area that is not being graded.

¶ Road (127 acres), substation (5 acres), BESS (30 acres), O&M building and parking (5 acres), miscellaneous (3 acres), laydown area (40 acres).

2.6 Resource Management Plan Amendments

As described in EIS/RMPA Section 1.6, Land Use and Management Plan Conformance, the Proposed Action and Action Alternatives have been evaluated for conformance with the 1998 Las Vegas RMP. First, the RMP was reviewed for potential conflicts between the proposed Project and BLM management decisions contained within the RMP. Then, follow-up meetings were held with BLM staff to evaluate the potential conflicts with the RMP management decisions.

The evaluation process concluded that the proposed Project would not be in conformance with the RMP due to two conditions:

- The Project would not comply with VRM Class III objectives.
- The Project ROW would cross areas designated in the RMP as a Legacy Locally Designated Corridor named the U.S. 95/Crater Flat Corridor and West Wide Energy Corridor (WWEC) 223-224.

Plan amendment(s) would be required for alternatives where no conforming alternatives could be developed that would meet the purpose of and need for the Project. Two plan amendment alternatives have been identified for the Las Vegas RMP and are discussed in detail in EIS/RMPA Chapter 4.

2.7 No Action Alternative

Under the No Action Alternative, the BLM would not grant a ROW for the Project and the BLM would not amend the relevant RMP. The PV solar facility would not be constructed, operated, maintained, or decommissioned. There would be no impacts to resources because the project would not be constructed, and the existing land uses and present activities in the Project Area would continue.

2.8 Alternatives Considered but Eliminated from Detailed Analysis

Alternatives considered but eliminated from detailed analysis in this EIS/RMPA were assessed using the criteria described in Section 6.6.3 of the BLM NEPA Handbook (BLM 2008:52). Alternatives were eliminated because they would be ineffective (not respond to the purpose and need), technically or economically infeasible, inconsistent with policy objectives for the management of the area (e.g., not in conformance with RMPs), remote or speculative, substantially similar in design to an alternative that is analyzed, or have substantially similar effects to an alternative that is analyzed. A summary of the alternatives considered but not analyzed in detail with accompanying rationale is provided in Appendix J.

2.9 Comparison of Alternatives

This section provides a summary of the impacts, by alternative. The No Action Alternative would have no changes compared to the existing conditions. Table 2-12 compares the acres of disturbance categories for the Proposed Action, Alternative 1, and Alternative 2. Table 2-13 provides a comparison of impacts by alternative and resource topic presented in EIS/RMPA Chapter 3.

Table 2-12. Comparison of Alternatives, by Disturbance Category and Restoration Timeframe

Disturbance Category and Other Details	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Total Application Area	5,133 acres	5,133 acres	5,133 acres	5,133 acres
Total Buildable Areas	2,368 acres	2,413 acres	2,413 acres	2,590 acres
D-0 (avoidance)	2,720 acres	2,720 acres	2,720 acres	2,543 acres
D-1 (overland travel)	944 acres	1,449 acres	1,184 acres	1,262 acres
D-2 (clear and cut/ drive and crush)	442 acres	482 acres	637 acres	680 acres
D-3 (clear and cut with soil removal)	1,027 acres (20% of Application Area; 43% of Buildable Areas)	482 acres (20% of Buildable Areas)	592 acres (25% of Buildable Areas)	648 acres (25% of Buildable Areas)
Vegetation Objective	50% cover based on pre-construction conditions and 65% vegetation density	75% of reference perennial vegetation cover	65% of reference perennial vegetation cover	65% of reference perennial vegetation cover
Natural Recovery Period	10 years	2 years	2 years	2 years
Active Restoration Timeframe*	10 years	2 years	3–5 years	3–5 years
Perimeter Road Widths	30 feet wide	Maximum 14 feet wide, if required	Maximum 14 feet wide, if required	Maximum 14 feet wide, if required
Hydrologic Flow Controls	Included in D-3 disturbance acreage within Buildable Areas	Not allowed	Not allowed	Included in D-3 disturbance acreage within Buildable Areas
Mojave Desert Tortoise Protection Features	Required access management plan	Maximum road widths, maintain natural flow patterns, required access management plan	Maximum road widths, maintain natural flow patterns, required access management plan	Required access management plan
Mojave Desert Tortoise Reoccupation	Conditions not appropriate	Yes	Yes	Yes
NDOT Mineral Material Replacement	Not proposed by Applicant	120-acre NDOT mineral material replacement site east of the Application Area	120-acre NDOT mineral material replacement site east of the Application Area	93-acre NDOT mineral material replacement site east of the Application Area

*Note: If the vegetation cover threshold is not met within post-construction restoration timeframe (or a longer period as determined by BLM Authorized Officer in the case of drought), restoration would be implemented to reach the vegetation objective pursuant to an agency-approved Site Restoration Plan.

Table 2-13. Comparison of Alternatives, by Resource/Use and Impacts

Resource/Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Vegetation	No impact	Approximately 1,027 acres of vegetation within the Buildable Areas would be permanently impacted using the clear and cut with soil removal construction method (D-3). Direct impacts from D-3 heavy surface disturbance would result in the removal of vegetation, roots, and soils; loss of the seedbank; reduced biodiversity; and high levels of soil compaction. Vegetation cover standard: 50% of reference perennial vegetation cover and 65% of vegetation density within the Buildable Areas.	**Less compared to the Proposed Action and the other Action Alternatives.** Approximately 482 acres of vegetation would be subject to the clear and cut with soil removal construction method (D-3), resulting in heavy surface disturbance through grading, soil removal, and loss of vegetation. Vegetation cover standard: 75% of reference perennial vegetation within Buildable Areas. Approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east boundary of the Application Area. This mineral material relocation site would result in a long-term adverse impact to (removal of) vegetation when fully developed, similar to the Proposed Action impacts associated with D-3 disturbance.	**Less compared to the Proposed Action and Alternative 3, more compared to Alternative 1.** Approximately 592 acres of vegetation would be subject to the clear and cut with soil removal construction method (D-3), resulting in heavy surface disturbance through grading, soil removal, and loss of vegetation. Vegetation cover standard: 65% of reference perennial vegetation within the Buildable Areas. Alternative 2 is the same as Alternative 1 for the relocation of the NDOT mineral material sites.	**Less compared to the Proposed Action, more compared to Alternative 1 and Alternative 2.** Approximately 648 acres of vegetation would be subject the clear and cut with soil removal construction method (D-3), resulting in heavy surface disturbance through grading, soil removal, and loss of vegetation. Alternative 3 is the same as Alternative 2 for the vegetation cover standard. The NDOT mineral material sites that overlap the proposed Project would be relocated and replaced with a 93-acre site on the eastern Application Area boundary.
Wildlife, Migratory Birds, and Special Status Species	No impact	Approximately 1,027 acres of species habitat would be removed due to permanent ground disturbance from construction activities (D-3 disturbance). Permanent disturbances would result in the permanent loss of nesting, foraging, and refuge habitat, and would reduce connectivity for the life of the Project. Vegetation cover standard: 50% of reference perennial vegetation cover and 65% of vegetation density within the Buildable Areas.	**Less compared to the Proposed Action and the other Action Alternatives.** Approximately 482 acres of species habitat would be removed due to permanent ground disturbance from construction activities (D-3 disturbance). Vegetation cover standard: 75% of reference perennial vegetation within Buildable Areas. The 120-acre mineral material relocation site would result in a long-term adverse impact to (removal of) wildlife, migratory bird, and special status species habitat when fully developed, similar to the Proposed Action impacts associated with D-3 disturbance.	**Less compared to the Proposed Action and Alternative 3, more compared to Alternative 1.** Approximately 592 acres of species habitat would be removed due to permanent ground disturbance from construction activities (D-3 disturbance). Vegetation cover standard: 65% of reference perennial vegetation within Buildable Areas. Alternative 2 is the same as Alternative 1 for the relocation of the NDOT mineral material sites.	**Less compared to the Proposed Action, more compared to Alternative 1 and Alternative 2.** Approximately 648 acres of species habitat would be removed due to permanent ground disturbance from construction activities (D-3 disturbance). Alternative 3 is the same as Alternative 2 for the vegetation cover standard. The NDOT mineral material sites that overlap the proposed Project would be relocated and replaced with a 93-acre site on the eastern Application Area boundary.

Resource/Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Federally Listed Species	No impact	Approximately 1,027 acres would be subject to permanent ground disturbance from construction activities (D-3 disturbance), resulting in a long-term adverse impact to Mojave desert tortoise connectivity habitat (D-3 disturbance). Vegetation cover standard: 50% of reference perennial vegetation cover and 65% of vegetation density within the Buildable Areas. Migrating individuals of southwestern willow flycatcher, yellow-billed cuckoo, and Yuma Ridgway's rail may collide with PV solar modules (also known as "lake effect") and other Project components, or electrocution associated with the gen-tie. Estimated water use up to 615 acre-feet of water for the life of the Project would contribute to unmeasurable groundwater level decline and adverse habitat impacts at Devils Hole and Ash Meadows National Wildlife Refuge.	**Less compared to the Proposed Action and the other Action Alternatives.** Approximately 482 acres of would be subject to permanent ground disturbance from construction activities, resulting in a long-term adverse impact to Mojave desert tortoise connectivity habitat (D-3 disturbance). Vegetation cover standard: 75% of reference perennial vegetation within Buildable Areas. Alternative 1 impacts to federally protected bird species and groundwater dependent species at Ash Meadows NWR is the same as the Proposed Action. The NDOT mineral material relocation sites overlap 120 acres of Priority 1 connectivity habitat and would result in a long-term adverse impact to Mojave desert tortoise habitat and connectivity when fully developed similar to the Proposed Action impacts associated with D-3 disturbance.	**Less compared to the Proposed Action and Alternative 3, more compared to Alternative 1.** Approximately 592 acres would be subject to permanent ground disturbance from construction activities, resulting in a long-term adverse impact to Mojave desert tortoise connectivity habitat (D-3 disturbance). Vegetation cover standard: 65% of reference perennial vegetation within Buildable Areas. Alternative 2 impacts to federally protected bird species and groundwater dependent species at Ash Meadows NWR is the same as the Proposed Action. Alternative 2 is the same as Alternative 1 for the relocation of the NDOT mineral material sites.	**Less compared to the Proposed Action, more compared to Alternative 1 and Alternative 2.** Approximately 648 acres would be subject to permanent ground disturbance from construction activities, resulting in a long-term adverse impact to Mojave desert tortoise connectivity habitat (D-3 disturbance). Alternative 3 is the same as Alternative 2 for the vegetation cover standard. Alternative 3 impacts to federally protected bird species and groundwater dependent species at Ash Meadows NWR is the same as the Proposed Action. The NDOT mineral material sites that overlap the proposed Project would be relocated and replaced with a 93-acre site on the eastern Application Area boundary.

Resource/Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Earth Resources	No impact	Approximately 1,027 acres of ground disturbance would cause erosion, soil compaction, and loss of vegetation which would adversely impact soils (D-3 disturbance). Vegetation cover standard: 50% of reference perennial vegetation cover and 65% of vegetation density within the Buildable Areas. Approximately 120 acres of overlapping NDOT mineral sites would be no longer available for use with no proposal by the Applicant to replace the mineral material sites. NDOT would lose access to their existing material sites permanently. This is a long-term, adverse effect to mineral resource uses. Continued operation of existing mineral material sites outside of the Application Area would not be hindered by construction activities.	**Less compared to the Proposed Action and the other Action Alternatives.** Approximately 482 acres of ground disturbance would cause erosion, soil compaction, and loss of vegetation which would adversely impact soils (D-3 disturbance). Vegetation cover standard: 75% of reference perennial vegetation within Buildable Areas. The NDOT mineral material sites that overlap the proposed Project would be relocated and replaced with a 120-acre site on the eastern Application Area boundary.	**Less compared to the Proposed Action, more compared to Alternative 1, and less compared to Alternative 3.** Approximately 592 acres of ground disturbance would cause erosion, soil compaction, and loss of vegetation which would adversely impact soils (D-3 disturbance). Vegetation cover standard: 65% of reference perennial vegetation within Buildable Areas. The NDOT mineral material sites that overlap the proposed Project would be relocated and replaced with a 120-acre site on the eastern Application Area boundary.	**Less compared to the Proposed Action, more compared to Alternative 1 and Alternative 2.** Approximately 648 acres of ground disturbance would cause erosion, soil compaction, and loss of vegetation which would adversely impact soils (D-3 disturbance). Alternative 3 is the same as Alternative 2 for the vegetation cover standard. The NDOT mineral material sites that overlap the proposed Project would be relocated and replaced with a 93-acre site on the eastern Application Area boundary.
Water Resources	No impact	Direct impacts to surface water features would occur within 1,027 acres of grading and soil removal, including hydrologic controls within the graded areas. During construction, there is potential for the release of hazardous materials such as fuel, herbicide, and other chemical spills. Any potential spills would be a surface water quality concern. Direct impacts to groundwater include the loss of approximately 615 acre-feet of water through the use of an on-site water well or off-site water source for the life of the Project. Drawdown calculations are estimated to be less than 5 feet at the on-site well and 1 foot at distance of 7,850 feet from the well. Annual groundwater level decline during O&M was estimated to be less than 0.1 foot at the well. The Project would result in unmeasurable contributions to groundwater level decline at Devils Hole.	**Less compared to the Proposed Action and the other Action Alternatives.** Direct impacts to surface water features would occur within 482 acres of grading and soil removal, which would disrupt natural water flow within the Buildable Areas. No hydrologic controls would be allowed under Alternative 1, with the aim of maintaining natural surface water conditions to the extent possible. Under Alternative 1, 120 acres of NDOT mineral material sites would be relocated to the eastern boundary of the Application Area, disturbing natural surface water flow. Groundwater impacts would be the same as the Proposed Action.	**Less compared to the Proposed Action and Alternative 3, more compared to Alternative 1.** Direct impacts to surface water features would occur within 592 acres of grading and soil removal, which would disrupt natural water flow within the Buildable Areas. No hydrologic control would be allowed under Alternative 2, with the aim of maintaining natural surface water conditions to the extent possible. NDOT mineral material site relocation would be the same as Alternative 1. Groundwater impacts would be the same as the Proposed Action.	**Less compared to the Proposed Action, more compared to Alternative 1 and Alternative 2.** Direct impacts to surface water features would occur within 648 acres of grading and soil removal, which would disrupt natural water flow within the Buildable Areas. Under Alternative 3, hydrologic controls, such as detention basins, would be used within the D-3 disturbance areas. Under Alternative 3, 93 acres of NDOT mineral material sites would be relocated to the eastern boundary of the Application Area, disturbing natural surface water flow. Groundwater impacts would be the same as the Proposed Action.

Resource/Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Cultural Resources and Native American Concerns	No impact	Ten cultural resources were identified within the Class III Cultural Resources Analysis Area and two historic properties were identified within the Class I Cultural Resources Analysis Area. Nine of the resources are determined or recommended ineligible for the National Register of Historic Places, while one Tribally identified trail (26CK11556) remains unevaluated pending further consultation. Project construction activities, including ground disturbance, modification of the slope of the natural terrain, compacting of soils, and removal of vegetation, would cause effects to unidentified historic properties if such resources are found. Resource 26CK11556 would be physically affected by the overlapping solar development. Effects would include destruction of the trail, displacement of associated resource components, and making the trail no longer useable for cultural purposes. Effects to 26CK11556 and/or unidentified historic properties could include illegal artifact collection, vandalism, or looting due to new or increased access to sites or increased visibility of sites.	**More compared to the Proposed Action and Alternative 3; same as Alternative 2.** Same as Proposed Action plus the 120-acre NDOT mineral material relocation site would overlap the Tribally identified trail (26CK11556), resulting in physical effects including destruction of the trail, displacement of associated resource components, and making the trail no longer useable for cultural purposes.	**More compared to the Proposed Action and Alternative 3; same as Alternative 1.** Same as Proposed Action plus the 120-acre NDOT mineral material relocation site would overlap the Tribally identified trail (26CK11556), resulting in physical effects including destruction of the trail, displacement of associated resource components, and making the trail no longer useable for cultural purposes.	**Less compared to the Proposed Action, Alternative 1, and Alternative 2.** The Tribally identified trail (26CK11556) would be avoided by the revised layout of the Buildable Areas and revised location of the 93 acres of NDOT mineral material sites. Other construction effects to 26CK11556 would also include temporary increased dust and audible effects. Effects to 26CK11556 and/or unidentified historic properties could include illegal artifact collection, vandalism, or looting due to new or increased access to sites or increased visibility of sites.

Resource/Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Air Quality, Climate Change, and Greenhouse Gas Emissions	No impact	Annual criteria air pollutants and hazardous air pollutants emitted from Project construction would be less than 0.50% of the individual counties' 2020 annual emissions and less than 0.20% of Clark and Nye Counties' combined total 2020 annual emissions. Temporary greenhouse gas emissions would occur over a large area, resulting in negligible impacts at any given location. Air quality in the region could be improved in the long term because additional renewable generation would offset emissions from fossil-fuel-generated energy sources.	Same as Proposed Action, with a potential for reduced fugitive dust due to less grading and soil removal (D-3 surface disturbance) under this alternative. The 120-acre NDOT mineral material site would contribute to fugitive dust emissions of particulate matter 10 microns in diameter or smaller (PM_{10}) and particulate matter 2.5 microns in diameter or smaller ($PM_{2.5}$).	Same as Proposed Action, with a potential fto or reduced fugitive dust due less grading and soil removal (D-3 surface disturbance). The 120-acre NDOT mineral material site would contribute to fugitive dust emissions of PM_{10} and $PM_{2.5}$.	Same as Proposed Action, with a potential for reduced fugitive dust due to an increase of vegetation, and grading and soil removal (D-3 surface disturbance) would be reduced compared to the Proposed Action. The 93-acre NDOT mineral material site would contribute to fugitive dust emissions of PM_{10} and $PM_{2.5}$.
Land Use and Realty	No impact	Five NDOT mineral material sites would no longer be available for use. There is no proposal to relocate the approximately 120 acres of NDOT mineral material sites. Four transmission lines, two fiber optic lines, one highway, and one substation that includes an access road have been authorized and coordination would occur with the existing ROW holder prior to construction. Impacts associated with construction activities would primarily be associated with vehicle and equipment access to the Project from U.S. 95. Intermittent temporary lane closures for U.S. 95 may be required for improvements to U.S. 95.	**Less compared to the Proposed Action, same as Alternative 2, more than Alternative 3.** Five NDOT mineral material pits would be replaced. Up to 120 acres of NDOT mineral material sites would be relocated.	**Less compared to the Proposed Action, same as Alternative 1, more than Alternative 3.** Five NDOT mineral material pits would be replaced. Up to 120 acres of NDOT mineral material sites would be relocated.	**Less compared to the Proposed Action, Alternative 1, and Alternative 2.** Four mineral material pits would be replaced. Up to 93 acres of NDOT mineral material sites would be relocated.

Resource/Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Visual Resources	No impact	The existing landscape character, scenic quality, and key observation points would be affected by the Project from the removal of vegetation, fugitive dust, movement and presence of heavy equipment, and the introduction of forms, lines, colors, textures, lighting, and glint and glare that are not currently in the existing landscape. Elevated repeating solar panels and other Project elements would be in contrast with the existing flat valley. Grading and vegetation removal would introduce exposed soils of colors of reddish browns. Long-term impacts include the presence of geometrical shapes of the solar panels and Project facilities, which would present weak to moderate contrasts in form, line, color, and texture. For key observation points (KOPs), the degree of contrast would vary depending on the KOP. The Project components would lack scale or spatial dominance in the landscape and the valley and the mountain terrain surrounding the area would remain visually dominant. The Project would not conform with VRM Class III objectives as defined by the Las Vegas RMP (BLM 1998a).	Same as Proposed Action with a potential for reduced visual resource impacts due to less grading and soil removal (D-3 surface disturbance) under this alternative. The 120-acre NDOT mineral material site would increase the amount of visual contrast resulting in marginal, long-term adverse impacts to visual resources.	Same as Proposed Action with a potential for reduced visual resource impacts due to less grading and soil removal (D-3 surface disturbance) under this alternative. The 120-acre NDOT mineral material site would increase the amount of visual contrast resulting in marginal, long-term adverse impacts to visual resources.	Same as Proposed Action with a potential for reduced visual resource impacts due to less grading and soil removal (D-3 surface disturbance) under this alternative. The 93-acre NDOT mineral material site would increase the amount of visual contrast resulting in marginal, long-term adverse impacts to visual resources.

Resource/Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Socioeconomics and Environmental Justice	No impact	The number of construction workers would average 280, peaking at approximately 500. Worker-related impacts to demographics, labor markets, housing markets, demand for public services, or community cohesiveness in Clark and Nye Counties are not anticipated. Property value impacts are not anticipated. Project-related purchases are not expected to change the availability of goods and services. Grid reliability or transmission capability impacts are not anticipated during construction. Construction activity related to solar generation and electricity storage capacity in Clark County may encourage development of transmission infrastructure, increasing linkages between Clark County and demand centers. Operation would enhance electric grid flexibility and would reduce the probability of blackouts or brownouts, and the social costs associated with those events. The Project is approximately 4 miles from the nearest community. It is anticipated that most workers would reside in Las Vegas and materials would be transported primarily along U.S. 95. Given the size of U.S. 95 and the population of Las Vegas, impacts related to transportation/commuting and or an influx of workers are not anticipated. An increase in transportation activities through the Pahrump Valley could affect EJ populations.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.

Resource/Use	No Action Alternative	Proposed Action	Alternative 1 (Resource Integration Alternative)	Alternative 2 (BLM Preferred Alternative)	Alternative 3 (Modified Layout Alternative)
Public Health and Safety	No impact	Occupational hazards may be encountered. A health and safety risk to workers and the general public during construction is the inhalation of the fungal spores that cause Valley Fever. Any naturally occurring asbestos that could be present at the Project would also be released through ground-disturbing activities and the production of fugitive dust. Public exposure to electric and magnetic fields from the Project would be limited due to the closest residences being 5 miles from the gen-tie. Project could be a target for intentionally destructive acts. Noise would be generated. The maximum noise level of the equipment to be used at the Project ranges from 72 to 92 decibels (dB) from 50 feet away. At the Temple of Goddess Spirituality, the maximum noise level from construction would be 34 dB. The sound generated during O&M would be at the same level or below the level of construction. The probability of a wildfire would be low due to the low wildfire threat rating in the Project Area, low-risk site conditions, low-level risk associated with the O&M activities, and the Applicant’s commitment to maintaining fire suppression measures on-site. Potential releases of existing hazardous substances during construction would be unlikely. There would be minimal hazardous and non-hazardous waste at the site.	Same as Proposed Action.	Same as Proposed Action.	Same as Proposed Action.

2.10 Bureau of Land Management Preferred Alternative

Under NEPA, the "Preferred Alternative" is a preliminary indication of the Lead Agency's preference of action among the Proposed Action and the Action Alternatives. The identification of a preferred alternative does not constitute a commitment or decision in principle by the BLM, and there is no requirement for the BLM to select the preferred alternative in the ROD. A NEPA Lead Agency may select a preferred alternative for a variety of reasons, including the agency's priorities, in addition to the environmental considerations discussed in the EIS. In accordance with NEPA (40 CFR 1502.14(d)), the BLM has identified Alternative 2 as the Agency's Preferred Alternative.

Chapter 3 Affected Environment, Environmental Consequences, and Cumulative Impacts

3.1 Introduction

This chapter describes the existing environmental and human resource conditions that could be impacted by the Project and the potential impacts that the Project components and Action Alternatives presented in Chapter 2 would have on the issues identified during scoping. The affected environment and environmental consequences were determined through desktop research, field surveys, input from the public scoping period, ongoing coordination with agencies, and baseline resource reports. The resource reports are available for public review on the BLM National NEPA ePlanning project website.[4] Table 3-1 lists each Project-specific resource report written for the Bonanza Solar Project and the corresponding resource topics. Note that Table 3-1 is not a comprehensive list of references consulted for the impact analysis in this EIS/RMPA. See Chapter 6 for the comprehensive list of references.

Issues carried forward for detailed analysis are described and analyzed in each resource/use section in this chapter. Resources/uses not present and issues not carried forward for detailed analysis are included in Appendix C.

3.1.1 Affected Environment

NEPA requires that the environment of the area to be affected by the alternatives under consideration is sufficiently described (40 CFR 1502.15). The affected environment sections describe the resources that could be affected by the implementation of the alternatives carried forward for detailed analysis from Chapter 2. The resource descriptions provided in the affected environment sections serve as the baseline from which to evaluate the potential impacts of the alternatives.

Table 3-1. Issues and Resource Topics Cross-Referenced by Environmental Impact Statement/Resource Management Plan Amendment Section

Issue/Topic	EIS/RMPA Section	Referenced Reports
Vegetation Communities	Section 3.2	Bonanza Solar Project Biological Resources Technical Report (Heritage Environmental Consultants [Heritage] 2024) Bonanza Solar Project Cactus Investigation Memo (Heritage 2023a)
Wildlife, Migratory Birds, and Special Status Species	Section 3.3	Bonanza Solar Project Biological Resources Technical Report (Heritage 2024)
Federally Listed Species	Section 3.4	Bonanza Solar Project Biological Resources Technical Report (Heritage 2024)
Earth Resources	Section 3.5	Desktop Geotechnical Review Bonanza Solar U.S. Route 95 (Dudek 2024a:Appendix I)
Water Resources	Section 3.6	Bonanza Solar Project Water Supply and Demand Analysis and Groundwater Resources Impact Evaluation (Dudek 2024a:Appendix L)

[4] https://eplanning.blm.gov/eplanning-ui/project/2020905/510

Issue/Topic	EIS/RMPA Section	Referenced Reports
Cultural Resources and Native American Concerns	Section 3.7	Bonanza Solar Project Class III Archaeological Inventory report (Giacinto et. al. 2023)
Air Quality, Climate Change, and Greenhouse Gas Emissions	Section 3.8	Preliminary Plan of Development (Dudek 2024a)
Land Use and Realty	Section 3.9	Letter from Office of the Assistant Secretary of Defense (Dudek 2024a:Appendix C) Bonanza Solar Project Corridor Study (Dudek 2024a:Appendix G)
Visual Resources	Section 3.10	Visual Resources Study Bonanza Solar Project (Dudek 2024b) Bonanza Solar Project Glare Analysis Report (Dudek 2024c)
Socioeconomics and Environmental Justice	Section 3.11	POD (Dudek 2024a)
Public Health and Safety	Section 3.12	Soil Radiation Public Document Review, Proposed Bonanza Solar Project Site, Cactus Springs, Nevada (Dudek 2024a:Appendix D) Bonanza Solar Noise Impact Analysis Memorandum (Dudek 2024a:Appendix H)

3.1.2 Environmental Consequences

The environmental consequences sections analyze both beneficial and adverse impacts that would result from implementing the alternatives. NEPA regulations require agencies to assess the direct, indirect, and cumulative impacts from the alternatives carried forward for detailed analysis. Direct and indirect impacts are discussed for each resource immediately following the characterization of each resource's affected environment in these sections of this EIS/RMPA. Cumulative impacts are discussed in Section 3.13, Cumulative Impacts.

A direct impact is an effect on a resource that is caused by the Proposed Action or Action Alternatives and occurs at the same time and in the same place (40 CFR 1508.1(i)).

An indirect impact is an effect that is caused by the Proposed Action or Action Alternatives and is later in time or removed in distance but is still reasonably foreseeable (40 CFR 1508.1(i)). Indirect impacts remain consistent within the temporal and spatial boundaries of analysis established for the resource.

Cumulative impacts are effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.1(i)). CEQ guidance directs the cumulative impacts analysis to focus on important issues of national, regional, or local significance.

Residual impacts are those impacts that remain after mitigation measures are applied (BLM 2008:62). The level of residual impact is determined by how effective the mitigation is in reducing or avoiding the initial impact. Locations and intensities of potential residual impacts anticipated to occur from the project were assessed for each issue statement and alternative analyzed in this chapter. The disclosures of impacts below are predominantly focused on residual impacts, because it is assumed all necessary design features and applicable mitigation measures would be applied, where appropriate. Refer to this EIS/RMPA Appendix B for a list of design features, mitigation measures, required plans, and programmatic design features as well as a discussion regarding mitigation effectiveness.

To properly and meaningfully evaluate the potential impacts of each alternative, the impacts of each action alternative are measured against the impacts projected to occur under the No Action Alternative. The No Action Alternative is the baseline for purposes of comparison of the alternatives to one another.

Table 3-2 summarizes the calculations and spatial dimensions that were used to estimate the ground disturbance that would be caused by the various components of the Project, by temporary and permanent disturbance. Temporary disturbance is classified as disturbance during the construction period only, whereas permanent disturbance is for the lifetime of the project. For more information on Project components, refer to Section 2.2.1, Project Components.

Table 3-2. Ground Disturbance Assumptions for Project Components

Project Component	Temporary Disturbance	Permanent Disturbance
Buildable Areas, Proposed Action	2,368 acres	1,027 acres
Buildable Areas, Alternative 1	2,413 acres	482 acres
Buildable Areas, Alternative 2	2,413 acres	592 acres
Buildable Areas, Alternative 3	2,590 acres	638 acres
Collector Corridor	12 acres	12 acres
Gen-Tie Foundation Ground Disturbance	100 × 100 feet (0.23 acre) per structure	Up to 12 feet in diameter (0.003 acre) per structure
Gen-Tie Structure Depth	Up to 30 feet (3,400 cubic feet) per structure	Up to 30 feet (3,400 cubic feet) per structure
Gen-Tie Conductor Pulling and Tensioning Sites	6.1 acres	–
New Access Roads from U.S. 95 and Collector Roads Between Buildable Areas	21 acres	21 acres
NDOT Mineral Material Sites Relocation Area (Alternatives 1 and 2)	120 acres	120 acres
NDOT Mineral Material Sites Relocation Area (Alternative 3)	93 acres	93 acres

3.1.3 Impact Analysis Approach and Definitions

In order to determine whether an alternative has the potential to result in significant impacts, the context and intensity of the action must be considered. Context refers to area of impacts, timing, and duration. Intensity refers to the severity of the impact. Context in terms of duration of impact are estimated as either short term or long term.

For the purposes of this analysis, short-term or temporary impacts are defined as those that cease after construction and post-construction reclamation activities are complete; long-term or permanent impacts are defined as those associated with operation, decommissioning, and reclamation of the project or otherwise extend beyond the short-term (temporary) time period. [5] Thus, some long-term effects would cease immediately upon the end of operations, whereas other long-term effects would remain until successful decommissioning is accomplished, depending on the nature of the effect. Note that the timeframe for successful reclamation would vary by vegetation type and other factors such as the amount and timing of annual precipitation.

Intensity of impacts are specific to each resource evaluated. Impact indicators are used for much of the analysis in this EIS/RMPA to quantify the magnitude of each impact, and then those impacts are compared to the amount of the resource within each analysis area to help inform impact intensity.

3.2 Vegetation Communities

Vegetation resources to be included in the analysis herein include invasive plant species and noxious weeds, and vegetation resources that occur across the Application Area such as native vegetation. Special status plant species, including cactus, yucca, and BLM-listed sensitive plant species are discussed in Section 3.3, Wildlife, Migratory Birds, and Special Status Species. Plant species that are listed as federally threatened and endangered species are also under the jurisdiction of the USFWS are discussed in Section 3.4, Federally Listed Species. Desert pavement and biocrust are discussed in Section 3.5, Earth Resources. Fire risk associated with the spread and infestation of noxious weeds and nonnative invasive plant species are discussed below as well as in Section 3.12, Public Health and Safety.

Under EO 13112, an invasive species is defined as a harmful nonnative species causing or likely to cause harm to the economy, environment, animal, or human health. Projects with a federal nexus have the responsibility to:

(i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; and (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded (DOI 1999).

Noxious weeds are legally designated and regulated by state and federal laws. Although noxious weeds and nonnative invasive plants have similar effects on native plant communities, not all nonnative invasive plants have been put on noxious weeds list to be regulated by federal and state laws. The State of Nevada defines noxious weeds as “any species of plant which is, or liable to be, detrimental or destructive and difficult to control or eradicate” (Nevada Revised Statutes [NRS] 555.005).” The Nevada Department of Agriculture (NDA) maintains the state list of noxious weeds and has developed a rating system that reflects the statewide importance of the noxious weed, the likelihood that eradication or control efforts would be successful, and the present distribution of noxious weeds within Nevada (NDA 2021).

[5] The Applicant’s POD notes a 40-year operational life of the Project. If approved, BLM would issue a ROW grant for a 50-year term with the option to renew. This term would include decommissioning and restoration activities.

3.2.1 Issues Identified for Analysis

- How would construction, O&M, and decommissioning of the Project affect native vegetation, invasive plant species and noxious weeds?

3.2.2 Analysis Area and Methodology

The Vegetation Analysis Area consists of the entire 5,133-acre Application Area and a 3-mile buffer around all proposed facilities, including the gen-tie, totaling approximately 73,558 acres (Appendix A, Figure A-6). This is the area in which direct and indirect effects on vegetation could occur. The Vegetation Analysis Area was selected to account for impacts resulting from construction, O&M, and decommissioning that have the potential to affect vegetation resources within and outside the Application Area. The Vegetation Cumulative Effects Analysis Area (CEAA) is approximately 335,689 acres and is defined as the valley corridor between State Route 160 and U.S 95 intersection, east to the Red Rock Canyon National Conservation Area (NCA)/Desert National Wildlife Refuge (NWR) boundary and up to 4,700 feet above mean sea level (amsl) in elevation. The Vegetation Analysis Area and the Vegetation CEAA were both selected to be the same as the Federally Listed Species Analysis Area used for the federally listed Mojave desert tortoise due to the importance of vegetation as a factor for possible Mojave desert tortoise passive reoccupation into the Application Area as well as in maintaining habitat connectivity for this species (Appendix A, Figure A-7 and Figure A-8).

Baseline data used for this analysis are primarily derived from the Integrated Vegetation Survey Report (IVR) (Heritage 2023d), the Biological Resources Technical Report (BRTR) (Heritage 2024), and Southwest Regional Gap Analysis Project Land Cover Descriptions (SWReGAP) (U.S. Geological Survey [USGS] 2023). Surveys were conducted for special status plant species, cactus and yucca densities, desert pavement and biocrust, invasive weeds, quantitative botanical factors (assessed vegetation cover, height, density, and species richness and diversity), weed vectors, Joshua trees, and general plant and common species lists which were used to field verify vegetation communities. As part of the vegetation survey, BLM Assessment, Inventory, and Monitoring (AIM) protocol (USDA 2017) was used to assess vegetation cover, vegetation height, density, species richness, and species diversity. A total of 15 vegetation plots were established across the survey areas (Heritage 2023d:26–27). Survey efforts reported in the IVR were conducted in May 2021, April 2022, and June 2022 under severe to exceptional drought conditions following BLM survey protocols (Heritage 2023d:2–3, 12).

Vegetation communities in the IVR survey area were based on SWReGAP and reclassified based on field observations to align with vegetation community descriptions identified in the International Vegetation Classification Alliances and Associations Occurring in Nevada with Proposed Additions (Peterson 2008) and are shown in Appendix A, Figure A-6 and further described in the BRTR (Heritage 2024:12). The IVR modified vegetation community descriptions contain minor differences from the SWReGAP vegetation community descriptions and the IVR survey area is smaller in size than the Vegetation Analysis Area. For these reasons, and to provide consistent data across the entire Vegetation Analysis Area and Vegetation CEAA, only the SWReGAP vegetation community data is used to characterize the affected environment and environmental consequences for vegetation in this EIS/RMPA.

3.2.3 Affected Environment

The Vegetation Analysis Area (see Appendix A, Figure A-6) is located within the Mojave Desert in the Mojave Basin and Range and Creosote-Dominated Basins U.S. Environmental Protection Agency (USEPA) Ecoregions which includes valleys lying between scattered mountain ranges of the Mojave Desert at elevations ranging from 1,800 to 4,500 feet amsl (Heritage 2023d:6). The Application Area is north of the Spring Mountains, within the Indian Springs Valley approximately 4.5 miles west of the town of Indian Springs, Nevada. The Vegetation Analysis Area is primarily undeveloped, except for existing transmission lines, dirt roads, mineral material pits, U.S. 95, and the GridLiance Innovation Substation.

Native Vegetation Communities

Within the Vegetation Analysis Area, vegetation communities were mapped based on SWReGAP (USGS 2023a) (see Appendix A, Figure A-6) and the approximate acres of each are summarized in Table 3-3. A brief description of vegetation communities comprising more than 1% of the analysis area is provided below Table 3-3. No riparian vegetation is present within the Vegetation Analysis Area.

Table 3-3. Vegetation Communities Within the Vegetation Analysis Area

Vegetation Community or Land Cover	Within Vegetation Analysis Area (acres)	Within Vegetation Analysis Area (percent)
Sonora-Mojave Creosotebush-White Bursage Desert Scrub	55,684	76
Mojave Mid-Elevation Mixed Desert Scrub	9,538	13
North American Warm Desert Bedrock Cliff and Outcrop	5,251	7
Inter-Mountain Basins Semi-Desert Shrub Steppe	1,708	2
Sonora-Mojave Mixed Salt Desert Scrub	1,280	2
North American Warm Desert Playa	82	0.1
Other: North American Warm Desert Wash, Inter-Mountain Basins Big Sagebrush Shrubland, and Inter-Mountain Basins Montane Sagebrush Steppe	15	<0.1
Total	**73,558**	**100**

Source: USGS (2023).

<u>Sonora-Mojave Creosotebush-White Bursage Desert Scrub</u>

The Sonora-Mojave Creosotebush-White Bursage Desert Scrub is the most abundant vegetation community within the Vegetation Analysis Area. It occurs in broad valleys, lower bajadas, plains, and low hills in the Mojave and lower Sonoran Deserts and is characterized by a sparse to moderately dense layer of broad-leaved shrubs. Dominant species are creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) while dwarf-shrub and cacti species are codominant, forming a sparse understory. Codominant species may include fourwing saltbush (*Atriplex canescens*), desertholly (*Atriplex hymenelytra*), brittlebush (*Encelia farinosa*), Nevada jointfir (*Ephedra nevadensis*), water jacket (*Lycium andersonii*), and beavertail pricklypear (*Opuntia basilaris*). The herbaceous layer is typically sparce but may be seasonally abundant following precipitation and may include species such as sandmat (*Chamaesyce* spp.), desert trumpet (*Eriogonum inflatum*), low woollygrass (*Dasyochloa pulchella*), threeawn (*Aristida* spp.), cryptantha (*Cryptantha* spp.), and phacelia (*Phacelia* spp.) (USGS 2023a:129).

Mojave Mid-Elevation Mixed Desert Scrub

The Mojave Mid-Elevation Mixed Desert Scrub vegetation community is in the extensive transition zone above Sonora-Mojave Creosotebush-White Bursage Desert Scrub and below the lower montane woodlands which occurs in the eastern and central Mojave Desert. This vegetation community is quite variable with codominant species including blackbrush (*Coleogyne ramosissima*), Eastern Mojave buckwheat (*Eriogonum fasciculatum*), Nevada jointfir, spiny hopsage (*Grayia spinosa*), spiny menodora (*Menodora spinescens*), buckhorn cholla (*Cylindropuntia acanthocarpa)*, Mexican bladdersage (*Salazaria mexicana*), Parish's goldeneye (*Viguiera parishii*), Joshua tree (*Yucca brevifolia*), or Mojave yucca (*Yucca schidigera*). The herbaceous layer may be formed by desert grasses, including Indian ricegrass (*Achnatherum hymenoides*), desert needlegrass (*Achnatherum speciosum*), bush muhly (*Muhlenbergia porteri*), James' galleta (*Pleuraphis jamesii*), big galleta (*Pleuraphis rigida*), or Sandberg bluegrass (*Poa secunda*). Scattered Utah juniper (*Juniperus osteosperma)* or desert scrub species may also be present (USGS 2023a:121).

North American Warm Desert Bedrock Cliff and Outcrop

The North American Warm Desert Bedrock Cliff and Outcrop vegetation community occurs from subalpine to foothill elevations and includes barren and sparsely vegetated landscapes of steep cliff faces, narrow canyons, and small rock outcrops, as well as scree and talus slopes. Associated species may include teddybear cholla (*Cylindropuntia bigelovii*), and other succulents. Lichens are predominant lifeforms in some areas. Small areas of desert shrublands from adjacent areas may also occur within this vegetation community (USGS 2023a:23).

Inter-Mountain Basins Semi-Desert Shrub Steppe

The Inter-Mountain Basins Semi-Desert Shrub Steppe vegetation community occurs throughout the western United States on alluvial fans and flats with moderate to deep soils. It is typically dominated by grasses including Indian ricegrass, blue grama (*Bouteloua gracilis*), saltgrass (*Distichlis spicata*), needle and thread (*Hesperostipa comata*), James' galleta, Sandberg bluegrass, and alkali sacaton (*Sporobolus airoides*). The woody open shrub layer often includes fourwing saltbush, little sagebrush (*Artemisia arbuscula*), Greene's rabbitbrush (*Chrysothamnus greenei*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), jointfir (*Ephedra* spp.), rubber rabbitbrush (*Ericameria nauseosa*), broom snakeweed (*Gutierrezia sarothrae*), and winterfat (*Krascheninnikovia lanata*). Little sagebrush may be present but does not dominate (USGS 2023a:165).

Sonora-Mojave Mixed Salt Desert Scrub

This vegetation community includes extensive open-canopied shrublands of typically saline basins in the Mojave and Sonoran Deserts, often occurring around playas. Vegetation is typically composed of one or more saltbush species (Atriplex spp.) such as fourwing saltbush or cattle saltbush (*Atriplex polycarpa*). Species of allenrolfea (*Allenrolfea* spp.), pickleweed (*Salicornia* spp.), seepweed (*Suaeda* sp.), or other halophytic plants are often present to codominant. Grass species may include alkali sacaton or saltgrass at varying densities (USGS 2023a:131).

Cacti and Yucca

The following cacti and yucca plant species were observed during rare plant surveys: Wiggins' cholla (*Cylindropuntia echinocarpa*), branched pencil cholla (*Cylindropuntia ramosissima*), cottontop cactus (*Echinocactus polycephalus*), Engelmann's hedgehog cactus (*Echinocereus engelmannii*), matted cholla (*Grusonia parishii*), beavertail pricklypear (*Opuntia basilaris* var. *basilaris*), desert pincushion (*Coryphantha chlorantha*), and Mojave yucca (*Yucca schidigera*) (Heritage 2024). The Bonanza Solar Project Cactus Investigation Memorandum (Heritage 2023a) provided a summary of the two initial cactus and yucca surveys and one additional survey to investigate the pencil cholla populations at the site. Branched pencil cholla was relatively common with 12 locations within the Application Area.

Additionally, numerous cactus and yucca specimens were observed during rare plant surveys. During the IVR studies by Heritage in 2021 and 2023, seven species of cacti and one species of yucca were observed in the IVR survey area; no special status plant species were observed during these surveys (Heritage 2023d). Based on the IVR survey area of the rare plant surveys, the average density was approximately 63 cacti/yucca per acre. Extrapolated totals for the Application Area's 5,133 acres yield an estimate of 169,445 cacti and yuccas across the entire Application Area.

Invasive Species

Invasive plant species and noxious weed occurrences were documented in vegetation surveys within the IVR survey area and along key vectors (weed vectors) that promote the spread of invasive plant species (Heritage 2023d). Key vectors include paved and unpaved roads and two-track roads within the IVR survey area. Additional weed vectors within the Vegetation Analysis Area include U.S. 95 and additional unpaved roads. No noxious weeds were documented within the IVR survey area; however, the noxious weed tamarisk (*Tamarix* spp.) was observed within the Vegetation Analysis Area around Cactus Springs, Nevada (Heritage 2023d:9; Golden 2023). Salt cedar is a Category C weed which, as defined by the NDA, is generally established and widespread in many counties in Nevada (NDA 2021). The nonnative, invasive common Mediterranean grass (*Schismus barbatus*), red brome (*Bromus rubens*), redstem stork's bill (*Erodium cicutarium*), and prickly Russian thistle (*Salsola tragus*) were ubiquitous in very low densities throughout the IVR survey area. As surveys were conducted under severe to exceptional drought conditions, it is likely that in a wetter year, higher densities of the above species and additional species, such as Sahara mustard (*Brassica tournefortii*), may be encountered (Heritage 2023d:12, 27–28). Nonnative annual grasses such as red brome, cheatgrass (*Bromus tectorum*), and common Mediterranean grass create highly flammable fuel, which has led to increased wildfire frequency and intensity in parts of the Mojave Desert where they have been historically rare (Invasive Weed Awareness Coalition 2006).

3.2.4 Environmental Consequences

This section describes potential direct and indirect impacts to vegetation communities and invasive plant species and noxious weeds associated with construction, O&M, and decommissioning of the Proposed Action and Action Alternatives relative to the number of acres of permanent or temporary disturbance, and proposed disturbance levels. Permanent disturbance is where topsoil and plant roots are removed, and temporary disturbance is where disturbance can be reclaimed and revegetated within three to five years following Project construction. Disturbances considered to result in long-term impacts are those that would remain throughout the duration of Project construction and O&M activities.

No Action Alternative

Under the No Action Alternative, the Project would not be constructed, and current land uses and trends would continue to occur. There would be no Project-related impacts to vegetation communities, native plant species habitats, and invasive plant species and noxious weeds.

Proposed Action

Implementation of the Proposed Action would result in direct impacts to vegetation within the disturbance footprints described in Section 2.2.1, Project Components, specifically Table 2-2. Indirect impacts resulting from implementation of the Proposed Action would occur throughout the Application Area, as well as adjacent areas throughout the Vegetation Analysis Area.

Native Vegetation Communities

Construction Impacts

Construction of the Proposed Action would result in direct and indirect impacts to vegetation communities through the removal and/or crushing of vegetation, and the removal and/or compactions of soils from the construction of the solar array fields, gen-tie, and new access roads. The Sonora-Mojave Creosotebush-White Bursage Desert Scrub vegetation community is the most impacted vegetation community, comprising 98% of the Application Area. The Mojave Mid-Elevation Mixed Desert Scrub comprises 1.5% of the Application Area. The Inter-Mountain Basins Semi-Desert Shrub Steppe and Sonora-Mojave Mixed Salt Desert Scrub vegetation communities comprise less than 1% of the Application Area.

Direct impacts from construction would vary based on the type of site preparation methods and construction techniques used. Construction impacts to vegetation communities would occur from clearing and cutting or grading and leveling, soil removal, trenching and excavation, overland travel with machinery and vehicles, and trimming of vegetation. The four defined disturbance levels (D-0, D-1, D-2, D-3) are described in Section 2.1, Development of Alternatives, and summarized in Table 3-4 below as they relate to the impact levels to vegetation. No direct impacts are anticipated for the approximately 2,720 acres of vegetation (D-0), only indirect impacts. Short-term, long-term, and permanent direct and indirect impacts are anticipated for the approximately 2,413 acres of vegetation or 3% of the Vegetation Analysis Area which fall under the D-1, D-2, and D-3 disturbance levels.

Table 3-4. Proposed Action Disturbance Levels and Permanent Impacts to Vegetation

Proposed Action	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term*	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,720	944	442	1,027
Percent of Buildable Areas (2,368 acres) †	Excluded from Buildable Areas	40%	19%	43%
Percent of Application Area (5,133 acres)	53%	18%	9%	20%
Percent of Vegetation Analysis Area (73,558 acres)	4%	1%	<1%	1%
Impacts to Vegetation	No anticipated effects from construction.	If vegetation is crushed, no more than half of the plant is crushed and at least half of the plant remains intact such that it can survive and continue growing; seedbank is left in place. ‡	No vegetation remains above soil surface; vegetation is scraped off soil surface or crushed; seedbank remains in place, soil very compacted.	Vegetation and seedbank are removed. No vegetation or roots remain, soils extremely compacted.

* Shorter term (approximately 2–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

† Total does not sum to 100 due to rounding.

‡ Vegetation frequently can survive some passes of a vehicle, although the number of passes depends on the vegetation type, the weight of the vehicle, and other factors.

Permanent direct impacts to vegetation from construction activities are anticipated where clear and cut with soil removal construction methods (D-3) would be required. Under the Proposed Action, this disturbance level may be up to 1,027 acres of the Application Area, which would account for 43% of the Buildable Areas (solar arrays and other Project facilities). Direct impacts from D-3 disturbances would result in the removal of vegetation, roots, and soils; loss of the seedbank; reduced biodiversity; and high levels of soil compaction. Areas of soil disturbance are more susceptible to invasive species infestations. Future restoration of these areas would be substantially more difficult due to the abovementioned impacts, and reclamation of these areas may take 100 years or more after decommissioning occurs (Abella 2010; Grodsky and Hernandez 2020; Webb 2002).

Temporary long-term direct impacts to vegetation from construction activities are anticipated where drive and crush (D-2) disturbance is required, on 442 acres under the Proposed Action. Direct impacts from D-2 disturbances would trim some vegetation, crush vegetation and retain roots, and soils and seedbanks would be left in place. The level of impact to vegetation from crushing and soil compaction may vary depending on the type of vehicles used and the number of vehicle passes that occur; if the level of impact to vegetation is severe enough, this level of disturbance may raise to the level of permanent impacts to vegetation. D-2 disturbances have an increased potential for the native vegetation to recover post-construction due to the roots remaining intact and the retention of the seedbank. Increased levels of disturbance to perennial plants from repeated drive and crush further reduces their likelihood to resprout. Annual plant species may be able to germinate in this disturbance level.

Temporary, short-term direct impacts to vegetation would occur where overland travel (D-1) access is required on 944 acres under the Proposed Action, and would have a limited number of vehicles passing, resulting in less damage to vegetation and less soil compaction. These areas are the most likely to recover naturally after construction, and provide ecosystem benefits such as reduced runoff, reduced dust, and lowered temperatures through vegetation retention (Adeh et al. 2019; Barron-Gafford et al. 2019; Devitt et al. 2022; Williams et al. 2023).

The Proposed Action would result in long-term indirect impacts to vegetation within the entire 5,133-acre Application Area as well as the adjacent habitat. The Proposed Action has the most amount of proposed D-3 disturbance (up to 43% of the Buildable Areas). The higher the impacts to soils and vegetation within the Application Area, the higher the indirect impacts would be to adjacent and undisturbed habitats.

Indirect impacts would primarily be associated with the introduction and increased presence of noxious and nonnative invasive species; dust generated from construction, O&M, and decommissioning; and dust generated from exposed soils that would accumulate on plants, reduce photosynthesis, and hinder plants' growth and reproduction.

Cactus and yucca plants would be removed from areas of D-2 and D-3 disturbance and are unlikely to recover in D-3 areas given the high degree of disturbance. These species are long lived and provide important structure for wildlife habitat in the desert, and their long-term removal from the 1,027 acres of the Application Area would likely be a permanent loss.

Dust created from equipment and vehicle use on disturbed soils would accumulate on plants which would indirectly reduce photosynthesis and subsequently hinder plant growth and reproduction and may reduce a plant's ability to compete with nonnative invasive plant species. The effects of dust on plants along roadways are compounded because vehicles are common vectors for the spread of invasive plant species. Herbicides have the potential to drift off-site and indirectly impact adjacent plant communities or suppress restoration efforts after Project completion.

Indirect effects are also expected to occur to vegetation in and around the Application Area from anticipated increases in temperatures resulting from the high level of removal of vegetation from the site under the Proposed Action (Adeh et al. 2019; Barron-Gafford et al. 2019; Devitt et al. 2022; Williams et al. 2023). One study identified temperatures to be warmer by between 41 to 46 degrees Fahrenheit outside of a solar facility in the Mojave Desert, with the most effects found within a 984-foot distance of the site (Devitt et al. 2022). Temperature increases could indirectly affect annual and perennial vegetation within and outside of the Application Area.

Implementation of Project design features and APMs Eco-2 (which includes developing a Grading Plan to delineate areas to be cleared of vegetation), Eco-5, Rec-1, Air-1, and Air-2 (see Appendix B) would reduce short-term and long-term effects from impacts resulting from the Proposed Action; however, impacts would not be eliminated and would remain high anywhere there is soil disturbance. Short-term and long-term effects would be further reduced through the implementation of mitigation measures from the following required plans: Dust Abatement Plan, Site Restoration Plan, Integrated Weed Management Plan, Worker Environmental Awareness Plan (WEAP), Grading Plan, and Site Access Plan. Applicable design features in the Western Solar Plan (BLM and DOE 2012) would also be implemented. Appendix B lists the Western Solar Plan design features that are most relevant to the Project and vegetation communities, which include minimizing fugitive dust generation (AQC2-1); preventing establishment and spread of noxious weeds and nonnative invasive species, implementing revegetation of temporary use areas, minimizing vehicle and foot traffic through undisturbed areas, and reducing the collection and disturbance of plants through employee and contractor education (ER2-1); and managing vegetation using the principles of integrated pest management to prevent the spread of nonnative species (ER3-1).

Operations and Maintenance Impacts

Under the Proposed Action, the Applicant has the goal of achieving 50% of vegetation cover and 65% of vegetation density within the non-graded Buildable Areas, with a 10-year natural recovery period. If the Project has not met these standards with natural recovery after 10 years, the Applicant would implement active restoration pursuant to an agency-approved Site Restoration Plan (Section 2.2.1, Project Components). Therefore, 43% of the Buildable Areas would be bare ground throughout O&M, while the remaining 67% of the Buildable Areas may have 50% of reference site perennial vegetation cover (<7% cover) and 65% of reference perennial vegetation density, within a maximum of 20 years. Given the Proposed Action's extensive time period to wait for natural recovery, the Buildable Areas may remain heavily impacted, and even with restoration, would still have extensive areas of grading where vegetation is not expected to naturally recover within the 40-year lifetime of the ROW grant. These areas would experience prolonged erosion (from wind and water) and would be more likely to facilitate invasive plant species and noxious weeds proliferation. Indirect effects are also expected to occur to vegetation in and around the Buildable Areas from anticipated increases in temperatures resulting from the high level of removal of vegetation from the site under the Proposed Action (Adeh et al. 2019; Barron-Gafford et al. 2019; Devitt et al. 2022; Williams et al. 2023). One study identified temperatures to be warmer by between 41 to 46 degrees Fahrenheit outside of a solar facility in the Mojave Desert, with the most effects found within a 984-foot distance of the site (Devitt et al. 2022). Temperature increases could indirectly affect annual and perennial vegetation within and outside of the solar facility.

During O&M, native vegetation disturbed under all disturbance levels during construction activities would be allowed to regrow; however, continued direct impacts to vegetation within the Buildable Areas would occur where trimming and maintenance of remaining vegetation would be required to avoid interference with the panels. This would result in temporary long-term impacts to vegetation that would hinder plant growth and reproduction and result in reduced perennial vegetation cover. Vehicle and equipment travel through the Application Area during O&M would facilitate the spread of invasive plant species and noxious weeds. Dust from vehicle use during O&M, as well as from disturbed soil surfaces, would result in long-term indirect impacts to vegetation similar to those described under construction activities but to a lesser extent. Herbicide applications performed in accordance with the Project's approved Integrated Weed Management Plan could have indirect effects on remaining and adjacent vegetation communities.

Indirect impacts anticipated during O&M would be reduced through the implementation of Project design features and APMs Eco-2, Eco-5, Air-1, and Air-2 (see Appendix B) as well as the following required plans: Dust Abatement Plan, Site Restoration Plan, Integrated Weed Management Plan, Worker Environmental Awareness Plan, and Site Access Plan. Additionally, the Western Solar Plan (BLM and DOE 2012) design feature ER3-1 and ER3-2, and mitigation measures MM Veg-1, MM Veg-2, MM Veg-3, MM Veg-4, and MM Veg-5. listed in Appendix B would be implemented during O&M to prevent the spread of nonnative species and minimize impacts to ecological resources.

Decommissioning Impacts

During decommissioning, temporary vegetation disturbance would occur during the removal of Project components and would be comparable to the area temporarily disturbed during construction. Most activities would directly affect areas that were previously disturbed during Project construction and O&M. Potential direct and indirect effects on native vegetation communities include the introduction and establishment of invasive plant species and noxious weeds during and after decommissioning and dust generated from disturbed soils. Decommissioning activities would be implemented in compliance with APMs Rec-1 and a Site Restoration Plan, approved by BLM (see Appendix B). Per APM Rec-1, decommissioning would be implemented with design features developed for similar construction activities, and that reclamation would begin immediately after decommissioning. The details of this plan are generally described in the POD which describes the decommissioning goals and potential strategies to achieve them (Dudek 2024a:59–60). The plan would provide details regarding the removal of all Project components and restoration activities to BLM-approved specifications and requirements such as soil replacement, recontouring, seed types, seeding methods, monitoring and reporting plan, and success standards. The Western Solar Plan (BLM and DOE 2012) design feature ER4-1 listed in Appendix B would be implemented to minimize ecological resource impacts during reclamation and decommissioning activities.

Vegetation would be slow to recover across the site from the heavy to moderate disturbance associated with construction and O&M activities, and most native vegetation could take 100 years or more to recover to pre-disturbance conditions, if at all (Abella 2010; Webb 2002). Given the presence of invasive species growing on-site and the level of disturbance proposed, the restoration time may be even longer. With soil removal and compaction from construction activities and reduced reproduction of vegetation within the Buildable Areas resulting from trimming and maintenance, much of the native seed bank in the soil may not be viable, so it is likely native seeds would need to be sourced from other locations to meet restoration requirements. This would result in adverse impacts to adjacent communities where seeds are sourced.

Decommissioning and restoration results would differ from existing conditions as perennial and annual plant diversity is anticipated to be lower wherever vegetation removal and soil removal occurred during construction (D-3), as seed banks in these areas would be removed. In areas where vegetation has been crushed but roots and soils remain intact (D-1 and D-2), the seed bank and some live residual vegetation species may facilitate restoration on the Application Area constructed under these disturbance levels.

Restoring native plant communities invaded by invasive plant species and noxious weeds is difficult and often unsuccessful, especially in arid environments. It is possible that invasive species could alter native plant communities to the point where many native plant species can no longer persist. Changes to the composition of native species would be permanent as many species, such as cacti and yucca, would not be expected to reinhabit the site. The Application Area is not expected to fully recover to pre-disturbance conditions, especially in areas to be impacted under D-2 and D-3 disturbance levels. Some cover of native perennial plants is expected to be retained and reestablished after decommissioning. Overall impacts of the Proposed Action would remain adverse over the long term.

<u>Invasive Species</u>

Construction Impacts

Although invasive plant species were documented throughout the Application Area, their densities and vegetation cover are relatively low (no major infestations) as the landscape is mostly undisturbed. Based on the BLM weed risk assessment, Project activities are likely to result in some areas becoming infested with nonnative and/or noxious weed species even when preventative management actions are followed (Heritage 2023d:28).

Implementation of the Proposed Action would result in moderate to heavy soil disturbance from 1,027 acres of permanent disturbance (D-3) and 1,386 acres of temporary disturbance (D1 and D-2), totaling 2,413 acres or 3% of the Vegetation Analysis Area. This level of soil disturbance increases the potential for noxious weeds and nonnative invasive species to occupy the area as these species are better adapted to disturbance than native desert plants (Abella 2010). Higher cover and density of invasive plant species within and adjacent to the Application Area are expected over time and would result in reduced biodiversity, increasing competition with native species, and increased fire hazards. Invasive plant species and noxious weeds may be transported throughout the site and introduced from outside the site in materials used for erosion control and through seeds and/or plant parts unknowingly clinging to construction vehicles, equipment, and crews; access roads would serve as weed vectors into the site.

Adverse effects from the spread of noxious weeds and nonnative invasive species associated with construction activities would be reduced through the implementation of Project design features and APM Eco-2, including developing a Grading Plan to delineate areas to be cleared of vegetation and using certified weed-free seed and mulching where applicable (see Appendix B), as well as the following required plans: Integrated Weed Management Plan, Worker Environmental Awareness Plan, and Site Access Plan. Additionally, the Western Solar Plan (BLM and DOE 2012) design features listed in Appendix B would be implemented to prevent the establishment and spread of noxious weeds and nonnative invasive species (ER2-1) and managing vegetation using the principles of integrated pest management to prevent the spread of nonnative species (ER3-1).

The Integrated Weed Management Plan would be implemented during construction and operation of the Project to address management and control of invasive species. Weed management and treatment methods, such as herbicide use, would be approved by the BLM and would comply with BLM and state of Nevada laws and regulations and are further detailed in the Project POD (Dudek 2024a:36–37).

Operations and Maintenance Impacts

During O&M, the spread and introduction of noxious weeds and nonnative invasive species throughout the Application Area and adjacent areas would mostly be associated with managing remaining vegetation and vehicle and equipment travel through the Application Area during O&M.

The risk of noxious weeds and nonnative invasive plant species spread and introduction during O&M is less than during construction activities as there would be less soil disturbance; however, vegetation trimming during O&M, has high potential to increase invasive species densities and introduce invasive or noxious weed species into adjacent areas. Invasive plant species and noxious weeds may be transported throughout the site and introduced from outside the site through seeds and/or plant parts unknowingly clinging to construction vehicles, equipment, and crews, and access roads would serve as weed vectors into the site.

Adverse effects from the spread of noxious weeds and nonnative invasive species associated with O&M activities would be reduced through the implementation of Project design features and APMs Eco-2 and Air-1, which limit travel to stabilized roads (see Appendix B), as well as the following required plans: Integrated Weed Management Plan, Worker Environmental Awareness Plan, and Site Access Plan.

During O&M, if a treatment window was missed, weeds could proliferate along roads or other disturbed areas and weed control costs could increase. The use of herbicides to control invasive plant species and noxious weeds could inadvertently result in damage or mortality to native plants that are in close proximity. The Project design features, APMs, mitigation measures, and plans could reduce some adverse effects on native vegetation from the spread of invasive weeds; however, the Proposed Action would still result in adverse direct and indirect impacts from invasive weeds. The Western Solar Plan (BLM and DOE 2012) design features ER3-1 listed in Appendix B would also be implemented to prevent the spread of nonnative species during O&M.

Decommissioning Impacts

During decommissioning, temporary vegetation disturbance would occur during the removal of Project components. Noxious and nonnative weed impacts would be very similar to those described for construction activities. Potential direct and indirect effects on noxious weeds and nonnative invasive species include introduction and establishment of invasive plant species and noxious weeds, and further proliferation of weed species that were introduced and/or established during the O&M timeframe.

Alternative 1

The majority of impacts related to construction, O&M, and decommissioning activities on vegetation communities would be similar to those described in the Proposed Action. The discussion below focuses on elements where impacts differ.

<u>Construction Impacts</u>

Under Alternative 1, approximately 482 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation (Table 3-5), resulting in a long-term adverse impact to vegetation communities. Per MM Wild-9 in Appendix B, restoration is required on graded areas within the panel array blocks or any other graded areas considered temporary disturbance. D-3 disturbance acreage would be permanently lost to Project infrastructure and represents a less than 1% decrease in available vegetation within the Vegetation Analysis Area.

Another approximately 1,931 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1) and moderate to heavy disturbance from drive and crush activities (D-2) (see Table 3-5). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates; thereby supporting the goal of maintaining 75% of reference perennial vegetation cover within the Buildable Areas within two years post-construction. Areas subject to D-1 and D-2 disturbances represent a 3% decrease in available vegetation within the Vegetation Analysis Area.

Table 3-5. Alternative 1 Disturbance Categories and Impacts to Vegetation Communities

Alternative 1	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term*	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,720	1,449	482	482
Percent of Buildable Areas (2,413 acres)	Excluded from Buildable Areas	60%	20%	20%
Percent of Application Area (5,133 acres)†	53%	28%	9%	9%
Percent of Vegetation Analysis Area (73,558 acres)	4%	2%	<1%	<1%

* Shorter term (approximately 2–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

† Total does not sum to 100 due to rounding.

Alternative 1 would result in reduced permanent long-term impacts to vegetation from construction due to 545 acres less D-3 disturbance compared to the Proposed Action. An additional 545 acres disturbance under D-1 and D-2 compared to the Proposed Action would result in more seedbank, root, and plant material retention which would promote the natural recovery of the area as well as future restoration efforts. Under Alternative 1, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-4). This mineral material relocation site would result in a long-term adverse impact (removal) of vegetation when fully developed, similar to the Proposed Action impacts associated with the D-3 disturbance.

Operations and Maintenance Impacts

The O&M impacts to vegetation communities with Alternative 1 would be similar to those under the Proposed Action for vegetation communities. However, the two-year timeframe for achieving the 75% vegetation cover standard would provide improved vegetation conditions within the shortest timeframe, when compared to the Proposed Action, Alternative 2, and Alternative 3.

Decommissioning Impacts

Decommissioning impacts under Alternative 1 on vegetation communities are expected to have a shorter duration due to fewer graded areas overall, and a higher percentage of vegetation maintained during O&M. Time to recovery of the Application Area after decommissioning will be significantly shorter under Alternative 1 as compared to the Proposed Action or other Action Alternatives.

Alternative 2 (BLM Preferred Alternative)

The majority of impacts related to construction, O&M, and decommissioning activities on vegetation communities would be similar to those described in the Proposed Action. The discussion below focuses on elements where impacts differ.

Construction Impacts

Under Alternative 2, approximately 592 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation (Table 3-6), resulting in a long-term adverse impact to vegetation communities. Per MM Wild-9 in Appendix B, restoration is required on graded areas within the panel array blocks or any other graded areas considered temporary disturbance. D-3 disturbance acreage would be permanently lost to Project infrastructure and represents a less than 1% decrease in available vegetation within the Vegetation Analysis Area. Another approximately 1,821 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1) and moderate to heavy surface disturbance from drive and crush activities (D-2) (see Table 3-6). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates; thereby supporting the goal of maintaining 65% of reference perennial vegetation cover within the Buildable Areas within three to five years of completion of construction. Areas subject to D-1 and D-2 disturbances represent a less than 3% decrease in available vegetation within the Vegetation Analysis Area.

Alternative 2 would result in reduced permanent long-term impacts to vegetation from construction due to 435 acres less D-3 disturbance compared to the Proposed Action. An additional 435 acres of disturbance under D-1 and D-2 compared to the Proposed Action would result in more seedbank, root, and plant material retention which would promote the natural recovery of the area as well as future restoration efforts.

Table 3-6. Alternative 2 Disturbance Categories and Impacts to Vegetation Communities

Alternative 2	D-0	D-1	D-2	D-3
Definition/Construction method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term (3–5 years)	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,720	1,184	637	592
Percent of Buildable Areas (2,413 acres)	Excluded from Buildable Areas	49%	26%	25%
Percent of Application Area (5,133 acres)	53%	23%	12%	12%
Percent of Vegetation Analysis Area (73,558 acres)	4%	2%	<1%	<1%

* Shorter term (approximately 3–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

Under Alternative 2, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-4). This mineral material relocation site would result in a long-term adverse impact (removal) of vegetation when fully developed, similar to the Proposed Action impacts associated with D-3 disturbance.

Operations and Maintenance Impacts

The O&M impacts to vegetation communities with Alternative 2 would be similar to those under Alternative 1. However, the three- to five-year timeframe for achieving the 65% vegetation cover standard would provide 10% less improved vegetation conditions when compared to the Alternative 1.

Decommissioning Impacts

Overall, decommissioning impacts under Alternative 2 on vegetation communities would be similar to those under the construction and decommissioning of the Alternative 1.

Alternative 3

The majority of impacts related to construction, O&M, and decommissioning activities on vegetation communities would be similar to those described in the Proposed Action. The discussion below focuses on elements where impacts differ.

Construction Impacts

Under Alternative 3, approximately 648 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation (Table 3-7), resulting in a long-term adverse impact to vegetation communities. Per MM Wild-9 in Appendix B, restoration is required on graded areas within the panel array blocks or any other graded areas considered temporary disturbance. D-3 disturbance acreage would be permanently lost to Project infrastructure and represents a 1% decrease in available vegetation within the Vegetation Analysis Area.

Another approximately 1,942 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1) and moderate to heavy disturbance from drive and crush activities (D-2) (see Table 3-7). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates, thereby supporting the goal of maintaining 65% of reference perennial vegetation cover within the Buildable Areas within 2 years of completion of construction. Areas subject to D-1 and D-2 disturbances represent a less than 3% decrease in available vegetation within the Vegetation Analysis Area.

Table 3-7. Alternative 3 Disturbance Categories and Impacts to Vegetation Communities

Alternative 3	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term (3–5 years)	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,543	1,262	680	648
Percent of Buildable Areas (2,590 acres)	Excluded from Buildable Areas	49%	26%	25%
Percent of Application Area (5,133 acres) †	50%	25%	13%	13%
Percent of Vegetation Analysis Area (73,558 acres)	3%	2%	<1%	1%

* Shorter term (approximately 3–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

† Total does not sum to 100 due to rounding.

Alternative 3 would result in reduced permanent long-term impacts to vegetation from construction due to 379 acres less D-3 disturbance compared to the Proposed Action. An additional 556 acres disturbance under D-1 and D-2 compared to the Proposed Action would result in more seedbank, root, and plant material retention which would promote the natural recovery of the area as well as future restoration efforts. Alternative 3 would have increased impacts when compared to Alternatives 1 and 2.

Under Alternative 3, up to 93 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-5). This mineral material relocation site would result in a long-term adverse impact (removal) of vegetation when fully developed, similar to the Proposed Action impacts associated with the D-3 disturbance.

Alternative 3 has three additional collector access roads which would serve as additional weed vectors into the site; therefore, this alternative has an increased risk of transporting and introducing invasive plant species and noxious weeds throughout the site during all phases of the Project. Adverse effects from the spread of noxious weeds and nonnative invasive species would be reduced through the implementation of Project design features and APMs Eco-2 and Air-1, which limit travel to stabilized roads (see Appendix B), as well as the following required plans: Integrated Weed Management Plan, Worker Environmental Awareness Plan, and Site Access Plan.

Operations and Maintenance Impacts

The O&M impacts to vegetation communities with Alternative 3 would be similar to those under the Proposed Action. Like the Proposed Action, this alternative would aim to achieve the 50% vegetation cover and 65% vegetation density standards within a 10-year timeframe.

Decommissioning Impacts

Overall, decommissioning impacts under Alternative 3 on vegetation communities would be similar to the construction and decommissioning impacts of the Proposed Action.

3.3 Wildlife, Migratory Birds, and Special Status Species

This section provides information for the general wildlife, migratory birds, and other special status species that are known to occur or could occur in areas affected by the Project's construction, O&M, and decommissioning.

General wildlife includes common species that are neither federally nor state protected nor BLM sensitive species. Species referred to as having "special status" include protected species under applicable laws and regulations, as well as species of concern to land management agencies with jurisdiction over the Project. Special status wildlife and plant species include state or federally protected species, BLM sensitive species, avian species protected under the Migratory Bird Treaty Act (MBTA) or Bald and Golden Eagle Protection Act (BGEPA), USFWS birds of conservation concern (BCC), and Nevada Department of Wildlife (NDOW) species of greatest conservation need (SGCN). Birds, both migratory and most native-resident bird species including raptors and eagles, are protected under the MBTA, and their conservation by federal agencies is mandated by EO 13186 (Migratory Bird Conservation). Species that are listed as federally threatened and endangered species are also under the jurisdiction of the USFWS and are discussed in Section 3.4, Federally Listed Species.

3.3.1 Issues Identified for Analysis

- How would construction, O&M, and decommissioning of the Project affect general wildlife, migratory birds, and special status species habitats?
- What would be the effects to general wildlife, migratory birds, and special status species from the risk of collision and electrocution from the solar panels, gen-tie, and perimeter fencing?

3.3.2 Analysis Area and Methodology

The Project Area plus a 3-mile buffer is the General Wildlife, Migratory Birds, and Special Status Species Analysis Area for consideration of the direct and indirect effects to them, totaling approximately 73,558 acres (see Appendix A, Figure A-6). The General Wildlife, Migratory

Birds, and Special Status Species Analysis Area is intended to capture existing conditions and potential impacts to individuals, habitats, and movement corridors for wide-ranging species such as bats, birds, and larger mammals that may have the potential to occur. The Golden Eagle Analysis Area is the Project Area plus a 10-mile buffer (370,325 acres), which is based on USFWS (2023e) guidance for golden eagle (*Aquila chrysaetos*).

Special status species that occur or have the potential to occur within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area were identified from the following data sources:

- USFWS Information for Planning and Consultation (IPaC) data (USFWS 2023a)
- USFWS Critical Habitat for Threatened and Endangered Species
- BLM Sensitive and Special Status Species List (BLM 2023b)
- NDOW Data Request and Sensitive Data Request (NDOW 2024)
- NDOW Special Animals List
- Nevada State Wildlife Action Plan (NDOW 2022) SGCN
- Western Bat Working Group (WBWG) Priority Species List (Heritage 2024)
- Bonanza Solar Project BRTR (Heritage 2024)
- Nevada Division of Natural Heritage (NDNH) (formally the Nevada Natural Heritage Program [NNHP]) records of endangered, threatened, candidate, and at-risk plant and animal taxa (Heritage 2024)

All special status wildlife and plant species that have the potential to occur were evaluated and discussed within the BRTR (Heritage 2024). Prior to field surveys, agency coordination, literature review, and records searches of the Project Area were completed to create a list of plant and wildlife species and sensitive vegetation communities or habitats that could potentially occur in the Project Area. Focused field surveys for Mojave desert tortoise, rare plants, thrasher, and aquatic resources were completed to provide additional information for the species' potential to occur.

The potential for each species to occur was categorized as high, moderate, low, unlikely, or no potential, based on the sources listed above, species habitat requirements, habitat connectivity, habitat available in the General Wildlife, Migratory Birds, and Special Status Species Analysis Area, and in coordination with the USFWS, National Park Service (NPS), BLM, and NDOW. Table 3-8 provides a description of the potential occurrence categories.

Table 3-8. Special Status Species Potential to Occur Categories

Potential to Occur Category	Description
No Potential	Species has not been documented in the analysis area, the analysis area is outside the species' known range, and/or no suitable habitat is present.
Unlikely	Unlikely to occur based on the lack of suitable habitat.

Potential to Occur Category	Description
Low	Species has not been recently documented in the analysis area, existing habitat conditions in the analysis area preclude the establishment of viable populations, or the species ranges widely, and individuals could incidentally occur in the analysis area.
Moderate	Species has not been recently documented in the analysis area, but potentially suitable habitat is present and there is a reasonable likelihood for the species to occur in the analysis area.
High	Species has been recently documented in the analysis area or there is a high likelihood of occurrence based on the species' known range and/or the presence of suitable habitat.

A full list of the plant and wildlife species evaluated for their potential to occur are included in the BRTR Appendices G and H (Heritage 2024). Species that were determined as having low, unlikely, or no potential to occur were not evaluated further for detailed analysis in this EIS/RMPA. Species determined to have a moderate or high potential to occur are analyzed in this section.

3.3.3 Affected Environment

Ecological Setting

The ecological setting, predominant land cover types, and habitat acreages were determined based on the SWReGAP land cover data (USGS 2023a; USEPA 2023a) Ecoregions, and confirmed by field observation (Heritage 2021b, 2024). The General Wildlife, Migratory Birds, and Special Status Species Analysis Area is located within the Mojave Desert in the Basin and Range and Creosote-Dominated Basins USEPA Ecoregions, which includes valleys lying between scattered mountain ranges of the Mojave Desert at elevations ranging from 1,800 to 4,500 feet amsl (Heritage 2023d:6). The analysis of impacts to vegetation is provided in Section 3.2, Vegetation Communities, and all SWReGAP data for the General Wildlife, Migratory Birds, and Special Status Species Analysis Area is provided in Table 3-3. There are no perennial sources of water; however, several ephemeral drainages flow through the Project Area. Water within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area flows generally from south to north toward an unnamed isolated playa that is located approximately 8 miles northeast of the Project (Heritage 2024). Ephemeral drainages and dry washes provide important habitat sources and are often used as movement corridors by a range of species.

The General Wildlife, Migratory Birds, and Special Status Species Analysis Area is primarily undisturbed, but there are existing anthropogenic impacts associated with two transmission lines, dirt roads, gravel pits, U.S. 95, a fiber-optic line, an existing substation, flood control berms, and trash (Heritage 2024).

General Wildlife

The ecological setting for the General Wildlife, Migratory Birds, and Special Status Species Analysis Area is typical for this part of the Mojave Desert and is inhabited by heat-tolerant wildlife and plant species. Species that would be affected by the Project include a variety of mammals, reptiles, birds, invertebrates, and plant species.

A list of observed wildlife species during pre-Project surveys is included in Appendix H of the BRTR (Heritage 2024).

Many terrestrial invertebrate species can be found within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area. General types of terrestrial invertebrates found in Mojave Desert habitats include moths, butterflies, ants, beetles, spiders, scorpions, grasshoppers, and crickets. Invertebrates are a vital dietary resource for wildlife (birds, small mammals, and reptiles) as well as important pollinators for native vegetation and are often critical to healthy and functioning ecosystems.

Threats to wildlife in the Mojave Desert include habitat destruction and fragmentation from developments for anthropogenic use, natural resource extraction, and invasive species (Ostoja et al. 2013). The effects of habitat destruction and fragmentation may be exacerbated by climate change and recent trends of decreasing precipitation, changing frequency of intense storms and related flood events, increased occurrence of wildfires, and persistent drought have been occurring across the region.

Special Status Wildlife

Overall, habitat communities and characteristics contribute to determining the potential occurrence for species. A list of 196 plant species and 51 wildlife species were assessed for their potential to occur in the General Wildlife, Migratory Birds, and Special Status Species Analysis Area or Golden Eagle Analysis Area (for golden eagles). Based on a review of the species' habitat requirements, data review, and historic and recent observations, species with a moderate or high potential to occur in the General Wildlife, Migratory Birds, and Special Status Species Analysis Area or Golden Eagle Analysis Area include four mammal species, eight reptile species, and seven avian species. No special status plant species were observed or mapped in the Application Area (Heritage 2024). Table 3-9 provides details on the individual species with a moderate or high potential to occur within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area as well as their protection status, and habitat suitability. Wildlife species groups that would incur direct and indirect effects from the Proposed Project are reptile, mammal, and avian species.

<u>Reptiles</u>

Eight special status reptile species are expected to occur due to their adaptation to living in desert habitats that exist throughout the General Wildlife, Migratory Birds, and Special Status Species Analysis Area. Additionally, the long-nosed leopard lizard (*Gambelia wislizenii*), Mojave desert tortoise (*Gopherus agassizii*), Mojave desert sidewinder (*Crotalus cerastes cerastes*), and southern desert horned lizard (*Phrynosoma platyrhinos calidiarum*) have been observed within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area according to NDNH records or observance during pre-Project survey efforts. All special status reptile species are primarily nocturnal and seek shelter underground in burrows or under rocks during the daytime. The special status reptiles have diverse prey resources which include insects, spiders, lizards, snakes, small rodents, and soft leaves, blossoms, and berries. The desert iguana (*Dipsosaurus dorsalis*) feeds primarily on plant matter but will also eat insects and carrion.

The Mojave desert sidewinder primarily occupies areas of wind-blown sand especially where hummocks of sand are topped with vegetation. There is suitable habitat within the Application Area for sidewinders. Three individuals have been observed incidentally during pre-Project surveys near the boundary of the Application Area. Additionally, numerous southern desert horned lizard individuals have been observed incidentally during survey and monitoring efforts in 2021, 2022, and 2023 within the Survey Area (Heritage 2024). The Mojave desert tortoise was observed within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area and is discussed in detail in Section 3.4, Federally Listed Species.

Mammals

Four mammal species, the desert bighorn sheep (*Ovis canadensis*), desert pocket mouse (*Chaetodipus penicillatus*), desert kangaroo rat (*Dipodomys deserti*), and desert kit fox (*Vulpes macrotis*) have potential to occur in the General Wildlife, Migratory Birds, and Special Status Species Analysis Area. Bighorn sheep are known to occur within 4 miles of the Project in the mountains to the north and southeast (NDOW 2023a, 2024; Heritage 2024:Figure 6). Based on the NDOW bighorn distribution data, desert bighorn sheep are known to occur with the General Wildlife, Migratory Birds, and Special Status Species Analysis Area but not within the Application Area (Heritage 2024:Figure 6). The desert bighorn sheep have a moderate potential to use the Application Area for foraging and migration primarily during winter months (Heritage 2024:42).

Desert kit foxes are primarily carnivorous and prey on black-tailed jackrabbits (*Lepus californicus*), desert cottontails (*Sylvilagus audubonii*), small mammals, insects, reptiles (sometimes small Mojave desert tortoises, and birds [including eggs]). They typically dig burrows and dens in open, level areas with loose-textured, sandy, and loamy soils (Clark County Department of Comprehensive Planning [CCDCP] 2000; Ironwood Consulting 2012). These burrows may also be used by other species including burrowing owls and small mammals. Signs for the desert kit fox were observed and several suitable burrows were observed during the Mojave desert tortoise surveys in October 2021. There is a high potential that kit fox could use the General Wildlife, Migratory Birds, and Special Status Species Analysis Area at any time of the year. No bats are anticipated to be impacted by the Project. Little to no suitable roosting habitat for bats is present within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area.

The desert pocket mouse and desert kangaroo rat are primarily nocturnal and spend most of daytime hours in their underground burrows (NDNH 2023a). Suitable habitats with sandy soils are not common in the Survey Area, but some exist, especially in the northeast corner closer to the playa. Numerous potentially suitable small mammal burrows have been observed during field effort.

Table 3-9. Special Status Wildlife and Plant Species with Moderate to High Potential to Occur within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area or Golden Eagle Analysis Area (for Golden Eagles)

Common Name ***Scientific Name***	**Status***	**Habitat**	**Potential to Occur**
Mammals			
Desert bighorn sheep *Ovis canadensis*	BLM (S); NV (G); NDNH-S4	Adapted to steep, rocky terrain with open visibility in arid desert mountains. Requires perennial water sources, especially during summer months. During the warm months they graze on mountain slopes and will move down to lower valleys during the winter. There are known populations of desert bighorn sheep in the Spotted and Pintwater Ranges in the Desert NWR to the north and northeast of the Project as well as in the Spring Mountains to the south (BLM 2015; NDOW 2023b; USFWS et al. 2020).	Moderate; not likely to use the area regularly due to a lack of steep rocky cliffs. May use the area for foraging and migration primarily during winter months. No observations during field survey efforts from 2021–2023 (Heritage 2024). NDOW data shows that there is mapped bighorn sheep distribution within mountainous areas to the north of the Project by approximately 2.5 miles, to the southeast of the Project by approximately 3 miles, and to the north of the GridLiance Innovation Substation by approximately 3.3 miles (NDOW 2024).
Desert kangaroo rat *Dipodomys deserti*	BLM (S)	Occupies desert flatlands in sandy soil with sparse vegetation. Found in shadscale scrub and Mojave creosote bush scrub. Mostly restricted to deposits of deep, windblown sand, but they will occasionally occupy gravelly areas as well. Use underground burrows and are primarily nocturnal (NDNH 2023b).	High; suitable habitats exist within the Survey Area and potentially suitable burrows have been observed during field surveys.
Desert kit fox *Vulpes macrotis*	NV (P); NDNH-S3	Widely distributed throughout the arid southwest and can be found in a variety of habitat types. Kit foxes rely on dens throughout the year for rest sites, shelter against harsh weather, bearing and rearing locations for young, and as an escape from predators. Also known to use exposed/protected pipes or smaller culverts which provide protection from predators, harsh conditions, and temporary and maternal dens (CCDCP 2000; NDOW 2023b).	High; numerous suitable burrows with sign observed during Mojave desert tortoise surveys in October 2021 (Heritage 2024).
Desert pocket mouse *Chaetodipus penicillatus*	BLM (S)	Occurs on sparsely vegetated sandy desert floors. Primarily occupy areas with creosote bush and saltbush and fine, sandy, or light gravelly soils. Use underground burrows and are primarily nocturnal (NDNH 2023b).	High; suitable habitats exist within the Survey Area and potentially suitable burrows have been observed during field surveys.
Birds			
Brewer’s sparrow *Spizella breweri*	BLM (S); SGCN; NDNH-S3	Typically breeds in shrub habitats, such as sagebrush (Artemisia spp.) habitats east of Sierra Nevada Range and in higher valleys of Mojave Desert. Somewhat common in open desert habitats such as creosote bush scrub and saltbush scrub during winter (BLM 2023b; Rotenberry et al. 2020).	High; suitable habitat occurs especially for wintering individuals. No known occurrences within 3 miles (5 kilometers [km]) of the Project based on NDNH records (NDNH 2023a). Three individuals were observed during thrasher surveys in April 2023 (Heritage 2023b).

Common Name ***Scientific Name***	**Status***	**Habitat**	**Potential to Occur**
Costa's hummingbird *Calypte costae*	BCC	Inhabits Sonoran and Mojave desert scrub habitats, generally moving further south into the Sonoran Desert during winter months and occupying more of the Mojave Desert and Great Basin during summer months. Tends to frequent riparian areas and springs, especially in the Mojave Desert, and is much less widespread than in the Sonoran Desert. In the Mojave Desert, nest sites include chollas (Cylindropuntia spp.) and various shrubs such as catclaw acacia (Senegalia greggii), greythorn, and desert willow (Baltosser and Scott 2020).	Moderate; breeding months only. Suitable breeding habitat occurs but this species is unlikely to occur during winter months. No observations have been made during field survey efforts from 2021–2023.
Golden eagle *Aquila chrysaetos*	BLM (S); SGCN; BGEPA; NDNH-S4	Wide variety of habitats that varies with season, age, breeding status, and specific behaviors. Commonly found near areas of high topographic relief (mountains, rolling hills) (Katzner at al. 2020).	Moderate; there is one known NDNH record within 1 mile (1.6 km) of the southeastern corner of the Golden Eagle Analysis Area (NDNH 2023a). No observations have been made during field survey efforts from 2021– 2023.
Loggerhead shrike *Lanius ludovicianus*	BLM (S); SGCN; NDNH-S3	Typically found in open habitats with scattered shrubs, trees, pots, fences, utility lines, or other perches. Typically build nests 3 to 9 feet above ground depending on the height of vegetation (Yosef 2020).	High; suitable habitat occurs and individuals have been observed in the survey area. No known occurrences within 3.1 miles (5 km) of the Project based on NNHP records (NDNH 2023a). One individual was observed during thrasher surveys in April 2023 (Heritage 2023b).
Sagebrush sparrow *Artemisiospiza nevadensis*	BLM (S); NDNH-S3B, S4N	Occupies semi-open habitats with evenly spaced shrubs primarily within Great Basin during breeding season. Prefers sagebrush and saltbush desert scrub habitats during breeding season. Will occupy other desert scrub habitats during migration and winter periods when it moves south to the Mojave and Sonoran Deserts (Martin and Carlson 2020; NDNH 2023b).	Moderate; winter and migration periods only. Potentially suitable desert scrub habitats exist within the Survey Area. No observations have been made during field survey efforts from 2021–2023.
Verdin *Auriparus flaviceps*	BCC; BLM (S); NDNH -S3	Inhabits desert scrub habitats primarily in areas along washes where thorny vegetation occurs or in desert riparian zones. Prefers brushy areas over open desert (Webster 2020).	Moderate; suitable habitats exist within the Survey Area, though vegetation density is not as high as verdin usually prefer. More likely to occur in the vicinity of Cactus Springs. No observations have been made during field survey efforts from 2021–2023.
Western burrowing owl *Athene cunicularia hypugaea*	BCC, BLM (S); SGCN; NHDH-S3B	Known to occur in open, dry grasslands, agricultural and range lands, and desert habitats often associated with burrowing animals. Typically nests in mammal burrows although may use human-made structures including culverts and debris piles. They exhibit strong nest site fidelity. In some cases, they migrate into southern deserts during winter (Poulin et al. 2020).	Moderate; suitable habitat exists and potential burrows with burrowing owl pellets, feathers, and whitewash were observed during Mojave desert tortoise surveys. The vegetation is slightly more dense than is generally preferred by burrowing owl, but they could use less dense areas especially in the northern half of the General Wildlife, Migratory Birds, and Special Status Species Analysis Area. No known occurrences within 3 miles of the Project based on NDNH records (NDNH 2023a).

Common Name ***Scientific Name***	**Status***	**Habitat**	**Potential to Occur**
Raptors (Falconiformes: hawks, eagles, falcons, and their allies)	MBTA Some of these species may be NDOW and BLM SSS listed species.	Various.	High; raptors could forage within any of the habitats within the Survey Area and could perch or nest in tall yucca and on transmission line towers. Several red-tailed hawks (Buteo jamaicensis) have been observed incidentally during various surveys and two active red-tailed hawk nests and 42 inactive raptor nests were observed during Greenlink West Transmission Project eagle surveys that spanned the Bonanza Solar Project Area (BLM 2022a). NDOW has records of 66 raptor nests (55 inactive, 11 active) within 10 miles of the Project that were recorded in 1973, 2013, and 2014 in the mountains to the south and southeast of the Project (NDOW 2024).
Reptiles			
Desert glossy snake and Mojave glossy snake *Arizona elegans eburnata* and *A. e. candida*	BLM (S); NDNH-S4	Both subspecies use desert scrub and salt desert scrub habitats with open sandy surfaces, scattered brush, and rocky areas. Prefers loose soils for burrowing (BLM 2023b; CCDCP 2000).	Moderate; suitable habitat occurs. No known occurrences within 3 miles of the Project based on NDNH records (NDNH 2023a). No observations during field survey efforts from 2021–2023.
Desert iguana *Dipsosaurus dorsalis*	BLM (S); NDNH-S3	Inhabits creosote bush scrub desert. Prefers hummocks of loose sand and patches of firm ground with scattered rocks and desert washes (BLM 2023b; CCDCP 2000).	Moderate; suitable habitat occurs. No known occurrences within 3 miles of the Project based on NDNH records (NDNH 2023a).
Long-nosed leopard lizard *Gambelia wislizenii*	BLM (S); NDNH-S4	Found in sandy and gravelly desert and semidesert areas with scattered shrubs or other low plants, especially in areas with abundant rodent burrows for cover and breeding. Avoids densely vegetated areas that can interfere with running (BLM 2023b; NDNH 2023b).	High; suitable habitat occurs. No known occurrences within 3 miles of the Project based on NDNH records (NDNH 2023a). One individual was observed incidentally during rare plant surveys in 2021 just south of the southern boundary of the General Wildlife, Migratory Birds, and Special Status Species Analysis Area (Heritage 2024).
Mojave desert tortoise *Gopherus agassizii*	USFWS (FT); NV (P, T); BLM (S); NDNH-S2, S3; NDOW (SGCN)	Primarily occupies creosote bush scrub, cactus and shadscale scrub, and Joshua tree woodland habitats from flats to slopes. Requires soils that are friable enough for digging burrows, but firm enough so they do not collapse (BLM 2023b; NDOW 2023b; USFWS 2011a).	High; suitable habitat occurs. Individuals have been observed in the General Wildlife, Migratory Birds, and Special Status Species Analysis Area. There are several known occurrences within 3 miles of the Project based on DNH records (NDNH 2023a). Fifteen juvenile and 23 adult Mojave desert tortoises were observed during protocol surveys in October 2021 for the Project (Ironwood Consulting 2022, 2024), five adult Mojave desert tortoises were observed during intuitive surveys that analyzed habitat use outside the Project Area, and numerous other Mojave desert tortoises were observed incidentally during other survey efforts.

Common Name ***Scientific Name***	**Status***	**Habitat**	**Potential to Occur**
Mojave Desert sidewinder *Crotalus cerastes*	BLM (S); NDNH-S4; NDOW (SGCN)	Primarily inhabits areas of windblown sands, especially where sand hummocks are topped with vegetation. Also found in hardpan, open flats, rocky hillsides, and other desert areas especially those with creosote bush and where there is open terrain allowing for the sidewinding motion (BLM 2023b).	High; suitable habitat occurs. No known occurrences within 3 miles of the Project based on NDNH records (NDNH 2023a). Three individuals have been observed incidentally during rare plant surveys, Mojave desert tortoise surveys, and geotechnical monitoring within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area and south of the southern boundary of the General Wildlife, Migratory Birds, and Special Status Species Analysis Area.
Southern desert horned lizard *Phrynosoma platyrhinos calidiarum*	BLM (S); NDNH-S4; NDOW (SGCN)	Typically found in open sandy areas in deserts, chaparral, and grassland among woody shrubs, cacti, and yucca. Often associated with ant hills – their primary food source (BLM 2023b; CCDCP 2000).	High; suitable habitat occurs. No known occurrences within 3 miles of the Project based on NDNH records (NDNH 2023a). Several horned lizards were observed during other survey efforts.
Mojave shovel-nosed snake *Chionactis occipitalis*	BLM (S); NDNH-S4	Inhabits dry desert habitats with loose sand and often with little vegetation. Occurs in washes, dunes, sandy flats, and rocky hillsides (BLM 2023b; NDNH 2023b).	Moderate; suitable habitat occurs. No known occurrences within 3 miles of the Project based on NDNH records (NDNH 2023a). No observations have been made during field survey efforts from 2021 to 2023.
Invertebrates			
Median-gland springsnail *Pyrgulopsis pisteri*	BLM (S); NDNH S-1; NDOW (SGCN)	Endemic to the springs of Ash Meadows NWR in the Amargosa River basin. Found primarily in Scruggs and Marsh Springs and can be abundant near vegetated areas (BLM 2023b; Hershler and Sada 1987).	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.
Sanchez pyrg *Pyrgulopsis sanchezi*	BLM (S); NDNH S-2; NDOW (SGCN)	Endemic and distributed in five separate groundwater discharge areas of the Amargosa River basin: Grapevine Springs, Ash Meadows, Tecopa, Shoshone, Saratoga Spring. Preferred habitat is natural springs where groundwater flows to the surface are consistent (BLM 2023b; Hershler et al. 2013).	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.
Nye County pyrg Pyrgulopsis licina	BLM (S); NDNH S-1; NDOW (SGCN)	Endemic to the springs of Ash Meadows NWR in the Amargosa River basin. Found primarily in a broad spring brook that courses through a pit-like depression south of the Clay Pits in Ash Meadows NWR (BLM 2023b; Hershler et al. 2013).	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.
Ash Meadows pebblesnail *Pyrgulopsis erythropoma*	BLM (S); NDNH S-1; NDOW (SGCN)	Endemic to the Point of Rocks spring complex of Ash Meadows NWR in the Amargosa River basin. Found in five springs across the Ash Meadows NWR where it occurs mostly along the travertine (BLM 2023b; Hershler and Sada 1987).	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.
Distal-gland springsnail *Pyrgulopsis nanus*	BLM (S); NDNH S-1; NDOW (SGCN)	Endemic to the springs of Ash Meadows NWR in the Amargosa River basin. Found in Five, Mary Scott, and Collins Ranch Springs within the Ash Meadows NWR where it occurred in multiple substrate types (BLM 2023b; Hershler and Sada 1987). .	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.

Common Name ***Scientific Name***	**Status***	**Habitat**	**Potential to Occur**
Fairbanks springsnail *Pyrgulopsis fairbanksensis*	BLM (S); NDNH S-1; NDOW (SGCN)	Endemic to a large spring in the northern section of Ash Meadows NWR in the Amargosa River basin. Found only in Fairbanks Springs where it occurs commonly on the travertine at the spring's opening (BLM 2023b; Hershler and Sada 1987).	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.
Crystal springsnail *Pyrgulopsis crystalis*	BLM (S); NDNH S-1; NDOW (SGCN)	Endemic to and rare in Crystal Pool, a large, low elevation (2,200 feet amsl) spring in Ash Meadows NWR. Snails only found clinging to travertine walls of chasm-like orifices in deepest (>13 feet) part of spring (BLM 2023b; Hershler and Sada 1987).	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.
Sportinggoods tryonia *Tryonia angulata*	BLM (S); NDNH S-1; NDOW (SGCN)	Endemic to the springs of Ash Meadows NWR in the Amargosa River basin. Found at three large pool springs (Big, Crystal, and Fairbanks Springs) in Ash Meadows NWR at 2,200 feet amsl in elevation and was common at all three sites (BLM 2023b; Hershler and Sada 1987).	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.
Amargosa tryonia *Tryonia variegata*	BLM (S); NDNH S-2; NDOW (SGCN)	Occurs in at least 19 small springs in Ash Meadows NWR, Nye County, Nevada, and in a few similar springs at Shoshone and Tecopa, Inyo County, California. Found to be common at virtually all sites and occurred on macrophytes, in detritus-covered areas, or on travertine blocks in spring pools; and on travertine and in soft sediment along sides of upper portions of stream outflows (BLM 2023b; Hershler and Sada 1987).	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.
Minute tryonia *Tryonia ericae*	BLM (S); NDNH S-1; NDOW (SGCN)	Endemic to the springs of Ash Meadows NWR in the Amargosa River basin. Only found in North Scruggs Spring and an unnamed spring north of Collins Ranch Spring, within 2.5 miles of one another at 2,300 feet amsl in elevation. Common in a small spring pool in North Scruggs Spring on various macrophytes and in the stream outflow on loose travertine bits and algal mats at the unnamed spring (BLM 2023b; Hershler and Sada 1987).	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.
Point of Rocks tryonia *Tryonia elata*	BLM (S); NDNH S-1; NDOW (SGCN)	Endemic to the springs of Ash Meadows NWR in the Amargosa River basin. Only found in two small springs on travertine mounds at Point of Rocks Springs within Ash Meadows NWR. Commonly occurs in stream outflows of silted areas (BLM 2023b; Hershler and Sada 1987).	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.
Devils Hole Warm Spring riffle beetle *Stenelmis calida*	BLM (S); NDNH S-1	Endemic to the springs of Ash Meadows NWR in the Amargosa River basin. Only known to occur in Devil's Hole, Indian Spring, and Point of Rocks Springs within the NWR. The major factor linking the springs inhabited by this beetle species is their association with the Ash Meadows Groundwater Basin which maintains the constant flow required for riffle beetle habitat (BLM 2023b; Shepard 1992).	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.

Common Name *Scientific Name*	**Status***	**Habitat**	**Potential to Occur**
Amphibians			
Western toad *Anaxyrus boreas*	BLM (S); NDNH S-4; NDOW (SGCN)	The Anaxyrus boreas species complex occurs within the western United States and includes subspecies A. b. boreas, A. b. halophilus and three narrow endemics known only to occur within the hydrological Great Basin: A. canorus, A. exsul, and A. nelsoni. The species complex inhabits many different types of habitats including grasslands, marshes, as well as springs. Found in most of Nevada, except for the very southern part of the state. These toads preferred habitat is believed to be natural areas with moderate to high emergent vegetation cover, with a high proportion of the surface area wetted. Woody debris and tunnels/burrows have also been documented as highly preferred microhabitat (BLM 2023b; Browne and Paszkowski 2018; Gordon et al. 2017).	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.

Note: Status, habitat, and potential to occur information is from Bonanza Solar Project Biological Resources Technical Report (Heritage 2024); NDNH (2023a); WBWG (2023); Greenlink West Transmission Project Draft EIS/RMP Amendments (Greenlink West 2023); Greenlink West Transmission Project eagle survey data (BLM 2022a); USFWS IPaC (USFWS 2023a); and BLM Nevada Special Status Species List (BLM 2023b).

* Status definitions:

Nevada Revised Statutes (NRS)-PC = NRS Protected Cacti and Yucca

USFWS:

FT = Threatened. Threatened species are those in imminent jeopardy of becoming endangered. The ESA prohibits the take of a species listed as threatened under Section 4d of the ESA. Take is defined by the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct.

Nevada (NV):

P = Protected. Protected from “take” under Nevada state law. Protected species may further be classified as endangered, threatened, or sensitive.

T = Threatened. Threatened species are those in imminent jeopardy of becoming endangered.

G = State Game Species

BLM:

S = Sensitive. Species are listed as Sensitive if there is information that the species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that viability of the species is at risk, or because the species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the viability of the species is at risk. The BLM Sensitive status only applies when the species is on BLM-administered lands.

NDOW:

NDOW (SGCN) = Species of Greatest Conservation Need. Species identified by the NDOW in greatest need of conservation in Nevada.

NDNH:

S1 = Critically imperiled: At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.

S2 = Imperiled due to rarity or other demonstrable factors.

S3 = Vulnerable to decline because of rare and local throughout its range, or with very restricted range.

S4 = Long-term concern, though now apparently secure; usually rare in parts of its range, especially at its periphery.

B = Breeding: Conservation status refers to the breeding population of the species in the nation or state/province.

N= Non-breeding: Conservation status refers to the non-breeding population of the species in the nation or state/province.

Special Status Plants and Habitats

No special status plant species were identified within the Project Area. Of the four special status species identified as potentially present, none were identified during field surveys, and suitable habitat was not present within the Project Area (Heritage 2023d).

There is no habitat for threatened or endangered plant species within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area (USFWS 2023a). Of the 196 special status plant species evaluated for potential to occur based on elevation, habitat, and known range, 191 are not expected to occur in the General Wildlife, Migratory Birds, and Special Status Species Analysis Area. The remaining five plant species were determined to be unlikely to occur based on literature review and rare plant surveys conducted in May 2021, April 2022, and June 2022 (Heritage 2024:16).

Migratory Birds

The following migratory bird species have a moderate or high potential to occur within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area (3 miles): Brewer's sparrow (*Spizella breweri*), Costa's hummingbird (*Calypte costae*), golden eagle, loggerhead shrike (*Lanius ludovicianus*), sagebrush sparrow (*Artemisiospiza nevadensis*), verdin (*Auriparus flaviceps*), Western burrowing owl (*Athene cunicularia hypugaea*), and raptors (see Table 3-9).

Various surveys have been completed within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area from 2021 to 2023 (Heritage 2023b, 2024). During the March 2023 thrasher survey, one loggerhead shrike was observed. During the April 2023 thrasher survey, three Brewer's sparrows were observed. No thrasher species were observed during either survey (Heritage 2023b). During Mojave desert tortoise surveys, numerous potentially suitable burrows for western burrowing owls and four burrows with western burrowing owl sign (feathers, pellets, whitewash) were discovered (Heritage 2024). Additionally, several red-tailed hawks (*Buteo jamaicensis*) were observed (Heritage 2024). As well as seven active and inactive red-tailed hawk nests and other unidentified raptor nests were observed between 2 and 4 miles east of the General Wildlife, Migratory Birds, and Special Status Species Analysis Area and 4 miles west of the General Wildlife, Migratory Birds, and Special Status Species Analysis Area during Greenlink West Transmission Project eagle surveys (BLM 2023c).

The closest Important Bird Area, essential for the conservation of bird species, is Spring Mountains located approximately 2.5 miles south of the analysis area within the Mount Sterling Wilderness Study Area (National Audubon Society 2013).

There is no potential for bald eagles to occur within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area; therefore, they are not included for detailed analysis (see Table 3-8 and Heritage 2024:31). Golden eagles have a moderate potential to occur and are a BLM sensitive species and protected under BGEPA. Typical territories can span from 5 to 10 miles depending on the availability of prey, nest sites, and wind resources. In desert settings, territories may range up to 20 miles. They will use cliffs, rock outcroppings, tall and prominent trees, and occasionally tall transmission towers within proximity to hunting grounds for their nests (Pagel et al. 2010; Katzner et al. 2020). They are highly site-faithful, maintaining a few nests within their territory that can be reused for many years. Golden eagles generally forage in open areas on small- to medium-sized mammals but will also take birds and larger mammals and will also scavenge. The breeding season includes courtship, nesting, egg-laying, and chick-rearing and generally occurs from December through August (Katzner et al. 2020). The USFWS IPaC list identified that the golden eagle has potential to occur within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area (Heritage 2024). According to the NDNH, there is one known record within 1 mile of the southeastern corner of the General Wildlife, Migratory Birds, and Special Status Species Analysis Area directly south of Cactus Springs within the unnamed ridges (Heritage 2024). No observations were made during field survey efforts from 2021–2023 (Heritage 2024).

Eagle survey data from the Greenlink West Transmission Project was used to determine the status of golden eagle nests within and near the Bonanza Project Area. There were 42 inactive raptor nests observed during the Greenlink West Transmission Project eagle surveys, which spanned the Bonanza Project Area (BLM 2022a). None of the 42 raptor nests were identified as golden eagle nests (BLM 2022a). There is one NNHP record from 2013 of a golden eagle nest within 2 miles of the southeastern corner of the proposed Project (NDNH 2023a; Heritage 2024:Figure 5). NDOW also has recorded three active golden eagle nests that were observed in 2013 in the mountainous areas to the south and southeast of the Project (NDOW 2024). During other resource surveys, Heritage did not observe any golden eagles or their nests (Heritage 2024:45). While there are no active golden eagle nests observed within the last five years in the General Wildlife, Migratory Birds, and Special Status Species Analysis Area, golden eagles from the Pahrump Valley are known to move through the area and potentially use the area for hunting (BLM 2024b).

3.3.4 Environmental Consequences

This section describes the potential impacts to species and habitats associated with the construction, O&M, and decommissioning of the Project. Direct effects to wildlife include actions that cause disturbance from noise, harassment, entrapment, injury, and mortality as well as habitat loss, and changes in habitat use or behavior such as movement, foraging, or breeding. Indirect effects could occur through changes in the characteristics or quality of habitat through degradation or modification. Habitat loss and degradation would directly affect species due to the reduction of shelter areas, nesting areas, and access to food and water resources. Additional effects on wildlife habitat are included in Section 3.2, Vegetation Communities.

No Action Alternative

It is anticipated that under the No Action Alternative current land uses and trends would continue to occur. There would be no Project-related impacts to species, and they would continue to use the habitat with current conditions.

Proposed Action

Construction Impacts

The anticipated impacts of the Proposed Action would cause stress, disturbance, injury, and mortality to terrestrial wildlife, plants, raptors, and migratory birds. Direct impacts to plant and wildlife species include construction actions that cause disturbance from noise, harassment, entrapment, injury, and mortality as well as habitat loss, and changes in habitat use or behavior such as movement, foraging, or breeding. Exposure to herbicides or other hazardous materials throughout the lifetime of the Project would also directly affect wildlife. Contact or ingestion of chemicals could kill animals or disrupt hormone levels, potentially affecting behavior and the ability to reproduce.

Indirect effects could occur to terrestrial wildlife, plants, raptors, golden eagles, and migratory birds through changes in the characteristics or quality of habitat through degradation or modification from the development of the solar facility and associated components (Abella 2010).

The Proposed Action would result in 2,413 acres of ground disturbance (Table 3-10). The solar facility would create a movement barrier for large mammals and some reptile species. Ground and human disturbances would increase the risk of entrapment or fatal injuries to fossorial wildlife. The Applicant would work to maintain 50% of vegetation cover within the solar panel fields. Permanent disturbance of 1,027 acres from the Proposed Action would result in the permanent loss of nesting, foraging, and shelter habitat would last for the life of the Project. The Proposed Action could also potentially alter or influence wildlife such as by blocking its movement, reducing ecological connectivity, and affecting wildlife's ability to find food, breed, and adapt to climate change. The proposed security fencing and ground disturbance would reduce habitat connectivity and resource access for all wildlife. However, per measure Gen-1 (Appendix B, Table B-2), standard wildlife escape holes would be established 5 inches above ground within perimeter fencing at a recurring interval of 0.15 mile to allow small animal ingress or egress. Small wildlife and avian species would still be able to access the construction site and be in harm's way for collision with equipment or vehicles. Small species, such as birds, reptiles, and small mammals have an increased risk of mortality or collision with vehicles, personnel, or gen-tie infrastructure. Nocturnal species, including migrating birds, could be adversely affected by light pollution created by temporary construction lighting by being attracted to the area; there, individuals could become disoriented and could be at increased risk for collision with Project components.

Direct/indirect impacts from construction would vary based on the type of site preparation methods and construction techniques used. Construction impacts to species' habitats would occur from clear and cut or grading and leveling, soil removal, trenching and excavation, overland travel with machinery and vehicles, and trimming of vegetation. The four defined disturbance levels (D-0, D-1, D-2, D-3) described in Section 2.1.1, Construction Definitions, specifically Table 2-1, and are summarized in Table 3-10 as they relate to habitat impacts. No direct impacts are anticipated to approximately 2,720 acres of vegetation (D-0), only indirect impacts. Short-term, long-term, and permanent direct and indirect impacts are anticipated to affect approximately 2,413 acres of habitat or 3% of the General Wildlife, Migratory Birds, and Special Status Species Analysis Area which fall under D-1, D-2, and D-3 disturbance levels.

Table 3-10. Proposed Action Disturbance Categories and Impacts to Species Habitat

Proposed Action	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal

Proposed Action	D-0	D-1	D-2	D-3
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term*	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,720	944	442	1,027
Percent of Buildable Areas (2,368 acres)	Excluded from Buildable Areas	40%	19%	43%
Percent of Application Area (5,133 acres)	53%	18%	9%	20%
Percent of Analysis Area (73,558 acres)	4%	1%	<1%	1%

* Shorter term (approximately 2–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

The Project has been designed to minimize potential impacts to wildlife and plant species through the implementation of design features, mitigation measures, and management plans (see Appendix B for more details). APMs, mitigation measures, and Western Solar Plan (BLM and DOE 2012) design features (Appendix B) include reducing noise (Noise-1, N3-1), lighting (Vis-2), dust (Air-1, Air-2 , AQC2-1), night sky effects (Vis-1), preventing the spread of nonnative species (ER3-1), and decreasing impacts to ecological resources (ER2-1) and habitat (Eco-1 and Eco-2) impacts. Mitigation measure WR-2 would minimize impacts to water and wildlife resources. The use of herbicides and pesticides would be within the framework of BLM and DOI policies and standard operating procedures and would include the use of only USEPA-registered pesticides/herbicides that also comply with state and local regulations. Transportation, storage, management, and disposal of hazardous materials and vehicle/equipment fuels would be conducted in accordance with accepted best management practices (BMPs) and in compliance with all applicable regulations. While these measures would reduce the potential for adverse effects, the impacts to regional wildlife would remain adverse.

Impacts to groundwater dependent species at Ash Meadows NWR would primarily occur during construction phase when the on-site well or off-site water source would be used to provide water for construction activities, with estimated water use up to 325 acre-feet total (see Table 2-6).

Indirect impacts to groundwater due to the on-site well would include impacts to groundwater dependent species at Ash Meadows NWR, and specifically Devils Hole. In a model run by Halford Hydrology (2023), pumping at the Project's on-site water well resulted in 0.007 foot or less of water level drawdown at Devils Hole due to the Project (Dudek 2023a:Attachment A). While this value is small to the point of being unmeasurable on the device installed at Devils Hole, it is not necessarily a negligible impact to the Devils Hole ecosystem. The Project would contribute a small amount of drawdown (0.007 foot or less) at Devils Hole that would incrementally contribute to the decline in water levels that support habitat for the Devils Hole pupfish (*Cyprinodon diabolis*). Similar adverse impacts are also expected to occur to habitats for BLM sensitive groundwater dependent species including 12 invertebrates and one amphibian (see species listed in Table 3-9) from the proposed Project.

Use of off-site water would also have an indirect impact to groundwater dependent ecosystems at Ash Meadows NWR. While the off-site well is slightly farther away from Ash Meadows NWR than the proposed on-site well, it is assumed that drawdown impacts at Devils Hole would be similar to the impacts of sourcing all water from the on-site well.

Applicable Western Solar Plan design features relevant to groundwater dependent species would be implemented (Appendix B), which include avoiding groundwater withdrawals that adversely affect sensitive habitat (ER2-1), monitoring unavoidable impacts to wetlands during O&M (ER3-2), and maintaining water resource design elements during O&M (WR3-1).

Operations and Maintenance Impacts

O&M activities would cause similar long-term and permanent disturbances to the wildlife and the environment as discussed with the construction of the Project. Injury or mortality would result from maintenance vehicles and equipment performing operation oversight, scheduled facility and road maintenance, security checks, and vegetation management activities. Also, during operations, the presence of solar panels can cause avian collisions with panels (i.e., “lake effect”) while the introduction of structures (e.g., fencing and the gen-tie) may provide collision risk and new perching opportunities for raptors and ravens (Horváth et al. 2009). The implementation of anti-perching and nest deterrents along the gen-tie (Eco-7, ER2-1) would reduce potential impacts to species but not eliminate the issue because predators could perch on the security fence placed around the Buildable Areas. However, if deemed necessary, anti-perching deterrents could also be installed along the security fencing to further reduce perching opportunities (Seamans and Gosser 2016). In addition, the presence of trash and other human-related nuisances may attract predatory species. Implementation of a Raven Management Plan includes measures intended to deter raven presence and potential predation of species, which would reduce the risk for mortality.

As with temporary construction lighting, permanent lighting for the operational safety of the Project could result in light pollution in foraging areas for nocturnal species. All lighting on the project area must be down shielded to prevent as much light pollution as possible, thus reducing the impacts to wildlife (Appendix B). Electrocution from the gen-tie and transmission lines is another risk to avian species during the operation phase. Electrocution occurs when a bird contacts two conductors of different voltages at the same time, such as an energized wire conductor and an electrical ground. This can occur when a bird’s wings connect two different wires, or when it perches where a wire connects to a support pole. Electrocution risk would be mitigated because the gen-tie would be built according to applicable federal standards and regulations and in accordance with the Avian Power Line Interaction Committee’s (APLIC’s) Reducing Avian Collisions with Power Lines: State of the Art in 2012 (APLIC 2012; Dudek 2024a:83).

It is unlikely that the composition of the vegetation would be the same as the existing vegetation. Noxious and invasive weeds will outcompete native vegetation from reestablishing in the Project Area. This is an important reason for why scraping and vegetation removal must be minimal. Weed control would also need to be conducted throughout the life of the Project, including construction. Additionally, increased human activity would contribute to the spread of noxious weeds and habitat loss. Currently, there are no major weed infestations, and the overall percent cover of noxious weeds is relatively low (Heritage 2021b). The Site Restoration Plan would develop and implement methods for reducing degradation and managing vegetation within and near the Project Area during the lifespan of the solar facility. See Section 3.2, Vegetation Communities, for more information about invasive species.

As described in the Applicant's POD, if the Project Area reaches vegetation cover thresholds, the Mojave desert tortoise exclusion fencing around the Buildable Areas would be removed. This would allow for passive reoccupation by small to medium-sized wildlife species, such as greater roadrunners, rabbits, reptiles, and foxes, by allowing them to access habitats within the Project Area.

O&M of the Project would require an estimated 1 acre-foot per year (AFY) of water. Impacts to groundwater dependent BLM sensitive species within Ash Meadows NWR would be similar in nature and smaller in magnitude as those impacts described for construction of the Proposed Action, above. Section 3.6, Water Resources, provides the impact analysis for groundwater resources, including impacts to water levels at Devils Hole.

Decommissioning Impacts

Following the end of Project operation, decommissioning impacts to wildlife would be similar to the impacts described in construction. The use of heavy equipment and other activities to remove aboveground and belowground infrastructure and to restore natural gradients would contribute to ground disturbance and risk of noxious weed invasion. Additionally, the decommissioning activities would result in noise and vibration that would cause wildlife to change their habitat use and behavior such as movement, foraging, or breeding. The Applicant would develop and implement a Site Restoration Plan that would help minimize site disturbance and restore the Project Area to pre-Project conditions. Additionally, the Western Solar Plan (BLM and DOE 2012) design feature ER-4 (Appendix B) would also be implemented to minimize ecological resource impacts during reclamation and decommissioning activities. Restoration of graded areas (1,027 acres) is estimated to take up to 20 years for the areas to become suitable for wildlife and may never become restored to pre-Project conditions for some wildlife and special status species due to a lack of ecological structure and function of the desert environment (Abella 2010). It is anticipated that the loss of some wildlife and their habitat would result from the Proposed Action.

Water use during decommissioning is estimated at 250 acre-feet (see Table 2-6), which is similar to water use during construction. Impacts of decommissioning are considered in the analysis presented above for the construction phase in the modeled local drawdown and the modeled water level decline at Devils Hole. Western Solar Plan design feature WR4-1 would be implemented during reclamation and decommissioning to continue groundwater monitoring. Once water usage for the Project is completed, there would be no further impacts from the Project on water levels at Devils Hole and Ash Meadows NWR (see Section 3.6, Water Resources).

Alternative 1

The majority of impacts related to construction, O&M, and decommissioning activities on wildlife, migratory birds, and special status species would be similar to those described in the Proposed Action. The discussion below focuses on elements where impacts differ.

Construction Impacts

Under Alternative 1, approximately 482 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation (Table 3-11), resulting in a long-term adverse impact to wildlife, migratory bird, and special status species habitats. D-3 disturbance acreage would be permanently lost to Project infrastructure and represents a less than 1% decrease in available habitat within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area.

Another approximately 1,449 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1 disturbance category) and 482 acres of drive and crush activities (D-2 disturbance category) (see Table 3-11). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates; thereby supporting the goal of maintaining 75% of reference perennial vegetation cover within the Buildable Areas. Areas subject to D-1 and D-2 disturbances represent a 3% decrease in available habitats within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area.

Table 3-11. Alternative 1 Disturbance Categories and Impacts to Species Habitat

Alternate 1	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term*	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,720	1,449	482	482
Percent of Buildable Areas (2,413 acres)	Excluded from Buildable Areas	60%	20%	20%
Percent of Application Area (5,133 acres)†	53%	28%	9%	9%
Percent of Analysis Area (73,558 acres)	4%	2%	<1%	<1%

* Shorter term (approximately 2–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

† Total does not sum to 100 due to rounding.

The other primary difference between the Proposed Action and Alternative 1 is that the acres of D-1 disturbance would increase by 505 acres under Alternative 1 as compared to the Proposed Action (1,449 acres compared to 944 acres). This represents 505 more acres of wildlife habitat maintained over the 50-year term of the ROW as compared to the Proposed Action (see Table 3-11). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates, thereby supporting the goal of maintaining 75% of reference perennial vegetation cover within the Buildable Areas.

Under Alternative 1, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-4). This mineral material relocation site would result in a long-term adverse impacts (removal) to wildlife, migratory bird, and special status species habitat.

Operations and Maintenance Impacts

The O&M impacts to wildlife, migratory birds, special status species with Alternative Action 1 would be similar to those under the Proposed Action for special status species. Under Alternative 1, 1,449 acres of wildlife habitat would be subject to D-1 disturbance, which is 505 more acres than the Proposed Action. The acreage subject to D-1 disturbance would be minimally impacted during construction, which would result in faster recovery of vegetation and more intact habitat available to special status species during O&M of the Project. Similar to the Proposed Action, per measure Gen-1, wildlife openings would be installed in regular intervals within the security fence to allow wildlife access (Appendix B, Table B-2). However, under Alternative 1, the higher proportions of D-1 disturbance compared to D-3 disturbance, the higher vegetation cover requirements, and the shorter time period to achieve any needed active restoration would facilitate adequate vegetation cover throughout the site such that the BLM and USFWS may conclude that the cover is high enough for Mojave desert tortoise to reenter the site (see Section 3.4, Federally Listed Species). When vegetation cover standards are met, the Mojave desert tortoise fencing along the bottom of the security fence would be removed, which would facilitate small to medium-sized wildlife access in and out of the Project Area for the remaining lifetime of the Project (MM Wild-9 in Appendix B). Having universal wildlife access under the security fence is anticipated to result in more natural habitat conditions as compared to the Proposed Action and better overall use of available habitat by special status species. The two-year timeframe for natural recovery, and two-year timeframe for active restoration to achieve the 75% vegetation cover standard, would provide more refuge and habitat overall for special status species as compared to the Proposed Action.

Decommissioning Impacts

Overall, the types of decommissioning impacts under Alternative 1 to wildlife, migratory birds, and special status species would be similar to those under the construction and decommissioning of the Proposed Action. The magnitude of impacts to wildlife would be smaller under Alternative 1 due to the reduced amount of D-3 disturbance that would need to be restored compared to the Proposed Action. Restoration of graded areas (482 acres) is estimated to take up to 20 years for the areas to become suitable for wildlife and they may never achieve pre-Project conditions for some wildlife and special status species due to a lack of ecological structure and function of the desert environment.

Alternative 2 (BLM Preferred Alternative)

The majority of impacts related to construction, O&M, and decommissioning activities on wildlife, migratory birds, and special status species would be similar to those described in the Alternative 1. The discussion below focuses on elements where impacts differ.

Construction Impacts

Under Alternative 2, approximately 592 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation (Table 3-12), resulting in 110 additional acres of long-term disturbance and long-term adverse impacts to wildlife, migratory bird, and special status species habitats when compared to Alternative 1. Compared to the Proposed Action, Alternative 2 would result in 435 fewer acres of long-term adverse impacts to wildlife, migratory bird, and special status species habitats. Under Alternative 2, D-3 disturbance acreage would be permanently lost to Project infrastructure and represents a less than 1% decrease in available habitat within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area.

Another approximately 1,184 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1 disturbance category) and 637 acres of the drive and crush activities (D-2 disturbance category) (see Table 3-12). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates; thereby supporting the goal of maintaining 65% of reference perennial vegetation cover within the Buildable Areas. Areas subject to D-1 and D-2 disturbances represent a 3% decrease in available habitats within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area.

Under Alternative 2, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-4). This mineral material relocation site would result in a long-term adverse impacts (removal) to wildlife, migratory bird, and special status species habitat.

Table 3-12. Alternative 2 Disturbance Categories and Impacts to Species Habitat

Alternate 2	D-0	D-1	D-2	D-3
Definition/Construction method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term*	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,720	1,184	637	592
Percent of Buildable Areas (2,413 acres)	Excluded from Buildable Areas	49%	26%	25%
Percent of Application Area (5,133 acres)†	53%	23%	12%	11%
Percent of Analysis Area (73,558 acres)	4%	2%	<1%	<1%

* Shorter term (approximately 2–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

† Total does not sum to 100 due to rounding.

Operations and Maintenance Impacts

The O&M impacts to wildlife, migratory birds, and special status species with Alternative 2 would be similar to those under Alternative 1. Alternative 2 would also allow for two years of natural recovery post-construction before restoration criteria were applied. However, there would be a three- to five-year timeframe for achieving the 65% vegetation cover standard. Tortoise reintroduction would not be considered until the 75% cover standard is met under this alternative, and therefore it could take five to 10 years (two years of natural recovery, up to five years of potential active restoration, and an additional three to four years of natural recovery) before Mojave desert tortoise exclusion fencing would be removed. Small to medium-sized wildlife would still have more habitat within the site than under the Proposed Action, but would need to access the site via wildlife openings in the fence for a longer period of time than under Alternative 1. Under Alternative 2, all temporary disturbance areas would be restored after construction is complete per MM Wild-9 (Appendix B).

Decommissioning Impacts

Overall, the types of decommissioning impacts under Alternative 2 to wildlife, migratory birds, and special status species would be similar to those under the construction and decommissioning of the Proposed Action. The magnitude of impacts to wildlife would be smaller under Alternative 2 due to the reduced amount of D-3 disturbance that would need to be restored compared to under the Proposed Action. Restoration of graded areas (592 acres) is estimated to take up to 20 years for the areas to become suitable for wildlife and they may never achieve pre-Project conditions for some wildlife and special status species due to a lack of ecological structure and function of the desert environment.

Alternative 3

The majority of impacts related to construction, O&M, and decommissioning activities on wildlife, migratory birds, and special status species would be similar to those described in the Alternative 2. The discussion below focuses on elements where impacts differ.

Construction Impacts

Under Alternative 3, approximately 648 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation (Table 3-13), resulting in 166 additional acres of long-term disturbance and long-term adverse impacts to wildlife, migratory bird, and special status species habitats when compared to Alternative 1. Compared to the Proposed Action, Alternative 3 would result in 379 fewer acres of long-term adverse impacts to wildlife, migratory bird, and special status species habitats. D-3 disturbance acreage would be permanently lost to Project infrastructure and represents a less than 1% decrease in available habitat within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area.

Another approximately 1,262 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1 disturbance category) and 680 acres of drive and crush activities (D-2 disturbance category) (see Table 3-13). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates, thereby supporting the goal of maintaining 50% cover based on pre-construction conditions and 65% vegetation density within the Buildable Areas. Areas subject to D-1 and D-2 disturbances represent a 3% decrease in available habitats within the General Wildlife, Migratory Birds, and Special Status Species Analysis Area.

Table 3-13. Alternative 3 Disturbance Categories and Impacts to Species Habitat

Alternate 3	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance

Alternate 3	D-0	D-1	D-2	D-3
Temporal Qualifier	N/A	Temporary, short term (3–5 years)	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,543	1,262	680	648
Percent of Buildable Areas (2,590 acres)	Excluded from Buildable Areas	49%	26%	25%
Percent of Application Area (5,133 acres)†	50%	25%	13%	13%
Percent of Analysis Area (73,558 acres)	3%	2%	<1%	<1%

* Shorter term (approximately 3–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

† Total does not sum to 100 due to rounding.

Under Alternative 3, approximately 93 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-5). This mineral material relocation site would result in a long-term adverse impacts (removal) to wildlife, migratory bird, and special status species habitat.

Operations and Maintenance Impacts

The O&M impacts to wildlife, migratory birds, and special status species with Alternative 3 would be similar to those under Alternative 2 for special status species. Under Alternative 3, 648 acres (25% of Buildable Areas) of the Project would be graded (D-3 disturbance). The restoration timeframe is estimated to be three to five years, which is one to three years more than Alternative 1 and five to seven years less than the Proposed Action (see Table 2-12).

Decommissioning Impacts

Overall, the types of decommissioning impacts under Alternative 3 to wildlife, migratory birds, and special status species would be similar to those under the construction and decommissioning of the Proposed Action. The magnitude of impacts to wildlife would be smaller under Alternative 3 due to the reduced amount of D-3 disturbance that would need to be restored compared to the Proposed Action. Restoration of graded areas (648 acres) is estimated to take up to 20 years for the areas to become suitable for wildlife and they may never achieve pre-Project conditions for some wildlife and special status species due to a lack of ecological structure and function of the desert environment.

3.4 Federally Listed Species

Federally listed species include all species listed as threatened or endangered under the Endangered Species Act (ESA). An endangered species is any species that is in danger of extinction throughout all or a substantial portion of its range, while a threatened species is any species that is likely to become an endangered species in the foreseeable future throughout all or a substantial portion of its range. Threatened and endangered species are placed on a federal list by the USFWS and receive protection under the ESA, as amended (16 USC 1536[c]).

3.4.1 Issues Identified for Analysis

- How would construction, O&M, and decommissioning of the Project affect habitat of the Mojave desert tortoise?
- How would water extraction from a new Project well affect water levels and habitat of the groundwater dependent federally listed species at Ash Meadows NWR and BLM-administered lands around Ash Meadows NWR?

3.4.2 Analysis Area and Methodology

The Federally Listed Species Analysis Area for federally listed species consists of the Project Area plus a 3-mile buffer, which is the extent to which direct or indirect impacts could occur. The Federally Listed Species Analysis Area comprises 73,558 acres (Appendix A, Figure A-7 and Figure A-8).

Information for federally listed species and critical habitats that may occur within the Federally Listed Species Analysis Area was obtained from the USFWS using the IPaC web tool on May 3, 2023 (Heritage 2024:Appendix J). The IPaC identified four federally listed species—southwestern willow flycatcher (*Empidonax trailii extimus*; endangered), yellow-billed cuckoo (*Coccyzus americanus*; threatened), Devils Hole pupfish (endangered), and Mojave desert tortoise (threatened)—that could potentially occur in the Federally Listed Species Analysis Area; however, no critical habitat is present. Although not identified in IPaC, the federally endangered species Yuma Ridgway's (clapper) rail (*Rallus obsoletus yumanensis*) could also have the potential to occur in the Federally Listed Species Analysis Area. Although preferred habitat for Southwestern willow flycatcher, yellow-billed cuckoo, and Yuma Ridgway's rail is not present within the Federally Listed Species Analysis Area (see Section 3.4.3), these species may fly over the area during migration but are unlikely to use any habitat within it to breed or overwinter in the Federally Listed Species Analysis Area (BLM 2024d). The IPaC identified one candidate for federal listing that could potentially occur in the Federally Listed Species Analysis Area, the monarch butterfly (*Danaus plexippus*). One species of milkweed (Utah vine milkweed [*Funastrum utahense*]) was observed during rare plants surveys (Heritage 2023d:Appendix B, 2024:25). Monarch butterflies may use the Project Area during migration and for foraging but are unlikely to breed or overwinter in the area. No federally listed plant species or habitat is present in the Federally Listed Species Analysis Area (Heritage 2024).

Based on a desktop analysis, the Mojave desert tortoise has the potential to occur within the Federally Listed Species Analysis Area (Heritage 2024). Protocol-level Mojave desert tortoise surveys were conducted in fall 2021 and fall 2023 to document the presence and estimate the density of Mojave desert tortoise (Ironwood Consulting 2024). Biologists also investigated the extent of Mojave desert tortoise sign south and east of the Project in fall 2021 by conducting focused intuitive surveys (Heritage 2024).

The Proposed Action includes the development of an on-site water well using a point of diversion from the Nevada State Water Engineer of existing unused allocations. This necessitates analysis of groundwater impacts to water levels for the Devils Hole pupfish and the groundwater dependent federally listed species known to occur at Ash Meadows NWR. These species include the Ash Meadows Amargosa pupfish (*Cyprinodon nevadensis mionectes*), Ash Meadows speckled dace (*Rhinichthys osculus nevadensis*), Warm Springs pupfish (*Cyprinodon nevadensis pectoralis*), Ash Meadows naucorid (*Ambrysus amargosus*), Amargosa niterwort (*Nitrophila mohavensis*), Ash Meadows blazingstar (*Mentzelia leucophylla*), Ash Meadows gumplant (*Grindelia fraxinipratensis*), Ash Meadows ivesia (*Ivesia kingii* var. *eremica*), spring-loving centaury (*Centaurium namophilum*), Ash Meadows milk-vetch (*Astragalus phoenix*), and Ash Meadows sunray (*Enceliopsis nudicaulis* var. *corrugata*). The Groundwater Dependent Species Analysis Area for these species is the same used as the one used for water resources and consists of the Indian Springs Valley and Amargosa Desert groundwater basins (Appendix A, Figure A-9).

3.4.3 Affected Environment

This section describes the affected environment for the federally listed species that could be impacted by the proposed Project (Table 3-14).

Table 3-14. Federally Listed Species Likely to Occur within the Federally Listed Species Analysis Area

Common Name (*Scientific Name*)	Status and Habitat	Potential to Occur
Reptiles		
Mojave desert tortoise (*Gopherus agassizii*)	Federally threatened. Primarily occupies creosote bush scrub, cactus and shadscale scrub, and Joshua tree woodland habitats from flats to slopes. Requires soils that are friable enough for digging burrows, but firm enough so they do not collapse (BLM 2017; NDOW 2023b; USFWS 2011a). USFWS designated Critical Habitat is present approximately 42 miles east of the Project Area.	Suitable habitat occurs and individuals have been observed in the Survey Area(Ironwood Consulting 2024). There are several known occurrences within 3.1 miles of the Project based on NNHP records (NDNH 2023a). In total, 20 juvenile and 33 adult Mojave desert tortoises were observed during protocol surveys for the Project (Ironwood Consulting 2024), five adult Mojave desert tortoises were observed during intuitive surveys that analyzed habitat use outside the Project Area, and numerous other Mojave desert tortoises have been observed incidentally during other survey efforts. NDOW records also indicate that Mojave desert tortoise have been observed within the Project Area (NDOW 2024).
Birds		
Yellow-billed cuckoo (*Coccyzus americanus*)	Federally threatened. Habitat used by western Distinct Population Segment (DPS) of yellow-billed cuckoos in the western United States is limited to desert riparian woodland corridors on larger streams and rivers in association with willow, cottonwood, alder, walnut, box elder (Acer negundo), and dense mesquite (Hughes 2020). They nest most frequently in willows amongst riparian woodlands with dense cover and water nearby (BLM 2024d). USFWS designated Critical Habitat is present approximately 145 miles southwest of the Project Area (BLM 2024d).	Unlikely. There is no suitable habitat for the species in the Project Area, but there is suitable habitat associated within the Ash Meadows NWR. Transitory or migratory individuals could fly over the Project Area but are unlikely to use any habitats within it (BLM 2024d).

Common Name (*Scientific Name*)	**Status and Habitat**	**Potential to Occur**
Yuma Ridgway's (clapper) rail (*Rallus obsoletus yumanensis*)	Federally endangered. The species occupies marsh-like situations around rivers, ponds, and bogs where emergent vegetation such as cattails, bulrush, and reed grass occur (Eddleman 1989; BLM 2024d). Densities of rails are highest in light cattail stands, followed in descending order by light bulrush stands, dense bulrush stands, and dense cattail stands (BLM 2024d). No USFWS designated Critical Habitat is present.	Unlikely. There is no suitable habitat for the species in the Project Area, but there is suitable habitat associated within the Ash Meadows NWR and potentially suitable habitats approximately 23 miles southeast of the Project Area in the Desert NWR. Transitory or migratory individuals could fly over the Project Area but are unlikely to use any habitats within it. (BLM 2024d)
Southwestern Willow Flycatcher (*Empidonax trailii extimus*)	Federally endangered. Southwestern willow flycatchers are found below 8,500 feet amsl in elevation where there is suitable breeding habitat of dense riparian tree and shrub communities (cottonwood/willow and tamarisk vegetation) alongside streams, rivers, or other wetlands near or adjacent to surface water or underlain by saturated soil (BLM 2024d). USFWS designated Critical Habitat is present approximately 27 miles southwest of the Project Area within Ash Meadows NWR (BLM 2024d).	Unlikely. There is no suitable habitat for the species in the Project Area, but there is suitable habitat associated within the Ash Meadows NWR. Transitory or migratory individuals could fly over the Project Area but are unlikely to use any habitats within it (BLM 2024d).
Fish		
Devils Hole pup fish (*Cyprinodon diabolis*)	Federally endangered. This pupfish is only known to live in one deep limestone cave in Nevada (i.e., Devils Hole) located in the Ash Meadows NWR (USFWS 2023b). No USFWS designated Critical Habitat is present.	Known to occur within Devils Hole at Ash Meadows NWR (approximately 28 miles southwest of the Project).
Ash Meadows Amargosa pupfish (*Cyprinodon nevadensis mionectes*)	Federally endangered. This pupfish is isolated to warm springs and outflows in Ash Meadows NWR, including Point of Rocks, Crystal Springs, and the Carson Slough drainage (NDNH 2023b; USFWS 1990). USFWS designated Critical Habitat is present approximately 27 miles southwest of the Project Area within Ash Meadows NWR.	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.
Warm Springs pupfish (*Cyprinodon nevadensis pectoralis*)	Federally endangered. This pupfish persists in five isolated low-flow thermal springs with very limited outflows in Ash Meadows NWR (NDNH 2023b; USFWS 1990). No USFWS designated Critical Habitat is present.	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.
Ash Meadows speckled dace (*Rhinichthys osculus nevadensis*)	Federally endangered. Occupies cooler spring source pools and spring brook outflows within Ash Meadows NWR. Prefers flowing outflow streams for drift feeding (NDNH 2023b; USFWS 1990). USFWS designated Critical Habitat is present approximately 27 miles southwest of the Project Area within Ash Meadows NWR.	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.
Invertebrates		
Ash Meadows naucorid (*Ambrysus amargosus*)	Federally threatened. Occupies small thermal springs with high flowing water and fine gravel substrate. Only known to occupy five low-flow spring brooks at Ash Meadows NWR (USFWS 2020a). USFWS designated Critical Habitat is present approximately 27 miles southwest of the Project Area within Ash Meadows NWR.	Known to occur near springs or subsurface groundwater within Ash Meadows NWR.

Common Name (*Scientific Name*)	Status and Habitat	Potential to Occur
Monarch butterfly (*Danaus plexippus*)	Federal candidate species. Occurs in North, Central, and South America; Australia; New Zealand; islands of the Pacific and Caribbean, and elsewhere. Monarchs lay their eggs on their obligate milkweed host plant (primarily Asclepias spp.) (USFWS 2020b). North America has several dozen native milkweed species with which monarchs coevolved and upon which they rely to complete their life cycle. Monarch butterflies from Nevada generally migrate to California to overwinter. In the southwestern states, migrating monarch butterflies tend to occur more frequently near water sources (Morris et al. 2015). During breeding and migration, monarchs require a diversity of blooming nectar resources and milkweed (Heritage 2024).	Low; may use the Project Area during migration and for foraging but are unlikely to breed or overwinter in the area.
Plants		
Amargosa niterwort (*Nitrophila mohavensis*)	Federally endangered. Occurs in open, moist, heavily alkaline and salt-crusted barren clay flats in low drainages and seepage areas surrounded by shadscale saltbush (Atriplex confertifolia) and saltgrass (Distichlis spicata) vegetation. Very tolerant of high soil alkalinity and salinity but very sensitive to disturbances to salt crust and relies on saturation of the soil by a high water table. Occurs at elevations from 1,258 to 2,081 feet amsl. This perennial herb blooms in late spring (NDNH 2023b; SEINet 2023; USFWS 1990). USFWS designated Critical Habitat is present approximately 33 miles southwest of the Project Area within Ash Meadows NWR.	Known to occur near springs, seeps, or subsurface groundwater within Ash Meadows NWR and BLM-administered lands around Ash Meadows NWR.
Ash Meadows blazingstar (*Mentzelia leucophylla*)	Federally threatened. Occurs in open, generally dry, hard, salt-crusted alkaline clay or sandy-clay soils on low bluffs, swales, flats, and drainages in shadscale vegetation surrounding spring and seep areas within Ash Meadows NWR and BLM-administered lands around Ash Meadows NWR. Occurs at elevations from 2,200 to 2,350 feet amsl. This biennial/perennial herb blooms from June to September (NDNH 2023b; SEINet 2023; USFWS 1990). USFWS designated Critical Habitat is present approximately 27 miles southwest of the Project Area within Ash Meadows NWR.	Known to occur near springs, seeps, or subsurface groundwater within Ash Meadows NWR and BLM-administered lands around Ash Meadows NWR.
Ash Meadows gumplant (*Grindelia fraxinipratensis*)	Federally threatened. Occurs in open, flat, whitish, strongly alkaline, moist and hard to sometimes dry and powdery clay soils in or bordering meadows and shallow drainages near springs and seeps, sometimes in disturbed areas and somewhat weedy, in the creosote-bursage and shadscale zones in ash-mesquite woodlands, shadscale scrub, or saltgrass meadows. Only known to occur within Ash Meadows NWR and BLM-administered lands around Ash Meadows NWR. Occurs at elevations from 2,000 to 2,300 feet amsl. This perennial herb blooms from June to August (NDNH 2023b; SEINet 2023). USFWS designated Critical Habitat is present approximately 27 miles southwest of the Project Area within Ash Meadows NWR.	Known to occur near springs, seeps, or subsurface groundwater within Ash Meadows NWR and BLM-administered lands around Ash Meadows NWR.

Common Name (*Scientific Name*)	Status and Habitat	Potential to Occur
Ash Meadows ivesia (*Ivesia kingii* var. *eremica*)	Federally threatened. Occupies highly alkaline, barren soils that remain moistened by water spreading outward from surface flow discharged by springs. Only known to occur within Ash Meadows NWR and BLM-administered lands around Ash Meadows NWR. Occurs at elevations from 2,100 to 2,300 feet amsl. This perennial herb blooms in late spring (NDNH 2023b; SEINet 2023; USFWS 1990). USFWS designated Critical Habitat is present approximately 27 miles southwest of the Project Area within Ash Meadows NWR.	Known to occur near springs, seeps, or subsurface groundwater within Ash Meadows NWR and BLM-administered lands around Ash Meadows NWR.
Spring-loving centaury (*Centaurium namophilum*)	Federally threatened. Occurs in highly alkaline moist soils near riparian zones. Typically occurs within saltgrass meadows next to streams, springs, and seeps. Endemic to Ash Meadows NWR and BLM-administered lands around Ash Meadows NWR. Occurs at elevations from 4,233 to 4,390 feet amsl. This annual herb blooms from July to September (NDNH 2023b; SEINet 2023; USFWS 1990). USFWS designated Critical Habitat is present approximately 27 miles southwest of the Project Area within Ash Meadows NWR.	Known to occur near springs, seeps, or subsurface groundwater within Ash Meadows NWR and BLM-administered lands around Ash Meadows NWR.
Ash Meadows milk-vetch (*Astragalus phoenix*)	Federally threatened. Found only in Nye County, Nevada, and in the Amargosa River drainage in extreme southeastern Inyo County, California. It grows in low spreading mounds about 5.5 inches high, along flats and knolls of hard, white, alkaline clay soils. This milk-vetch is sensitive to disturbance. This federally threatened plant occurs on portions of the Ash Meadows NWR and on lands managed by the BLM. This perennial herb blooms during mid-spring (USFWS 2020c). USFWS designated Critical Habitat is present approximately 27 miles southwest of the Project Area within Ash Meadows NWR.	Known to occur near springs, seeps, or subsurface groundwater within Ash Meadows NWR and BLM-administered lands around Ash Meadows NWR.
Ash Meadows sunray (*Enceliopsis nudicaulis* var. *corrugata*)	Federally threatened. Occurs across a broad range of habitats including occasionally moist alkaline soils, spring and seep areas, and dry desert washes. Endemic to the Ash Meadows area of Nye County, Nevada. The range of the species encompasses the Ash Meadows NWR and adjacent BLM Ash Meadows ACEC and private lands (USFWS 2011b). Results from monitoring in 2019 indicate the species is still present at all previously known populations within the refuge. Further, the species distribution remains the same as described in 2011. This perennial herb blooms from late March to late May (USFWS 2020d). USFWS designated Critical Habitat is present approximately 27 miles southwest of the Project Area within Ash Meadows NWR.	Known to occur near springs, seeps, or subsurface groundwater within Ash Meadows NWR and BLM-administered lands around Ash Meadows NWR.

Mojave Desert Tortoise Habitat

The Mojave desert tortoise was listed as federally threatened under the ESA in 1990 throughout its range in Nevada, California, Utah, and Arizona, which includes the Mojave Desert and parts of the Sonoran Desert (USFWS 2011a). The species is also considered a BLM-sensitive species (BLM 2023b) and a Nevada state threatened species according to Nevada Administrative Code (NAC) 503.080. The Federally Listed Species Analysis Area is located within the Eastern

Mojave Recovery Unit in Indian Springs Valley, Nevada (USFWS 2011a). The nearest critical habitat unit is Mormon Mesa, which is approximately 42 miles to the east (BLM 2024d:45–46).

Mojave desert tortoise studies in the Federally Listed Species Analysis Area consisted of USFWS protocol surveys (USFWS 2017) within a 7,909-acre survey area which observed 53 live individuals (33 adults, 20 juveniles) (Heritage 2024:52; Ironwood Consulting 2024:9). The results of these surveys suggest an estimated density of 1.9 adult Mojave desert tortoises per square kilometer (/km^2 [247 acres]) within the 7,909-acre survey area, which is comparable to the average density of 1.5 adult Mojave desert tortoises/km^2 (247 acres) in the Eastern Mojave Desert Tortoise Recovery Unit (Heritage 2024:52, Ironwood Consulting 2024:10). The estimated density for adult tortoise calculated for the Buildable Areas, 3.5 tortoise/km^2 (247 acres), is used to calculate density estimates in Section 3.4.3, Environmental Consequences (BLM 2024d:36). There were 183 Mojave desert tortoise carcasses observed and 68 carcasses (51 adult, 17 juveniles) were estimated at less than one year old (Heritage 2024:52, Ironwood Consulting 2024). Additionally, focused intuitive surveys for Mojave desert tortoise were conducted in 2021 within a 14,000-acre survey area to the south and east of the Project which observed five adult Mojave desert tortoises. Focused intuitive surveys observed Mojave desert tortoise sign at elevations up to approximately 4,750 feet amsl, which indicates Mojave desert tortoise inhabit areas outside the highest value Mojave desert tortoise habitat modeled by Averill-Murray et al. (2013) and Nussear et al. (2009) (Heritage 2024). Observed Mojave desert tortoise sign in the mountains south of Indian Springs indicates connectivity may existing south of U.S. 95 in an east–west direction (Heritage 2024). Active Mojave desert tortoise sign (burrows/pallets, scat, tracks/dig marks) was found throughout the protocol-level and intuitive survey areas, suggesting that habitat adjacent to the Project Area is also suitable habitat for Mojave desert tortoise (Heritage 2024). A study of Mojave desert tortoise population densities near culverts along U.S. 93 and U.S. 95 observed the majority (91%) of Mojave desert tortoises on the south side of U.S. 95 which overlaps with the Proposed Action (Ecocentric 2021). Habitat on the south side of U.S. 95 is more suitable for Mojave desert tortoise compared to the north side of U.S. 95 which is less suitable partially due to steeper terrain (Nussear 2023:20, 46). There is also more suitable habitat to the west of the Proposed Action on both sides of U.S. 95 (Nussear 2023:20, 46), which is further supported as the Ecocentric study observed 86% of Mojave desert tortoises were concentrated in the study's western plots which partially overlap with the Proposed Action (Ecocentric 2021).

Mojave desert tortoise habitat generally consists of sandy–gravel soils suitable for burrowing, with gently sloping terrain, sparse cover of low-growing shrubs (typically dominated by creosote bush and/or white bursage, and typically below 5,500 feet amsl (USFWS 2011a). Review of Mojave desert tortoise survey results affirms the Federally Listed Species Analysis Area and Application Area consist of suitable habitat and the Mojave desert tortoise occurs throughout the Project footprint and within the Federally Listed Species Analysis Area (Heritage 2024:61; Ironwood Consulting 2024:7-17). See Section 3.2, Vegetation Communities, for a description of vegetation communities within the Federally Listed Species Analysis Area (the same as the Vegetation Analysis Area).

Habitat and population connectivity is important to maintain Mojave desert tortoise access to required resources (e.g., water or burrow sites), minimize energetic expenditures to access resources, limit risk of travel-related injury or death by minimizing the need to move through risky or uninhabitable areas, maintain social behaviors and gene flow, and enable movement with a change in environmental conditions, such as climate shift (BLM 2024d; Lowe and Allendorf 2010; Webster et al. 2002). The proposed Project is in an area of Mojave desert tortoise habitat that has been modeled for population connectivity of important linkages between Mojave desert tortoise conservation areas (TCAs) (Averill-Murray et al. 2013; USFWS 2011a). The USFWS described the connectivity corridor between Indian Springs and the Amargosa Valley, which the proposed Project is located within, as essential to maintain Mojave desert tortoise connectivity between the Eastern and Northeastern Recovery Units (USFWS 2023c). Additionally, this connectivity corridor is the only remaining corridor connecting Mojave desert tortoise populations on the west side of the Spring Mountains to those on the east side. Habitat connectivity is especially important for Mojave desert tortoise because they are considered corridor dwellers, meaning that for habitats to be considered connected there must be enough suitable habitat to support sustaining populations of Mojave desert tortoise (Averill-Murray et al. 2021). There have been many efforts to refine and develop a better understanding of Mojave desert tortoise habitat and population connectivity through modeling. Much of the modeling of Mojave desert tortoise habitat begins with a habitat model developed by Nussear et al. (2009). This model used a variety of landscape values including 30-year average of mean wet and dry season precipitation, elevation, topography (roughness and smoothness), soil data (average bulk density, depth to bedrock, and percentage of rocks greater than 254 millimeters [10 inches]), and perennial plant cover to model the probability (0.0 = low probability to 1.0 = high probability) that habitat would be suitable for Mojave desert tortoise. The output of the Nussear et al. (2009) model was used to develop two separate models of habitat connectivity, the first model was developed by Averill-Murray et al. (2013) and focused on identifying least-cost corridors (areas Nussear et al. [2009] modeled as high probability of being suitable [values of 1.0 to 0.5]) that connected existing TCAs. The second connectivity model identifies large areas of contiguous habitat by first removing developed areas as non-habitat, then creating a model of connected habitat by identifying areas modeled as high habitat potential (values of 1.0) then successively adding habitat potential values down to moderate probability (values of 0.9 to 0.6), with the final model consisting of areas down to 0.6, which can be reached from any 1.0 area, and removing any unconnected islands of habitat (USFWS 2012).

These models were incorporated into the 2012 Western Solar Plan by identifying the intersection of variance lands and the least-cost corridor model (Averill-Murray et al. 2013) as Priority 1 and the intersection with the contiguous habitat model (USFWS 2012) as Priority 2. Table 3-15 summarizes Priority 1 and 2 connectivity habitats that overlap the Project-specific Federally Listed Species Analysis Area (Appendix A, Figure A-7 and Figure A-8). The designation of Priority 1 and 2 connectivity habitats identified under the Western Solar Plan (BLM and DOE 2012) only applies to BLM-administered lands identified as variance lands, additional areas modeled as having high connectivity value occur outside of the variance lands include 18,666.7 acres of the least-cost corridor model (Averill-Murray et al. 2013) and 6,274.7 acres of the contiguous habitat model (USFWS 2012) within the Federally Listed Species Analysis Area (Appendix A, Figure A-7 and Figure A-8).

Table 3-15. Priority 1 and Priority 2 Connectivity Habitat Overlapping the Federally Listed Species Analysis Area

Area	Connectivity Habitat (acres)
Total Federally Listed Species Analysis Area	73,558
Priority 1 Connectivity Habitat	42,321
Priority 2 Connectivity Habitat	24

The Federally Listed Species Analysis Area lies within a least-cost corridor (Averill-Murray et al. 2013) and is designated as Priority 1 connectivity habitat (BLM and DOE 2012), identifying the area as a priority linkage between TCAs within the Eastern Mojave Recovery Unit and important for sustaining demographically viable populations across the landscape (Averill-Murrey et al. 2021; USFWS 2012). However, the presence of existing anthropogenic disturbance, particularly U.S. 95 has likely had historic and ongoing impacts to connectivity within this corridor. Mojave desert tortoise exclusion fencing along U.S. 95 was installed in 2015 (Ironwood Consulting 2022) and prior to the fence installation, Mojave desert tortoises in the area were vulnerable to mortality from vehicle strikes when entering the roadway. Previous studies have reported a road-effect zone that can reduce local Mojave desert tortoise population density and distribution measuring from 0.10 to 0.25 mile wide depending on road size and traffic (Boarman and Sazaki 2006; Peaden et al. 2015). The historic impacts from U.S. 95 prior to fence installation could have reduced local Mojave desert tortoise populations impacting both north-south and east-west connectivity (Ironwood Consulting 2022).

Current conditions along U.S. 95 include restricted north-south connectivity facilitated by a series of box culverts that tie into the Mojave desert tortoise fencing (Ironwood Consulting 2022). A study of Mojave desert tortoise population densities near culverts along U.S. 93 and U.S. 95 included Mojave desert tortoise surveys within survey plots around each culvert on the north and south side of U.S. 95. Within the U.S. 95 survey plots, 58 Mojave desert tortoises were observed and tagged for future identification by wildlife cameras within the culverts, and 14 adult Mojave desert tortoises had radio transmitters attached for future telemetry and GPS monitoring studies around the culverts. Of the 58 Mojave desert tortoises tagged in this study, two were documented using these culverts to cross under U.S. 95, providing evidence that the culverts do allow Mojave desert tortoises to cross north-south under the highway (Ecocentric 2021). There are at least 12 culverts within the Federally Listed Species Analysis Area, nine of which provide poor to good Mojave desert tortoise access under the highway and three of which are unsuitable for Mojave desert tortoise crossing (Heritage 2024:53; Ironwood Consulting 2022:7).

A site-specific connectivity assessment (Ironwood Consulting 2022) and Project-specific connectivity modeling (Nussear 2023) were developed to better understand local habitat connectivity near the Project. The site-specific connectivity assessment found that siting the Project closer to U.S. 95 resulted in minimum corridor widths of approximately 2.2 miles (distance from Project to extent of contiguous habitat model) to 3.1 miles (distance from Project to 4,750-foot elevation contour [maximum elevation of observed Mojave desert tortoise sign during surveys]) compared to a benchmark minimum corridor width of 1.4 miles based on the maximum cumulative home range of a male tortoise (Ironwood Consulting 2022; USFWS 1994). This suggests that there is sufficient habitat adjacent to the Project to maintain connected Mojave desert tortoise populations. For a complete description of the site-specific connectivity assessment, refer to the Desert Tortoise Population Connectivity Modeling in the Vicinity of the Proposed Bonanza Solar Project (Nussear 2023) in Appendix C of the BRTR (Heritage 2024).

The Project-specific connectivity modeling included simulations of local Mojave desert tortoise population demographics over a 100-year period with several hypothetical existing landscape scenarios, including 1) no barriers to movement, 2) roads with full barriers to movement, and 3) existing culverts allowed partial movement (Nussear 2023). Simulations also compared four Project alternatives: 1) Mojave desert tortoises completely excluded from Buildable Areas; and allowing Mojave desert tortoises back into the Buildable Areas with 2) 25%, 3) 50%, and 4) 75% suitable habitat post-construction. Simulations did not consider other proposed solar projects in the area. The simulations also allowed for random fluctuations and found that there were no significant differences in local Mojave desert tortoise population demographics, thus providing evidence that Mojave desert tortoise populations would remain connected under each of the simulated Project alternatives and landscape scenarios (Nussear 2023). The Project-specific connectivity modeling applied Mojave desert tortoise densities of the Project for the larger modeled area although actual Mojave desert tortoise densities may be different and modeling was not intended to simulate causes of reported declines in Mojave desert tortoise populations. The Project-specific connectivity modeling is limited as simulations were compared to static conditions and not of current or future conditions which may be impacted by other proposed developments, climate change, disease, wildfire, increased off-highway vehicle (OHV) use or other impacts that may cause declines in Mojave desert tortoise populations (Nussear 2023).

Bird Species

There is no suitable habitat in the Project Area for the federally protected bird species southwestern willow flycatcher, yellow-billed cuckoo, and Yuma Ridgway's rail (see Table 3-14), but there is suitable habitat located within and around the Ash Meadows NWR (approximately 27 miles southwest of the Project Area) and Corn Creek Spring within the Desert NWR (approximately 23 miles southeast of the Project Area). Additional potential habitat for the yellow-billed cuckoo is in the area around the Muddy River near Overton Wildlife Management Area and the Warm Springs Ranch Natural Area (approximately 58 miles east-northeast of the Project) (BLM 2024d:47–49). These species could fly over the Project Area during migration to and from the above-described suitable and potential habitats and may use the Project Area as stopover habitat (BLM 2024d:47-49).

Groundwater Dependent Species

Ash Meadows NWR is a protected wildlife refuge that is administered by the USFWS. Devils Hole is a park unit managed by the NPS and is part of the Death Valley National Park. The refuge and Devils Hole are located approximately 28 miles southwest of the Application Area in Nye County. The area, which extends to surrounding BLM-administered lands, includes desert oases and is a major discharge point for a vast underground aquifer water system. Water-bearing strata come to the surface in more than 30 seeps and springs, including Devils Hole. Numerous stream channels and wetlands are scattered throughout the Ash Meadows NWR and surrounding BLM-administered lands. The Ash Meadows NWR and surrounding BLM-administered lands provides and protects habitat for four fish, one invertebrate, and seven groundwater dependent plants that are USFWS-listed species (see Table 3-14).

The Project Area sits within Indian Springs Valley, which is a subarea of the Ash Meadows groundwater basin. Groundwater development between 1967 and 1976 in the Ash Meadows groundwater basin conflicted with preservation of an endangered species, the Devils Hole pupfish. Concerns from government and private conservationists prompted a scientific investigation by the USGS that correlated water-level declines in Devils Hole with pumping in the Ash Meadows discharge area (Dudley and Larson 1976). In 1976, the U.S Supreme Court limited pumping of groundwater so that a minimum pool elevation is maintained in Devils Hole. Groundwater resources and water levels in Devils Hole have been managed by the State Engineer since designating Amargosa Desert in 1979 with Order No. 724 (NDWR 1979). Management to maintain a minimum pool elevation has evolved in parallel with improved understanding of how climatic stresses, earthquakes, and pumping affect the pool elevation in Devils Hole.

The groundwater dependent species at Devils Hole and Ash Meadows NWR subject to analyses in this EIS/RMPA were listed in Table 3-14 and are endemic to the area. These species rely on permanent groundwater flow to the springs which comprise their habitats. Although these springs are outside the 3-mile Federally Listed Species Analysis Area, they are within the Groundwater Dependent Species Analysis Area (the same as the Water Resources Analysis Area) and water drawdowns via the on-site well using a point of diversion from the Nevada State Water Engineer of existing unused allocations could impact water levels at Devils Hole and other groundwater dependent springs at Ash Meadows NWR. A detailed discussion of existing groundwater resources and a summary of modeling efforts to estimate potential impacts from the proposed on-site well can be found in Section 3.6, Water Resources.

3.4.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the BLM would not issue the ROW grant and the Project would not be constructed. No Project-specific impacts to federally listed species would occur. Existing conditions and trends would continue to affect federally listed species in the Federally Listed Species Analysis Area and Ground Water Dependent Species Analysis Area under this alternative.

Proposed Action

The majority of impacts to threatened and endangered species associated with the Proposed Action would be similar to those described for other wildlife (refer to Section 3.3, Wildlife, Migratory Birds, and Special Status Species). Impacts that may be more specific to individual threatened and endangered species are discussed in more detail below. No impacts to USFWS designated Critical Habitat would occur from the Proposed Action (BLM 2024d).

Mojave Desert Tortoise

Construction Impacts

Impacts to the Mojave desert tortoise associated with construction of the Proposed Action would include changes to available habitat (including loss, modification, and/or fragmentation), potential direct take of Mojave desert tortoise, and increased noise and increased human activity.

Under the Proposed Action a total of 2,412 acres (2,368 acres within the Buildable Areas and 44 acres outside the Buildable Areas) of Mojave desert tortoise habitat would be disturbed. Under the Proposed Action, up to 1,027 acres would be subject to heavy surface disturbance (D-3) through grading, soil removal, and loss of vegetation (Table 3-16), resulting in a long-term adverse impact to Mojave desert tortoise connectivity habitat. D-3 disturbance acreage would be permanently lost to Project infrastructure and represents a 2% decrease in available Priority 1 connectivity habitat within the Federally Listed Species Analysis Area. See Section 2.1, Development of Alternatives, for disturbance category definitions.

Another approximately 1,386 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1 disturbance category) and moderate to heavy disturbance from drive and crush activities (D-2 disturbance category) (see Table 3-16). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates. Areas subject to D-1 and D-2 disturbances represent a 3% decrease in available Priority 1 connectivity habitat within the Federally Listed Species Analysis Area.

Table 3-16. Proposed Action Disturbance Categories and Impacts to Connectivity Habitat

Proposed Action	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term*	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres) †	2,720	944	442	1,027
Percent of Buildable Areas (2,368 acres) ‡	Excluded from Buildable Areas	40%	19%	43%
Percent of Application Area (5,133 acres)	53%	18%	9%	20%
Portion of Priority 1 Connectivity Habitat (42,321 acres)	6%	2%	1%	2%

* Shorter term (approximately 2–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

† Total Project Area is a sum of acres within Buildable Areas and outside Buildable Areas as detailed in Table 2-2.

‡ Total does not sum to 100 due to rounding.

The Buildable Areas (2,368 acres total) would be surrounded by a fence, which would exclude Mojave desert tortoise from entering the area until vegetation standards are achieved (Appendix B, measures Eco-4, Eco-9, and Tortoise-1). Under the Proposed Action, the applicant would work to maintain 50% of vegetation cover and 65% of the vegetation density within the solar array fields, which does not include the BESS, O&M building, substation, and exterior roads or areas that require spot-grading within the arrays. Vegetation standards are proposed to be met within 10 years of completion of construction (or a longer period as determined by BLM in the case of drought), restoration would be implemented pursuant to an agency-approved Site Restoration Plan (Rec-1). This disturbance within the Priority 1 connectivity habitat would have a long-term adverse impact to Mojave desert tortoise (Appendix B, measure Eco-6).

The estimated number of adult Mojave desert tortoises within the D-1, D-2, and D-3 disturbance categories for the Proposed Action that would be directly impacted is approximately 34.55 based on the density estimate of 3.5 adult Mojave desert tortoise/km^2 (247 acres) (BLM 2024d:36; Heritage 2024:52; Ironwood Consulting 2024:10). Direct effects include the displacement of these adult individuals expected to be found on the Buildable Areas prior to construction and the permanent loss of Mojave desert tortoise habitat for the entire Buildable Area. Displacement of Mojave desert tortoises from the Buildable Areas may put pressure on adjacent habitats by increasing local density of Mojave desert tortoise. This may result in increased mortality of resident and relocated Mojave desert tortoises. The site would be fenced to exclude Mojave desert tortoise prior to construction (Appendix B, measures Eco-4, Eco-6, Eco-9, and Tortoise-3). Prior to construction activities and as needed for the duration of the Project, clearance surveys and translocation to locate and remove all Mojave desert tortoises from harm's way would occur in accordance with the BLM and USFWS-approved Mojave Desert Tortoise Translocation Plan, which is currently under development (Appendix B, measure Eco-4).

Due to the difficulty in locating juvenile Mojave desert tortoise and eggs, some Mojave desert tortoises may remain on-site following clearance surveys and could be directly affected by Project construction. Potential impacts would include mortality or injury from being crushed by moving vehicles while outside of burrows or being crushed while in burrows during ground disturbance. Direct mortality of Mojave desert tortoises during construction would primarily be minimized by speed limitations, fencing, performing clearance surveys, and translocating Mojave desert tortoises out of the Buildable Areas before construction begins (Appendix B, measures Air-1, Eco-2, Eco-4, and Eco-9).

Construction equipment could also temporarily disturb Mojave desert tortoises by creating vibrations, noise, and light pollution (Appendix B, measure Eco-2 and Noise-1; Western Solar Plan design feature N3-1). Such disturbance could cause Mojave desert tortoises to temporarily avoid otherwise suitable habitat near the construction activities. Mojave desert tortoises could also be affected by fugitive dust and hazardous materials generated on-site, and construction could also increase the risk of predation by the introduction of perch structures for ravens and raptors, and litter or trash produced at the Project could attract ravens and coyotes. Vibrations and water from dust control measures could draw Mojave desert tortoises out of their burrows during normal periods of dormancy due to the similarities with rainfall noise, vibrations, and humidity. While there is potential for some adult Mojave desert tortoises to be injured or killed on-site, the number is expected to be low. Adult Mojave desert tortoises are more easily detected during pre-construction surveys because of their large size; therefore it is expected that most adult Mojave desert tortoises that occur within the construction-phase exclusionary fence would be identified and translocated. Because of the difficulty in locating juvenile Mojave desert tortoises and eggs, some may not be found during pre-construction surveys and could be crushed or injured during Project construction (Eco-4, Tortoise-2). Measures outlined in the Dust Control Plan would minimize dust pollution and its potential impacts to surrounding vegetation, which provides habitat to the Mojave desert tortoise, (Appendix B, measure Air-2; Western Solar Plan design feature AQC2-1). These impacts would primarily occur during the construction and decommissioning phases of the Project.

Installing Mojave desert tortoise–proof fencing around the Buildable Areas would prevent resident Mojave desert tortoises and Mojave desert tortoises to be removed from the Buildable Areas from entering the Buildable Areas during construction and potentially being killed or injured (Appendix B, measures Eco-4, Eco-9, and Tortoise-1; Western Solar Plan design feature ER2-1). Project access roads going through existing U.S. 95 Mojave desert tortoise fence would have Mojave desert tortoise exclusion fence and turn-backs installed to prevent Mojave desert tortoise from entering U.S. 95, avoiding injury or mortality (Gen-1 and Tortoise-3). The Site Restoration Plan and Integrated Weed Management Plan may result in improved long-term viability of the site as Mojave desert tortoise habitat by improving habitat and ecosystem function (Appendix B, measure Eco-2; Western Solar Plan design feature ER3-1).

The risk of vehicle mortality on Mojave desert tortoises prior to temporary fence construction and in unfenced areas of the Project would be minimized by having authorized Mojave desert tortoise biologists and qualified Mojave desert tortoise monitors to monitor construction to ensure the avoidance of all Mojave desert tortoises and avoidance or excavation of Mojave desert tortoise burrows as necessary. A WEAP would be prepared and presented to all work crews at the Project (Appendix B, measure Eco-2; Western Solar Plan design feature ER2-1).

Although the translocation of Mojave desert tortoises would be used as a measure to reduce Project-caused mortality of Mojave desert tortoises during construction, it is also a source of take in the form of harassment of Mojave desert tortoises by temporarily causing stress to the individuals. As part of the clearance surveys and pre-translocation planning, Mojave desert tortoises would need to be handled to perform health assessments to determine their suitability for translocation; if suitable, they would require subsequent handling and transportation to the recipient site or edge of the Project. Translocated Mojave desert tortoises may be subject to increased stress and mortality due to spending additional time and energy exploring their new habitat and attempting to return to their home ranges, which can lead to increased susceptibility to predation, vehicle collision, thermoregulations challenges due to exposure, and lower fitness. Translocation of Project Mojave desert tortoises is also likely to impact other resident Mojave desert tortoises adjacent to the Project by increasing local density of Mojave desert tortoise. These impacts would be mitigated through following the guidelines established in a Mojave Desert Tortoise Translocation Plan (Appendix B, measure Eco-4; Western Solar Plan design feature ER2-1, ER3-1).

In addition to the direct effects of construction on Mojave desert tortoise, permanent disturbance to Mojave desert tortoise habitat would occur. The magnitude of habitat loss from construction of the Project would be greatest for this species due to the exclusion from the Buildable Areas. Because Mojave desert tortoises occupy large home ranges, the long-term persistence of extensive, unfragmented habitats is essential for the survival of the species. Connectivity for Mojave desert tortoise is an important concern, and the loss or fragmentation of habitat places the Mojave desert tortoise at increased risk of extirpation. The removal of Priority 1 connectivity habitat would impact landscape connectivity outside of the immediate Project footprint by restricting the amount of habitat that Mojave desert tortoises can move through the landscape. Mojave desert tortoise are considered corridor dwellers in regards to habitat connectivity and require large blocks of intact habitat to maintain connectivity among populations. The removal of 2,413 acres of Priority 1 connectivity habitat (1,027 acres D-3 permanent disturbance and 1,386 acres D-1 and D-2 temporary disturbance) represents approximately 5.5% of the 42,321 acres of Priority 1 connectivity habitat within the 3-mile Federally Listed Species Analysis Area. However, Priority 1 connectivity habitat only represents connectivity habitat within the Western Solar Plan designated variance areas, and similar modeled connectivity habitat outside of the variance area also exists within the 3-mile buffer (Appendix A, Figure A-7) (Averill-Murray et al. 2013; USFWS 2012). The Proposed Action could create a barrier to Mojave desert tortoise movement, which could reduce the use of at least two directly adjacent box culverts designed to facilitate tortoise crossing under U.S. 95 (BLM 2024d). These box culverts are potentially suitable for use by Mojave desert tortoises, and a decline in the box culvert use by Mojave desert tortoises would potentially, reduce north-south habitat connectivity on both sides of U.S. 95.

Applicable design features in the Western Solar Plan (BLM and DOE 2012) would also be implemented. Appendix B lists the Western Solar Plan design features that are most relevant to the Project and federally listed species, which include methods to avoid, minimize, or mitigate impacts to ecological resources (ER2-1); managing vegetation using the principles of integrated pest management to prevent the spread of nonnative species (ER3-1); minimizing fugitive dust generation (Western Solar Plan design feature AQC2:1); and maintaining compliance with noise design elements (N3-1).

Under the Proposed Action, hydrologic controls would be included in the project design, as described in Section 2.2.2. Flow diversions, berms or ditches, and similar stormwater control features would be constructed within the fenced Buildable Areas. The hydrologic controls could include the use of riprap. As discussed under O&M impacts, is unlikely that the Mojave desert tortoise exclusion fence would be removed to allow for passive reoccupation of the Mojave desert tortoise due to the unsuitable vegetation cover standards identified for the Proposed Action. As a result, there are no adverse impacts identified for Mojave desert tortoise associated with the hydrologic controls proposed under the Proposed Action since the hydrologic controls would occur within the fenced Buildable Areas. If the Mojave desert tortoise fence is removed and Mojave desert tortoise passively reoccupy the Buildable Areas, measures Wild-1, MM Wild-5, and MM Wild-9 (see Appendix B) would be applied to the project and would minimize the risk of Mojave desert tortoise entrapment in riprap.

Operations and Maintenance Impacts

Impacts to Mojave desert tortoise associated with O&M of the Proposed Action would include potential direct take of Mojave desert tortoise, changes to habitat, and increased noise and increased human activity.

Overall, Mojave desert tortoises do not coexist well with human development and disturbances and would be unlikely to persist in the area following construction. Studies have shown that Mojave desert tortoises are essentially absent from habitat within 0.6 mile of areas with greater than 10% development, including urban development, cultivated agriculture, energy development, surface mines and quarries, pipelines and transmission lines, and roads and railroads (Carter et al. 2020). O&M activities along the gen-tie and access roads and within the Buildable Areas would be a continued source of noise and ground-vibration disturbance, resulting in long-term impacts to behavior, and direct mortality or injury of Mojave desert tortoise from being crushed by Project-related vehicle traffic. Implementation of mitigation measures and BMPs such as reduced speed limits, maintain compliance with noise design elements and WEAP training for personnel would minimize impacts to Mojave desert tortoises during O&M activities (Appendix B, measures Air-1, Eco-2, and Eco-3; Western Solar Plan design features AQC2-1, ER2-1, ER3-2, and N3-1).

The Proposed Action, as described in the Applicant's POD, includes removing Mojave desert tortoise exclusion fencing post-construction to allow for Mojave desert tortoises' passive reoccupation of the Buildable Areas (Appendix B, measures Eco-3, Eco-4, and Tortoise-2). However, the BLM and USFWS have expressed concerns that the Proposed Action's retention of vegetation cover post-construction may not be sufficient to provide suitable habitat to allow for passive reoccupation by Mojave desert tortoise of the Buildable Areas. Under the Proposed Action, the removal of the exclusion fencing for passive reoccupation by the Mojave desert tortoise would not occur unless approved by the BLM and USFWS if vegetation conditions are deemed appropriate for Mojave desert tortoise.

Passive reoccupation by Mojave desert tortoise of the Buildable Areas would likely not occur under the Proposed Action, which would result in fewer direct impacts to individuals within the fenced Buildable Areas during O&M but could result in long-term impacts to movement and connectivity of the species around the fenced Buildable Areas. Indirect effects are also expected to occur to Mojave desert tortoise habitat in and around the Buildable Areas from anticipated increases in temperatures resulting from the high level of removal of vegetation from the site under the Proposed Action (Adeh et al. 2019; Barron-Gafford et al. 2019; Devitt et al. 2022; Williams et al. 2023). One study identified temperatures to be warmer by between 41 to 46 degrees Fahrenheit outside of a solar facility in the Mojave Desert, with the most effects found within a 984-foot distance of the site (Devitt et al. 2022). Temperature increases could indirectly affect annual and perennial vegetation within and outside of the solar facility and cause reduced use of the area by Mojave desert tortoises.

Due to the high likelihood for adverse impacts to the species from Project O&M activities and the reduced habitat quantity and quality within the Buildable Areas, exclusion of Mojave desert tortoise is the most effective method for minimizing direct impacts to the species (Appendix B, measures Eco-9 and Tortoise-1).

During O&M there may be a continued risk of colonization by nonnative plant species. Continued monitoring and management of nonnative plant species through the Site Restoration Plan and Integrated Weed Management Plan would help to minimize these risks (Appendix B, Eco-2; Western Solar Plan design feature ER3-1). Once construction has been completed there would be considerably less vibration and noise created during the O&M phase (Appendix B, measure Noise-1; Western Solar Plan design feature N3-1).

Once completed the gen-tie could provide habitat for avian predators, particularly common ravens (Corvus corax). However, the Proposed Action includes installation of perch deterrents to reduce potential use of the gen-tie by common ravens (Appendix B, measures Eco-7 and MM

Wild-6; Western Solar Plan design feature ER2-1). The gen-tie would also be co-located with other transmission lines to reduce the area that transmission lines may impact adjacent habitats.

Project access roads are not anticipated to decrease population connectivity substantially beyond the existing conditions. As discussed in the revised recovery plan (USFWS 2011a) and elsewhere, habitat linkages are essential to maintaining range-wide genetic variation (Averill-Murray et al. 2021) and the ability to shift distribution in response to environmental stochasticity, such as climate change. Natural and anthropomorphic constrictions (such as development and highways) can limit gene flow and the ability of Mojave desert tortoises to move between larger blocks of suitable habitat and populations (Dutcher 2020). In the Federally Listed Species Analysis Area, existing anthropogenic constrictions compound effects of natural barriers on Mojave desert tortoise population connectivity.

Decommissioning Impacts

Impacts to Mojave desert tortoise associated with decommissioning of the Proposed Action would be similar to impacts described during construction of the Proposed Action. Although the Mojave desert tortoise exclusion fence may be removed during the O&M of the Proposed Action, it is assumed that there would be fewer Mojave desert tortoises reoccupying the Project footprint than what were present prior to construction. Impacts to Mojave desert tortoises present during decommissioning activities could be mitigated through similar efforts described for Construction Impacts. Additionally, design feature ER4-1 from the Western Solar Plan (Appendix B; BLM and DOE 2012) would also be implemented to minimize ecological resource impacts during reclamation and decommissioning activities.

Once site decommissioning and reclamation are completed, Mojave desert tortoises would be allowed to reoccupy the area, and movement patterns through the Buildable Areas would be restored with the removal of perimeter fencing. Long-term effects to habitat for Mojave desert tortoise following decommissioning would be similar to those described for wildlife in Section 3.3, Wildlife, Migratory Birds, and Special Status Species. Although Western Solar Plan design feature ER4-1 would require rehabilitation of native vegetation to begin immediately upon decommissioning, in accordance with the Site Restoration Plan, it would take several decades or longer before the site becomes functioning habitat again. Repeated restoration efforts would likely be required, which could adversely affect Mojave desert tortoises that have reinhabited the site. As described for construction of the Project, Western Solar Plan design features would require surveys prior to any restoration activities that could cause disturbance or harm to Mojave desert tortoises.

<u>Bird Species</u>

Construction, Operations and Maintenance, and Decommissioning Impacts

Construction, O&M, and decommissioning of the Proposed Action may impact migrating individuals of southwestern willow flycatcher, yellow-billed cuckoo, and Yuma Ridgway's rail through mortality due to collision with PV solar modules (also known as "lake effect") and other Project components, or electrocution associated with the gen-tie. Additionally, the three federally listed bird species could be adversely affected by light pollution created by temporary construction lighting and O&M lighting. Individuals migrating nocturnally could be attracted to the area, could become disoriented, and could be at increased risk for collision with Project components. However, since the Project Area is not located close to any of the suitable or potential habitat areas for the three federally protected bird species, migrating individuals would be at a low risk of colliding with aboveground Project components (BLM 2024d). No federally protected bird species habitat would be removed by the Proposed Action during construction, O&M, and decommissioning and no direct impacts to habitat are expected. Groundwater withdrawals during construction, O&M, and decommissioning may result in unmeasurable reductions in levels in springs and seeps in the Ash Meadows NWR, the magnitude of effects would be too small to affect any of the federally protected bird species' habitat (e.g., riparian and vegetation) (see analysis presented below under the Groundwater Dependent Species section). USFWS designated Critical Habitat for the federally protected bird species (see Table 3-14) would not be impacted by the Proposed Action (BLM 2024d:60-62).

Potential impacts to the three federally protected bird species during construction, O&M, and decommissioning would be minimized by the implementation of applicable design features from the Western Solar Plan (BLM and DOE 2012), APMs and other mitigation measures (Appendix B) including reducing lighting to limit attracting wildlife, particularly migrating birds (Eco-2, Vis-2, MM Wild-10, ER3-2); constructing power lines consistent with APLIC suggested practices (APLIC 2006, 2012) (MM Wild-10); and minimizing night sky effects (Vis-1). Additionally, impacts would be minimized through the implementation of a Bird and Bat Conservation Strategy Plan (Appendix B).

Groundwater Dependent Species

Construction and Operations and Maintenance Impacts

Impacts to groundwater dependent species at Devils Hole and Ash Meadows NWR (see Table 3-14) would primarily occur during construction phase when the on-site well or off-site water source would be used to provide water for construction activities, with estimated water use up to 325 acre-feet total (see Table 2-6). O&M of the Project would require an estimated 1 AFY over 40 years (see Table 2-6). Section 3.6, Water Resources, provides the impact analysis for groundwater resources, including impacts to water levels at Devils Hole.

Indirect impacts to groundwater due to the on-site well would include impacts to groundwater dependent species at Ash Meadows NWR, and specifically Devils Hole. The minimum water level in Devils Hole as mandated by the U.S. Supreme Court is 2.7 feet below an established reference point (USGS 2020a, 2020b). If water were to fall below this level, it would interrupt the spawning of the endangered, endemic Devils Hole pupfish, which would critically impact the species (USGS 2020a). It is the responsibility of the Nevada State Water Engineer to ensure compliance with this mandate.

In a model ran by Halford Hydrology (2023), pumping at the Project's on-site water well resulted in 0.007 foot or less of water level drawdown at Devils Hole due to the Project (Dudek 2023a:Attachment A).[6] While this value is small to the point of being unmeasurable on the

[6] The groundwater model (Halford Hydrology 2023 found within Dudek 2023a) was developed for the Project assuming a 30-year operation period of the Project. The Proposed Action and the Action Alternatives include a 40-year life of the Project.

device installed at Devils Hole, it is not necessarily a negligible impact to the Devils Hole ecosystem. The Project would contribute a small amount of drawdown (0.007 foot or less) at Devils Hole that would incrementally contribute to the decline in water levels that support habitat for the Devils Hole pupfish. Similar adverse impacts are also expected to occur to habitats for federally listed groundwater dependent species including three additional fish species, one invertebrate, and five plants (see species listed in Table 3-14) from the proposed Project.

Adverse impacts to groundwater dependent species would persist over the life of the Project. While model simulations show low levels of drawdown at Devils Hole, current appropriated water rights in the Indian Springs Valley groundwater basin (1,394 AFY) exceed the estimated perennial yield of the basin (500 AFY), and reported actual pumpage in 2020 was 573 AFY (Dudek 2023a:13). By purchasing existing water rights from within the Indian Springs Valley groundwater basin, the Project would make use of currently unused appropriations, and no new appropriations within the Indian Springs Valley groundwater basin would be required for the Project. However, since existing water right holders would likely continue to pump a similar volume of water each year, the Project would contribute additional annual pumpage in the basin, which could result in continued adverse impacts to groundwater dependent species over the life of the Project.

Use of off-site water would also have an indirect impact to groundwater dependent ecosystems at Ash Meadows NWR, and specifically Devils Hole. While the off-site well is slightly farther away from Ash Meadows NWR than the proposed on-site well, it is assumed that drawdown impacts at Devils Hole would be similar to the impacts of sourcing all water from the on-site well.

Applicable Western Solar Plan design features relevant to groundwater dependent species would be implemented (Appendix B), which include avoiding groundwater withdrawals that adversely affect sensitive habitat (ER2-1), monitor unavoidable impacts to wetlands during O&M (ER3-2), and maintaining water resource design elements during O&M (WR3-1). Mitigation measures related to groundwater pumping, monitoring and reporting MM WR-4 and MM Gen-1 would also be implemented (Appendix B).

Decommissioning Impacts

Water use during decommissioning is estimated at 250 acre-feet (see Table 2-6), which is similar to water use during construction. Impacts of decommissioning are considered in the analysis presented above for the construction phase in the modeled local drawdown and the modeled water level decline at Devils Hole. Western Solar Plan design feature WR4-1 would be implemented during reclamation and decommissioning to continue groundwater monitoring. Following decommissioning, the on-site water well would be removed, additional pumping at the off-site well would cease, and the groundwater system at the Project would undergo annual recharge without continued pumping from the Project, thereby halting the Project’s contribution to drawdown of water levels at Devils Hole and Ash Meadows NWR (see Section 3.6, Water Resources).

Alternative 1

Under Alternative 1, impacts to Mojave desert tortoise would be similar to those impacts described under the Proposed Action; however, disturbance acres are reduced compared to the Proposed Action and all other Action Alternatives. The analysis presented below presents the difference in impacts between the Proposed Action and Alternative 1.

Under Alternative 1, impacts to bird species and groundwater dependent species within the Ash Meadows NWR (see Table 3-14) would be the same as described under the Proposed Action. No impacts to USFWS designated Critical Habitat would occur from Alternative 1 (BLM 2024d).

Construction Impacts

Under the Alternative 1, a total of 2,457 acres (2,413 acres within the Buildable Areas and 44 acres outside the Buildable Areas) of Mojave desert tortoise habitat would be disturbed. Under Alternative 1, approximately 482 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation (Table 3-17), resulting in a long-term adverse impact to Mojave desert tortoise connectivity habitat. D-3 disturbance acreage would be permanently lost to Project infrastructure and represents a 1% decrease in available Priority 1 connectivity habitat within the Federally Listed Species Analysis Area.

Another approximately 1,931 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1 disturbance category) and drive and crush activities (D-2 disturbance category) (see Table 3-17). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates; thereby supporting the goal of maintaining 75% of reference perennial vegetation cover within the Buildable Areas. Areas subject to D-1 and D-2 disturbances represent a 4.5% decrease in available Priority 1 connectivity habitat within the Federally Listed Species Analysis Area.

Table 3-17. Alternative 1 Disturbance Categories and Impacts to Connectivity Habitat

Alternative 1	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term*	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,720	1,449	482	482
Percent of Buildable Areas (2,413 acres)	Excluded from Buildable Areas	60%	20%	20%
Percent of Application Area (5,133 acres) †	53%	28%	9%	9%
Portion of Priority 1 Connectivity Habitat (42,321 acres)	6%	3%	1%	1%

* Shorter term (approximately 2–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

† Total does not sum to 100 due to rounding.

Alternative 1 would result in reduced permanent long-term impacts to Mojave desert tortoise habitat due to 545 acres less D-3 disturbance compared to the Proposed Action. The other primary difference between the Proposed Action and Alternative 1 is that the acres of D-1 disturbance would increase by 505 acres under Alternative 1 as compared to the Proposed Action (1,449 acres compared to 944 acres). This represents 505 more acres of Mojave desert tortoise habitat maintained over the 50-year term of the ROW as compared to the Proposed Action (see Table 3-17). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates; thereby supporting the goal of maintaining 75% of reference perennial vegetation cover within the Buildable Areas.

The estimated number of adult Mojave desert tortoises within the D-1, D-2, and D-3 disturbance categories for Alternative 1 that would be directly impacted is approximately 34.8 based on the density estimate of 3.5 adult Mojave desert tortoise/km^2 (247 acres) (BLM 2024d:36; Heritage 2024:52; Ironwood Consulting 2024:10). Impacts to Mojave desert tortoise resulting from construction activities under Alternative 1 would be similar to those under the Proposed Action. Total D-3 disturbance would be reduced by 545 acres compared to the Proposed Action which would promote the natural recovery of the area and support future restoration efforts, increasing the overall vegetation cover to provide suitable habitat to allow for passive reoccupation by Mojave desert tortoise of the Buildable Areas post-construction during O&M.

Under Alternative 1, no hydrologic controls would be included in the Project design. Therefore, there would be no risk of Mojave desert tortoise entrapment or injury related to hydrologic controls since these controls would not exist within the Buildable Areas.

Under Alternative 1, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-4). Future use of this site by NDOT would result in similar impacts to Mojave desert tortoise as the Proposed Action. Ahead of future surface disturbance, NDOT would be responsible for implementing and adhering to mitigation measures provided in Appendix B including installing permanent Mojave desert tortoise–proof fencing, conducting a clearance survey to locate and remove all Mojave desert tortoises from harm’s way, implementing a Mojave desert tortoise education program to be presented to all on site personnel, and developing a Site Restoration Plan to be approved by the BLM. This mineral material relocation site overlaps 120 acres of Priority 1 connectivity habitat and would result in a long-term adverse impact to Mojave desert tortoise habitat and connectivity.

Operations and Maintenance Impacts

Mojave desert tortoise exclusion fencing around the Buildable Areas would not be removed until vegetation standards are met, as approved by BLM and USFWS. Under Alternative 1, the BLM has set a two-year timeframe for the 75% vegetation cover standard to be met. During this estimated two-year timeframe, passive reoccupation by Mojave desert tortoises of the solar fields during operation would not occur, which would result in fewer direct impacts to individuals within the fenced Buildable Areas but could result in long-term impacts to movement and connectivity of the species around the fenced Buildable Areas. This alternative does not include flood control features that would otherwise pose an injury or mortality risk to Mojave desert tortoise allowed to passively reoccupy the Buildable Areas.

After the vegetation standard has been met, with a natural recovery period two years post-construction and an active restoration timeframe estimated at two years (see Table 2-12) or earlier; passive reoccupation by Mojave desert tortoise of the Buildable Areas would be allowed, which could potentially lessen the degradation of Mojave desert tortoise connectivity as long as vegetation standards are maintained over the life of the Project. Under Alternative 1, perimeter road widths would be 16 feet narrower than under the Proposed Action which could potentially lessen the degradation of Mojave desert tortoise connectivity.

Removing the Mojave desert tortoise exclusion fencing post-construction would allow passive reoccupation by local Mojave desert tortoise of the Buildable Areas (Eco-3, Tortoise-2). Although the quality of habitat within the Buildable Areas and whether it would be suitable for maintaining sustainable Mojave desert tortoise populations is unknown, it is likely that it would provide some level of functional habitat for Mojave desert tortoise that reoccupy the Buildable Areas (Drake et al. 2015). Temperatures under the solar panels may be warmer than the surrounding undisturbed, vegetated areas (Barron-Gafford et al. 2016), which could change the habitat conditions for Mojave desert tortoise. If exclusion fence removal is approved and Mojave desert tortoises are allowed to reenter the Project Area, any Mojave desert tortoises that do enter the Project Area could be exposed to vehicle collision during normal O&M activities. However, following suitable speed limits and the use of a WEAP for on-site workers should reduce the risk of collision (Appendix B, measures Air-1, Eco-2, and Eco-3; Western Solar Plan design features AQC2-1 and ER2-1).

<u>Decommissioning Impacts</u>

Decommissioning impacts under Alternative 1 on Mojave desert tortoises are expected to have a shorter duration due to fewer graded areas overall, and a higher percentage of vegetation maintained during O&M. Time to recovery of the project area after decommissioning will be significantly shorter under Alternative 1 as compared to the Proposed Action or other Action Alternatives. Restoration of graded areas (482 acres) is estimated to take up to 20 years for the areas to become suitable for Mojave desert tortoise and they may never achieve pre-Project conditions due to a lack of ecological structure and function of the desert environment.

Alternative 2 (BLM Preferred Alternative)

Under Alternative 2, impacts to Mojave desert tortoise would be similar to those impacts described under the Alternative 1. The analysis presented below presents the difference in impacts between the Proposed Action and Alternative 2.

Under Alternative 2, impacts to bird species and groundwater dependent species within the Ash Meadows NWR (see Table 3-14) would be the same as described under the Proposed Action. No impacts to USFWS designated Critical Habitat would occur from Alternative 2 (BLM 2024d).

<u>Construction Impacts</u>

Under Alternative 2, a total of 2,457 acres (2,413 acres within the Buildable Areas and 44 acres outside the Buildable Areas) of Mojave desert tortoise habitat would be disturbed. Under Alternative 2, approximately 592 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation (Table 3-18), resulting in a long-term adverse impact to Mojave desert tortoise connectivity habitat. D-3 disturbance acreage would be permanently lost to Project infrastructure and represents a 1% decrease in available Priority 1 connectivity habitat within the Federally Listed Species Analysis Area. See Section 2.1, Development of Alternatives, for disturbance category definitions.

Another approximately 1,821 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1 disturbance category) and drive and crush activities (D-2 disturbance category) (see Table 3-18). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates; thereby supporting the goal of maintaining 65% of reference perennial vegetation cover within the Buildable Areas. Areas subject to D-1 and D-2 disturbances represent a 4.3% decrease in available Priority 1 connectivity habitat within the Federally Listed Species Analysis Area.

Table 3-18. Alternative 2 Disturbance Categories and Impacts to Connectivity Habitat

Alternative 2	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term*	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,720	1,184	637	592
Percent of Buildable Areas (2,413 acres)	Excluded from Buildable Areas	49%	26%	25%
Percent of Application Area (5,133 acres)	53%	23%	12%	12%
Portion of Priority 1 Connectivity Habitat (42,321 acres)	6%	3%	2%	1%

* Shorter term (approximately 2–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

Alternative 2 would result in reduced permanent long-term impacts to Mojave desert tortoise habitat due to 435 acres less D-3 disturbance compared to the Proposed Action. The other primary difference between the Proposed Action and Alternative 2 is that the acres of D-1 disturbance would increase by 240 acres under Alternative 2 as compared to the Proposed Action (1,184 acres compared to 944 acres). This represents 240 more acres of Mojave desert tortoise habitat maintained over the 50-year term of the ROW as compared to the Proposed Action (see Table 3-18). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates, thereby supporting the goal of maintaining 65% of reference perennial vegetation cover within the Buildable Areas.

The estimated number of adult Mojave desert tortoises within the D1, D-2, and D-3 disturbance categories for Alternative 2 that will be directly impacted is approximately 34.8 based on the density estimate of 3.5 adult Mojave desert tortoise/km^2 (247 acres) (BLM 2024d:36; Heritage 2024:52; Ironwood Consulting 2024:10). Impacts to Mojave desert tortoise resulting from construction activities under Alternative 2 would be similar to those under the Proposed Action. Total D-3 disturbance would be reduced by 435 acres compared to the Proposed Action, which would promote the natural recovery of the area and support future restoration efforts, increasing the overall vegetation cover to provide suitable habitat to allow for passive reoccupation by Mojave desert tortoise of the Buildable Areas post-construction during O&M.

Under Alternative 2, no hydrologic controls would be included in the project design. Therefore, there would be no risk of Mojave desert tortoise entrapment or injury related to hydrologic controls since these controls would not exist within the Buildable Areas.

Under Alternative 2, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-4). Future use of this site by NDOW would result in similar impacts to Mojave desert tortoise as the Proposed Action. Ahead of future surface disturbance, NDOT would be responsible for implementing and adhering to mitigation measures provided in Appendix B including installing permanent Mojave desert tortoise–proof fencing, conducting a clearance survey to locate and remove all Mojave desert tortoises from harm's way, implementing a Mojave desert tortoise education program to be presented to all on-site personnel, and developing a Site Restoration Plan to be approved by the BLM. This mineral material relocation site overlaps 120 acres of Priority 1 connectivity habitat and would result in a long-term adverse impact to Mojave desert tortoise habitat and connectivity.

<u>Operations and Maintenance Impacts</u>

Mojave desert tortoise exclusion fencing around the Buildable Areas would not be removed until vegetation standards are met, as approved by BLM and USFWS. Under Alternative 2, the BLM has set a three- to five-year timeframe for the 65% vegetation cover standard to be met. During this estimated five-year timeframe, passive reoccupation by Mojave desert tortoises of the solar field during operations would not occur, which would result in fewer direct impacts to individuals within the fenced Buildable Areas during O&M but could result in long-term impacts to movement and connectivity of the species around the fenced Buildable Areas. This alternative does not include flood control features that would otherwise pose an injury or mortality risk to Mojave desert tortoise allowed to passively reoccupy the Buildable Areas.

After the vegetation standard has been met with a natural recovery period two years post-construction and an active restoration timeframe estimated at five years post-construction (see Table 2-12), or earlier, passive reoccupation by Mojave desert tortoise of the Buildable Areas would be allowed, which could potentially lessen the degradation of Mojave desert tortoise connectivity as long as vegetation standards are maintained over the life of the Project. The same as Alternative 1, under Alternative 2 the perimeter road widths would 16 feet narrower than under the Proposed Action which could potentially lessen the degradation of Mojave desert tortoise connectivity.

Removing the Mojave desert tortoise exclusion fencing post-construction would allow passive reoccupation by local Mojave desert tortoise of the Buildable Areas (Appendix B, measures Eco-3 and Tortoise-2). Although the quality of habitat within the Buildable Areas and whether it would be suitable for maintaining sustainable Mojave desert tortoise populations is unknown, it is likely that it would provide some level of functional habitat for Mojave desert tortoise that reoccupy the Buildable Areas (Drake et al. 2015). Temperatures under the solar panels may be warmer than the surrounding undisturbed, vegetated areas (Barron-Gafford et al. 2016), which could change the habitat conditions for Mojave desert tortoise. If exclusion fence removal is approved and Mojave desert tortoises are allowed to reenter the Project Area, any Mojave desert tortoises that do enter the Project Area could be exposed to vehicle collisions during normal O&M activities. However, following suitable speed limits and the use of a WEAP for on-site workers should reduce the risk of collisions (Appendix B, measures Air-1, Eco-2, and Eco-3; Western Solar Plan design features AQC2-1 and ER2-1).

Decommissioning Impacts

Impacts to Mojave desert tortoise associated with decommissioning would be similar to those described in Alternative 1. Decommissioning impacts under Alternative 2 on Mojave desert tortoises are expected to have a shorter duration due to fewer graded areas overall, and a higher percentage of vegetation maintained during O&M. Time to recovery of the project area after decommissioning would be significantly shorter under Alternative 2 as compared to the Proposed Action. Restoration of graded areas (592 acres) is estimated to take up to 20 years for those areas to become suitable for Mojave desert tortoise and they may never achieve pre-Project conditions due to a lack of ecological structure and function of the desert environment.

Compensatory Mitigation

To offset residual impacts to Mojave desert tortoises, the BLM would collect remuneration fees from the Applicant for the total disturbance within the Mojave desert tortoise habitat as compensatory mitigation. The remuneration fees would provide funding for Mojave desert tortoise mitigation. Remuneration fees would be used for actions expected to promote management and recovery of the Mojave desert tortoise over time (Hastey et al. 1991). Actions may involve habitat acquisition, population or habitat enhancement, increasing knowledge of the species' biological requirements, reducing loss of individual animals, documenting the species status and trend, and preserving distinct population attributes.

Alternative 3

Under Alternative 3, impacts to Mojave desert tortoise would be similar to those impacts described under Alternative 2. The analysis presented below presents the difference in impacts between the Proposed Action and Alternative 3.

Under Alternative 3, impacts to bird species and groundwater dependent species within the Ash Meadows NWR (Table 3-14) would be the same as described under the Proposed Action. No impacts to USFWS designated Critical Habitat would occur from Alternative 3 (BLM 2024d).

Construction Impacts

Under Alternative 3, a total of 2,634 acres (2,590 acres within the Buildable Areas and 44 acres outside the Buildable Areas) of Mojave desert tortoise habitat would be disturbed. Under Alternative 3, approximately 648 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation (Table 3-19), resulting in a long-term adverse impact to Mojave desert tortoise connectivity habitat. D-3 disturbance acreage would be permanently lost to Project infrastructure and represents a 2% decrease in available Priority 1 connectivity habitat within the Federally Listed Species Analysis Area.

Another approximately 1,942 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1 disturbance category) and drive and crush activities (D-2 disturbance category) (see Table 3-19). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates, thereby supporting the goal of maintaining 65% of reference perennial vegetation cover within the Buildable Areas. Areas subject to D-1 and D-2 disturbances represent a 4% decrease in available Priority 1 connectivity habitat within the Federally Listed Species Analysis Area.

Table 3-19. Alternative 3 Disturbance Categories and Impacts to Connectivity Habitat

Alternative 3	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term*	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,543	1,262	680	648
Percent of Buildable Areas (2,590 acres)	Excluded from Buildable Areas	49%	26%	25%
Percent of Application Area (5,133 acres) †	50%	25%	13%	13%
Portion of Priority 1 Connectivity Habitat (42,321 acres)	6%	3%	2%	2%

* Shorter term (approximately 2–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

† Total does not sum to 100 due to rounding.

Alternative 3 would result in reduced permanent long-term impacts to Mojave desert tortoise habitat due to 379 acres less D-3 disturbance compared to the Proposed Action. The other primary difference between the Proposed Action and Alternative 3 is that the acres of D-1 disturbance would increase by 318 acres under Alternative 3 as compared to the Proposed Action (1,262 acres compared to 944). This represents 318 more acres of Mojave desert tortoise habitat maintained over the 50-year term of the ROW as compared to the Proposed Action (see Table 3-19). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates, thereby supporting the goal of maintaining 65% of reference perennial vegetation cover within the Buildable Areas.

The estimated number of adult Mojave desert tortoises within the D-1, D-2, and D-3 disturbance categories for Alternative 3 that would be directly impacted is approximately 37.3 based on the density estimate of 3.5 adult Mojave desert tortoise/km^2 (247 acres) (BLM 2024d:36; Heritage 2024:52; Ironwood Consulting 2024:10). Impacts to Mojave tortoise resulting from construction activities under Alternative 3 would be similar to those under the Proposed Action. Total D-3 disturbance would be reduced by 120 acres compared to the Proposed Action which would promote the natural recovery of the area and support future restoration efforts, increasing the overall vegetation cover.

Under Alternative 3, hydrologic controls, such as stormwater detention basins, would be included in the project design, as described in Section 2.5. The hydrologic control features would be constructed within the fenced Buildable Areas and could include the use of riprap. Under this alternative, the exclusion fence would be removed to allow for passive reoccupation of the Mojave desert tortoise if vegetation and habitat conditions are deemed suitable by BLM and USFWS. Therefore, the hydrologic controls could pose an entrapment risk to Mojave desert tortoise, if large riprap is used. Measures Wild-1, MM Wild-5, and MM Wild-9 (see Appendix B) would minimize the risk of Mojave desert tortoise entrapment in riprap.

Under Alternative 3, 93 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-5). Compared to the Proposed Action, the NDOT mineral material site would be reduced by 27 acres under Alternative 3, resulting in reduced impacts to Mojave desert tortoise habitat. Future use of this site by NDOT would result in similar impacts to Mojave desert tortoise as the Proposed Action. Ahead of future surface disturbance, NDOT would be responsible for implementing and adhering to mitigation measures provided in Appendix B including installing permanent Mojave desert tortoise–proof fencing, conducting a clearance survey to locate and remove all Mojave desert tortoises from harm's way, implementing a Mojave desert tortoise education program to be presented to all on-site personnel, and developing a Site Restoration Plan to be approved by the BLM. This mineral material relocation site overlaps 93 acres of Priority 1 connectivity habitat and would result in a long-term adverse impact to Mojave desert tortoise habitat and connectivity.

Alternative 3 has an increased risk of vehicle mortality for Mojave desert tortoises compared to the Proposed Action, Alternatives 1, and Alternative 2, as it has three additional collector access roads. The risk of vehicle mortality for Mojave desert tortoises prior to temporary fence construction and in unfenced areas of the Project would be minimized by having authorized Mojave desert tortoise biologists and qualified Mojave desert tortoise monitors to monitor construction to ensure the avoidance of Mojave desert tortoises and avoidance or excavation of Mojave desert tortoise burrows as necessary. A WEAP would be prepared and presented to all work crews at the Project (Appendix B, measure Eco-2; Western Solar Plan design feature ER2-1).

Operations and Maintenance Impacts

Mojave desert tortoise fencing around the Buildable Areas would not be removed until vegetation standards are met, as approved by the BLM and USFWS. Under Alternative 3, the BLM has set a three- to five-year timeframe for the 65% vegetation cover standard to be met. During this estimated five-year timeframe, passive reoccupation by Mojave desert tortoises of the solar field during operations would not occur, which would result in fewer direct impacts to individuals within the fenced Buildable Areas during O&M but could result in long-term impacts to movement and connectivity of the species around the fenced Buildable Areas.

Under Alternative 3, hydrologic controls would be included in the project design, as described in Section 2.5. Flow diversions, berms or ditches, and similar stormwater control features would be constructed within the fenced Buildable Areas. Once the Mojave desert tortoise exclusion fence is removed and Mojave desert tortoise passively reoccupy the Buildable Areas, measures Wild-1, MM Wild-5, and MM Wild-9 (see Appendix B) would be applied to the project and would minimize the risk of Mojave desert tortoise entrapment in riprap.

Removing the Mojave desert tortoise exclusion fencing post-construction would allow passive reoccupation by local Mojave desert tortoise of the Buildable Areas (Appendix B, measures Eco-3 and Tortoise-2). Although the quality of habitat within the Buildable Areas and whether it would be suitable for maintaining sustainable Mojave desert tortoise populations is unknown, it is likely that it would provide some level of functional habitat for Mojave desert tortoise that reoccupy the Buildable Areas (Drake et al. 2015). Temperatures under the solar panels may be warmer than the surrounding undisturbed, vegetated areas (Barron-Gafford et al. 2016), which could change the habitat conditions for Mojave desert tortoise. If exclusion fence removal is approved and Mojave desert tortoises are allowed to reenter the Project Area, any Mojave desert tortoises that do enter the Project Area could be exposed to vehicle collisions during normal O&M activities. However, following suitable speed limits and the use of a WEAP for on-site workers should reduce the risk of collisions (Appendix B, measures Air-1, Eco-2, and Eco-3; Western Solar Plan design features AQC2-1 and ER2-1).

Decommissioning Impacts

Impacts to Mojave desert tortoise associated with decommissioning would be similar to those described for Alternative 2.

3.5 Earth Resources

This section describes issues related to geology, soils, geological hazards, minerals, and mineral material sites. Federal laws regarding these earth resources must be adhered to throughout the life cycle of the Project. NEPA and FLPMA are the primary federal regulations that require assessment of and mitigation for potential impacts to geological resources on federal land. Specifically, the following laws govern the discovery, disposition, and extraction of mineral resources throughout the western United States: General Mining Law of 1872, Mineral Leasing Act of 1920, and Mineral Materials Act of 1947.

The Mineral Materials Act of 1947 (30 USC 601–604) governs the sale and disposal of mineral material resources from public land, including but not limited to, sand, gravel, stone, pumice, pumicite, cinders, clay, and petrified wood. Resources regulated by the Mineral Material Act of 1947 are commonly applied in construction or industry. On December 12, 2022, the BLM published a Notice of Land Segregation in the *Federal Register*, which segregated the lands within the Application Area from appropriation under the public land laws, including the Mining Law, but not the Mineral Leasing or Material Sales Acts, for a period of two years, subject to valid existing rights (87 FR 76081-76082).

3.5.1 Issues Identified for Analysis

- How would construction, O&M, and decommissioning of the Project affect geological hazards, including ground rupture from Quaternary faults, destabilization of the land surface by fissures, and flooding?

- How would construction, O&M, and decommissioning of the Project affect sensitive soils and biotic soils?
- How would construction, O&M, and decommissioning of the Project cause ground disturbing activities that affect soil health and productivity?
- How would construction, O&M, and decommissioning of the Project affect access to the NDOT mineral material sites?

3.5.2 Analysis Area and Methodology

The General Earth Resources Analysis Area is for geological units, sensitive soils, biotic soils, and soil health and productivity and is the Project Area, which consists of the solar array and associated facilities, the gen-tie, and the access road. The Geological Hazards and Mineral Resources Analysis Area adds a 1-mile radius around the Project Area. The Project Area is near the Nevada Security Test Site. Historically, nuclear weapons were tested and detonated at the Nevada Security Test Site. During Project scoping, concerns were brought forward of potentially disturbing radioactive contaminated soils during construction. See Section 3.12, Public Health and Safety, for a discussion of soil radiation investigations.

Soils Resources

Soil susceptibilities to water erosion were assessed based on Natural Resources Conservation Service (NRCS) standards assigned to Soil Survey Geographic Database-level soil map units (NRCS 2020). Water erosion factor "K" (or K-factor) represents both susceptibility of soils to erosion and the rate of runoff ranging on a scale of 0.0 to 0.65, with increasing values corresponding to greater susceptibilities to water erosion. Fine textured soils high in clay have low K values, about 0.05 to 0.15, because they are resistant to detachment. Coarse-textured soils, such as sandy soils, have low K-factor values of about 0.05 to 0.2 due to low runoff even though these soils are easily detached. Medium-textured soils, such as the silt loam soils, have a moderate K-factor value of about 0.25 to 0.45 because they are moderately susceptible to detachment and produce moderate runoff. Soils having a high silt content are most erodible of all soils. They are easily detached, tend to crust, and produce high rates of runoff. These soils tend to have K-factor values greater than 0.45 and can be as large as 0.65 (NRCS 2023; USDA 2001).

The methods for assessing impacts to soil resources from the Project include identifying areas that would accelerate erosion and where there would be conversion of designated prime or unique farmland soils to nonagricultural uses. Any Project-related impacts to biological soil crusts would be considered where there would be direct impacts of surface-disturbing activities (e.g., blading of new access roads). Soil survey data was derived from the NRCS databases (NRCS 2020).

Geology and Mineral Resources

Information for geological hazards and mineral resources was obtained from scientific literature including publications, maps, GIS data from the BLM, USGS, and Nevada Bureau of Mines and Geology. Methods for assessing impacts from geological hazards include identifying the types of impacts and areas with the likelihood of a geological hazard occurring in the future. The method to assess impacts to mineral resources resulting from the Project include identifying where the construction and operation of the Project could limit development and extraction of mineral resources or where the proposed facilities might interfere with mining activities.

3.5.3 Affected Environment

This section describes the existing conditions related to soil resources and geology including geological hazards and mineral resources associated with the Project.

Geology and Geological Hazards

The General Earth Resources Analysis Area is located in the southern portion of the Indian Springs Valley (Bohannon 1978; Crafford 2010; House et. al. 2010; Weide 1982). The Indian Springs Valley lies in the southwestern portion of the Great Basin, within the Basin and Range physiographic province. The Indian Springs Valley is a naturally formed structural basin as a result of block faulting, a fundamental characteristic of the Basin and Range physiographic province. The Indian Springs Valley extends in a northeast-southwest direction and drains generally toward the northeast. Surrounding the alluvium-filled valley are relatively steep mountain ranges, including the Spring Mountain Range to the south and the Spotted Range to the north. Mercury Valley and Las Vegas Valley border the site to the west and east, respectively (Bohannon 1978; Crafford 2010; House et. al. 2010; Weide 1982).

The Indian Spring Valley is likely underlain by Proterozoic igneous and metamorphic basement rock, which is overlain by thick Paleozoic and Mesozoic sedimentary rock, and Tertiary volcanic rock. The floor of the Indian Springs Valley is filled with coalescing Tertiary and Quaternary alluvial, eolian, playa, and channel deposits surrounded by sloping alluvial aprons consisting primarily of poorly sorted gravel and sand deposits with cobbles and boulders (Sweetkind et al. 2001).

Within the General Earth Resources Analysis Area, 92% of the Project Area is underlain by undifferentiated alluvium and 8% by playa, lakebed, and floodplain deposits (Table 3-20) (Crafford 2007). The proposed Project is located on an alluvial fan at the base of the Spring Mountain Range. Alluvial soils on the fan are composed of unconsolidated and consolidated detritus shed off from formational units of the Spring Mountain Range, which consist primarily of sedimentary bedrock. Quaternary-age channel deposits were mapped north of U.S. 95, a few hundred feet north of the Project Area . The channel deposits may include fine-grained soil such as silt and clay.

The nearest active faults (i.e., a fault that has experienced ground surface rupture within the past 11,000 years) are the West Spring Mountains fault and the Rock Valley Fault zone (USGS 2022). These faults are outside the Geological Hazards and Mineral Resources Analysis Area and approximately 10 to 11 miles from the Project boundary (Table 3-21). The Peace Camp faults and the Cactus Springs faults, which are considered potentially active (i.e., faults that have experienced ground surface rupture within the past 1.6 million years), are also located in the Geological Hazards and Mineral Resources Analysis Area vicinity. The distances from the site to these active and potentially active faults are provided in Table 3-21.

The northern portion of the Geological Hazards and Mineral Resources Analysis Area is underlain by the Las Vegas Valley Shear Zone (LVVSZ) (Workman et al. 2002). The LVVSZ was mapped extending roughly in an east-west direction and is concealed beneath the alluvial soil. However, the shear zone is up to 3.1 miles deep, and its exact location is unknown. The LVVSZ was previously a regional structural geologic system associated with the movement of large mountain blocks 8.5 to 14 million years ago (Langenheim et al. 2001). Accordingly, the seismic activity level of the LVVSZ is considered to be inactive.

Ground fissures are generally believed to be caused by erosion and differential stress resulting from regional subsidence due primarily to withdrawal of groundwater, generally from infiltration of surface water into stress-related ground cracks and subsequent erosion of subsurface soils along the cracks (Slemmons et al. 2001). Ground fissures are not known to occur within the Geological Hazards and Mineral Resources Analysis Area.

Flooding risks are discussed in Section 3.6, Water Resources.

Table 3-20. Geological Classification within the Project Area

Geological Unit Name	Symbol	Acres within Project Area (percent of total Application Area)
Alluvium, undifferentiated	Qal	4,722 (92%)
Playa, lakebed, and floodplain deposits	Qpl	411 (8%)

Source: Crafford (2007).

Table 3-21. Faults in Project Area within 1-mile Buffer of the Project Area

Fault	Seismic Activity Level	Age (Years)	Distance from Site (miles)
West Spring Mountains fault	Latest Quaternary	<15,000	10.4
Rock Valley Fault zone	Latest Quaternary	<15,000	11.3
Peace Camp faults	Middle and Late Quaternary	<750,000	0.8
Cactus Springs faults	Quaternary	<1.6 million	1.7
Las Vegas Valley Shear zone	Inactive	8.5 to 14 million	Concealed under alluvial soil in the northern portion of the site.

Source: Ninyo & Moore Geotechnical & Environmental Sciences Consultants (2022).

Soils Resources

The General Earth Resources Analysis Area is in the Basin and Range Province of the Intermontane Plateaus, and broad basins, valleys, and old lakebeds make up most of the area (NRCS 2006). The dominant soil orders are Aridisols (arid environment soils) and Entisols (poorly developed soils with little to no structure), which together make up approximately 99.7% of the soils within the General Earth Resources Analysis Area (Table 3-22).

Several sensitive soil resources have been identified within the General Earth Resources Analysis Area and comprise approximately 2% of the area surveyed (Heritage 2024). These sensitive resources include soils with erosion susceptibility, biotic soils, and soils with elevated concentrations of pedogenic carbonate and possible gypsum-influenced soils. The dominant soil orders, Aridisols and Entisols, have low organic matter with less than 1% of organic matter present within the upper 6 inches of the soil profile. These soils can lose approximately 2.92 and

4.07 tons of soil per acre per year, respectively, before their long-term productivity is reduced. These two soil orders also have a relatively low average wind erosion group rating and have low water erosion risk factors. The remaining approximately 0.3% of the soils at the Project Area are not classified (NRCS 2020).

The soil K-factor (erosion factor) within the General Earth Resources Analysis Area ranges from 0.05 to 0.46 (see Table 3-22). However, 97.9% of the Project Area has a K-factor of 0.34, which indicates that most of the Project Area has a moderate susceptibility to erosion (see Table 3-22) (NRCS 2023).

Biotic soils have been documented within the Project Area, comprising up to 103 acres or 2% of the area surveyed during baseline rare plant surveys (Heritage 2024).

Research shows there are three soil types with the greatest potential to support biocrusts: gypsiferous soils, noncalcareous sandy soils, and limestone-derived soils (Bowker and Belnap 2008). Soils within the Project Area are primarily derived from limestone and dolomite (NRCS 2006, 2015). Gypsum-containing soils have been documented within the Project Area, but little data on the surface expression of gypsum and its relation to biotic soils is available. Biotic soils are susceptible to impacts related to surface-disturbing activities.

Layers of moderately hard to very hard, moderately to strongly cemented soils, called petrocalcic soils or also known as caliche. were encountered in previous subsurface explorations within the Project Area and are common in southern Nevada (Ninyo & Moore Geotechnical & Environmental Sciences Consultants 2022). Petrocalcic soils are naturally occurring cemented soils with rock-like characteristics (Reeves 1976).

Table 3-22. Soil Unit Classification within the Project Area

Soil Unit Name	Soil Order	Drainage Class	Acres within Project Area (percent of total Project Area)	K-factor (relative soil erosion potential)
Canoto association	Entisols	Well drained	22 (0.4%)	0.24 (Low)
Corncreek-Haymont association	Aridisols	Well drained	74 (1.4%)	0.46 (High)
Pits, gravel	–	Well drained	17 (0.3%)	0.05 (Low)
Weiser-Wechech association	Aridisols	Well drained	5,110 (97.8%)	0.34 (Moderate)
Yurm-Canoto association	Aridisols	Somewhat excessively drained	4 (0.1%)	0.34 (Moderate)

Source: NRCS (2006, 2015, 2023).

Mineral Resources

No locatable or leasable mineral resources are known to occur within the Geological Hazards and Mineral Resources Analysis Area. The NDOT mineral material sites are within and adjacent to the Project Area boundary. The NDOT mineral material sites produce aggregate, sand, and gravel for NDOT’s use. The BLM has worked with NDOT to relocate the acres of overlapping NDOT mineral material sites that occur within the Application Area to reduce conflicts and access concerns under Alternatives 1, 2, and 3 (Appendix A, Figure A-4 and Figure A-5).

3.5.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project would not be constructed, operated and maintained, or decommissioned. The Geological Hazards and Mineral Resources Analysis Area would exist under current authorizations and land uses. The current uses, conditions, and trends for earth resources would continue to occur. There would be no impacts to earth resources attributed to the Project.

Proposed Action

The Proposed Action would result in permanent ground disturbance and temporary ground disturbance during construction of the Project. These disturbances would cause erosion, compaction, and loss of vegetation which would adversely impact earth resources within the General Earth Resources Analysis Area.

Geological Hazards

Construction, Operations and Maintenance, and Decommissioning

In the event that an earthquake should happen, construction and operation workers could be exposed to potential hazards from seismic ground shaking or ground failure. Construction of the Project would not increase the risks of seismic hazard exposure over typical seismic hazard risks throughout the region. Earthquake safety training pursuant to the federal Occupational Safety and Health Administration (OSHA) regulations would minimize the potential for effects to workers.

During O&M of the proposed facilities, direct impacts from seismicity would include ground movement that could cause damage to facilities. Through implementation of Geo-1, ensuring all structures are built to all applicable codes, the risk of damage from seismic activity would be reduced. No direct effects resulting in destabilization of unstable geologic units would occur during O&M. If an earthquake were to occur, workers conducting O&M activities could be exposed to seismic shaking. Pursuant to OSHA regulations, earthquake safety training would minimize the potential effects on workers. Seismic hazards would not result in a substantial direct effect to Project infrastructure or workers during O&M.

Soil Resources

Construction

Impacts of the Proposed Action on soil resources would occur primarily due to ground-disturbing activities, such as grading, excavation, and soil compaction activities. The four defined disturbance levels (D-0, D-1, D-2, D-3) are described in Section 2.1.1, Construction Definitions, specifically Table 2-1, and are summarized in Table 3-23 below as they relate to the impact levels to soil resources. No direct impacts are anticipated to soil resources on approximately 2,720 acres (D-0), only indirect impacts. Short-term, long-term, and permanent direct and indirect impacts are anticipated to soil resources on approximately 2,413 acres vegetation or 17% of the Geological Hazards and Mineral Resources Analysis Area which fall under D-1, D-2, and D-3 disturbance levels.

Table 3-23. Proposed Action Disturbance Levels and Permanent Impacts to Soil Resources

Proposed Action	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term*	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,720	944	442	1,027
Percent of Buildable Areas (2,368 acres) †	Excluded from Buildable Areas	40%	19%	43%
Percent of Application Area (5,133 acres)	53%	18%	9%	20%

* Shorter term (approximately 2–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

† Total does not sum to 100 due to rounding.

Permanent direct impacts to vegetation from construction activities are anticipated where clear and cut with soil removal construction methods (D-3) would be required. Under the Proposed Action, this disturbance level would not exceed 1,027 acres throughout the Project Area (43% of the Buildable Areas). Surface-disturbing activities, particularly D-3 surface disturbance, could result in changes to soil quality and characteristics, loss of biotic soils, loss of soil productivity, and increase in erosion potential during wind and precipitation events. Vegetation clearing, topsoil clearing, and grading could result in newly exposed disturbed soils within the Buildable Areas that could be subject to increased erosion by water and wind. Potential physical effects of soil compaction may include reduced permeability and porosity and increased potential erosion. The Proposed Action would result in the largest adverse impacts to soils when compared to the other Action Alternatives.

Soil erosion in areas of ground disturbance would also have a greater potential until the soil is stabilized by successful revegetation efforts, such as reseeding or planting. Disturbed soils not successfully reclaimed or stabilized are likely to lose productivity and sustain vegetation. Over time, this would reduce watershed health and contribute to sedimentation in surface water or degradation of local air quality. The effects of erosion would be lessened by APMs (see Appendix B), and Geo-1 would minimize ground disturbance and construction timeframes, preventing channel erosion and controlling water runoff. The adoption of APM Air-2 would have a dedicated dust monitor on-site to enforce erosion control measures as well as the Dust Control Plan. Throughout construction APMs Geo-1 and WR- 2 would implement design elements to minimize erosion, including installing sediment controls. These measures would ensure the Project complies with Section 402 of the Clean Water Act (CWA). Additionally, applicable design features in the Western Solar Plan (BLM and DOE 2012) would also be implemented. Appendix B lists the Western Solar Plan design features that are most relevant to the Project and earth resources, which include that facilities be constructed to minimize soil erosion and geologic hazard concerns, control water runoff, reduce dust erosion, lessen fugitive dust emissions and site soils compaction, salvage topsoil, restore native plant communities, implement environmental inspection and monitoring measures, and respond to impacts to soil resources during construction, operations, and decommissioning (SR2-1), along with additional measures to minimize fugitive dust generation (AQC2-1).

Soil contamination could result from accidental material or fuel spills during construction activities. If spills occur, contamination could result in the removal and disposal of large amounts of soil. Saturated contaminated soils have the potential to disperse to groundwater or surface water. APM Haz-1 (see Appendix B) would help reduce the risk of a spill or release of hazardous materials within the site by developing a Hazardous Materials and Waste Management Plan. This measure would reduce the potential of soil contamination and help meet state and federal requirements.

Operations and Maintenance

Under the Proposed Action, 50% of vegetation cover and 65% of vegetation density within the Buildable Area is to be met within 10 years post-construction (or a longer period as determined by BLM in the case of drought), otherwise restoration would be implemented pursuant to an agency-approved Site Restoration Plan (Section 2.2.1, Project Components). During O&M, native vegetation disturbed under D-2 and D-3 disturbance levels during construction activities would be allowed to regrow, which would provide beneficial coverage to soil resources and reduce erosion potential.

Direct impacts to vegetation and soil resources within the solar panel fields would occur where trimming and maintenance of remaining vegetation would be required to avoid interference with the panels. This would result in temporary long-term impacts to soil resources because plant cover would be disturbed, soils could be exposed, and erosion potential could increase. O&M activities could lead to an increase in erosion, compaction, and less soil stabilization over the long term.

Decommissioning

Impacts from decommissioning would be very similar to those impacts described for the Project’s construction phase. Restoration of graded areas (1,027 acres) is estimated to take up to 20 years for these areas to reach restoration goals and they may never achieve pre-Project conditions due to a lack of ecological structure and function of the desert environment.

<u>Mineral Resources</u>

Construction and Operations and Maintenance

Under the Proposed Action the approximately 120 acres of overlapping NDOT mineral sites would no longer be available for use and no replacement areas would be authorized for use. NDOT would lose access to their existing material pits permanently. This is a long-term, adverse effect on mineral resource uses. Continued operation of existing mineral material sites outside of the Application Area would not be hindered by construction activities.

Decommissioning

Once decommissioning is completed and the ROW is terminated, the surface would be available for surface extraction of mineral resources again.

Alternative 1

The majority of impacts related to construction, O&M, and decommissioning activities on geological hazards and soil resources would be similar to those described in the Proposed Action. The discussion below focuses on elements where impacts differ.

Construction Impacts

Under Alternative 1, approximately 482 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation (Table 3-24), resulting in a long-term adverse impact to soil. D-3 disturbance acreage would adversely impact sensitive soils, and soil productivity would be permanently lost. Alternative 1 would result in the least adverse impacts to soils when compared to all other Action Alternatives.

Another approximately 1,931 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1) and drive and crush activities (D-2) (see Table 3-24). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates; thereby supporting the goal of maintaining 75% of reference perennial vegetation cover within the Buildable Areas. With the application of less intensive and disruptive construction methods, soil compaction would be reduced, and on-site vegetation would have a higher likelihood to survive and regrow after construction and during operations. Erosion and sedimentation would be reduced due to retention of vegetation in these areas.

Table 3-24. Alternative 1 Disturbance Categories and Impacts to Soil Resources

Alternative 1	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term*	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,720	1,449	482	482
Percent of Buildable Areas (2,413 acres)	Excluded from Buildable Areas	60%	20%	20%
Percent of Application Area (5,133 acres) †	53%	28%	9%	9%

* Shorter term (approximately 2–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

† Total does not sum to 100 due to rounding.

Under Alternative 1, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-4). This mineral material relocation site would result in a long-term adverse impact to soil resources when fully developed because the area would be subject to direct removal of soil, gravel, and aggregate material, changing the soil characteristics of the area. The relocation of the NDOT mineral material pit would be a beneficial impact to mineral resource uses because the site would be an active mineral source for local transportation projects.

Operations and Maintenance Impacts

The O&M impacts to vegetation communities with Alternative 1 would be similar to those under the Proposed Action for vegetation communities. However, the two-year timeframe for achieving the 75% vegetation cover standard would provide improved vegetation conditions within the shortest timeframe, when compared to the Proposed Action and Alternative 2.

Decommissioning Impacts

Overall, decommissioning impacts under Alternative 1 on vegetation communities would be similar to those under the construction and decommissioning of the Proposed Action.

Alternative 2 (BLM Preferred Alternative)

The majority of impacts related to construction, O&M, and decommissioning activities on geological hazards and soil resources would be similar to those described in the Proposed Action. The discussion below focuses on elements where impacts differ.

Construction Impacts

Under Alternative 2, approximately 592 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation (Table 3-25), resulting in a long-term adverse impact to soils. D-3 disturbance acreage would adversely impact sensitive soils, and soil productivity would be permanently lost. Alternative 2 would result in less adverse impacts to soils when compared to the Proposed Action and Alternative 3. Alternative 2 would have greater impacts to soils than Alternative 1.

Another approximately 1,821 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1) and drive and crush activities (D-2) (see Table 3-25). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates; thereby supporting the goal of maintaining 65% of reference perennial vegetation cover within the Buildable Areas. With the application of less intensive and disruptive construction methods, soil compaction would be reduced, and on-site vegetation would have a higher likelihood to survive and regrow after construction and during operations. Erosion and sedimentation would be reduced due to retention of vegetation in these areas.

Table 3-25. Alternative 2 Disturbance Categories and Impacts to Soil Resources

Alternative 2	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance

Alternative 2	D-0	D-1	D-2	D-3
Temporal Qualifier	N/A	Temporary, short term*	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,720	1,184	637	592
Percent of Buildable Areas (2,413 acres)	Excluded from Buildable Areas	49%	26%	25%
Percent of Application Area (5,133 acres) †	53%	23%	12%	11%

* Shorter term (approximately 2–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

† Total does not sum to 100 due to rounding.

Under Alternative 2, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-4). This mineral material relocation site would result in a long-term adverse impact to soil resources when fully developed because the area would be subject to direct removal of soil, gravel, and aggregate material, changing the soil characteristics of the area. The relocation of the NDOT mineral material pit would be a beneficial impact to mineral resource uses because the site would be an active mineral source for local transportation projects.

Operations and Maintenance Impacts

The O&M impacts to soils from Alternative 2 would be similar to those under the Proposed Action. However, the three- to five-year timeframe for achieving the 65% vegetation cover standard would provide improved vegetation conditions when compared to the Proposed Action.

Decommissioning Impacts

Overall, decommissioning impacts under Alternative 2 on soils would be similar to those under the construction and decommissioning of the Proposed Action.

Alternative 3

The majority of impacts related to construction, O&M, and decommissioning activities on geological hazards and soil resources would be similar to those described in the Proposed Action. The discussion below focuses on elements where impacts differ.

Construction Impacts

Under Alternative 3, approximately 648 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation (Table 3-26), resulting in a long-term adverse impact to soils. D-3 disturbance acreage would adversely impact sensitive soils, and soil productivity would be permanently lost. Alternative 3 would result in the second largest adverse impacts to soils, behind the Proposed Action, when compared to the other Action Alternatives.

Another approximately 1,942 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1) and drive and crush activities (D-2) (see Table 3-26). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates, thereby supporting the goal of retaining 65% of reference perennial vegetation cover within the

Buildable Area within three to five years post-construction. With the application of less intensive and disruptive construction methods, soil compaction would be reduced, and on-site vegetation would have a higher likelihood to survive and regrow after construction and during operations. Erosion and sedimentation would be reduced due to retention of vegetation in these areas.

Table 3-26. Alternative 3 Disturbance Categories and Impacts to Soil Resources

Alternative 3	D-0	D-1	D-2	D-3
Definition/Construction Method	No impact / avoidance	Overland travel	Clear and cut / drive and crush	Clear and cut with soil removal
Disturbance Qualifier	No disturbance	Minimal to moderate disturbance	Moderate to heavy disturbance	Heavy disturbance
Temporal Qualifier	N/A	Temporary, short term*	Ranges from temporary to long term*	Permanent, long term (100+ years)
Total Project Area (acres)	2,720	1,262	680	648
Percent of Buildable Areas (2,590 acres)	Excluded from Buildable Areas	49%	26%	25%
Percent of Application Area (5,133 acres) †	53%	25%	13%	13%

Note: N/A = not applicable.

* Shorter term (approximately 2–5 years) impact to vegetation cover, and longer term impacts to vegetation composition which could occur for the life of a project.

† Total does not sum to 100 due to rounding.

Under Alternative 3, approximately 93 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-5). Due to the buildable areas being shifted slightly compared to the Proposed Action, the overlap with NDOT mineral material sites has been reduced by 27 acres. The mineral material relocation site would still result in a long-term adverse impact to soil resources when fully developed because the area would be subject to direct removal of soil, gravel, and aggregate material, changing the soil characteristics of the area. The relocation of the NDOT mineral material sites would be a beneficial impact to mineral resource uses because the relocation site would be an active mineral source for local transportation projects.

<u>Operations and Maintenance Impacts</u>

The O&M impacts to soils from Alternative 3 would be similar to those under the Proposed Action.

<u>Decommissioning Impacts</u>

Overall, decommissioning impacts under Alternative 3 on soils would be similar to those under the construction and decommissioning of the Proposed Action.

3.6 Water Resources

In Nevada, waters are the property of the public and are subject to appropriation under NRS Chapters 532 through 538. The agency responsible for managing groundwater in Nevada is the

NDWR. This responsibility includes overseeing water right applications, appropriations, and interbasin transfers (NDWR 2021a).

The NDWR has delineated the state into 14 Hydrographic Regions and 232 Hydrographic Areas also known as basins, which are further delineated into Hydrographic Subareas. NDWR, via the State Engineer, has the authority to prioritize preferred uses of groundwater (e.g., municipal or industrial), and define groundwater extraction quantities (NDWR 2021b). In accordance with NRS Section 533.372, the State Engineer may approve or disapprove any application of water to a use involving generation of energy for export out of Nevada. Surface water rights in the State of Nevada are fully appropriated, so new development relies primarily on groundwater resources. The amount of groundwater available for extraction is based on a concept of "perennial yield," which is defined in the Nevada State Water Plan as "the amount of usable water from a ground-water aquifer which can be economically withdrawn and consumed each year for an indefinite period of time without depleting the source" (NDWR 1999:3-11).

3.6.1 Issues Identified for Analysis

- How would construction, O&M, and decommissioning affect surface waters, including water quality, quantity, and hydrologic behavior of surface waters?
- How would water consumption for dust abatement and panel washing affect surface and/or groundwater resources in the region (including effects on water rights)?
- How would construction, O&M, and decommissioning of the Project affect groundwater levels, contamination, or ability to recharge, including effects to groundwater basins?

3.6.2 Analysis Area and Methodology

The Water Resources Analysis Area encompasses the Indian Springs Valley and Amargosa Desert groundwater basins (Appendix A, Figure A-10). The Water Resources Analysis Area includes the approximately 5,133-acre Project footprint and encompasses the hydrologic unit code (HUC) 10 watershed that is relevant to potential surface water–impacting activities and the two above-named groundwater basins that are relevant to potential groundwater-impacting activities associated with the construction, operation, and decommissioning of the Proposed Action. The Groundwater Resources and Water Consumption Analysis Area is based on the assumption that water for construction and operation of the Proposed Action would be sourced from within the Indian Springs Valley groundwater basin, which is connected to the Amargosa Desert groundwater basin via a mega-channel. The Water Resources CEAA is defined as the Indian Springs Valley and Amargosa Desert groundwater basins (which is the same as the Water Resources Analysis Area).

3.6.3 Affected Environment

The Project Area is located in the Basin and Range region; specifically, within a transition zone between the Sonoran Desert to the south and the southern Great Basin to the north (both of which are sub-provinces of the Basin and Range province). The region is generally characterized by relatively narrow but elongated mountain ranges that are separated by sediment-filled valleys (Britannica 2023).

The climate in the Project Area is both arid and highly variable with elevation. Generally, climatic conditions in the region are characterized by hot, dry summers and warm, dry winters. Indian Springs, the closest community to the Project Area, has summer highs that average 100 degrees Fahrenheit (°F) and winter lows that average approximately 32°F. The town of Indian Springs, which is at a similar elevation to the Project Area, is estimated to have an average annual rainfall of about 6 inches, which generally occurs in the winter months (late November through early April) from Pacific frontal storms, and during the summer (July through September) due to the southwest monsoon season, in which moisture advects northward from the Gulf of Mexico and/or the Gulf of California. Precipitation in the winter tends to occur as widespread, long-duration, low-intensity storm events, whereas rainfall that occurs in the summer monsoon season is characterized by highly localized, short-duration, and high-intensity storm events (USGS 2010).

Surface Water

The Project Area is located at the distal end of multiple coalescing alluvial fans in the 8th-level HUC Sand Spring-Tikaboo Valleys Subbasin watershed (HUC8 – 16060014) and the 10th-level HUC Lower Indian Springs Valley watershed (HUC10 – 1606001419) (USGS 2023b). The Lower Indian Springs Valley is a closed basin and has no downstream surface water connections to other watersheds. The alluvial fans drain from several mountain ranges in the Toiyabe National Forest, primarily the Spring Mountains approximately 10 miles south of the Project Area. The ephemeral washes resulting from this drainage flow from south-southwest to north-northeast and are only present after significant rainfall events (Appendix A, Figure A-11). A large unnamed wash north of the Project Area and U.S. 95 conveys the surface water from the ephemeral flows to a dry lakebed (playa) that is topographically and hydrographically closed. The playa is located approximately 8 miles northeast of the Project Area on a portion of the Desert NWR that is within the Nevada Test and Training Range (Dudek 2023a).

Construction of the existing transmission lines and their access roads and U.S. 95 previously altered the historic hydrology within the Project Area, diverting some historic tributaries to new channels. Berms have been constructed south of U.S. 95 to divert flow from south of the highway through culverts to the north side of the highway. All culverts divert flow to a large unnamed wash that ultimately drains to the playa (Heritage 2024:56).

An aquatic resources delineation was conducted in February 2023 and determined that the ephemeral washes in the Project Area are not likely to be jurisdictional. Insufficient precipitation and well-drained soils preclude development of hydric soils and do not sustain hydric vegetation. The washes also either infiltrate prior to, or flow into the dry lake playa northeast of the study area. This playa has no connection to traditional navigable waters. A request for an approved jurisdictional determination (AJD) was submitted to the USACE on June 8, 2023. The USACE issued an AJD letter for the Project on January 11, 2024 (SPK-2021-00578) that states that all of the drainages and washes within the Survey Area are not WOTUS regulated under Section 404 of the Clean Water Act or under Section 10 of the Rivers and Harbors Act (USACE 2024).

In the Indian Springs Valley, named surface water features include Willow Creek, Cold Creek, Niavi Wash, and East Sandy Wash, and the unnamed surface water features include the washes and playas that are described above (Dudek 2023a:11, 49). All of the named and unnamed surface water features are ephemeral. There are also several springs present in the uplands of the

Spring Mountains and three springs present on the valley floor: Indian Springs, Cactus Springs, and an unnamed spring. However, none of these springs intersect the Project Area, and the closest of the three springs, the unnamed spring, is approximately 1 mile east of the eastern Project boundary (Dudek 2023a:11, 49; USGS 2023b).

Groundwater

The Project is located in the partially designated Indian Springs Valley groundwater basin (Basin 161). Designated basins are those with all permitted groundwater rights approaching or exceeding the estimated average annual recharge. The designated portion of the Indian Springs Valley groundwater basin consists of the area roughly south of U.S. 95 and is inclusive of the Project Area (NDWR 2021b). The Indian Springs Valley groundwater basin includes a total surface area of 671 square miles and has a perennial yield of 500 AFY. This perennial yield was established in NDWR's Report 54 in 1970 due to the discharge from the spring at Indian Springs being approximately 500 AFY in 1970. However, the Indian Springs Valley groundwater basin has 1,394 AFY of committed water to date, and actual pumpage within the Indian Springs groundwater basin has exceeded its assigned perennial yield for at least the last 30 years (NDWR 2024a). Despite historical pumping in the Indian Springs groundwater basin consistently exceeding its established perennial yield of 500 AFY, data from the most consistently monitored wells show that groundwater levels have either remained steady or increased over time (Dudek 2023a; USGS 2021). Report 54 also indicated that annual recharge to the Indian Springs Valley groundwater basin is 10,000 AFY. The Spring Mountains, which function as the primary recharge area for the Indian Springs Valley groundwater basin, have some of the highest rainfall totals in southern Nevada (NDWR 1970).

The Project Area is located in a part of the Indian Springs Valley groundwater basin that has been identified as sitting on a "mega channel" that is directly connected to Devils Hole, home of the endangered, endemic fish species, the Devils Hole pupfish. Devils Hole is located in a detached unit of Death Valley National Park and is adjacent to the Ash Meadows NWR, approximately 25 miles from the Project Area, which is also home to other groundwater dependent endemic, threatened, and endangered species. Devils Hole and Ash Meadows NWR are within the Amargosa Desert groundwater basin, and the Proposed Action is within the Indian Springs groundwater basin, however the mega channel connects the Indian Springs groundwater basin to the Amargosa Desert groundwater basin, and therefore the Ash Meadows NWR. While the mega channel does not directly intersect with the Project Area, a USGS study did find that there is a connection between pumping in the carbonate rock aquifer of the Indian Springs groundwater basin and water levels in Devils Hole (USGS 2020a, 2020b).

The mega channel is a carbonate rock aquifer that is extensive in size and highly transmissive. Because of the presence of the mega channel, drawdowns in Devils Hole and Ash Meadows NWR propagate quickly and recover slowly (USGS 2020a, 2020b). The development of groundwater pumping in the region has conflicted with the preservation of the Devils Hole pupfish for over 50 years. In the 1960s, concerns prompted an investigation by the USGS regarding water-level declines in Devils Hole that were sufficient for the U.S. Supreme Court to limit groundwater pumping in the Amargosa Desert groundwater basin in Cappaert v. United States, 426 U.S. 128 (1976). The limit was set such that a minimum pool elevation of 2.7 feet below an established reference point is maintained in Devils Hole. Water levels in Devils Hole are now managed by the State Engineer, and current standards are outlined in Order No. 1330 (State of Nevada 2022). The USFWS holds some of the most senior water rights in the Amargosa Basin, even more senior than the NPS's 1952 federal reserved water right at Devils Hole (Mayer et al. 2014). However, the potentiometric surface of the carbonate aquifer at Devils Hole is 14 to 159 feet higher in elevation than the elevations of the spring orifices on Ash Meadows NWR (Winnograd and Thordarson 1975). A small decline in the general potentiometric surface of the carbonate aquifer related to groundwater pumping from other areas may not affect spring flow measurably but may threaten to expose the spawning shelf at Devils Hole (Mayer et al. 2014). In this sense, the federal reserved water right for Devils Hole is the most sensitive and the most important water right in the area (Mayer et al. 2014).

In part due to concerns over groundwater dependent ecosystems like Devils Hole, the USGS developed the Death Valley Regional Groundwater Flow System model. The model was used to evaluate the effects of future groundwater pumping on the Death Valley groundwater system (USGS 2020a). Four groundwater pumping scenarios were considered in the evaluation. The base case scenario simulates the effects on the groundwater system if pumping were to remain at 2010 rates. Scenario A evaluates an increase in total pumping in the system by 13% of the base case, with additional wells in the Pahrump Valley and Amargosa Valley. Scenario B evaluates an increase in total pumping by 6% of the base case with the same well locations as Scenario A, plus two wells open to carbonate rock approximately 14 to 20 miles north of Devils Hole. Scenario C evaluates an increase in total pumping by 94% of the base case, with nine additional high-capacity wells at Indian Springs (USGS 2020a). In these simulated scenarios, Devils Hole fell below its federally mandated water level in 2078, 2073, 2058, and 2025, with respect to each modeled scenario described above (USGS 2020a).

3.6.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the current uses and trends for water resources would continue to occur, and there would be no impacts to surface water or groundwater resources due to the proposed Project.

Proposed Action

<u>Surface Water Resources</u>

Construction Impacts

Surface water features within the Project Area include the distal end of multiple coalescing alluvial fans and ephemeral washes that drain from the north side of the Spring Mountains (USFWS 2023d). Some of these ephemeral washes converge into a larger wash on the east end of the Project Area and all surface water ultimately drains through culverts to an unnamed wash on the north side of U.S. 95. The Project Area has been divided into three Buildable Areas for the solar arrays and ancillary facilities. Generally, only washes within the Buildable Areas would be modified due to installation of the Project, and sheet flow would be maintained where feasible so that water can exit the site within its natural contours (Dudek 2024a:35). Since the surface water flow within the Project Area is within a closed basin that drains to a playa, the primary impacts of the Project on surface waters would be erosion, sedimentation, and flooding.

Grading and removal of vegetation within the Project Area would alter some of these surface water features and change their drainage patterns. There are approximately 93 miles of ephemeral washes within the Project Area, and approximately 39 miles of ephemeral washes within the Buildable Areas would be directly impacted by construction; disruption to drainage patterns may increase the risk of flooding in the Project Area and alter downstream sedimentation. The soil K-factor (erosion factor) within the Project Area ranges from 0.05 to 0.46, but 97.9% of the Project Area has a K-factor of 0.34; this indicates that most of the Project Area has a moderate susceptibility to erosion. The effects of sedimentation would be most prevalent during construction due to active ground-disturbing activities. Along the gen-tie route, there would be minimal construction impact to ephemeral washes. APMs Geo-1 and WR-2 would minimize erosion and sedimentation risks created by the Project. Additionally, applicable design features in the Western Solar Plan (BLM and DOE 2012) would also be implemented. Appendix B lists the Western Solar Plan design features that are most relevant to the Project and surface water features, which include that facilities be constructed to minimize soil erosion, control water runoff, minimize land disturbance in natural drainage systems (i.e., ephemeral washes), provide space between facilities and natural washes to preserve hydrologic function, avoid excessive grades on ditches and drainages, and to implement monitoring measures and respond to impacts on soil resources during construction, operations, and decommissioning (SR2-1), along with reducing the number of stream crossings (ER2-1).

Flood risk is most likely in the Buildable Areas of the Project. However, according to the Federal Emergency Management Agency (FEMA), the Project Area is within Zone X, an area of minimal flood hazard outside of the 500-year flood (FEMA 2023). Therefore, the potential for flooding would also only be present during major rainfall events.

Direct impacts to surface water in the Project Area during construction would be minimized through the retention of 50% vegetation cover and D-3 disturbance levels (grading and soil removal) being limited to 1,027 acres (20% of the Application Area and 43% of the Buildable Areas). By minimizing grading and keeping vegetation in place, more natural surface water flow is retained, and less erosion potential is created. Additionally, an Erosion Control and Stormwater Drainage Plan identifying site-specific erosion control techniques and BMPs would be developed and implemented for the Project. APMs Geo-1, WR-1, and WR-2 and Western Solar Plan design features ER2-1 and WR3-1 would also minimize impacts to surface waters in the Water Resources Analysis Area (Appendix B).

Cactus Springs, Indian Springs, and the unnamed spring that exist outside the Project Area would also experience impacts from the development of the Proposed Action, specifically the Project's water demand (see Table 3-27). The Applicant proposes to drill a water well to serve as the primary water source during construction and operation of the Project. If necessary, water could be trucked onto the site. As part of the Project's *Water Supply and Demand Analysis and Groundwater Resources Impact Evaluation* (Dudek 2023a), predicted drawdown at the closest spring to each potential Project water source was calculated. The unnamed spring is the closest spring to the Project, approximately 29,831 feet away from the proposed on-site well, and the spring would experience an estimated drawdown of 0.51 feet. Indian Springs is the closest spring to the existing off-site well, approximately 1,532 feet away, and would experience an estimated drawdown of approximately 1.61 feet. These estimates are based on each location providing the full Project water demand and do not take into account groundwater recharge. Therefore, the drawdown estimates represent a worst-case scenario of drawdown. Additionally, following the high volume and rate of water pumping during construction, groundwater levels would have the opportunity to recover during O&M (Dudek 2023a: Table 7).

During construction, there is potential for the release of hazardous materials such as fuel, herbicide, and other chemical spills. Any potential spills would be a surface water quality concern that would be managed in accordance with the Project's Spill Prevention, Control, and Countermeasures Plan (SPCC) and erosion control and stormwater drainage plan. The plans would include measures to be taken to minimize the effects of hazardous materials releases on water quality. Any herbicide used as part of the Project would be managed by the Project's Pesticide Use Plan to ensure that water quality is protected. APM Haz-1 and Western Solar Plan design feature Haz-1 would minimize impacts from hazardous wastes (Dudek 2024a).

Operations and Maintenance Impacts

The ephemeral washes within the fenced solar array area would be altered for the installation of the solar arrays, the on-site substation, and other ancillary facilities. Within the Application Area, 1,027 acres would be subject to D-3 disturbance, clearing, grading, and soil compaction. Approximately 1,386 acres would remain relatively intact, i.e., only be disturbed by a single pass of drive and crush (D-1) or multiple passes (D-2). During operation, the potential for sedimentation would be reduced due to the lack of ground-disturbing activity but the potential for flooding both in the Project Area and in the surrounding landscape would still be present during major rainfall events. Due to this risk, the Project would be designed to protect against 100-year, 24-hour flood events (Dudek 2024a:35).

Decommissioning Impacts

Decommissioning and reclamation of the solar facility following its productive life would include removing all Project components and restoring the site to its natural condition. Specific activities and plans would be described in a Site Restoration Plan. During decommissioning, erosion impacts would be similar to construction, and the same protocols and BMPs described in the Erosion Control and Stormwater Drainage Plan and the APMs would be implemented to minimize impacts. The Project Area would be recontoured and revegetated to its natural conditions. Additionally, Western Solar Plan design feature WR4-1 (Appendix B) would also be implemented to minimize and monitor water resources impacts associated with reclamation and decommissioning activities.

<u>Groundwater Resources</u>

Construction and Operations and Maintenance Impacts

Water for construction and O&M of the Proposed Action would primarily be sourced from an on-site water well (Appendix A, Figure A-10) from existing unused allocations through a point of diversion application that would be approved through the Nevada State Water Engineer. In order for the Applicant to develop an on-site well, the Indian Springs Water Company filed point of diversion applications for the Project with the Nevada State Water Engineer in March 2024 (NDWR 2024a, 2024b). However, if the on-site water well does not produce at the necessary capacity, an off-site water source would be used as a supplement to the on-site water source. The water rights for the on-site well would likely be purchased from the Indian Springs Water Company (ISWC) or could be imported from outside the Indian Springs Valley Hydrographic Area (Basin Number 10-161) (Dudek 2024a). Construction and use of the groundwater well would then also require a Change in Use, Manner of Use, and Point of Diversion from the State Engineer. A more detailed description of this process is described in the *Water Supply and Demand Analysis and Groundwater Resources Impact Evaluation* prepared for the Bonanza Solar Project (Dudek 2023a). By purchasing existing water rights from the ISWC, the Project would make use of currently unused appropriations at ISWC, and no new appropriations within the Indian Springs Valley groundwater basin would be required for the Project. However, since ISWC and others would likely continue to pump a similar volume of water each year, the Project would contribute additional annual pumpage in the basin. Overall, pumpage within the Indian Springs Valley groundwater basin has decreased over the last decade, with total pumpage of 702 AFY in 2010 and total pumpage of 552 AFY in 2022 (NDWR 2010a, 2022a).

The water needed for each phase of the Project is shown in Table 3-27.

Table 3-27. Bonanza Solar Project Water Demand

Project Phase	Water Use	Estimated Water Demand
Construction (20 months)	Soil compaction, dust control, concrete batch plant (if needed), and sanitary needs for construction workers	250–325 acre-feet
O&M	O&M facility, fire suppression, and other miscellaneous uses	1 AFY
Decommissioning	Dust control and sanitary needs for construction workers	250 acre-feet
Total Water Demand		540–615 acre-feet

Source: Dudek (2024:85).

There would be direct, localized impacts to groundwater levels in the Indian Springs Valley groundwater basin due to the on-site water well and indirect impacts to Devils Hole via the mega channel. The localized impacts to groundwater levels would result from the drawdown associated with pumping water from a new well within the Application Area. The drawdown associated with the on-site well would be deepest at the well and would decrease radially out to a distance where the drawdown impact would no longer be noticeable. Drawdown calculations were completed for the Project, and groundwater level decline following construction was estimated to be less than 5 feet at the on-site well and 1 foot at a distance of 7,850 feet from the well. Annual groundwater level decline during O&M was estimated to be less than 0.1 foot at the well (Dudek 2023a:26). These estimates do not take into account groundwater recharge and, therefore, represent a worst-case scenario of drawdown. Additionally, following the high volume and rate of water pumping during construction, groundwater levels would have the opportunity to recover during O&M. The results of modeling also showed less than 1 foot of drawdown at the closest existing off-site wells due to the on-site water well and an insignificant reduction in groundwater in storage (Dudek 2023a:26). Additionally, since annual recharge to the Indian Springs groundwater basin is likely higher than its perennial yield, as described above, this water use would still be within a sustainable volume for the basin.

Indirect impacts to groundwater due to the on-site well would include impacts to groundwater dependent ecosystems at Ash Meadows NWR and Devils Hole. The minimum water level in Devils Hole as mandated by the U.S. Supreme Court is 2.7 feet below an established reference point (USGS 2020a, 2020b). If water were to fall below this level, it would interrupt the spawning of the endangered, endemic Devils Hole pupfish, which would critically impact the species (USGS 2020a). In the 2020 Death Valley Groundwater Flow Model, water levels in Devils Hole were predicted to fall below the minimum water level by 2078 in the modeled base case, which assumes 2010 rates of pumping across the geographic reach of the model. However, the Indian Springs area was shown in the model's base case to only have a minor contribution to the decline. Halford Hydrology (2023) used the Death Valley Groundwater Flow Model Version 3 to run a simulation of the proposed on-site well. In the model run by Halford Hydrology (2023), pumping at the Project's on-site water well resulted in 0.007 foot or less of water level drawdown at Devils Hole due to the Project (Dudek 2023a:Attachment A). While this value is small to the point of being unmeasurable on the device installed at Devils Hole, it is not necessarily a negligible impact on the Devils Hole ecosystem. Since the base case scenario sees Devils Hole reaching its minimum water level by 2078, any increase in pumping in the system is potentially contributing to expediting this timeline, as is demonstrated in scenarios A, B, and C in the Death Valley Groundwater Flow Model (USGS 2020a). This would occur even though the Indian Springs groundwater basin has lower pumpage rates in 2022 compared to 2010, because it is not the only basin contributing to the predicted decline in the system connected to Devils Hole.

In the case that an off-site water source is needed to supplement the on-site well, the water would be purchased from the ISWC and sourced from ISWC well 2, approximately 4.5 miles from the eastern Project Area boundary (Appendix A, Figure A-10). The ISWC has 798 AFY of water rights and used 265 AFY of their allocation in 2022; therefore, their unused allocation should be able to support a transfer of water rights for the Project's on-site well and supplement the Project with off-site water. There would be direct, localized impacts to groundwater levels in the Indian Springs Valley groundwater basin due to use of off-site water and indirect impacts to Devils Hole via the mega channel. If all the water needed for the Project were to come from the off-site well, the estimated drawdown would be less than 2 feet at the closest well, approximately 1,731 feet away, and 1 foot at 7,850 feet away (Dudek 2023a:26). These estimates do not take into account groundwater recharge and, therefore, represent a worst-case scenario of drawdown. Additionally, following the high volume and rate of water pumping during construction, groundwater levels would have the opportunity to recover during O&M. Groundwater storage impacts associated with the off-site water source are expected to be similar to the sole use of an on-site well.

Use of off-site water would also have an indirect impact to groundwater dependent ecosystems at Ash Meadows NWR, and specifically Devils Hole. The proposed on-site well is approximately 27.5 miles from Devils Hole, while the off-site water source is approximately 35.5 miles from Devils Hole. While the off-site well is slightly farther away from the Ash Meadows NWR than the proposed on-site well, and since modeling has not been completed for use of water from an off-site well, it is assumed that drawdown impacts at Devils Hole and the Ash Meadows discharge area would be similar to the impacts of sourcing all water from the on-site well (Dudek 2023a).

The Western Solar Plan (BLM and DOE 2012) design feature WR3-1 (Appendix B) would implement monitoring using adaptive management strategies to ensure long-term water use does not contribute to the long-term decline of ground water levels through O&M of the Project.

Decommissioning Impacts

During decommissioning, groundwater pumping would be similar to that of construction both in volume and rate. Impacts of decommissioning are considered above in the modeled local drawdown and the modeled water level decline at Devils Hole. Following decommissioning, the on-site water well would be removed, additional pumping at the off-site well would cease, and the groundwater system at the Project would undergo annual recharge without continued pumping from the Project.

The Western Solar Plan (BLM and DOE 2012) design feature WR4-1 would continue groundwater monitoring during decommissioning and reclamation.

Alternative 1

Surface Water

Construction Impacts

The potential impacts of the construction of Alternative 1 would be similar to those described for the Proposed Action; however, reducing heavy surface disturbance and grading to 482 acres and retaining 75% vegetation cover in the Project Area would better preserve natural surface hydrologic processes. Having greater vegetation cover, retaining the natural channels of ephemeral washes, and continuing natural surface water flow patterns would reduce erosion potential during construction, therefore decreasing potential downstream sedimentation. Decreased sedimentation downstream would also reduce flooding potential during construction. No flood control features would be implemented under Alternative 1. Overall, surface water impacts of Alternative 1 would be reduced compared to the Proposed Action.

Alternative 1 also includes relocation of 120 acres of an NDOT mineral material site immediately to the east of the Application Area (Appendix A, Figure A-4). This new surface disturbance of 120 acres would disrupt surface water flow over the life of the active mineral material activities, resulting in a long-term adverse impact to surface water resources. Overall, Alternative 1 would have similar surface hydrology impacts compared to the Proposed Action.

Operations and Maintenance *Impacts*

The potential impacts for O&M of Alternative 1 would remain similar to those described for the Proposed Action; however, retaining 75% vegetation cover in the Project Area would better preserve natural surface hydrologic processes. This may reduce the risk of flooding during the O&M phase of the Project. Flooding would still only present a risk during significant rainfall events in this scenario.

Decommissioning Impacts

The potential impacts of decommissioning Alternative 1 would remain similar to those described for the Proposed Action and would be comparable to the construction impacts of Alternative 1.

Groundwater

Construction, Operations and Maintenance, and Decommissioning Impacts

The potential impacts of Project construction, maintenance, and decommissioning activities for Alternative 1 would remain the same as those described in the Proposed Action because the estimated water use is the same across the Proposed Action and Action Alternatives. Therefore, impacts to groundwater would be the same.

Alternative 2 (BLM Preferred Alternative)

Surface Water

Construction Impacts

The potential impacts of the construction of Alternative 2 would be similar to those described for the Proposed Action; however, reducing heavy surface disturbance and grading to 592 acres and retaining 65% vegetation cover in the Project Area would better preserve natural surface hydrologic processes. Having greater vegetation cover, retaining the natural channels of ephemeral washes, and continuing natural surface water flow patterns would reduce erosion potential during construction, therefore decreasing potential downstream sedimentation. Decreased sedimentation downstream may also reduce flooding potential during construction. No flood control features would be implemented under Alternative 2. Overall, surface water impacts of Alternative 2 would be reduced compared to the Proposed Action.

Alternative 2 also includes relocation of 120 acres of an NDOT mineral material site immediately to the east of the Application Area (Appendix A, Figure A-4). This new surface disturbance of 120 acres would disrupt surface water flow over the life of the active mineral material activities, resulting in a long-term adverse impact to surface water resources. Overall, Alternative 2 would have similar surface hydrology impacts compared to the Proposed Action.

Operations and Maintenance Impacts

The potential impacts for O&M of Alternative 2 would remain similar to those described for the Proposed Action; however, retaining 65% vegetation cover in the Project Area would better preserve natural surface hydrologic processes. This may reduce the risk of flooding during the O&M phase of the Project. Flooding would still only present a risk during significant rainfall events in this scenario.

Decommissioning Impacts

The potential impacts of decommissioning activities for Alternative 2 would remain the same as those described for the Proposed Action; therefore, impacts to groundwater would be the same.

<u>Groundwater</u>

Construction, Operations and Maintenance, and Decommissioning Impacts

The potential impacts of Project construction, maintenance, and decommissioning activities for Alternative 2 would remain the same as those described in the Proposed Action; therefore, impacts to groundwater would be the same.

Alternative 3

<u>Surface Water</u>

Construction Impacts

Generally, the potential construction impacts of Alternative 3 would remain similar to those under the Proposed Action; however, the configuration of the five Buildable Areas changes the volume and location of the ephemeral washes that would be impacted. There are approximately 93 miles of ephemeral washes within the Project Area, and approximately 44 miles of ephemeral washes within the Alternative 3 Buildable Areas would be directly impacted by construction; the additional disruption to drainage patterns may increase the risk of flooding in the Project Area and alter downstream sedimentation. As compared to the Proposed Action, reducing heavy surface disturbance and grading to 648 acres and retaining 65% vegetation cover in the Project Area would better preserve natural surface hydrologic processes. Flood control features within the fenced Buildable Areas would be incorporated in the Project's final design and would reduce the risk of flood.

Alternative 3 also includes relocation of 93 acres of an NDOT mineral material site immediately to the east of the Application Area (Appendix A, Figure A-5). This new surface disturbance of 93 acres would disrupt surface water flow over the life of the active mineral material activities, resulting in a long-term adverse impact to surface water resources. Overall, Alternative 3 would have similar surface hydrology impacts compared to the Proposed Action.

Operations and Maintenance Impacts

The potential impacts for O&M of Alternative 3 would remain similar to those described for the Proposed Action; however, retaining 65% vegetation cover in the Project Area would better preserve natural surface hydrologic processes and constructing flood control features may reduce the risk of flooding during the O&M phase of the Project. Flooding would still only present a risk during significant rainfall events in this scenario.

Decommissioning Impacts

The potential impacts of Project construction, maintenance, and decommissioning activities for Alternative 3 would remain the same as those described in the Proposed Action; therefore, impacts to groundwater would be the same.

Groundwater

Construction, Operations and Maintenance, and Decommissioning Impacts

The potential impacts of Project construction, maintenance, and decommissioning activities for Alternative 3 would remain the same as those described in the Proposed Action; therefore, impacts to groundwater would be the same.

3.7 Cultural Resources and Native American Concerns

The classification of a cultural resource for this EIS/RMPA includes all districts, sites, buildings, structures, and objects that have been created by or are associated with humans and are considered to have historical or cultural significance. This section analyzes impacts to cultural resources within the context of NEPA and NHPA, including issues identified for analysis, regulatory background, analysis area and methodology, affected environment, effects, and measures to avoid, minimize, and/or mitigate adverse effects to cultural resources.

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties. The proposed Project is considered a federal undertaking subject to the compliance requirements of Section 106 of the NHPA. This cultural resources section was completed in partial fulfillment of the BLM's responsibility under Section 106.

3.7.1 National Environmental Policy Act Substitution

The ACHP allows federal agencies to complete NHPA compliance requirements in coordination with NEPA requirements, when needed, through a process known as substitution under regulation 36 CFR 800.8(c) of the NHPA. For the Bonanza Solar Project, the BLM has chosen to utilize Substitution, which allows federal agency officials to use the process and documentation required for the preparation of an environmental assessment (EA)/Finding of No Significant Impact or an EIS/ROD to comply with Section 106 in lieu of procedures set forth in 36 CFR 800.3 through 800.6. Given this, this EIS satisfies requirements of NHPA and NEPA for cultural resources as the prepared environmental document includes: identification of consulting parties including the SHPO, Tribal Historic Preservation Officers (THPOs), ACHP, and Native American Tribes; identification of historic properties and assessment of undertaking effects to such properties using standards and criteria outlined in the NHPA; consultation with identified parties on effects to historic properties during NEPA scoping, environmental analysis, and preparation of the draft EIS (see Section 5.2 Consultation and Coordination); involvement of the public consistent with the agency's NEPA procedures; and development of alternatives and proposed measures that might avoid, minimize, or mitigate any adverse effect to historic properties (36 CFR 800.3–800.5 and 800.8). Additionally, applicable design features in the Western Solar Plan (BLM and DOE 2012) would also be implemented as discussed in the environmental consequences section below.

Following publication of a draft EIS, and during the allotted comment period, consulting parties and/or the ACHP can object to the BLM that the EIS does not meet standards set forth in 36 CFR 800.8(c) and/or that the resolution of the effects on historic properties proposed in the EIS are inadequate. If such objections are received by the BLM the matter would be referred to the ACHP.

After publication of a Final EIS, the agency may approve the undertaking through a ROD, which must include binding commitment measures to avoid, minimize, or mitigate adverse effects (36 CFR 800.8(c)(4)). If the ROD makes a binding commitment to impose measures to resolve adverse effects, then neither a memorandum of agreement nor a programmatic agreement would be necessary for the undertaking.

3.7.2 Issues Identified for Analysis

- How would cultural resources be affected by physical, vibrational, visual, auditory, atmospheric, and cumulative changes to the environment due to Project-related construction, O&M, and decommissioning?
- Are there sacred sites, traditional cultural properties (TCPs), cultural landscapes, or other resources with importance to Tribes that could be affected by construction, operation, maintenance, and decommissioning of the Bonanza Solar Project?

National Historic Trails are not present for this Project and details of that determination are discussed in Appendix C.

3.7.3 Analysis Area and Methodology

Analysis Area

As defined under Section 106 of the NHPA, the area of potential effects (APE) is a geographic area or areas within which impacts from an undertaking may affect cultural resources that are listed in or eligible for the National Register of Historic Places (NRHP) (i.e., historic properties). As the lead federal agency, the BLM would determine the APE, in consultation with the SHPO and ACHP, by considering potential impacts to historic properties from the construction, operation, maintenance, and decommissioning of the proposed Project. Consultation is still ongoing, and the APE will not be finalized until a BLM preferred alternative is identified in the final EIS/RMPA, if different from Alternative 2 in this draft EIS/RMPA.

Thus, for the purposes of preparing the draft EIS/RMPA, the BLM has established Cultural Resources Analysis Areas (CRAAs) based on the level of identification appropriate to the type of effect. The CRAAs account for potential, as well as cumulative, impacts from implementation of the Project that could result in adverse effects on historic properties (i.e., cultural resources that qualify for the NRHP) as defined under 36 CFR 800.5(a)(1), Criteria of Adverse Effect.

The CRAA for physical and temporary vibrational effects, the Class III (CIII) CRAA, consists of the approximately 5,133-acre Application Area (plus a 100-foot buffer) encompassing the planned solar PV facility, BESS, gen-tie, and associated access roads, plus 120 acres of the NDOT mineral material replacement area falling outside of the Application Area (Appendix A, Figure A-12). Vibrational effects for the Project are anticipated to be temporary and confined to areas within the CIII CRAA where construction is being conducted.

The analysis area for visual, auditory, and atmospheric effects, the Class I (CI) CRAA, is defined as the Application Area and a 15-mile buffer extending from it, encompassing the probable extent of where changes from the Project would be most visible relative to cultural resources (Appendix A, Figure A-12). Rationale for defining the CI CRAA is presented below. The viewshed analysis (described below) covers the largest area around the Application Area (at 15 miles from the Application Area); therefore, this buffer was used to define the CI CRAA.

Visual Methodology

A viewshed analysis was conducted using digital elevation and topographic data to determine if the Project would have the potential to alter the visual setting of any historic property. The BLM's VRM system provides the foundation for defining distance zones based on relative visibility from travel routes or observation points, as described in Manual H-8410-1, Visual Resource Inventory (VRI) (BLM 1986a). The BLM typically defines distance zones as Foreground/Middleground (less than 3–5 miles), Background (3–5 miles, up to a maximum of 15 miles based on atmospheric conditions), and Seldom Seen (portions of the landscape that are not visible or typically distances greater than 15 miles). These definitions are used as a framework for the contrast analysis in the *Bonanza Solar Project Visual Resources Study* (Visual Resources Report; Dudek 2024b) and this EIS/RMPA.

The Visual Resources Report includes a viewshed analysis that extends to areas over 20 miles away from the Project to illustrate where in the surrounding landscape the project components would theoretically be visible (Dudek 2024b:3-4). The model indicates where theoretical direct line-of-sight views may occur between terrain locations and observer points used to represent the locations and heights of project components. The model is based on elevation and landform and does not account for vegetation, existing structures, and other landscape elements that could obstruct views (Dudek 2024b).

Adverse effects to historic properties could occur within the Background distance zone, so the 15-mile CI CRAA was established for analysis, based on the supporting GIS viewshed analysis. The BLM also used the results of the Visual Resources Report (Dudek 2024b) to help analyze visual impacts to cultural resources. Resources that have previously been evaluated as eligible for inclusion in the NRHP, and with visual contributions to their overall eligibility, were considered with this 15-mile APE. Any resources that were previously determined not eligible or have unknown/unevaluated status were excluded.

It is noted that digital elevation models used for viewshed analysis rely on average elevations. Given this, in-person confirmation of visibility was attempted at NRHP-eligible sites, with visual contributions to their overall eligibility, within the CI CRAA viewshed when possible. Further discussion on which NRHP-eligible sites were identified, and whether in-person confirmation was conducted, is presented below.

Auditory Methodology

A 100-foot buffer around the Application Area, including access routes, was deemed sufficient for identifying potential auditory effects. A noise analysis was prepared for the Project and the results of the analysis concluded noise impacts at the sensitive receptors closest to the Project

Area would be low to inaudible (Dudek 2022). Additional noise analysis is presented in EIS/RMPA Section 3.12.

Atmospheric Methodology

Atmospheric effects include any additions to the atmosphere that are produced by the operation of the Project. Any atmospheric additions would need to be considered in relation to the current levels within the APE. A Visual Contrast Rating System (BLM 1986a) was used to determine the degree of contrast of the proposed Project on the setting of any historic properties from defined key observation points (KOPs). The details of the visual contrast analysis are provided in EIS/RMPA Section 3.10. In summary, weak to moderate contrasts were identified for the Project.

Air quality impacts were also used to inform atmospheric effects and are presented in EIS/RMPA Section 3.8. Air quality in the area appears to be good to moderate with consideration of the nearby highway U.S. 95. The Project is designed to generate clean energy and as such would not substantially change the air quality. Construction would temporarily increase pollutants, including dust and emissions from equipment during construction. Design features would be put in place to minimize fugitive dust emissions (see Appendix B). This increase would be localized to the project vicinity and is not expected to extend beyond 3 miles from the Application Area. Atmospheric effects from the proposed construction methodology are assumed to be negligible.

Methodology

Pursuant to its obligation under the Section 106 review, the BLM must make a “reasonable and good faith effort” to identify and inventory historic properties that may be affected by implementation of the proposed Project as a federal undertaking (36 CFR 800.4(b)(1)). The cultural resources inventory encompassed approximately 5,918 acres of BLM-administered land to evaluate potential effects from the Project and associated linear facilities. The results of the inventory—which included an archival literature review, an intensive Class III pedestrian survey, and a visual assessment of CI CRAA—are presented in a report prepared by Dudek (Giacinto et al. 2024) and are briefly summarized below. Consulting parties identified for Section 106 review (see Section 5.2.2) will be provided with the Giacinto et al. (2024) report so that full methodology for identifying and inventorying historic properties may be understood.

3.7.4 Affected Environment

This section discusses the affected environment in the CRAAs as related to cultural resources that may be impacted by the proposed Project and associated relocation of the NDOT mineral materials sites. The affected environment includes past actions as they have contributed to existing conditions. The CRAAs are within the Northern Mojave Desert, near the eastern margin of the Great Basin section of the Basin and Range physiographic province, in southern Nevada. The Application Area lies within Indian Springs Valley north of the Spring Mountains and south of the Spotted Range, approximately 43 miles northwest of Las Vegas and directly west of Indian Spring, Nevada. This area falls within the Southern Great Basin cultural area near the divide between the Southwestern and Southeastern subregions. The following contextual information for cultural periods is drawn from Dudek's Class III report (Giacinto et al. 2024: 16–25).

Precontact Period (ca. 14,500 to 150 years before present)

Before European contact, the area was occupied from the Paleoarchaic through the Late Archaic periods (ca. 12,800 to 150 years before present). These early occupants were hunter-gatherer groups of low population density that utilized large conveyance zones to collect raw materials and exploit large and small game. In the Archaic periods, Great Basin groups transitioned to a more diverse, "broad spectrum" diet that utilized lower-ranked plant and animal resources from a variety of habitats using various levels of efficiency in capture, processing, and transportation. Populations increased throughout the Archaic periods, and by the Late Archaic residential permanence and intensified exploitation of specific resources is observed in varying degrees in different parts of the Great Basin.

Ethnohistoric Period (ca. 150 years before present to present day)

The land in and around the Application Area was traditionally, and is currently, occupied by Nuwuvi (Southern Paiute) and Newe (Western Shoshone). Geographical divisions between these groups were often fluid and not all-encompassing of each group's territory. Within the general Project Area, Nuwuvi (Southern Paiute) territory is largely considered to be lands east of the intersection between U.S. 95 and State Route 160, while Newe (Western Shoshone) territory is largely considered to be lands west of that intersection. However, there is a high amount of territory overlap in and around the Application Area, including areas north of the Spring Mountains which was likely used by both groups into the present day.

Historic Period (European contact to present)

Indian Springs Valley was quiet until after the Civil War. Mining and exploration were the dominant activities during the late nineteenth century, including Lieutenant Wheeler's 1869 expedition which mapped the valley where the Project has been proposed. Mining-related resources in the area are limited to early local roads associated with access into the mountains north and south of the Application Area. The Johnnie Mining District, located approximately 4 miles southwest of the Application Area in the northwestern portion of the Spring Mountains, was established in 1890 and represents the earliest and closest of the mining districts of Nevada. With the expansion of mining activity, various railroad lines were developed in the surrounding area during the early to mid-twentieth century including the Tonopah and Tidewater Railroad and the San Pedro, Los Angeles & Salt Lake Railroad. Also at that time, plans for the U.S. highway system included expansion of U.S. 95 into Nevada, which was approved in 1940 and included a stretch of highway through Indian Springs north of the Application Area. Expansion of the highway system coincided with establishment of the Las Vegas Bombing and Gunnery Range near Indian Springs for training purposes during World War II. The range was designated the Indian Springs Air Force Base in 1942 following the attack on Pearl Harbor, and was eventually named Creech Air Force Base in 2005.

Cultural Resource Analysis

The inventory conducted for the Project identified 10 cultural resource sites within the extent of the CIII CRAA, of which one was previously recorded and nine were newly identified (Giacinto et al. 2024:43) (Table 3-28). The previously recorded site has been determined ineligible for the NRHP, while eight of the nine newly identified resources are recommended ineligible for the NRHP. The ninth, a Tribally identified trail (26CK11556), is recommended as an unevaluated component of a larger trail running east-west through Indian Springs Valley, and thus could be treated as eligible for the NRHP in accordance with BLM cultural resources management directives. However, Section 106 consultation on resource evaluations is ongoing until finalization of the EIS/RMPA. The Tribally identified trail (26CK11556) is east-west-trending, following the U.S. 95 corridor in Indian Springs Valley. During a field visit, Tribal representatives consulted for the Project voiced interest and concern for protecting the trail; however, they did not identify the trail as being a TCP or having association with cultural landscapes discussed below.

Table 3-28. Cultural Resources Identified in the Cultural Resources Analysis Areas

Resource Identification	Resource Age	Resource Description	NRHP Eligibility	Within CIII CRAA?	Within CI CRAA?
26CK3909	Multicomponent	Precontact lithic scatter; historic-era artifact scatter	Determined ineligible	Yes	Yes
26CK11548	Historic-era	Artifact scatter	Recommended ineligible	Yes	Yes
26CK11549	Precontact	Lithic scatter	Recommended ineligible	Yes	Yes
26CK11550	Historic-era	Artifact scatter	Recommended ineligible	Yes	Yes
26CK11551	Historic-era	Artifact and feature scatter	Recommended ineligible	Yes	Yes
26CK11552	Precontact	Lithic segregated reduction locus	Recommended ineligible	Yes	Yes
26CK11553	Precontact	Lithic segregated reduction locus	Recommended ineligible	Yes	Yes
26CK11554	Historic-era	Artifact scatter	Recommended ineligible	Yes	Yes
26CK11555	Precontact	Lithic segregated reduction locus	Recommended ineligible	Yes	Yes
26CK11556		Trail	Unevaluated pending additional Tribal consultation	Yes	Yes
26NY12489	Modern / Ethnographic	Peace Camp nuclear protest site	Determined eligible (Criteria A, C, and D)	No	Yes
26CK5843	Precontact	Rockshelter, rock writing, and lithic scatter	Determined eligible (Criterion D)	No	Yes

In that 15-mile CI CRAA, two historic properties were identified (see Table 3-28), consisting of a nuclear protest site commonly referred to as “Peace Camp” (26NY12489), and a rockshelter and rock writing site (26CK5843).

Peace Camp (26NY12489) is located approximately 2.7 miles west of the Application Area. The site was determined eligible for the NRHP in 2010 for its association with protest activities occurring at the Nevada Test Site to the north. In-person observations indicate that on-site vegetation and topographic relief surrounding the site obscure visibility of the solar array

(Giacinto et al. 2024:67). Even if visible, the Project is not within line-of-sight between Peace Camp and the Nevada Test Site, which is the primary theme used for establishing the site's significance for the NRHP. Given this, the Project would not introduce any visual impacts that would affect Peace Camp's integrity.

The rockshelter and rock writing site (26CK5843) is located approximately 11 miles northeast of the Application Area within Nellis Air Force Range. It consists of a north-facing rockshelter with precontact tools and features that may contain data capable of addressing research questions relating to habitation, chronology, and broader archaeological patterns, and thus was determined eligible for the NRHP. As those eligibility characteristics do not pertain to the visual environment, visibility of the Project would not impact the site's integrity (Giacinto et al. 2024:67). In-person observations of visibility are not possible given restricted access to Nellis Air Force Range. However, considering the rockshelter faces north, it is not likely that the solar array is visible from the interior or mouth of the shelter where Indigenous peoples would have been residing. It is more likely that the viewshed analysis is identifying areas on top of the geologic landform where heightened elevation would allow for visibility (Giacinto et al. 2024:68).

3.7.5 Native American Concerns

In addition to analyses of effects to cultural resources, consultation efforts with Native American governments were conducted throughout the EIS process (see Sections 5.2.2, Section 106 Consultation; 5.2.3, Government-to-Government Consultation; and 5.2.4, Other Tribal Coordination) including asking Tribes to share indigenous knowledge and relevant information about sacred sites, TCPs, cultural landscapes, and/or natural resources that could be affected by Project construction, operation, maintenance, and decommissioning. Tribes were asked to consult on areas primarily within the CRAAs; however, concerns outside of the CRAAs were also addressed to make sure Project activities would not impact items of Tribal concern. Although Tribes did not describe any sacred sites or TCPs in the Project Area, Tribes did express interest in cultural landscapes in the areas surrounding the CRAAs, including those in proximity to the Salt Song Trail, the Spring Mountains, and the Sheep Mountain Range Archaeological District, as well as natural resources consisting of water sources, flora, and Mojave desert tortoise within the Project Area.

Cultural Landscapes

The NPS defines a cultural landscape as: "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person, or exhibiting other cultural or aesthetic values" (NPS 2023). For Native American Tribes, cultural landscapes can represent areas where their ancestors, and/or descendants, inhabit, congregate, utilize or collect resources, interact with the natural world, or perform religious gatherings and ceremonies, and that provide teaching opportunities that continue their way of life. Physical sites are formed through use of the landscape, but cultural landscapes themselves can be much larger than what is found in the archaeological record. According to oral traditions, Native American Tribes in Nevada have existed in this land since the beginning of time (d'Azevedo 1986:262-283 and 368-397). In a way, the entirety of Nevada could be considered a cultural landscape as Tribes have likely used all areas at some time. However, an overly broad view of landscape importance does not provide a reasonable method of management or protection, which is why physical manifestations of landscape use (i.e., resource sites) are the primary target for preservation. It is through consultation and collaboration that government agencies balance the need to preserve the intrinsic value a cultural landscape has to Tribes with the desire to develop public lands in a way that benefits all who live in the region.

Salt Song Trail

The Salt Song Trail is not considered a historic property for the purposes of Section 106 of the NHPA, but it is a physical and metaphysical corridor with cultural importance and is often mentioned in reference to known and potential TCPs (Deur and Confer 2012). The Salt Songs are sacred to the Nuwuvi (Southern Paiute) and are sung for various ceremonies and in times of mourning. These songs reference many places within the spiritual and physical landscape throughout traditional Nuwuvi territory and retrace trails and journeys between these locations (Cultural Conservancy 2023). The precise locations and extents of the Salt Song Trail and associated sites have not been thoroughly documented at present but places near the Application Area include Nuva Kaiv (Charleston Peak, approximately 19 miles south). The trail has primarily been described through oral tradition, which indicates it extended from the area around Ash Meadows south toward present-day Pahrump (Cultural Conservancy 2023; Giacinto et al. 2024:68). That description places the trail west of Application Area by approximately 30 miles.

Spring Mountains

The Spring Mountains is also not considered a historic property, but numerous historic properties have been recorded within the Spring Mountains cultural landscape. It contains an array of resource procurement areas and places of religious importance to Tribes in the region, including Mount Charleston and the Twin Sisters peaks. Trails to and from the Spring Mountains have been documented in physical locations and in ethnographic accounts. Likewise, the study of cultural landscapes around the Project provides ethnographic accounts from Tribal members of the importance of gathering locations, travelways, power places, and pilgrimage routes between and within the Desert Range, Sheep Range, Spring Mountains, Indian Springs Valley, and Mercury Valley (Stoffle et al. 2022). Those ethnographic accounts provide invaluable insight into past lifeways, some of which can be corroborated through the archaeological material record and others which stand as testament to oral histories and shared experiences of Native Americans. No physical trails leading to or from the Spring Mountains have been documented as cultural resources inside, or in the near vicinity, of the Application Area as part of archaeological investigations (Giacinto et al. 2024). A travelway extending from Cactus Springs, Nevada, to the Spring Mountains was voiced by Native American Tribes as a route of Tribal importance; however, this travelway exists as part of a larger network of travelways in the region which are accessed via public roads and two-track roads. The travelway was assessed during field visits with Tribal representatives (see Section 5.2.4, Other Tribal Coordination) and it was determined that the project would not impact the travelway or publicly available routes.

Sheep Mountain Range Archaeological District

The Sheep Mountain Range Archaeological District (NRHP No. 74001145) is an approximately 622,080-acre area containing numerous precontact campsites, hearth features, petroglyphs, and pictographs, as well as the remains of historic-era mining activity (Miller 1974). The Sheep

Mountain Range includes several geographical features important to Native American Tribes, such as Eagle Head and Corn Creek (Stoffle et al. 2022), that incorporate pilgrimage routes or provide support for pilgrimages. The district is primarily located in the Sheep Mountain Range, Las Vegas Range, Desert Mountain Range, as well as northern portions of the Las Vegas Valley, approximately 24 miles east of the Application Area (Giacinto et al. 2024:67).

Results of Cultural Landscape Consideration

The cultural landscapes described above are of utmost importance to Native American Tribes in southern Nevada, and preservation of their intrinsic value should always be considered when working within and near their traditional extent. Native American Tribes consulted did not express any concern for impacts from the Project to the cultural landscapes that they have vested interest in. Given this, those cultural landscapes are not addressed as part of environmental consequences.

Natural Resources

Native American Tribes expressed interest in natural resources in the Project Area consisting of native flora, Mojave desert tortoise, and water sources. Impacts to these resources are analyzed in Sections 3.2, Vegetation Resources; 3.4, Federally Listed Species, which includes the Mojave desert tortoise; and 3.6, Water Resources, respectively, and are not reiterated here.

3.7.6 Environmental Consequences

This section assesses effects to historic properties, and resources unevaluated for the NRHP (treated as eligible), that would result from the No Action Alternative and from the construction, O&M, and decommissioning of the Proposed Action and Action Alternatives. The findings and recommendations reported herein represent preliminary NRHP determinations and assessment of effect by the BLM and may change as a result of Section 106 consultation. Section 106 consulting parties will be provided with detailed technical reports for review and comment prior to the publication of the final EIS/RMPA (see Section 5.2.2 for detailed information on Section 106 consultation and consulting parties). The BLM will continue consultation to produce a final Mitigation/Treatment Plan regarding effects and treatment measures that, once complete, will be incorporated into the ROD.

Adverse effects to historic properties would be avoided, minimized, or mitigated. Effects to historic properties would be avoided as much as possible through design. Archaeological monitoring during construction would help minimize effects to historic properties. If adverse effects are not avoidable, historic properties would be subject to appropriate mitigation measures prior to construction. Applicable design features and mitigation measures would also be implemented as described in Appendix B.

Cultural resources that are ineligible for the NRHP warrant no further consideration under the NHPA. NRHP-ineligible resources may be modified, damaged, or destroyed by the Project and therefore are considered impacted.

No Action Alternative

Under the No Action Alternative, the proposed Project would not be constructed, operated, maintained, or decommissioned. The CRAAs would exist under current authorizations and land uses. Therefore, impacts to cultural resources associated with development of the Proposed Action would not occur.

Proposed Action

Ten cultural resources within the CIII CRAA, and two historic properties within the CI CRAA, were identified and assessed as a part of the Class III effort (see Table 3-28). Nine of the resources within the CIII CRAA are determined or recommended ineligible for the NRHP, while one Tribally identified trail (26CK11556) remains unevaluated pending additional Tribal consultation. As unevaluated resources are treated as eligible, only the Tribally identified trail (26CK11556) would be affected by the Project under the NHPA. The two historic properties within the CI CRAA were determined to not have visible line-of-sight to the Project from their location on the landscape. No further consideration of impacts from the Project's to ineligible resources within the CIII CRAA or historic properties within the CI CRAA is warranted.

Impacts to the Tribally identified trail (26CK11556), as well as impacts to unanticipated/unidentified cultural discoveries that may later be determined eligible for the NRHP (unidentified historic properties), associated with construction, O&M, and decommissioning of the Project are discussed below.

Construction Impacts

Project construction activities would cause effects to unidentified historic properties if such resources are found. Construction activities identified for the Proposed Action include ground disturbance, modification of the slope of the natural terrain, compacting of soils, and removal of vegetation. If they are found, construction activities could have physical effects on unidentified historic properties' materials and location, including displacement of artifacts, features, or cultural deposits, damage or destruction of artifacts or features, or increased erosion of archaeological deposits. Those construction of Project components could also have similar visual impacts to the setting and feeling of unidentified historic properties. Temporary construction effects could also impact the setting and feeling of unidentified historic properties. The APE for these temporary effects due to construction is the CIII CRAA.

Construction activities would have physical effects on the Tribally identified trail's (26CK11556) location, including destruction of the trail, displacement of associated resource components, and making the trail no longer usable for cultural purposes. Other aspects of the Tribally identified trail's (26CK11556)integrity may be affected by Project construction components, including the access and transportation system, site preparation and vegetation removal, site clearing and grading, solar array, gen-tie and telecommunication line, and BESS; however, consultation on the trail's importance in integrity is still being conducted. Other construction effects to the Tribally identified trail (26CK11556) would include temporary increased dust (atmospheric) and audible effects (construction machinery) associated with construction.

Effects to the Tribally identified trail (26CK11556) and/or unidentified historic properties could include illegal artifact collection, vandalism, or looting due to new or increased access to sites or increased visibility of sites. Studies show that unauthorized artifact collection and vandalism are more likely to occur at archaeological and historical sites near roads in rural settings than in more remote settings (Ahlstrom et al. 1992; Nickens et al. 1981; Spangler 2006; Spangler et al. 2006). Consultation for the Tribally identified trail (26CK11556) is ongoing, and quantification of impacts and proposed mitigation measures would be established after determination of eligibility and effects.

As described in Appendix B, measures MM CR-1, MM CR-2, and MM CR-3 would be implemented to avoid, minimize, or mitigate adverse effects to historic properties. The Applicant would implement cultural resources WEAP training (APM Cultural-1 [Appendix B]) to help reduce inadvertent effects to unidentified historic properties by conveying the importance of cultural resources. Additional measures for reducing inadvertent effects would include marking boundaries of authorized work areas and cultural resource monitoring during construction activities.

Operations and Maintenance Impacts

O&M activities would have physical effects on the Tribally identified trail's (26CK11556) location, including destruction of the trail, displacement of associated resource components, and making the trail no longer usable for cultural purposes, if the Tribally identified trail (26CK11556) could not be avoided.

Unidentified historic properties, if encountered during road construction or improvement, would be mitigated prior to commencement of any further construction or improvement. Adverse effects to unidentified historic properties from maintenance of existing roads are not expected if ground disturbance is minimal and kept within the existing road prism. Other O&M activities that have the potential to affect historic properties include vegetation management and new ground-disturbing activity within the solar array. As with roads, any unidentified historic properties encountered during vegetation management or new ground-disturbing activity would be mitigated prior to commencement of any further work, if encountered historic properties would be affected. As described in Appendix B, measures MM CR-1, MM CR-2, and MM CR-3would be implemented to avoid, minimize, or mitigate adverse effects to historic properties. The Applicant would implement cultural resources WEAP training (APM Cultural-1 [Appendix B]) to help reduce inadvertent effects to unidentified historic properties by conveying the importance of cultural resources. Additional measures for reducing inadvertent effects would include marking boundaries of authorized work areas and cultural resource monitoring during construction activities.

Decommissioning Impacts

A Site Restoration Plan would be filed by the Applicant and approved by the BLM before terminating the Project and before decommissioning activities could begin (Appendix B). Western Solar Plan design features CR3-1 and CR3-3 (Appendix B) would be implemented during reclamation and decommissioning activities to avoid, reduce, and mitigate impacts to historic properties. Potential effects during decommissioning would be similar to those described for the construction phase, although to a lesser extent.

Alternative 1

Similar to the Proposed Action, only impacts to the Tribally identified trail (26CK11556), as well as impacts to unidentified historic properties, associated with construction, O&M, and decommissioning of the Project are discussed below as all other resources identified in the CRAAs have been determined or recommended ineligible for the NRHP (see Table 3-28). Overall, impacts to cultural resources under Alternative 1 would be similar to those identified for the Proposed Action.

Under Alternative 1, approximately 482 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation. Another approximately 1,931 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1 disturbance category) and drive and crush activities (D-2 disturbance category). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates; this would support the goal of maintaining 75% of reference perennial vegetation cover within the Buildable Areas.

Construction Impacts

Alternative 1 would lessen physical effects on unidentified historic properties' materials and location by decreasing the chance of displacing artifacts, features, or cultural deposits; decreasing the chance of damaging or destroying artifacts or features; and lessening the amount of erosion that could occur to archaeological deposits when compared to the Proposed Action. Less overall grading would also decrease the chance that unidentified historic properties are encountered during ground disturbance.

Similar to the Proposed Action, construction activities would have physical effects to the location of the Tribally identified trail (26CK11556) and may also have visual effects. As described in Appendix B, measures MM CR-1, MM CR-2, and MM CR-3 would be implemented to avoid, minimize, or mitigate adverse effects to historic properties. The Applicant would implement cultural resources WEAP training (APM Cultural-1 [Appendix B]) to help reduce inadvertent effects to unidentified historic properties by conveying the importance of cultural resources. Additional measures for reducing inadvertent effects would include marking boundaries of authorized work areas and cultural resource monitoring during construction activities.

Operations and Maintenance Impacts

Retaining 75% vegetation cover within two years post-construction would lessen physical effects on unidentified historic properties' materials and location by decreasing the chance of displacing artifacts, features, or cultural deposits; decreasing the chance of damaging or destroying artifacts or features; and lessening the amount of erosion that could occur to archaeological deposits during vegetation removal.

Replacing 120 acres of the NDOT mineral material sites would have increased physical effects and increased visual effects on the Tribally identified trail (26CK11556) and unidentified historic properties in the same manner identified for the Proposed Action.

O&M activities would have physical effects on the Tribally identified trail's (26CK11556) location, including destruction of the trail, displacement of associated resource components, and making the trail no longer useable for cultural purposes.

Decommissioning Impacts

Impacts under Alternative 1 would be similar to those under the Proposed Action.

Alternative 2 (BLM Preferred Alternative)

Similar to the Proposed Action, only impacts to the Tribally identified trail (26CK11556), as well as impacts to unidentified historic properties, associated with construction, O&M, and decommissioning of the Project are discussed below as all other resources identified in the CRAAs have been determined or recommended ineligible for the NRHP (see Table 3-28). Overall, impacts to cultural resources under Alternative 2 would be similar to those identified for the Proposed Action.

Under Alternative 2, approximately 592 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation. Another approximately 1,821 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1 disturbance category) and drive and crush activities (D-2 disturbance category). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates; this would support the goal of maintaining 65% of reference perennial vegetation cover within the Buildable Areas.

Construction Impacts

Alternative 2 would lessen physical effects on unidentified historic properties' materials and location by decreasing the chance of displacing artifacts, features, or cultural deposits, decreasing the chance of damaging or destroying artifacts or features, and lessening the amount of erosion that could occur to archaeological deposits when compared to the Proposed Action. Less overall grading would also decrease the chance that unidentified historic properties are encountered during ground disturbance.

Similar to the Proposed Action, construction activities would have physical effects to the location of the Tribally identified trail (26CK11556) and may also have visual effects. As described in Appendix B, measures MM CR-1, MM CR-2, and MM CR-3 would be implemented to avoid, minimize, or mitigate adverse effects on historic properties. The Applicant would implement cultural resources WEAP training (APM Cultural-1 [Appendix B]) to help reduce inadvertent effects to unidentified historic properties by conveying the importance of cultural resources. Additional measures for reducing inadvertent effects would include marking boundaries of authorized work areas and cultural resource monitoring during construction activities.

Operations and Maintenance Impacts

Retaining 65% vegetation cover within two years post-construction would lessen physical effects on unidentified historic properties' materials and location by decreasing the chance of displacing artifacts, features, or cultural deposits; decreasing the chance of damaging or destroying artifacts or features; and lessening the amount of erosion that could occur to archaeological deposits during vegetation removal.

Replacing 120 acres of the NDOT mineral material sites would have increased physical effects and increased visual effects to the Tribally identified trail (26CK11556) and unidentified historic properties in the same manner identified for the Proposed Action.

O&M activities would have physical effects on the Tribally identified trail's (26CK11556) location, including destruction of the trail, displacement of associated resource components, and making the trail no longer useable for cultural purposes.

Decommissioning Impacts

Impacts under Alternative 2 would be similar to those under the Proposed Action.

Alternative 3

In contrast to the Proposed Action and Alternatives 1 and 2, only visual impacts to the Tribally identified trail (26CK11556), as well as impacts to unidentified historic properties, associated with construction, O&M, and decommissioning of the Project are discussed below. This is because physical impacts to the Tribally identified trail (26CK11556) would be avoided through design, and all other resources identified in the CRAAs have been determined or recommended ineligible for the NRHP (see Table 3-28). Overall, physical impacts to known cultural resources under Alternative 3 would be lessened, while visual impacts to cultural resources and impacts to unidentified historic properties would be similar to those under the Proposed Action.

Under Alternative 3, approximately 648 acres would be subject to heavy surface disturbance through grading, soil removal, and loss of vegetation. Another approximately 1,942 acres would be subject to minimal to moderate surface disturbance from overland travel (D-1 disturbance category) and drive and crush activities (D-2 disturbance category). Areas subject to D-1 and D-2 disturbances would be temporarily impacted until vegetation regenerates; this would support the goal of maintaining 65% reference perennial vegetation cover.

Construction Impacts

Alternative 3 would slightly lessen physical effects on unidentified historic properties' materials and location by decreasing the chance of displacing artifacts, features, or cultural deposits, decreasing the chance of damaging or destroying artifacts or features, and lessening the amount of erosion that could occur to archaeological deposits when compared to the Proposed Action. Less overall grading would also decrease the chance that unidentified historic properties are encountered during ground disturbance.

Construction activities would not have physical effects on the Tribally identified trail's (26CK11556) location. Visual effects to the Tribally identified trail (26CK11556) would remain the same as those under the Proposed Action. As described in Appendix B, measures MM CR-1, MM CR-2, and MM CR-3 would be implemented to avoid, minimize, or mitigate adverse effects on historic properties. The Applicant would implement cultural resources WEAP training (APM Cultural-1 [Appendix B]) to help reduce inadvertent effects to unidentified historic properties by conveying the importance of cultural resources. Additional measures for reducing inadvertent effects would include marking boundaries of authorized work areas and cultural resource monitoring during construction activities.

Operations and Maintenance Impacts

Retaining 65% vegetation cover within three to five years post-construction would be the same as the Alternative 2 and would result in no change to effects on unidentified historic properties.

Replacing 93 acres of the NDOT mineral material sites in an area that avoids the Tribally identified trail (26CK11556) would have increased visual effects to the trail but would lessen physical effects to the trail. As well, the relocation site would have an increased chance for effects to unidentified historic properties in the same manner identified for the Proposed Action. However, these effects would be within the relocation site rather than within the Application Area.

Similar to construction impacts, Alternative 3 O&M activities would not have physical effects on the Tribally identified trail's (26CK11556) location.

Decommissioning Impacts

Impacts under Alternative 3 would be similar to those under the Proposed Action.

3.8 Air Quality, Climate Change, and Greenhouse Gas Emissions

Section 176 of the federal Clean Air Act (CAA) requires federal agencies that fund, permit, or approve an activity to ensure that the activity complies with the applicable State Implementation Plan (SIP) adopted to eliminate or reduce air quality violations (42 USC 7506). In order to ensure that air pollutant emissions associated with federally approved or funded activities do not exceed emission budgets established in the applicable SIP and do not interfere with the state's ability to attain and maintain the national ambient air quality standards (NAAQS) in areas working to attain or maintain the standard, the USEPA passed federal conformity rules. The General Conformity Rule applies to all projects that are not related to transportation. According to 40 CFR 51(W), a detailed determination of the General Conformity Rule's applicability is required when federal actions or funding of nontransportation-related activities in nonattainment areas result in emissions that exceed de minimis threshold levels (USEPA 2023b). The Project's emissions have been quantified and compared to any applicable General Conformity Rule de minimis levels, state permit emission thresholds, and county emission inventories. However, given that the Project is located in areas of attainment/unclassified, the General Conformity Rule does not apply.

The prevention of significant deterioration (PSD) regulations are developed and implemented to protect public health and welfare and to preserve, protect, and enhance the air quality in national parks, wilderness areas, national monuments, and other areas of special value. The assessment applies to permitting for new or modified major stationary sources in attainment areas. As part of the PSD, the USEPA classifies airsheds as Class I or Class II. Class I areas are areas where PSD regulations provide special protection for air quality under the CAA. As set forth in the CAA, Class I areas are defined as national parks over 6,000 acres and wilderness areas and memorial parks over 5,000 acres that were established as of 1977.

In Nevada, under the NRS for air pollution, each county in the state with a population equal to or greater than 100,000 people must establish a board of county commissioners to establish and implement an air pollution control program (NRS 445B.500). In 2001, the Clark County Board of County Commissioners established the Division of Air Quality (DAQ) to carry out the mandated program. There are 17 counties in the state of Nevada. All but two counties are overseen by the Nevada Division of Environmental Protection (NDEP) for the implementation of the CAA. Washoe and Clark Counties have a delegated authority by the Governor of the State of Nevada for the implementation of the CAA. The DAQ under the Clark County Department of Environment and Sustainability is responsible for administering the air pollution control program for Clark County under the provisions of the Clark County Air Quality Regulations and the USEPA-approved SIP for Clark County, Nevada (Clark County Air Quality Regulations Sections 00 through 94 as adopted in 40 CFR 52(DD)). In Nevada, the NDEP Bureau of Air Pollution Control and Air Quality Planning (BAPC) has primary responsibility under NRS 445B.100 through 445B.825 for managing air quality through state regulations. Generally, any source that has the potential to emit greater than 100 tons per year (tpy) of any criteria pollutant is considered a Major Class I source. The NDEP BAPC regulates particulate matter emissions from construction projects disturbing areas greater than 5 acres. NAC 445B.22037 requires fugitive dust from construction projects to be controlled (regardless of the size or amount of acreage disturbed), and requires an ongoing program, using BMPs, to prevent particulate matter from becoming airborne. Within Clark County, emissions are regulated by the DAQ. Construction activities impacting greater than 0.25 acre in Clark County would require a dust control operating permit from DAQ. Projects larger than 10 acres would also require completion of a Dust Mitigation Plan Supplement for DAQ (Clark County 2024a). The NDEP BAPC and Clark County DAQ have both been delegated authority by the USEPA to implement federal programs of the CAA.

The CEQ released interim guidance on January 9, 2023, regarding GHGs and climate change in the NEPA process (88 FR 1196–1212 [January 9, 2023]). This interim guidance recommends that context for the GHG emissions and climate impacts associated with a proposed action be demonstrated by calculating the estimated social cost of greenhouse gas (SC-GHG). However, the Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews issued on August 5, 2016 (2016 GHG Guidance) noted that NEPA does not require monetizing costs and benefits. It also noted that “the weighing of the merits and drawbacks of the various alternatives need not be displayed using a monetary cost-benefit analysis and should not be when there are important qualitative considerations” (CEQ 2016).

3.8.1 Issues Identified for Analysis

- How would construction, O&M, and decommissioning of the Project impact air quality and visibility?
- What is the social cost of carbon (or GHG emissions) for the lifecycle of the Project (construction, O&M, and decommissioning)?
- How would emission-generating equipment during construction, O&M, and decommissioning contribute to GHG production and climate change?
- How would the Project contribute to GHG emission reductions?

3.8.2 Analysis Area and Methodology

Air Quality

Analysis Area

Due to the geographic size, topography, and high-density population of Clark County, hydrographic basins are used to delineate air quality management areas rather than political boundaries such as counties (Clark County 2024b). The Project lies within the Indian Springs Valley hydrographic basin (161), in the southern portion of the Indian Springs Valley and includes portions of Clark and Nye Counties (Appendix A, Figure A-13). Where basin specific data is not available, the Air Quality Analysis Area discussed is Clark and Nye Counties. Potential impacts from the Project would occur over the life of the Project, construction through decommissioning, with the Project generating renewable energy for a portion of this time.

Construction Methodology

During construction, sources of fugitive dust (particulate matter equal to or less than 10 microns in diameter [PM_{10}] and particulate matter equal to or less than 2.5 microns in diameter [$PM_{2.5}$]) would include grading and earthmoving associated with the development of the Project and vehicular traffic. Particulate matter emissions from traffic include both tailpipe emissions from fuel combustion and fugitive dust from traffic on paved and unpaved roads. On-road vehicles and nonroad engines (i.e., construction equipment) would release carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and PM_{10} and $PM_{2.5}$, volatile organic compounds (VOCs), and hazardous air pollutants (HAPs). Construction equipment would also emit GHGs, including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), which are discussed in Section 3.8.2.2, Greenhouse Gas Emissions and Climate Change.

The following categories of emission sources have been considered during construction (short term):

- Fugitive dust from earthmoving activities and access road construction associated with construction of the Project.
- Paved and unpaved road dust associated with on-road and nonroad vehicle activities. These include both commuting to and maneuvering at the Project construction site in on-road vehicles and nonroad vehicle fugitive dust.
- Traffic (tailpipe) emissions from on-road vehicles associated with workers commuting to and maneuvering at the Project construction site.
- Exhaust emissions from nonroad engines (i.e., construction equipment) associated with construction of the Project.

Construction would commence with pre-construction surveys and the construction of the two main access roads. Following the pre-construction surveys, construction would include the activities: Mojave desert tortoise exclusion fencing; security fencing around the solar site; clearing and construction of a laydown yard inside the permanent security fence; site mowing, grading, and preparation; and construction of the O&M building, parking area, and pad mounts for transformers. Construction would continue with the installation of on-site access ways, the

Project substation, and assembly of solar panel blocks and wiring within the three Buildable Areas. Construction of the gen-tie and the associated access roads would begin after the construction of the Project has already commenced.

Pre-construction activities are anticipated to commence during mid- to late 2025. The total construction schedule would be expected to be up to 20 months and the COD is anticipated for December 2026. Using the estimated number of workers and types of equipment required to construct the Project in Tables 2-2 and 2-3 and including all construction phases discussed above, the annual emissions per construction year were calculated. The disturbed acres associated with Project are accounted for in the fugitive dust calculations, as well as from travel by worker on paved and unpaved roads. Emission factors in grams per vehicle mile traveled for on-road vehicles were obtained from the USEPA's Motor Vehicle Emission Simulator (MOVES4) model (USEPA 2024a). Emissions from nonroad construction equipment engines used during Project construction were estimated based on the anticipated types of nonroad equipment and their associated levels of use. Nonroad emission factors in grams per hour were obtained using the MOVES4 model. Total fugitive dust emissions from vehicle travel on paved roads (USEPA AP-42 Chapter 13 Section 13.2.1 from 2011) and unpaved roads (USEPA AP-42 Chapter 13 Section 13.2.2 from 2006) (USEPA 2024b), and fugitive dust emissions from disturbed acres would be estimated using the Western Regional Air Partnership's *Fugitive Dust Handbook* (Countess Environmental 2006).

Operations and Maintenance Methodology

The following categories of emission sources have been considered during operations (long term):

- Paved and unpaved road dust associated with Project O&M.
- Traffic (tailpipe) emissions from on-road vehicles associated with Project O&M.

Using the estimated number of workers required to operate the Project (up to 12 permanent employees) and the nonroad equipment required during maintenance events, the annual operational emissions were calculated. Emission factors in grams per vehicle mile traveled for on-road vehicles were obtained from the MOVES4 model. Emissions from nonroad equipment engines used during Project maintenance were estimated based on the anticipated types of nonroad equipment and their associated levels of use. Emission factors in grams per hour were obtained using the MOVES4 model (USEPA 2024a). Total fugitive dust emissions from vehicle travel on paved roads (USEPA AP-42 Chapter 13 Section 13.2.1 from 2011) and unpaved roads (USEPA AP-42 Chapter 13 Section 13.2.2 from 2006) (USEPA 2024b) were estimated using the Western Regional Air Partnership's Fugitive Dust Handbook (Countess Environmental 2006).

Avoided Emissions Methodology

The use of the sun to generate electricity reduces the need to generate electricity from traditional fossil fuel–powered plants that produce air pollutant emissions. The estimated avoided emissions by generating electricity via the Project instead of traditional fossil fuel–powered plants were calculated using the USEPA's AVERT Excel Edition, Version 4.1 for the Northwest region based on USEPA's 2022 regional data file. The AVERT is not a long-term projection tool and is not intended to analyze avoided emissions for more than five years from baseline. The estimated annual and five-year long-term total avoided emissions are based on the 300-MW design capacity of the Project. To provide a rough estimate of the long-term avoided emissions of the Project, the annual avoided emissions estimated by AVERT were multiplied by five years.

Greenhouse Gas Emissions and Climate Change

Analysis Area

The GHG Emissions Analysis Area is the Indian Springs Valley hydrographic basin (161). Where Indian Springs Valley hydrographic basin (161) specific data is not available, the GHG Emissions Analysis Area consists of Clark and Nye Counties. GHGs emissions and climate change would be analyzed for the county, the state, and the United States.

Construction Methodology

During construction, sources of GHGs would be on-road vehicles (i.e., traffic) and nonroad engines (i.e., construction equipment). GHG emission factors in grams per vehicle mile traveled for on-road vehicles were obtained from the USEPA's MOVES4 model. GHG emissions from nonroad construction equipment engines used during Project construction were estimated based on the anticipated types of nonroad equipment and their associated levels of use. GHG emission factors in grams per hour were obtained using the USEPA's MOVES4 model (USEPA 2024a).

Operations and Maintenance Methodology

During Project O&M, sources of GHGs would be on-road vehicles (i.e., operational traffic) and nonroad engines (i.e., maintenance equipment). GHG emission factors in grams per vehicle mile traveled for on-road vehicles were obtained from the USEPA's MOVES4 model. GHG emissions from nonroad equipment engines used during Project maintenance were estimated based on the anticipated types of nonroad equipment and their associated levels of use. GHG emission factors in grams per hour were obtained using the USEPA's MOVES4 model (USEPA 2024a).

Social Cost of Greenhouse Gases Methodology

The SC-GHG associated with estimated emissions represent the present value of future market and nonmarket costs associated with CO_2, CH_4, and N_2O emissions. The SC-GHG analysis was prepared in consideration of the guidance issued by the CEQ on January 8, 2023, which includes quantifying the projected GHG emissions for the expected lifetime of the action, in addition to the best available SC-GHG estimates (CEQ 2023). Estimates are calculated based on Interagency Working Group (IWG) estimates of the social cost per metric ton of emissions for a given emissions year and the estimates of emissions in each year (IWG on Social Cost of Greenhouse Gases 2021).

Avoided Emissions Methodology

The Project would annually displace CO_2 as well as other non-GHG pollutants produced by the Nevada electric grid and decrease the creation of air pollutant emissions in the atmosphere from traditional fossil fuel–fired power plants. The estimated avoided emissions by generating electricity via the Project instead of traditional fossil fuel–powered plants were calculated using the USEPA's AVERT Excel Edition, Version 4.1 for the Northwest region based on USEPA's 2022 regional data file. The estimated annual and five-year long-term total avoided emissions are based on the 300-MW design capacity of the Project. To provide a rough estimate of the long-term avoided emissions of the Project, the annual avoided emissions estimated by AVERT were multiplied by five years.

3.8.3 Affected Environment

Air Quality

The CAA requires the USEPA to set NAAQS for air pollutants considered harmful to public health and the environment. The USEPA has set NAAQS for six criteria pollutants: CO, NO_2, ozone (O_3), lead (Pb), SO_2, and particulate matter (PM). Primary standards are established to protect public health, and secondary standards are established to protect public welfare. These standards define the maximum level of air pollution allowed in the ambient air. The CAA and subsequent amendments allow states to promulgate additional air quality standards that are the same or more stringent than the NAAQS. Two additional pollutants of concern, oxides of nitrogen (NO_x) and VOCs, contribute to the formation of O_3 in the atmosphere, which is a regulated criteria pollutant with a NAAQS. The applicable NAAQS, which have fully been adopted and expanded upon in the NSAAQS for criteria pollutants, are provided in Appendix E. For each criteria pollutant, the USEPA classifies areas as in "attainment" if the area is in compliance with NAAQS or as "non-attainment," if one or more NAAQS is exceeded.

The city of Indian Springs is approximately 3.5 miles east of the Project with a population of 837 (U.S. Census Bureau 2022a). The downtown area of Las Vegas is approximately 41 miles southeast of the Project with a population of 656,302 (U.S. Census Bureau 2022b). Air quality within the Indian Springs Valley hydrographic basin (161) is considered in "attainment" or "unclassifiable" for CO, Pb, NO_2, O_3, PM_{10}, and SO_2; however, portions of Clark County outside of the Indian Springs Valley hydrographic basin (161) and outside of the Project Area have been designated as moderate nonattainment for the 2015 eight-hour O_3 standard and a maintenance area for CO and PM10 (USEPA 2024c). Thus, the General Conformity Rule, which is designed to protect ambient air quality within nonattainment and maintenance areas against further degradation, does not apply (USEPA 2023b).

Criteria pollutants are monitored throughout various parts of the country. Monitors measure concentrations of pollutant in the atmosphere and the results are often presented in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Pursuant to 40 CFR 58.14 (c)(1), the USEPA and states periodically analyze and review monitor locations, discontinue monitoring at locations where pollutant concentrations have been well below the standards, and add monitors in areas where pollutant concentrations may be approaching air quality standards. Instantaneous on-demand monitored outdoor air quality data collected from state, local, and Tribal monitoring agencies can be obtained from USEPA's Air Data webpage and interactive tool (USEPA 2024d).

The USEPA uses the criteria pollutant monitoring data to determine a "design value" for each pollutant and averaging time listed in Table 3-29. A design value is a statistic representing the monitored concentration of a given pollutant in a given location, expressed in the manner of its standard, which can be compared to the NAAQS. Design values are updated annually and posted to the USEPA's Air Quality Design Value website (USEPA 2023c). The most recent available 2022 design values for representative counties in Nevada are provided in Table 3-29. Rural counties may not have existing monitors; therefore, no data are available, and it is assumed that pollutant concentrations meet ambient air quality standards. Other counties may have monitors that record only certain pollutants. With the exception of PM_{10}, criteria pollutant monitoring data were not available for Nye County in Nevada; however, available Clark County criteria pollutant monitoring data are reported. Design values are typically used to designate and classify nonattainment areas, as well as to assess progress toward meeting the NAAQS. The design value for O_3 for Clark County (0.075 ppm) exceeds the NAAQS for O_3 (0.70 ppm), and the design value of $PM_{2.5}$ for Clark County (32 µg/m^3) approaches the NAAQS for $PM_{2.5}$ (35 µg/m^3). None of the other design values listed in Table 3-29 exceed or approach proximity to the NAAQS (USEPA 2023c).

Table 3-29. 2022 Design Values for Clark County and Nye County, Nevada

Pollutant	Clark County 2022 Design Values	Nye County 2022 Design Values	Averaging Time	NAAQS
O_3	0.075 ppm	N/A	8-hour*	0.070 ppm
NO_2	21 ppb	N/A	Annual†	53 ppb
NO_2	53 ppb	N/A	1-hour‡	100 ppb
$PM_{2.5}$	10.8 µg/m^3	N/A	Annual§	9 µg/m^3
$PM_{2.5}$	32 µg/m^3	N/A	24-hour¶	35 µg/m^3
PM_{10}	4.0 µg/m^3	4.9 µg/m^3	24-hour	150 µg/m^3

Source: USEPA (2023c).

Note: N/A = not available, monitors do not report. Many rural counties have no monitoring data and are assumed under the CAA to be in attainment. ppb = parts per billion.

* Annual fourth highest daily maximum 8-hour concentration, averaged over 3 years.

† Not to be exceeded during the year.

‡ Annual fourth highest daily maximum 1-hour concentration, averaged over 3 years.

§ Annual mean, averaged over 3 years.

¶ 98th percentile, averaged over 3 years.

The USEPA's air quality index (AQI) is a metric used by the USEPA to disclose the quality of ambient air to the public. The AQI index is one way to evaluate how clean or polluted an area's air is and whether associated health effects might be a concern. The USEPA calculates a daily AQI based on local air monitoring data. When the AQI value is between 0 and 50, air quality is categorized as "good" and criteria air pollutants pose little or no risk. Table 3-30 and Table 3-31 list representative AQI data from the most recent three-year period (2020–2022).

Table 3-30. Annual Air Quality Index for Clark County, Nevada

Year	Qty Days with AQI	Qty Days Good	Qty Days Moderate	Qty Days Unhealthy	% Days Rated Good	% Days Rated Moderate	% Days Rated Unhealthy
2020	366	108	233	3	29.5	63.7	0.8
2021	365	119	212	3	32.6	58.1	1.1
2022	365	104	235	3	28.5	64.4	0.8

Source: USEPA (2023d).

Note: Qty = quantity. Totals are as provided in the source.

Table 3-31. Annual Air Quality Index for Nye County, Nevada

Year	Qty Days with AQI	Qty Days Good	Qty Days Moderate	Qty Days Unhealthy	% Days Rated Good	% Days Rated Moderate	% Days Rated Unhealthy
2020	366	343	20	2	93.7	5.5	0.5
2021	365	336	28	0	92.1	7.7	0
2022	358	306	41	4	85.5	11.5	1.1

Source: USEPA (2023d).

Note: Qty = quantity. Totals are as provided in the source.

The AQI data in Table 3-30 and Table 3-31 indicate that air quality in the Air Quality Analysis Area is generally good to moderate with unhealthy air quality days occurring infrequently. Due to wildfire smoke from fires in other states, recent years have had a higher percentage of moderate and unhealthy air quality days than the two previous years (USEPA 2023d). In addition to wildfires, the largest contributors of particulate matter for Clark and Nye Counties are construction and road dust and mining. The largest contributors of NO_2, CO, and VOC for Clark and Nye Counties are biogenic (natural) and mobile emissions.

CAA regulations also control the release of HAPs: chemicals that are known or suspected to cause cancer or other serious health effects, such as reproductive effects, birth defects, or adverse environmental effects. USEPA currently lists 187 compounds as HAPs, some of which, such as benzene, toluene, and formaldehyde, can be emitted from oil and gas development operations but are minimal in solar development operations. NAAQS have not been set for HAPs; rather HAP emissions are controlled by source type– or industrial sector–specific regulations by developing standards for controlling emissions of air toxics known as maximum achievable control technology standards. There are no Project-specific applicable maximum achievable control technology requirements regarding HAPs, as these standards only apply to stationary sources within specific industrial groups.

Valley Fever or coccidioidomycosis is a lung disease that is prevalent in the southwestern United States. The fungus Coccidioides immitis causes Valley Fever, which grows in soils with low rainfall, high summer temperatures, and moderate winter temperatures. When the soil is disturbed by winds, construction, farming, or other activities, these fungal spores become airborne. Infection occurs when a spore is inhaled by a susceptible person or animal. Construction, agriculture, and archaeology workers are at a higher risk of exposure and disease because their jobs cause soil disturbance, which can lead to the presence of fungal spores. The Project is in an area that may harbor the fungus that causes the disease Valley Fever (Centers for Disease Control and Prevention [CDC] 2022). More details on Valley Fever are provided in Section 3.12, Public Health and Safety.

The AirToxScreen, published by the USEPA, provides a screening tool for state, local, and Tribal air agencies. AirToxScreen's results help the USEPA and other agencies identify which pollutants, emission sources, and places they may wish to study further to better understand any possible risks to public health from air toxics. AirToxScreen is the successor to the previous National Air Toxics Assessment. In December 2022, the USEPA released the results of its 2019 AirToxScreen. AirToxScreen calculates concentration and risk estimates from a single year's emissions data using meteorological data for that same year. The risk estimates assume a person breathes these emissions each year over a lifetime (or approximately 70 years). AirToxScreen then provides quantitative estimates of potential cancer risk and five classes of noncancer hazards (grouped by organ/system: immunological, kidney, liver, neurological, and respiratory) associated with chronic inhalation exposure to real-world toxics for each county and census tract (USEPA 2022). The 2019 AirToxScreen assessment includes emissions, ambient concentrations, and exposure estimates for about 181 of the 187 CAA air toxics plus diesel particulate matter (diesel PM). AirToxScreen cannot give precise exposures and risks for a specific individual; therefore, AirToxScreen data are best applied to larger areas. Lastly, AirToxScreen only considers health impacts from breathing air toxics and does not take into account indoor hazards, contacting or ingesting these air toxics, or other ways in which people may be exposed (USEPA 2022).

The 2019 AirToxScreen map application reveals that the total cancer risk (defined as the probability of contracting cancer over the course of a 70-year lifetime, assuming continuous exposure) from human-caused emissions of HAPs in the Air Quality Analysis Area, which is located in Tract ID 32003005902, is approximately 20 cases per 1 million people, which is lower than the nationwide level (28.7 cases per 1 million people) (USEPA 2022). Major sources of HAPs in the Air Quality Analysis Area include NV Energy Chuck Lenzie Generating Station, which is a natural gas–fueled power plant north of Las Vegas and 40 miles from the Project Area (USEPA 2022). There are several residences in the unincorporated community of Cactus Springs, which is located approximately 1 mile east of the proposed site and the community of Indian Springs lies approximately 4 miles to the east. However, there are no other communities within 5 miles of the proposed Project.

Triennially, the USEPA publishes a comprehensive summary of air emissions data, known as the National Emissions Inventory (NEI). The most recent NEI data available are from 2020. Table 3-32 provides the 2020 emissions for the six criteria air pollutants and HAPs for the United States; the State of Nevada; and Clark County and Nye County, Nevada. The USEPA uses the NEI to develop and review regulations, conduct air quality modeling, and conduct risk assessments to understand how air pollution may affect the health in communities across the country. Therefore, the attainment status in the Air Quality Analysis Area and the AirToxScreen results showing HAPs lower than the nationwide average indicate the NEI data presented below are only a concern for those pollutants in nonattainment in portions of the Clark County outside of the Air Quality Analysis Area (USEPA 2023e).

Table 3-32. National Emissions Inventory 2020 Emissions Data for Nevada and Nye and Clark Counties (tons)

Pollutant	United States	Nevada	Clark County	Nye County
NO_x	8,814,608	80,106	24,426	2,734
CO	66,065,689	412,095	187,398	12,704
VOC	46,140,059	267,402	51,867	31,855
PM_{10}	16,761,114	117,964	15,733	25,884
$PM_{2.5}$	5,815,036	29,738	5,882	3,513
SO_2	1,838,518	4,807	404	57
HAPs	5,964,882	57,126	10,138	6,154

Source: USEPA (2023e).

The largest contributors of particulate matter for Clark and Nye Counties are construction and road dust and mining. The largest contributors of NO_2, CO, and VOC for Clark and Nye Counties are biogenic (natural) and mobile emissions.

Climate and Greenhouse Gases

The climate in the Project Area is both arid and highly variable with elevation. Generally, climatic conditions in the region are characterized by hot, dry summers and warm, dry winters. Indian Springs, the closest community to the Project Area, has summer highs that average 100°F and winter lows that average approximately 32°F. The town of Indian Springs, which is at a similar elevation to the Project Area, is estimated to have an average annual rainfall of approximately 6 inches, which generally occurs in the winter months (late November through early April) from Pacific frontal storms, and during the summer (July through September) due to the southwest monsoon season, in which moisture advects northward from the Gulf of Mexico and/or the Gulf of California. Precipitation in the winter tends to occur as widespread, long-duration, low-intensity storm events, whereas rainfall that occurs in the summer monsoon season is characterized by highly localized, short-duration, and high-intensity storm events (USGS 2010).

Characteristic meteorological conditions are listed in Table 3-33 from two National Centers for Environmental Information (NCEI) stations across the Air Quality Analysis Area at Desert NWR in Las Vegas, Nevada (USC00264439), and Amargosa Valley, Nevada (USC00260150) (NCEI 2021).

Table 3-33. Average Annual Meteorological Conditions in the Air Quality Analysis Area

Meteorological Parameter	Las Vegas, Nevada	Amargosa Valley, Nevada
Minimum daily temperature (°F)	37.5	30.5
Maximum daily temperature (°F)	105.8	103.5
Total precipitation (inches)	4.8	3.8
Snowfall (inches)	0.2	0.2

Source: NCEI (2021) for the latest 30-year period (1991–2020).

GHGs include CO_2, CH_4, N_2O, and several fluorinated species of gas. CO_2 is emitted primarily from the combustion of fossil fuels. The three largest sources of CH_4 emissions are enteric fermentation and manure management related to animal production, natural gas and petroleum production and handling, and anaerobic decomposition in landfills. These sources account for more than three quarters of total methane emissions. N_2O is emitted during agricultural and industrial activities. Fluorinated gases, which are synthetic, are emitted from a variety of industrial processes, such as sulfur hexafluoride (SF_6) emitted from industrial transmission and distribution of electricity. CO_2 and other GHGs are naturally occurring gases in the atmosphere; their status as a pollutant is not related to their toxicity but instead is due to the added long-term impacts on climate because of their increased incremental levels in the Earth's atmosphere and their effect on the atmospheres ability to retain heat that would otherwise be emitted to space. SF_6 is an inorganic compound that is colorless, odorless, nontoxic, and nonflammable (under standard conditions). SF_6 is used in a number of applications, including as a gaseous dielectric medium in the electrical industry for insulation and current interruption in electric transmission and distribution equipment; it is a gaseous dielectric medium for high-voltage (345-kV and greater) circuit breakers, switchgear, and other electrical equipment (USEPA 2023f).

The global warming potential (GWP) of gases was developed to allow comparison of global warming impacts between different gases. The GWP of a gas depends on how well the gas absorbs energy and how long the gas stays in the atmosphere. It is a measure of the total energy that a gas absorbs over a particular period of time (usually 100 years) compared to CO_2, which has a GWP of 1. The larger the GWP, the more warming the gas causes. For example, CH_4 has a 100-year GWP estimated to be 29.8, meaning that CH_4 would cause 29.8 times as much warming as an equivalent mass of CO_2, over a 100-year time period (Intergovernmental Panel on Climate Change [IPCC] 2021). The GWP for N_2O is estimated to be 273. The GWP for SF_6 is estimated to be 22,800. The term carbon dioxide equivalent (CO_2e) is used to describe different GHGs in a common unit. CO_2e is calculated with CO_2, CH_4, and N_2O multiplied by the high-end 100-year GWP values from the IPCC's Sixth Assessment Report (IPCC 2021).

Global, national, and state level GHG emissions can be found in the 2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends (BLM 2023d:Chapter 5, Table 5-1 [Global and U.S.] and Table 5-2 [State]). However, the USEPA's Inventory of the U.S. Greenhouse Gas Emissions and Sinks provides the most recent national and state level annual GHG emissions and are incorporated by reference (USEPA 2023f). NDEP's Air Program prepares a GHG emissions inventory for the State of Nevada (NDEP 2023). Table 3-34 lists the industry sector and total GHG emissions for the most recent reporting years (2021 for the United States and 2021 for Nevada). This table shows the largest sources of anthropogenic emissions contributing to GHG emissions at the national level are energy and agriculture and at the state level are transportation and energy.

Table 3-34. 2005 and 2021 Greenhouse Gas Emissions by Sector

Sector	2005 U.S. GHG Emissions (MMT CO_2e)	2021 U.S. GHG Emissions (MMT CO_2e)	2021 Nevada GHG Emissions (MMT CO_2e)
Transportation	N/A	N/A	13.66
Energy	6,351.5	5,196.6	13.26
Industry	356.1	376.4	6.75
Agriculture	577.7	598.1	1.90
Waste	192.1	169.2	1.91
Residential and Commercial	N/A	N/A	4.69
Land Use, Land Use Change, and Forestry*	−781.1	−754.2	−8.32
Total (gross)	7,477.4	6,340.2	42.17
Total (net)	6,696.3	5,586.0	33.85

Sources: NDEP (2023); USEPA (2023f).

Note: MMT = million metric tons, N/A = not available, GWP values have been applied

* Land use, land use change, and forestry show a negative, indicating that emissions and removals of CO_2 and emissions of CH_4 and N_2O from managed lands in the United States are at a net sink for CO_2 (sequestration).

In addition to the criteria air pollutants reported triennially, GHG emissions are also published. Table 3-35 provides the 2020 GHG emissions for the United States, the State of Nevada, and Nye and Clark Counties, Nevada (USEPA 2023e).

Table 3-35. National Emissions Inventory 2020 Emissions Data for the United States, Nevada, and Clark and Nye Counties (metric tons)

Pollutant	United States	Nevada	Clark County	Nye County
CO_2e	4,567.59	34.57	11.98	0.32
CO_2	4,378.76	33.92	11.91	0.29
CH_4	5.30	1.92E-02	1.11E-03	1.10E-03
N_2O	0.11	2.85E-04	1.45E-04	2.00E-06
SF_6	4.90E-05	N/A	N/A	N/A

Source: USEPA (2023e).

Note: N/A = not available.

With temperatures on the rise and precipitation levels decreasing, evaporation rates are increasing. Increasing evaporation rates intensify aridity and heighten the strain on the region's water resources (IPCC 2021). The arid landscape, coupled with diminishing water supplies, exacerbates the severity and frequency of drought events, impacting both natural ecosystems and human activities and increasing the risk of wildfires (Breshears et al. 2005). Additionally, human-induced factors such as deforestation and urbanization further exacerbate the impacts of climate change on drought and aridification in Clark County. Urbanization exacerbates the urban heat island effect, intensifying temperatures and evapotranspiration rates, which contribute to drying out the surrounding landscape (Grimm et al. 2008). These anthropogenic influences, coupled with climate change-induced shifts, synergistically heighten the vulnerability of Clark County to drought and aridification.

Social Cost of Greenhouse Gases

The "social cost of carbon," "social cost of nitrous oxide," and "social cost of methane" (together, the SC-GHG) are estimates of the monetized damages associated with incremental increases in GHG emissions in a given year.

On January 20, 2021, President Joe Biden issued EO 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis. Section 2 of the EO calls for federal agencies to review existing regulations and policies issued between January 20, 2017, and January 20, 2021, for consistency with the policy articulated in the EO and to take appropriate action. Thus, the CEQ rescinded its 2019 Draft National Environmental Policy Act Guidance on Considering Greenhouse Gas Emissions (CEQ 2021) and has begun to review (with the purpose of updating) its 2016 GHG Guidance (CEQ 2016). Although CEQ works on updated guidance, it has instructed agencies to consider and use all tools and resources available to them in assessing GHG emissions and climate change effects, including the 2016 GHG Guidance.

Section 5 of EO 13990 emphasized how important it is for federal agencies to "capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account" and established an IWG on the SC-GHG. In February of 2021, the IWG published

Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide: Interim Estimates under Executive Order 13990 (IWG 2021). This is an interim report that updated previous guidance from 2016.

For this EIS/RMPA, only direct Project emissions were able to be quantified. At this time, it is too speculative to estimate the indirect impacts from the Project such as variations in power demand, quantity of renewable energy delivered to power grid, and offset of fossil fuel–based power generation emissions from renewable energy delivery. Without the ability to calculate the benefits of GHG reductions achieved from the Project's renewable energy generation, the SC-GHG analysis is based solely on direct Project emissions and, thus, is skewed and does not accurately represent the net carbon balance from the full life cycle of the Project. Therefore, the SC-GHG estimates in this EA are provided only as a form of context for GHG emissions, which is consistent with the CEQ interim guidance on analyzing GHGs.

3.8.4 Environmental Consequences

This section describes the potential impacts to air quality associated with the construction, O&M, and decommissioning of the Project. Impacts to air quality are discussed in terms of Proposed Action emissions of criteria air pollutants and HAPs, which are detailed in Appendix E.

No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed, operated, or decommissioned. The Air Quality Analysis Area would exist under current uses and air trends would continue to occur. Therefore, air quality and GHG emissions associated with the development of the Proposed Action would not occur under the No Action Alternative. In addition, SC-GHG associated with the development of the Proposed Action would not occur.

The Project is a 300-MW PV solar energy generating facility, a substation, an AC-coupled BESS, and a 230-kV gen-tie and is assumed to provide the transmission infrastructure and capacity necessary to deliver electric power from renewable energy resources. Under the No Action Alternative, this renewable energy would not be available and more CO2e emissive energy sources (natural gas and coal) would be utilized. Under the No Action Alternative, the Project would not be an incremental contribution to supporting grid reliability and renewable energy supply within the Air Quality Analysis Area and surrounding states. Given that climate strongly affects energy supply and demand, and that climate change has contributed to an increase in average temperatures and unusually hot days, climate change would continue to exacerbate projected increases in power demand throughout the Air Quality Analysis Area and surrounding states.

Proposed Action

<u>Construction</u>

Air Quality

Construction activities would result in air pollutant emissions from equipment exhaust from construction equipment (including vehicles transporting personnel, equipment, and supplies) and fugitive dust from grading, earthmoving, and equipment/vehicles traveling on paved and unpaved roads. Emissions from these activities would occur over a large 2,412-acre area (Table 3-36), resulting in negligible impacts at any given location. Fugitive dust emissions would be mitigated to the extent practicable through implementation of dust control measures and BMPs as required by Clark and Nye Counties. Construction emissions were calculated using the construction machinery and vehicles needed for construction and material delivery vehicles in Tables 2-4 and 2-5. Table 3-36 presents the estimated total criteria pollutants and HAPs emissions that would occur from Project construction. Table 3-37 and Table 3-38 present the estimated criteria pollutant emissions that would occur from construction within the attainment area for the year 2025 and 2026, respectively.

Table 3-36. Estimated Total Proposed Action Construction Emissions (tons)

Construction Emission Source	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOCs	HAPs
Construction Equipment (off-road)	18.43	77.12	0.10	3.01	2.92	3.10	1.32
Worker and On-Road Construction Equipment Commuting	56.22	4.10	0.04	58.78	7.08	0.72	0.20
Equipment/Material Delivery	2.48	3.56	0.01	23.52	3.46	0.21	0.04
Fugitive Dust from Construction Operation	-	-	-	51.75	5.18	-	-
Total Construction Emissions for the Proposed Action	**77.13**	**84.78**	**0.15**	**137.06**	**18.64**	**4.03**	**1.56**

Table 3-37. 2025 Proposed Action Construction Emissions (tons)

Construction Emission Source	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOCs	HAPs
Construction Equipment (off-road)	8.29	34.70	0.05	1.35	1.31	1.39	0.59
Worker and On-Road Construction Equipment Commuting	25.30	1.85	0.02	26.45	3.19	0.33	0.09
Equipment/Material Delivery	1.12	1.60	0.00	10.58	1.56	0.09	0.02
Fugitive Dust from Construction Operation	-	-	-	23.29	2.33	-	-
2025 Construction Emissions of Proposed Action	**34.71**	**38.15**	**0.07**	**61.68**	**8.39**	**1.81**	**0.70**
Clark County EI Total	191,827	28,987	1,334	17,594	7,058	53,119	10,436
Total 2025 Construction Emissions Percentage of Clark County EI Total	0.02%	0.13%	0.01%	0.35%	0.12%	< 0.01%	0.01%
Nye County EI total	12,704	2,734	57	25,884	3,513	31,855	6,154
Total 2025 Construction Emissions Percentage of Nye County EI Total	**0.27%**	**1.40%**	**0.12%**	**0.24%**	**0.24%**	**0.01%**	**0.01%**
Total 2025 Construction Emissions Percent of Combined Counties' EI Total	**0.02%**	**0.12%**	**< 0.01%**	**0.14%**	**0.08%**	**< 0.01%**	**< 0.01%**

Note: EI = emissions inventory.

Table 3-38. 2026 Proposed Action Construction Emissions (tons)

Construction Emission Source	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOCs	HAPs
Construction Equipment (off-road)	10.14	42.42	0.06	1.66	1.61	1.70	0.72

Construction Emission Source	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOCs	HAPs
Worker and On-Road Construction Equipment Commuting	30.92	2.26	0.02	32.33	3.89	0.40	0.11
Equipment/Material Delivery	1.37	1.96	0.00	12.94	1.90	0.11	0.02
Fugitive Dust from Construction Operation	-	-	-	28.46	2.85	-	-
2026 Construction Emissions of Proposed Action	**42.43**	**46.64**	**0.08**	**75.39**	**10.25**	**2.21**	**0.85**
Clark County EI Total	191,827	28,987	1,334	17,594	7,058	53,119	10,436
Total 2026 Construction Emissions Percentage of Clark County EI Total	0.02%	0.16%	0.01%	0.43%	0.15%	< 0.01%	0.01%
Nye County EI Total	12,704	2,734	57	25,884	3,513	31,855	6,154
Total 2026 Construction Emissions Percentage of Nye County EI Total	**0.33%**	**1.71%**	**0.14%**	**0.29%**	**0.29%**	**0.01%**	**0.01%**
Total 2026 Construction Emissions Percent of Combined Counties' EI Total	**0.02%**	**0.15%**	**0.01%**	**0.17%**	**0.10%**	**< 0.01%**	**0.01%**

Note: EI = emissions inventory.

As shown above in Table 3-37 and Table 3-38, annual criteria air pollutants and HAPs emitted from Project construction would be less than 0.50% of the individual counties' 2020 annual emissions. In addition, annual criteria air pollutants and HAPs emitted from Project construction would be less than 0.20% of Clark and Nye Counties' combined total 2020 annual emissions. Data that form the assumptions and complete GHG emission calculation methodology and data are provided in Appendix E. Criteria air pollutant dispersion modeling will be conducted and reported in the Final EIS/RMPA.

Emissions from construction are not expected to cause or contribute to a violation of an applicable ambient air quality standard or contribute substantially to an existing or projected air quality violation because the construction equipment would be operated on an as-needed basis during daylight hours only and the emissions from gasoline and diesel engines would be minimized because the engines must be built to meet the standards for mobile sources established by the USEPA. Most of the construction equipment would be powered by diesel engines that would meet current USEPA emissions standards based on engine size and date of manufacture. The Project would conform to all necessary national, state, and county regulations pertaining to air quality protection by obtaining and adhering to any necessary air quality construction permits.

To determine visibility impacts on Class I areas, the Federal Land Managers' Air Quality Related Values (includes visibility and acid deposition) Work Group 2010 initial screening guidance (U.S. Forest Service et al. 2010) suggests summing the Project-wide tpy emission rates (Q) for all sources of NO_X, SO_2, PM_{10}, and sulfuric acid mist based on 24-hour maximum allowable emissions (which are annualized) and dividing this value by the distance (d) in kilometers from the proposed site to the Class I area. If this value is less than or equal to 10, the analysis is complete, and the Project is not expected to affect or contribute to Air Quality Related Values at any of the neighboring Class I areas. Fugitive particulate emissions from on-site roads were included in these estimates. This results in a conservative analysis as these fugitive emissions are close to the ground surface with low motive velocity and would not be likely to impact areas located several kilometers away. The distance from the Project Area to the closest border of the nearest Class I area (Grand Canyon National Park) is 104 miles (USEPA 2024e). Based on the Project construction emissions reported in Table 3-36 there are a total of 222.0 tpy of SO_2, NO_x, PM_{10}, and sulfuric acid mist. According to the initial screening test outlined in the work group guidance, the Q/d value is 1.33. Accordingly, because these are below the threshold of 10, the Project would not be expected to adversely affect Air Quality Related Values at any of the neighboring Class I areas.

BMPs would be incorporated to minimize fugitive dust and wind erosion during all phases of the Project (site characterization, siting and design, construction, O&M, and reclamation and decommissioning) as described in the POD (Dudek 2024a:71). Dust control protocols for the Project consistent with BLM and Clark County requirements would be developed prior to the start of construction. Table 10 of the POD provides additional APMs (Air-1 and Air-2) that would reduce air impacts to air quality (Dudek 2024a:94–95) (Appendix B). Additionally, Western Solar Plan (BLM and DOE 2012) design feature AQC2-1 (Appendix B) would also be implemented to minimize impacts on air quality.

The impacts of Proposed Action emissions would be low compared to the Air Quality Analysis Area's existing emissions (see Table 3-37 and Table 3-38). Air quality in the region could be improved in the long term because additional renewable generation would offset emissions from fossil fuel–generated energy sources.

Climate Change and Greenhouse Gas Emissions

Construction activities would result in temporary GHG emissions from equipment exhaust during construction and vehicle exhaust caused by travel to and from the Project Area. These construction emissions would occur over a large area, resulting in undetectable impacts at any given location, as shown in Table 3-39 and Table 3-40 and detailed in Appendix E. Impact intensity is assessed by comparing GHG emissions associated with the Project with the emission inventories of the impacted counties from the 2020 NEI. Table 3-39 and Table 3-40 present the estimated annual CO_2, CH_4, NO_2, and CO_2e construction activity emissions per year and the emissions from the construction of the Project as a percentage of each county's total emissions.

Table 3-39. 2025 Proposed Action Construction Emissions (metric tons)

Construction Emission Source	CO_2	CH_4	N_2O	CO_2e
Construction Equipment (off-road)	15,068.65	0.10	0.54	15,220.28
Worker and On-Road Construction Equipment Commuting	2,596.05	0.08	0.01	2,601.95
Equipment/Material Delivery	1,029.99	0.01	0.00	1,030.85
Fugitive Dust from Construction Operation	-	-	-	-
2025 Construction Emissions of Proposed Action	**18,694.69**	**0.19**	**0.55**	**18,853**
Clark County EI Total	–	–	–	21,579,559
Percentage of Clark County EI Total	–	–	–	0.09%
Nye County EI Total	–	–	–	293,612
Percentage of Nye County EI Total	–	–	–	6.42%
Percent of Combined Counties' EI Total	–	–	–	0.09%

Note: EI = emissions inventory.

Table 3-40. 2026 Proposed Action Construction Emissions (metric tons)

Construction Emission Source	CO_2	CH_4	N_2O	CO_2e
Construction Equipment (off-road)	18,417.23	0.12	0.67	18,602.57
Worker and On-Road Construction Equipment Commuting	3,172.95	0.09	0.02	3,180.16
Equipment/Material Delivery	1,258.87	0.01	0.00	1,259.93
Fugitive Dust from Construction Operation	-	-	-	-
2025 Construction Emissions of Proposed Action	**22,849.05**	**0.22**	**0.69**	**23,043**
Clark County EI Total	–	–	–	21,579,559
Percentage of Clark County EI Total	–	–	–	0.11%
Nye County EI Total	–	–	–	293,612
Percentage of Nye County EI Total	–	–	–	7.85%
Percent of Combined Counties' EI Total	–	–	–	0.11%

Note: EI = emissions inventory; MT = metric tons.

As shown above in Table 3-39 and Table 3-40, GHGs emitted from Project construction would be less than 0.2% of Clark and Nye Counties total 2020 combined annual emissions. Also, to provide context for these levels of emissions. Given that the level of CO_2e emissions during construction is low in comparison to the Clark and Nye Counties' total 2020 combined annual emissions, and given there is potential for indirect CO_2e benefits from the Proposed Action, it is anticipated that the Proposed Action would result in minimal impacts to county, state, or U.S. CO_2e concentrations. According to the USEPA's Greenhouse Gas Equivalencies Calculator, total construction CO_2e emissions are equivalent to the annual GHG emissions from 9,971 passenger cars driven for one year or electricity use for 8,268 homes for one year (USEPA 2024f). Data that form the assumptions and complete GHG emission calculation methodology and data are provided in Appendix E. Western Solar Plan (BLM and DOE 2012) design feature AQC2-1 (Appendix B) would also be implemented to minimize impacts related to emissions.

<u>Operations and Maintenance</u>

Air Quality

O&M activities would occur after completion of construction activities and throughout the life of the Project. Operational air quality impacts for a utility-scale PV project would include normal maintenance truck activity (e.g., vegetation management, routine maintenance, damage repair, etc.), possibly including periodic fire water pump engine testing, but would not include any future significant upgrades or rebuilds. Operation of the Project could require up to 12 permanent employees to provide technical oversight of plant management and operations. Criteria pollutant emissions would be generated from vehicles involved in maintenance activities, which would be a much smaller number than compared to construction. The information provided in Table 3-41 shows the estimated maximum potential emissions per year from typical O&M activities. Impacts would be undetectable and would not impact air quality to a degree that would exceed the standard thresholds for any pollutant criteria. Western Solar Plan design feature AQC2-1 (Appendix B) includes air quality monitoring during O&M activities including adaptive management protocols. The expected operational lifetime of the Project is 40 years. However, depending on economic or other circumstances, the real life of the Project could be longer or shorter.

Table 3-41. Estimated Total Proposed Action Operational Emissions (tons per year)

Construction Emission Source	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	HAPs
Total Annual Maintenance/Inspection Activities	1.28	0.53	0.00	1.27	0.16	0.03	0.01
Percentage of Clark County EI Total	<0.01%	<0.01%	<0.01%	0.01%	<0.01%	<0.01%	<0.01%
Percentage of Nye County EI Total	0.01%	0.02%	<0.01%	0.01%	<0.01%	<0.01%	<0.01%

Note: EI = emissions inventory.

Avoided Emissions

Table 3-42 provides the estimated annual and five-year long-term total avoided emissions based on the 300-MW design capacity of the Project. To provide a rough estimate of the long-term avoided emissions of the Project, the annual avoided emissions estimated by AVERT were multiplied by five years. As presented in Table 3-42, the Project would annually displace CO_2, NO_X, SO_2, $PM_{2.5}$, VOCs, and ammonia (NH_3) produced by the Nevada electric grid and decrease the creation of air pollutant emissions in the atmosphere from traditional fossil fuel–fired power plants.

Table 3-42. Avoided Emissions during Operations

Time Span	CO_2*	NO_X	SO_X	$PM_{2.5}$	VOC	NH_3
Annual (tons)	471,120	252	138	28	8	8
5-year (tons)	2,355,600	1,261	692	138	41	42

*427,393 metric tons of CO_2 (USEPA 2023g).

Climate Change and Greenhouse Gas Emissions

During O&M, estimated GHG emissions would result from tasks performed such as routine inspections, repair activities, and vegetation management. O&M emissions could occur anywhere within the Project Area and are anticipated to be significantly less than construction emissions. GHG emissions would be generated from vehicles involved in maintenance activities, which would be a much smaller number than compared to construction. The information provided in Table 3-43 shows the estimated maximum potential GHG emissions per year from typical O&M activities. These emissions took into consideration the commute for workers and any potential routine maintenance emissions, such as emissions from maintenance vehicles.

The potential impacts to the O&M from climate change could result in economic concerns due to extreme weather events that result in severe flooding or storms that have the potential to damage the transmission line or other infrastructure and increase the frequency of O&M activities. Most importantly, the Proposed Action would facilitate the delivery of renewable energy to the power grid, thus offsetting fossil fuel generation, resulting in a net reduction of GHG emissions. The long-term beneficial impact of the Proposed Action would be the reduction of GHGs.

Table 3-43. Estimated Total Proposed Action Operational Emissions (metric tons per year)

Construction Emission Source	CO_2	CH_4	N_2O	CO_2e
Total Annual Maintenance/inspection activities	281	0.005	0.001	282
Percentage of Clark County EI Total	–	–	–	<0.01%
Percentage of Nye County EI Total	–	–	–	0.10%

Note: EI = emissions inventory.

As shown above in Table 3-43, GHGs emitted from Project O&M would be less than 0.2% of Clark and Nye Counties' total 2020 annual emissions. The O&M annual emissions are 282 metric tons CO_2e per year and the life of Project is 40 years, for an operational life-of-Project total of 11,280 metric tons CO_2e. The overall life-of-Project GHG emissions (assuming a 40-year life of the Project and a 20-month construction period) would be 53,176 metric tons CO_2e per year. Given that the level of CO_2e emissions for the Proposed Action is a very small percentage of Clark and Nye Counties' CO_2e emissions, and there is potential for indirect CO_2e benefits from the Proposed Action, it is anticipated that the Proposed Action would result in minimal impacts to county, state, or U.S. CO_2e concentrations. Assumptions and complete GHG emission calculation methodology and data are provided in Appendix E.

Avoided Emissions

As presented in Table 3-42, the Project would annually displace CO_2 as well as other non-GHG pollutants produced by the Nevada electric grid and decrease the creation of air pollutant emissions in the atmosphere from traditional fossil fuel–fired power plants. The amount of CO_2 emissions that the Project would avoid annually (471,120 tons or 427,393 metric tons) is equivalent to the GHG emissions from 101,720 gasoline-powered passenger vehicles removed from the road for one year or the CO_2 emissions from 0.11 coal-fired power plant in one year or electricity use for 84,349 homes for one year (USEPA 2024f).

Decommissioning

During decommissioning, the Proposed Action would create the same or fewer emissions as during construction; therefore, impacts to air quality, GHGs, and climate change from decommissioning would be less than or equal to the impacts to air quality, GHGs, and climate change due to construction. Western Solar Plan design features AQC2-1, AQC4-1 (Appendix B) would be implemented during reclamation and decommissioning activities to reduce the likelihood of air quality impacts associated with reclamations and decommissioning activities.

Social Cost of Greenhouse Gases

Impacts of the Proposed Action

Table 3-44 provides estimates of the monetary value of changes in GHG emissions that could result from the Proposed Action construction, 40 years of operation, and decommissioning (decommissioning was assumed to have emissions equivalent to half of the total construction emissions). Due to the limitations of AVERT, the emissions that the Project would avoid if the same amount of energy were generated via the combustion of fossil fuels has not been accounted for in the SC-GHG analysis. This analysis should not be construed to mean a cost determination is necessary to address potential impacts of GHGs. These numbers were monetized; however, they do not constitute a complete cost-benefit analysis, nor do the SC-GHG numbers present a direct comparison with other impacts analyzed in this document. SC-GHG is provided only as a form of context for GHG emissions, consistent with the CEQ interim guidance on analyzing GHGs. Table 3-44 discloses the SC-GHG, which is calculated in accordance with the IWG's Technical Support Document (IWG on Social Cost of Greenhouse Gases 2021). Detailed calculations are provided in Appendix E.

Table 3-44. Total Social Cost of Greenhouse Gases (in 2020 dollars) Associated with Future Potential Development

Source	Average Value, 5% Discount Rate	Average Value, 3% Discount Rate	Average Value, 2.5% Discount Rate	95th Percentile Value, 3% Discount Rate
SC-CO_2	$1,079,256	$4,220,614	$6,461,648	$12,785,309
SC-CH_4	$588	$1,583	$2,175	$4,190
SC-N_2O	$11,820	$42,909	$65,448	$113,897
Total	**$1,091,664**	**$4,265,106**	**$6,529,271**	**$12,903,396**

Note: For federal agencies, the best currently available estimates of SC-GHG are the interim estimates of the social costs of CO_2, CH_4, and N_2O developed by the IWG. Select estimates are published in the *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide: Interim Estimates under Executive Order 13990* (IWG on Social Cost of Greenhouse Gases 2021), and the complete set of annual estimates are available on the U.S. Office of Management and Budget's website.

The IWG's SC-GHG estimates are based on complex models describing how GHG emissions affect global temperatures, sea level rise, and other biophysical processes; how these changes affect society through, for example, agricultural, health, or other effects; and monetary estimates of the market and nonmarket values of these effects. One key parameter in the models is the discount rate, which is used to estimate the present value of the stream of future damages associated with emissions in a particular year. A higher discount rate assumes that future benefits or costs are more heavily discounted than benefits or costs occurring in the present (i.e., future benefits or costs are a less important factor in present-day decisions). The current set of interim estimates of SC-GHG have been developed using three different annual discount rates: 2.5%, 3%, and 5% (IWG on Social Cost of Greenhouse Gases 2021).

As expected with such a complex model, multiple sources of uncertainty are inherent in the SC-GHG estimates. Some sources of uncertainty relate to physical effects of GHG emissions, human behavior, future population growth and economic changes, and potential adaptation (IWG on Social Cost of Greenhouse Gases 2021). To better understand and communicate the quantifiable uncertainty, the IWG method generates several thousand estimates of the social cost for a specific gas, emitted in a specific year, with a specific discount rate. These estimates create a frequency distribution based on different values for key uncertain climate model parameters. The shape and characteristics of that frequency distribution demonstrate the magnitude of uncertainty relative to the average or expected outcome.

To further address uncertainty, the IWG recommends reporting four SC-GHG estimates in any analysis. Three of the estimates reflect the average damages from the multiple simulations at each of the three discount rates. The fourth value represents higher-than-expected economic impacts from climate change. Specifically, it represents the 95th percentile of damages estimated, applying a 3% annual discount rate for future economic effects. This is a low-probability, but high-damage scenario that represents an upper bound of damages within the 3% discount rate model. The estimates in this table follow the IWG recommendations.

Alternative 1

Construction, Operations and Maintenance, and Decommissioning

Direct and indirect impacts to air quality and visibility from construction, O&M, and decommissioning, as well as cumulative impacts of the Proposed Action under Alternative 1, would be similar to those described under the Proposed Action. Alternative 1 would increase vegetation cover to 75%, and grading and soil removal (D-3 surface disturbance) would be limited to 482 acres. Because there would be a 25% increase in vegetation cover compared to the Proposed Action and grading would be limited to 20% of the Buildable Areas, this would lead to reduced fugitive dust during construction.

Anticipated air pollutant emissions would be comparable to the Proposed Action (see Table 3-37, Table 3-38, and Table 3-40), with potential for reduced fugitive dust impacts. The anticipated GHG emissions would also be comparable to the Proposed Action (see Table 3-39, Table 3-40, and Table 3-43). The anticipated SC-GHG from construction, O&M, and decommissioning impacts of the Alternative 1 would be similar to those described under the Proposed Action (see Table 3-44).

Also under Alternative 1, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-4). This mineral material relocation site would result in a new surface disturbance, which would be subject to wind erosion and could contribute to fugitive dust emissions of PM10 and PM2.5. However, the surface disturbance associated with Alternative 1 is 545 acres less than for the Proposed Action; therefore, the anticipated air pollutant emissions would still be comparable to the Proposed Action (see Table 3-37, Table 3-38, and Table 3-40), with potential for reduced fugitive dust impacts. The relocated mineral materials site would result in long-term adverse impact to air quality, during the life of the operation of the Project.

The impacts of Proposed Action emissions, and therefore the Alternative 1 emissions, would be low compared to the Air Quality Analysis Area and GHG Emissions Analysis Area's existing emissions. Air quality in the region could be improved in the long term because additional renewable generation would offset emissions from fossil fuel–generated energy sources.

Alternative 2 (BLM Preferred Alternative)

Construction, Operations and Maintenance, and Decommissioning

Direct and indirect impacts to air quality and visibility from construction, O&M, and decommissioning, as well as cumulative impacts of the Proposed Action under Alternative 1, would be similar to those described under the Proposed Action. Alternative 2 would increase vegetation cover to 65% and grading would be limited to 592 acres (25% of the Buildable Areas). Because there would be a 10% increase in vegetation compared to the Proposed Action and grading would be limited to 25% in developable areas, this would lead to reduced fugitive dust during construction. Anticipated air pollutant emissions would be comparable to the Proposed Action (see Table 3-37, Table 3-38, and Table 3-41), with potential for reduced fugitive dust impacts. The anticipated GHG emissions would also be comparable to the Proposed Action (see Table 3-39, Table 3-40, and Table 3-43). The anticipated SC-GHG from construction, O&M, and decommissioning impacts of the Alternative 2 would be similar to those described under the Proposed Action (see Table 3-44).

Also under Alternative 2, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-4). This mineral material relocation site would result in a new surface disturbance, which would be subject to wind erosion and could contribute to fugitive dust emissions of PM10 and PM2.5. However, the amount of D-3 surface disturbance associated with Alternative 2 is 435 acres less than for the Proposed Action; therefore, the anticipated air pollutant emissions would still be comparable to the Proposed Action (see Table 3-37, Table 3-38, and Table 3-41), with potential for reduced fugitive dust impacts. The relocated mineral materials site would result in long-term adverse impact to air quality, during the life of the operation of the Project.

The impacts of Proposed Action emissions, and therefore the Alternative 2 emissions, would be low compared to the Air Quality Analysis Area and GHG Emissions Analysis Area's existing emissions. Air quality in the region could be improved in the long term because additional renewable generation would offset emissions from fossil fuel–generated energy sources.

Alternative 3

Construction, Operations and Maintenance, and Decommissioning

Direct and indirect impacts to air quality and visibility from construction, O&M, and decommissioning from Alternative 3 would be similar to those described under the Proposed Action. Alternative 3 would keep vegetation cover at 65%, and grading and soil removal (D-3 surface disturbance) would be limited to 648 acres. Because there would be a 10% increase in vegetation compared to the Proposed Action and grading would be limited to 25% in developable areas, this would lead to reduced fugitive dust during construction. Anticipated air pollutant emissions would be comparable to the Proposed Action (see Table 3-37, Table 3-38, and Table 3-41), with potential for reduced fugitive dust impacts. Equipment and construction timeline assumptions would remain the same as the Proposed Action, so exhaust emissions and the anticipated GHG emissions would also be comparable to the Proposed Action (see Table 3-39, Table 3-40, and Table 3-43). The anticipated SC-GHG from construction, O&M, and decommissioning impacts of Alternative 3 would be similar to those described under the Proposed Action (see Table 3-44).

Also under Alternative 3, approximately 93 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-5). This mineral material relocation site would result in a new surface disturbance, which would be subject to wind erosion and could contribute to fugitive dust emissions of PM_{10} and $PM_{2.5}$. However, the surface disturbance associated with Alternative 3 is 379 acres less than for the Proposed Action; therefore, the anticipated air pollutant emissions would still be comparable to the Proposed Action (see Table 3-37, Table 3-38, and Table 3-41), with potential for reduced fugitive dust impacts. The mineral materials relocation site would result in long-term adverse impact to air quality, during the life of the operation of the Project.

The impacts of Proposed Action emissions, and therefore the Alternative 3 emissions, would be low compared to the Air Quality Analysis Area and GHG Emissions Analysis Area's existing emissions. Air quality in the region could be improved in the long term because additional renewable generation would offset emissions from fossil fuel–generated energy sources.

3.9 Land Use and Realty

Land use and realty addresses the current land uses that are designated through various management plans at the federal, state, county, and local government levels. Federal land uses are authorized under FLPMA, state land uses are authorized under NRS and master plans, county lands are authorized through county master plans, and local government lands are authorized through local master plans. This section discusses the current land uses on federal, county, and local government managed lands in the form of federal resource management plans, county master plans, and land use authorizations. Wild horse and burros, special designations, and recreation are addressed in Appendix C, Table C-1.

3.9.1 Issues Identified for Analysis

- How would construction, O&M, and decommissioning of the Project affect existing ROW authorizations, permits, and leases on federal land?
- How would construction, O&M, and decommissioning of the Project affect existing county or local government master planning?

3.9.2 Analysis Area and Methodology

The Land Use and Realty Analysis Area is the 5,133-acre Application Area plus a 1-mile buffer, which comprises 24,386 acres. The Land Use and Realty Analysis Area is the estimated extent of lands that could be directly or indirectly impacted by the Proposed Action.

The Project is located 2.5 miles southwest of KINS in Indian Springs, Nevada. Building near DoD-managed land requires notification of the DoD to ensure the Project Area would not interfere with the DoD's mission to test, train, and operate military aircraft. The structured process, either formal or informal, is for developers to request a mission compatibility evaluation of a proposed energy project, as documented in 32 CFR 211. Formal reviews are submitted to the Secretary of Transportation under 49 USC 44718 and informal reviews are submitted through the DoD Clearinghouse email. Results from the informal review found minimal impacts on military operations within the area as stated in the letter from the Office of the Assistant Secretary of Defense dated May 7, 2021 (DoD 2021).

There are no federal mining or mining claims within the Land Use and Realty Analysis Area (Nevada Bureau of Mines and Geology 2024).

This section is largely informed by information presented in the Las Vegas RMP ROD (BLM 1998b), BLM Mineral and Land Records System website (BLM 2024c), Clark County Master Plan (CCDCP 2021), BLM Programmatic Solar EIS (BLM and DOE 2012), Nye County Comprehensive Master Plan (Nye County 2011), the Project POD (Dudek 2024a), and aerial imagery. These documents are incorporated herein by reference.

3.9.3 Affected Environment

The Application Area is located on BLM-administered lands within the SNDO and DoD lands, located approximately 4 miles west of the unincorporated town Indian Springs, Nevada, south of U.S. 95 in Clark and Nye Counties.

Land Use Authorizations

Existing and pending land use authorizations include utilities, mineral material sites, and transportation facilities. Mineral material sites are discussed in Section 3.5, Earth Resources. See Table 3-45 for existing and Table 3-46 for pending land use authorizations within the Land Use and Realty Analysis Area. Appendix A, Figure A-14 shows the locations of the existing and pending land use authorizations, as well as the locations of the mineral material sites.

Table 3-45. Existing Federal Agency Land Use Authorizations that Overlap with the Land Use and Realty Analysis Area

Land Use Holder	MLRS Serial Number/Easement Number	Case Type	Description	Area Overlapping Analysis Area (acres)
DOE	NVNV105886218	Fiber optic cable	122.89-mile by 14-foot ROW running from the Nevada Test Site to KINS	205
Valley Electric Association	NVNV105896594	Transmission line	138-kV 25.6-mile by 200-foot ROW from Pahrump to Mercury	1,362
Nevada Power Co	NVNV105974435	Transmission line	138/69-kV 61.45-mile by 100-foot ROW running from Clark Station to Indian Springs and Mercury	1,239
GridLiance West Transco, LLC	NVNV106054061	Transmission line	230-kV from the GridLiance Innovation Substation to Northwest Substation	1,150
NDOT	NVNV106080665	Highway	400-foot ROW for U.S. 95, Clark and Nye Counties	470
AT&T Nevada	NVNV106181076	Fiber optic line	328.97-mile by 20-foot ROW	505
GridLiance West Transco, LLC	NVNV106088777	Substation and access road	GridLiance Innovation Substation 10 acres; access road is 4,300 × 10 feet	5
NDOT	NVNV105962115	Material site	Mineral material site	40
NDOT	NVNV105962115	Material site	Mineral material site	42
NDOT	NVNV106257420	Material site	Mineral material site	41
EDF Renewables Development Inc.	NVNV106239492	Solar test site	Meteorological station site for proposed Project	41
NDOT	NVNV105959733	Material site	Mineral material site	<0.1
NDOT	NVNV106183711	Material site	Mineral material site	1
Valley Electric Association	NVNV105883851	Transmission line	7,094 acres	2
EDF Renewables Development Inc.	NVNV105851829	Geotechnical investigation	Geotechnical investigation and access road associated with Project	1,973

Source: BLM (2024); Dudek (2021:12–14).

Table 3-46. Pending Federal Agency Land Use Authorizations that Overlap with the Land Use and Realty Analysis Area

Land Use Holder	MLRS Serial Number/Easement Number	Case Type	Description	Area Overlapping Analysis Area (acres)
Nevada Power Co	NVNV105844735	Transmission line	525-kV Greenlink West Transmission Project	1,032
Nevada Power Co	NVNV105848004	Transmission line	STROW for 525-kV Greenlink West Transmission Project	1,375
Southwest Solar Land Co LLC	NVNV105886930	Solar energy	50.4 MW energy generating facility with interconnect into existing 138kV transmission	182
GridLiance West, LLC	NVNV105858066	Transmission line	155 miles of 230/550 kV, Sloan Canyon to Trout Canyon Upgrade Project	1,278

Land Use Holder	MLRS Serial Number/Easement Number	Case Type	Description	Area Overlapping Analysis Area (acres)
South Ridge Solar, LLC	NVNV106330325	Solar energy	Proposed solar development	204
Renew Development Holdco, LLC	NVNV105862025	Solar energy	Kawich Solar Project is 350-MW solar generation project that includes a 230-kV gen-tie and access roads for a total of 4,399.4 acres	451
Vegas Valley Solar, LLC	NVNV106271307	Solar energy	1-gigawatt PV solar generating facility that includes a 230-kV gen-tie, BESS, and access roads for a total of 9,000 acres	1,831

Source: BLM (2024), Dudek (2021:12–14).

Transportation Infrastructure

Within the Land Use and Realty Analysis Area there is one primary roadway (U.S. 95), one secondary roadway (an access road for a transmission line being built by GridLiance West Transco, LLC [NVNV106088777]), and various tertiary unimproved roads throughout the Land Use and Realty Analysis Area. U.S. 95 has been in use for over 50 years. The GridLiance West Transco, LLC, transmission access road provides access to the GridLiance Innovation Substation for the GridLiance West Transmission Line (SWCA 2023).

Governmental Management Plans

Land use in the Land Use and Realty Analysis Area is governed by various management plans at the federal, county, and local government levels. Local government refers to an administration at a lower tier that can include cities, towns, or districts. There are no state lands in the Land Use and Realty Analysis Area. Governmental entities work collaboratively to create plans that establish goals, objectives, and standards for the pertinent management of land and resources under their jurisdictions. A brief description of land use plans by jurisdictional landowner is provided below.

<u>Federal</u>

Las Vegas Resource Management Plan

The Land Use and Realty Analysis Area includes federal land managed by the BLM SNDO, Las Vegas, and Pahrump Field Offices, which is subject to the Las Vegas RMP. The Las Vegas RMP provides management guidance for approximately 3.3 million acres of public land administered by the BLM. Under the authority of FLPMA, the Secretary of the Interior is required to develop RMPs for all public lands (BLM 1998a).

Within the Land Use and Realty Analysis Area, there is one Legacy Locally Designated Corridor designated by the 1998 Las Vegas RMP and referred to as U.S. 95/Crater Flat Corridor. The corridor is aligned longitudinally through the proposed Project Area (Appendix A, Figure A-25). The second corridor is a West Wide Energy Corridor, commonly known as the Section 368 Designated Corridor or Corridor 223-224 and is located south of the Project Area (see Figure A-25). This corridor was designated in BLM’s 2009 Approved RMP Amendments/ROD for

Designation of Energy Corridors on BLM-Administered Lands in the 11 Western States (BLM 2009a) under the authority of Section 368 of the Energy Policy Act of 2005. These corridors are recognized across multiple federal agencies as existing utility corridors and are identified as the preferred siting for new utility infrastructure (BLM and DOE 2012, 2022). See Chapter 4, Resource Management Plan Amendments, for more information about these energy corridors and the necessary RMPAs needed to address potential conflicts with these corridors.

BLM Solar Programmatic Environmental Impact Statement

The Application Area is on lands identified as "Variance Areas" by the 2012 Western Solar Plan (BLM and DOE 2012). Variance areas are open to utility-scale solar development applications but require developers to adhere to the proposed variance process. The Project underwent the variance process as described in Section 1.1, Introduction.

<u>County</u>

The Land Use and Realty Analysis Area is within Clark and Nye Counties. In total, 5,082 acres of the Application Area, which includes the Buildable Areas, access roads, and 2.4 miles of the gen-tie, are within Clark County and follow the Clark County Master Plan (CCDCP 2021:147). The Clark County Master Plan divides the county into 11 different Planning Areas. The Land Use and Realty Analysis Area is located within the Northwest County Planning Area. The Northwest County Planning area is rural and has no incorporated cities. The only populated unincorporated town is the desert community of Indian Springs located approximately 4 miles east of the Land Use and Realty Analysis Area.

The entire Land Use and Realty Analysis Area is within lands designated as "open lands" and has supporting uses for renewable energy facilities, and other regulated industries (CCDCP 2021:100, 147). The Northwest County Planning Area has goals of enhancing the community's renewable power and promoting contiguous development while also preserving the natural environment and improving the safety of its residents. Clark County as a whole has similar goals of expanding the use of clean energy, reducing GHG emissions, and preserving natural resources (CCDCP 2021:15–67).

The remaining 51 acres of the Application Area are within Nye County and follow the Nye County Comprehensive Master Plan. Nye County is primarily rural, and the Land Use and Realty Analysis Area, which includes 3 miles of the gen-tie, is designated as "multiple use" which considers various resources that may benefit the community including renewable energy (Nye County 2011:6, 61). The Nye County Comprehensive Master Plan is a long-range plan relating to public lands and how best to work collaboratively with federal (and state land management) agencies. The plan's main goal is to provide effective planning, communication, and coordination between Nye County and other agencies, taking into account the consistency requirement in Section 202(c)(9) of FLPMA (Nye County 2011:1–2).

<u>Local</u>

Indian Springs is the closest populated unincorporated town to the Project located approximately 4 miles to the east. There is no master plan associated with the town, instead the Clark County Master Plan (CCDCP 2021:152) applies.

Land Use Conditions

The 5,133-acre Application Area is entirely located on BLM-administered land. The land within and immediately surrounding the Land Use and Realty Analysis Area is predominately open space. The primary existing land uses surrounding the Land Use and Realty Analysis Area are dispersed recreation, residential, and utilities within two designated corridors (U.S. 95/Crater Flat and Corridor 223-224). The closest community to the Land Use and Realty Analysis Area is the town of Indian Springs. Indian Springs had a population of 1,353 in 2020 and consists of parks, a library, a Clark County fire station, and one kindergarten through 12th grade school (CCDCP 2021:307–315, 364). The closest metropolitan city is Las Vegas, Nevada, approximately 26 miles to the southeast. Las Vegas has a population of 683,396 in 2023 (City of Las Vegas 2023:4) and consists of 100 Clark County School District schools, parks, libraries, and police and fire services (City of Las Vegas 2021).

Existing land use categories that occur within the Land Use and Realty Analysis Area are open lands in Clark County (CCDCP 2021:147) and multiple use in Nye County (Nye County 2011:59). Both land use categories are defined in Table 3-47.

Table 3-47. Local Government Land Use Categories within the Land Use and Realty Analysis Area

Land Use Category	Land Use Category Definition
Clark County Master plan	
Open Lands	Active and passive recreation, habitat conservation, grazing, and designated military facilities. Supporting land uses include renewable energy facilities and other appropriate regulated industries.
Nye County Comprehensive Master Plan	
Multiple Use	A balance and diverse use of resources which takes into account the long-term needs of the residents for renewable and non-renewable resources including recreational activities; range; timber; energy; minerals; watershed; wildlife and fish; and natural scenic, scientific, and historic areas.

Source: Clark County (2021:100); Nye County (2011:6).

The Land Use and Realty Analysis Area does not overlap with any other federal land management agencies (Bureau of Indian Affairs [BIA], U.S. Forest Service [USFS], NPS, DOE, USFWS, and DoD). The closest government lands to the Project are as follows: Las Vegas Paiute Indian Reservation (BIA) is approximately 25 miles southeast; USFS land is approximately 4 miles south; NPS land is approximately 18 miles southeast; DOE land is approximately 2 miles west; USFWS land is approximately 1 mile north; and DoD land is approximately 1 mile northeast.

3.9.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed, operated, maintained, or decommissioned. The Land Use and Realty Analysis Area would exist under current authorizations and land uses. Therefore, impacts to land use associated with development of the Proposed Action would not occur.

Proposed Action

Construction Impacts

The BLM has notified all authorized holders who have the potential to be impacted by the Proposed Project within the Land Use and Realty Analysis Area when the application for the Project was submitted per 43 CFR 2807.14. Table 3-45 identifies the authorized ROW holders and the acres of their projects within the Land Use and Realty Analysis Area that have potential to be temporarily impacted during construction.

There are five NDOT mineral material sites that would no longer be available for use due to construction of the Proposed Action. Under the Proposed Action, there is no proposal to relocate the approximately 120 acres of NDOT mineral material pits. There are also four transmission lines, two fiber optic lines, one highway, and one substation that includes an access road that have been authorized and have the potential to be impacted. Any work within an existing ROW, such as within the existing U.S. 95 ROW, would be coordinated with the existing ROW holder.

The Project proposes to interconnect with the GridLiance Innovation Substation, west of the Buildable Areas. The applicant would construct and access the gen-tie along an existing transmission access road for construction and maintenance. The Project's gen-tie would not create safety conflicts or incompatibilities with other transmission lines, as the Project's gen-tie does not cross other existing or proposed transmission lines. Construction of the Project's gen-tie would not conflict with other proposed solar projects in the vicinity as the construction timeframes would not overlap.

Land use and realty impacts associated with construction activities for the Proposed Action would primarily be associated with vehicle and equipment access to the Project from U.S. 95, for which NDOT holds an existing BLM ROW and prior use rights. Any improvements to U.S. 95 would require coordination with and approval by NDOT. The level of service currently experienced on U.S. 95 would not change as a result of Project construction (Lochsa Engineering 2023). Project construction activities would occur over a 20-month period and would not block or preclude existing land use authorizations located within or adjacent to the Land Use and Realty Analysis Area. Traffic concerns would be addressed within the Traffic and Transportation Plan required as part of the BLM ROW grant and would not cause an impact to adjacent landowners, land uses, or transportation routes to adjacent land. The Traffic and Transportation Plan would provide for coordination with NDOT to ensure continued access along U.S. 95.

Intermittent temporary lane closures for U.S. 95 may be required for improvements to U.S. 95 and for access to the Project. The necessary encroachment permits, concurrences, and authorizations would be obtained prior to any work within the ROWs. Vehicle traffic on U.S. 95 would be managed according to NDOT encroachment permit requirements and a Traffic and Transportation Plan. Adverse effects on existing transportation corridors are not anticipated because the Applicant would be required under law to obtain the appropriate permissions, approvals, and permits for crossing.

APMs identified in Appendix B to avoid and minimize potential impacts during construction include Eco-6 and Transport-1, as well as Western Solar Plan (BLM and DOE 2012) design feature T2-1 (Appendix B), which would be implemented to minimize impacts on and related to transportation and traffic. The Applicant has also proposed 100- to 400-foot buffers between the Project's solar panel development and the edge of authorized and pending ROWs, where appropriate (Dudek 2024a:78), to avoid conflicts between the Project and other ROWs. Table 3-45 and Table 3-46 describe the existing and pending ROWs, and Appendix A, Figure A-14 provides the locations of all the authorized ROWs.

The Proposed Action would not necessarily preclude the use of all the land for future ROW siting, as the BLM may authorize compatible ROWs within an authorized ROW boundary as long as it is in a manner that would not be inconsistent with an existing holder's use. Similarly, the proposed Project would have to conform to the terms and conditions of other previously issued, overlapping ROWs in the Land Use and Realty Analysis Area (e.g., transportation, transmission, and other linear ROWs).

Once construction is complete, any temporary use areas would be returned to their pre-construction condition. Any public land administered by the BLM that is not already classified, segregated, or withdrawn, is available for land use leases and permits at the discretion of the agency (this excludes ACECs and wilderness study areas) per the 1998 Las Vegas RMP (BLM 1998a). The Land Use and Realty Analysis Area and surrounding area is designated by both Clark and Nye Counties for the same uses which would allow for similar projects to be built nearby or adjacent to the proposed Project.

Coordination with overlapping and nearby utilities would occur prior to the commencement of construction. In places where a conflict is unavoidable, minor shifts in the proposed Project or adjustments to the land use authorization may be required.

The Project would not result in any conflicts with county or local land use plans.

Operations and Maintenance Impacts

Operational impacts to lands and realty are limited to the potential for conflict with existing land use programs, plans, policies, or authorizations. The Proposed Action would preclude the development of other uses on the Buildable Areas but does not conflict with BLM's existing solar energy project policies nor would it conflict with any existing land uses in the Land Use and Realty Analysis Area. The Project does include two RMPAs, one for modification of the Visual Resource Management class and one for realignment of existing energy corridors (see Chapter 4, Resource Management Plan Amendments).

The proposed Project would have terms and conditions that would be developed under Title V of FLPMA, as amended (43 USC 1761–1771). Therefore, there would be no conflicts with other existing BLM-designated utility corridors or existing BLM ROW authorizations. Continued collaboration with the BLM and the overlapping and nearby land use holders would minimize the risk of any new potential impacts.

Decommissioning Impacts

Once the proposed Project reaches the end of its operational life, the proposed Project could be reauthorized for additional years of operation. If reauthorization is not sought, the proposed Project would be decommissioned and disassembled. All Project components (see Section 2.2.1, Project Components) would be decommissioned and disassembled unless converted to other uses. Impacts during decommission would be similar to those of construction. After disassembling, reclamation would begin following the Site Restoration Plan (Appendix B) with the goal of restoring the land to a reasonable pre-construction state. Once reclamation goals are reached, the land would be available for future uses.

Alternative 1

Construction, Operations and Maintenance, and Decommissioning Impacts

Impacts to land use and realty from Alternative 1 would be very similar to those under the Proposed Action, except that 120 acres of NDOT mineral materials would be relocated to the east of the Application Area, as shown in Appendix A, Figure A-14. This would result in a long-term beneficial impact to mineral material uses in the Land Use and Realty Analysis Area.

Alternative 2 (BLM Preferred Alternative)

Construction, Operations and Maintenance, and Decommissioning Impacts

Impacts to lands and realty from Alternative 2 would be very similar to those under the Proposed Action, except that 120 acres of NDOT mineral materials would be relocated to the east of the Application Area, as shown in Appendix A, Figure A-14. This would result in a long-term beneficial impact to mineral material uses in the Land Use and Realty Analysis Area.

Alternative 3

Construction, Operations and Maintenance, and Decommissioning Impacts

Impacts to land use and realty from Alternative 3 would be the very similar to those under the Proposed Action, except that only 93 acres of NDOT mineral material sites would overlap the Project due to construction of Alternative 3 because NDOT site NVNV105962115 would be avoided. As a result, 93 acres of NDOT mineral material sites would be relocated to the east of the Application Area, as shown in Appendix A, Figure A-14. This would result in a long-term beneficial impact to mineral material uses in the Land Use and Realty Analysis Area.

3.10 Visual Resources

This section describes the potential impacts to visual resources as they relate to the construction, O&M, and decommissioning of the Proposed Action and Action Alternatives for the Project. Visual resources consist of the physical features that make up the visible landscape (natural features such as land, water, vegetation, and topography and human-made features such as buildings, roads, utilities, and structures) as well as the response of viewers to those features. Visual impacts to the landscape attributable to the Project would depend on the extent to which the existing landscape is already altered from its natural condition, the number of viewers (residents, travelers, visiting recreational users, etc.) within visual range of the area, and the degree of public or agency concern for the landscape. This section details the degree of visual contrast introduced into the landscape by the Project and the Project conformance with the regulations of the land management agency.

3.10.1 Issues Identified for Analysis

- How would the existing visual character of the Visual Resources Analysis Area be affected by the introduction of Project components?
- How would the introduction of Project components in the Visual Resources Analysis Area affect sensitive viewing platforms (i.e., KOPs)?
- Would the Project components comply with BLM VRM classes?
- What effects would glint and glare from the Project have on military installations and airspace, including contributing to air navigation hazards?

3.10.2 Analysis Area and Methodology

The Visual Resources Report was developed by Dudek in 2024; baseline information from the Visual Resources Report is incorporated by reference into this visual resources analysis.

The Visual Resources Analysis Area is the Project Area and up to a 6-mile buffer (Appendix A, Figure A-15 through Figure A-18) which consists of approximately 176,890 acres. This encompasses the area's viewshed and corresponds to BLM's VRM background distance zone of 5 to 15 miles (BLM 1986a). Lands within the Visual Resources Analysis Area consist of BLM-administered land or those with private ownership. Only BLM-administered lands are subject to VRM class management objectives.

Visual character, scenic quality, sensitive viewing platforms, and compliance with BLM VRM classes were assessed using the principals of the BLM's Visual Contrast Rating system (BLM 1986a). The Visual Contrast Rating system measures the degree to which an activity (here, a solar project) affects the visual quality of a landscape by determining whether or not the degree of visual contrast created between a project and the existing landscape is allowable under the BLM's Visual Resource Management system. To determine the degree of visual change, the BLM notes that the contrast can be measured by comparing a project's features with the major features in the existing landscape. The basic design elements of form, line, color, and texture are used to make this comparison and to describe the visual contrast created by a project. A visual contrast rating system provides a means for determining visual impacts and identifying measures to mitigate these impacts. The Visual Resources Analysis Area is covered under the Las Vegas RMP (BLM 1998b). Conformance of the Proposed Action with VRM class objectives was based on specific language contained in the Las Vegas RMP, which is a more restrictive definition compared to that of BLM Manual 8410-1 (BLM 1986b).

The glare analysis for this Project was conducted per the FAA's recommended procedures described in the Technical Guidance for Evaluating Selected Solar Technologies on Airports (FAA 2018), and the geometric glare modeling software used adheres to FAA policy regarding solar energy system projects on federally obligated airports (FAA 2021). This policy does not apply to the Project but was included to describe the standard methodologies used to assess solar glare near operating airports. Specifically, the glare analysis and software quantify the level of ocular impact hazard (reported as "green," "yellow," or "red" glare) and pinpoints the exact time of year the glare would occur (Dudek 2024c).

3.10.3 Affected Environment

Visual Character and Scenic Quality

The Visual Resources Analysis Area, which includes the Indian Springs Valley, presents as a relatively flat landscape gently increasing in elevation to the north of U.S. 95 toward dark and rugged, mountainous terrain. South of U.S. 95, the landscape gently increases to abruptly increase in elevation to the south toward the Spring Mountains. The Visual Resources Analysis Area is covered with low desert scrub, appearing as colors of green, yellow, and gray depending on the season. When viewed from U.S. 95, clustered shrubs appear as a singular matte color that continues toward area foothills.

Existing transmission lines, including two in the Indian Springs Valley, a 138-kV and a 230-kV transmission line, cross the Visual Resources Analysis Area parallel to the highway and are located within the U.S. 95/Crater Flat Utility Corridor (BLM 1998b). Also in the Indian Springs Valley is the GridLiance Innovation Substation, and the military infrastructure associated with Nellis Air Force Base on the north side of U.S. 95. Indian Springs Valley's landscape is marked by several dirt roads, grazing and range improvements, and recreation. The dirt roads extend south from U.S. 95 and provide access to transmission lines or off-highway routes.

The SNDO completed its VRI in 2011, with updates made in 2022 (BLM 2011, 2022b). To provide the BLM with pertinent information associated with each factor of the VRI, including VRI classes, the Visual Resources Report details scenic quality, sensitivity levels, distance zones, and VRI class. Together, scenic quality rating units (SQRUs) and sensitivity level rating units (SLRUs) identify the landscape's diversity and visual appeal as well as the public's concern for maintaining the area's scenic quality. The VRI components within the Project boundary consist of a scenic quality rating of B (scenic quality is rated on a scale of A to C, with A being the highest quality rating and C being the lowest) and a sensitivity level rating of moderate (sensitivity level is rated on a scale from high to low), shown in Appendix A, Figure A-15 and Figure A-16. Visual distance zones identify areas of the landscape that are in more prominently viewed areas, like near major roadways. The Project is within the Foreground/Middleground distance zone indicating that within the zone the Project is more visible as it is located closer to viewers as shown in Appendix A, Figure A-17. The VRI components within the Visual Resources Analysis Area consists of a SQRU Class B, a SLRU range from low to moderate and a distance zone range from Foreground/Middleground to Seldom Seen (Table 3-48). The three evaluations combine into an overall VRI class III, shown in Appendix A, Figure A-18. The objective of a VRI Class III is to partially retain the existing character of the landscape and introduced changes should repeat the basic elements found in the predominant natural features of the landscape (BLM 1986b).

Table 3-48. Acres of Visual Resource Inventory Components within the Visual Resources Analysis Area

VRI Class	VRI Component	VRI Component Value within Visual Resources Analysis Area	Acres of VRI Component Measures within Visual Resources Analysis Area
VRI Class I	SQRU	Class B	78.3
	SLRU	Low	
	DZ	Foreground/Middleground	

VRI Class	VRI Component	VRI Component Value within Visual Resources Analysis Area	Acres of VRI Component Measures within Visual Resources Analysis Area
VRI Class I	SQRU	Class B	2,762.7
	SLRU	Low	
	DZ	Background	
VRI Class III	SQRU	Class B	58,921.2
	SLRU	Moderate	
	DZ	Foreground/Middleground	
VRI Class IV	SQRU	Class B	27,289.8
	SLRU	Low	
	DZ	Foreground/Middleground	
VRI Class IV	SQRU	Class B	8,283.6
	SLRU	Low	
	DZ	Background	
VRI Class IV	SQRU	Class B	16,121.9
	SLRU	Low	
	DZ	Seldom Seen	
VRI Class IV	SQRU	Class B	880
	SLRU	Moderate	
	DZ	Seldom Seen	
VRI Class IV	SQRU	Class B	1,658.3
	SLRU	Moderate	
	DZ	Seldom Seen	

Note: DZ = distance zone.

Key Observation Points

Viewing locations were identified where the public would potentially have views of the Proposed Action, including residential areas, travel routes, recreation areas, and specially designated areas represented both by static and linear viewpoints. To assist in identifying the location of representative KOPs, a viewshed analysis was conducted from the Project Area looking outward to determine where in the landscape the Proposed Action could be visible. Responding to BLM Manual 8431 (BLM 1986b) requirements, and to form a consistent baseline for the Proposed Action, seven KOPs were identified throughout the Visual Resources Analysis Area, including views from BLM-administered land and private land. In total, seven visual simulations (Dudek 2024b), were prepared from the agency-approved KOP locations to illustrate impacts on viewing locations and assess conformance with agency visual management objectives (Dudek 2024b).

Integral to the identification of KOPs is the determination of viewer sensitivity levels for each point, which corresponds to their expected sensitivity to changes in the viewshed. In general, views from residential areas and along designated scenic roads (e.g., state scenic byways and other scenic drives) were assigned a high sensitivity as it is anticipated that there would be a greater desire and expectation for viewing intact, naturalistic landscapes from those locations.

Views from interstate, U.S., and state highways not designated as scenic and other travel routes were assigned a moderate sensitivity, as the landscape would be viewed in key locations but would not be dependent on the use of these viewing locations. The agency-approved KOP locations, the viewer type and sensitivity level, rationale for selection, and whether a visual simulation was developed are provided in the Visual Resources Study (Dudek 2024b). The KOP locations are displayed on Appendix A, Figure A-19.

Seven representative KOPs were considered in the existing visual setting evaluation. Table 3-49 summarizes the KOP location, distance from Project, and available viewer geometry/angle relative to the Project. The KOPs are representative of public locations and areas surrounding the Project from which components would be viewed. KOPs were initially identified via a desktop review of the site and surrounding areas and a viewshed analysis and were additionally supplemented with input from the Applicant and the BLM. In addition, viewing conditions and visibility of the Project from KOPs were field-verified during a photographic field survey conducted on January 23, 2022. Additional KOP locations were recommended as having better visibility of the Project (KOPs 3 and 7) and included in July 2023 to replace two other locations that had no Project visibility (Dudek 2024b:9–12). Selected KOP locations provide representative views of the existing landscape context and viewing conditions to the Project and are depicted on Appendix A, Figure A-19. The view was photographed and characterized at each selected KOP and summarized in Table 3-49.

Contrast rating worksheets were prepared using BLM Form 8400-4 from each KOP and are included in the Visual Resources Report (Dudek 2024b:Appendix A).

Table 3-49. Key Observation Points

Key Observation Point	Location	Approximate Distance from Project Area (miles)	Viewer Geometry/Angle
KOP 1	Eastbound U.S. 95	1.2	At grade/normal
KOP 2	Eastbound U.S. 95	265 (feet)	At grade/normal
KOP 3	Temple of Goddess Spirituality site	1.25	At grade/normal
KOP 4	BLM OHV Designated Area*	5.6	Inferior (i.e., elevation lower than Project Area)
KOP 5	Community of Cold Creek (Cold Creek Road)†	8.7	Superior (i.e., elevation higher than Project Area)
KOP 6	National Forest Lands (within Humboldt-Toiyabe National Forest/Spring Mountain National Recreation Area)	6.8	Superior
KOP 7	OHV Route‡	2.95	Inferior

Note: Data from Dudek (2024). KOPs 1 through 4 and 7 were assigned the same VRI ratings as the Visual Resource Analysis Area, but KOPs 5 and 6 are not on public lands managed by the BLM, so the land underlying these KOPs was not included in the VRI. OHV = off-highway vehicle.

* Location selected due to location within OHV Designated Area and proximity to the GridLiance-owned 230-kV Innovation Substation, the Project's proposed gen-tie interconnection point.

† Approximately 360 feet from the Cold Creek Volunteer Fire Station.

‡ Inventoried route, not designated as the 2011 Las Vegas Recreation Area Management Plan was cancelled and has been withdrawn.

Conformance

The BLM identifies VRM classes on land they administer through the land-use planning process to guide project-level decisions. The BLM manages visual resource values in accordance with VRM objectives designated in Resource Management Plans. BLM Manual 8431 (BLM 1986b) defines four VRM class objectives (Class I through Class IV) that describe an allowable level of change that can occur to the visual character and the allowable amount of attention the change can attract. Conformance of the Proposed Action with VRM class objectives was based on specific language contained in the Las Vegas RMP (BLM 1998b), which is a more restrictive definition of VRM class objectives compared to that of BLM Manual 8410-1 (BLM 1986a). Conformance with VRM class objectives is assessed using a project-specific analysis from KOPs to evaluate the visual contrast resulting from the Proposed Action, compared with the existing visual character and the definition of the applicable VRM class objective. Contrast rating worksheets were prepared using BLM Form 8400-4 for each KOP and are included in the Visual Resources Report (Dudek 2024b: Appendix A). Lands administered by the BLM within Indian Springs Valley are managed in accordance with VRM Class III objectives (see Figure A-20). Therefore, for the Project, the applicable VRM Class is VRM Class III.

Glare Analysis

The Project would involve the installation of PV panels to convert the sun's light into electrical energy. To increase the efficiency of this conversion process, designers of solar systems strive to maximize the amount of solar energy that can be absorbed by solar cells. This work towards increasing efficiency has the added benefit of reducing the amount of light that could potentially reflect off the solar panels. Reflected light can cause glint (a quick reflection) and glare (reflection that lasts for a longer duration), which can create hazards for air-traffic-control personnel, motorists, and other potential receptors (ForgeSolar 2019). For this analysis, any light reflected off the solar panels or any other reflective surface is referred to as glare.

Glare can result in visual hazards and temporary loss of vision (also known as flash blindness). The hazard level of glare depends on the ocular impact to the observer. Generally, an ocular impact is calculated as a function of the size and distance of the glare spot and the intensity of the light. For this analysis, an ocular impact is classified in one of three categories, as follows (ForgeSolar 2023):

- Green: Low potential for the glare to cause an afterimage
- Yellow: Potential for the glare to cause a temporary afterimage
- Red: Potential for the glare to cause retinal burn and permanent eye damage

The report used observation points that include observers traveling along U.S. 95 directly north of the Project and three other routes within the area. This report also assesses potential glare impacts to pilots along common flight paths along 14 flight path observation routes to simulate an aircraft following flight paths associated with operations at KINS, which is the only USAF base within 20 miles of the Project. For more detail on the process and methodology used in the glare analysis refer to the Bonanza Solar Project Glare Analysis Report (Dudek 2024c).

3.10.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the BLM would not grant a ROW for the Project and the BLM would not amend the relevant RMP. The Project would not be constructed, operated, maintained, or decommissioned. Given this, there would be no change to scenic quality or introduction of visual contrast associated with the Project and present activities and existing land uses in the Visual Resources Analysis Area would continue. The No Action Alternative would conform with VRM Class objectives as no changes to the existing landscape would occur, and no effects would impact military installations and airspace or contribute to air navigation hazards.

Proposed Action

<u>Visual Character and Scenic Quality</u>

Construction, Operations and Maintenance, and Decommissioning

The construction and long-term O&M of the Project within the existing landscape character would result in contrasts within the area. The existing landscape character and scenic quality would be affected by construction activities such as the removal of vegetation, fugitive dust generated by the construction of the solar field, and movement and presence of heavy equipment. Construction activities would introduce forms, lines, colors, textures, and movements that are not currently in the existing landscape. Elevated repeating solar panels and other Project elements would be in contrast with the existing flat valley. Grading and vegetation removal would introduce exposed soils of colors of reddish browns. Long-term impacts over operation of the Project would include the presence of geometrical shapes of the solar panels, BESS enclosures, and gen-tie support poles which would present weak to moderate contrasts in form, line, color, and texture. The Project components would lack scale or spatial dominance in the landscape and the valley and the mountain terrain surrounding the area would remain visually dominant. The Project would add to the limited degree of development that is found within the area (Dudek 2024b). Visual impacts from decommissioning are anticipated to be those from similar to construction. Western Solar Plan (BLM and DOE 2012) design features VR2-4, VR3-1, and VR4-1 (Appendix B) would be implemented throughout construction, O&M, and reclamation and decommissioning activities to avoid, minimize, and mitigate adverse effects on visual resources as well as compliance monitoring and to employ adaptive management strategy as necessary.

<u>Key Observation Points</u>

Construction, Operations and Maintenance, and Decommissioning

Construction activities would introduce forms, lines, colors, textures, and movements that are not currently in the existing landscape and may attract the attention of the casual viewer. Depending on the location of a viewer, the construction activities would introduce form, line, color, or texture, that would begin to dominate or demand attention in the existing setting or may not be visually discernible. Similarly, construction activities would temporarily affect the views because of the fugitive dust and the presence and movement of heavy equipment. The construction-related impacts would vary in the degree of change, as much of the ground disturbance from the construction and decommissioning activities associated with the Project would not be readily apparent to the casual observer. Visual impacts would be associated with access road, gen-tie, and solar field construction equipment and activity; cleared areas; and visibility of Project facilities.

During O&M, the degree of contrast would vary depending on the KOP, as the anticipated degree of overall Project visibility would be the greatest at KOPs located near the Project Area and at elevated vantage points relative to the Project Area's elevation. Noticeable visual contrast is not anticipated to be experienced from distant, at-grade viewpoints because of the low vertical profile of solar panels and the presence of intervening shrubs and occasional trees (Dudek 2024b). Table 3-50 lists the KOPs selected for analysis to represent areas sensitive to contrast introduced from the Project.

Table 3-50. Key Observation Points and Determined Degree of Contrast

Key Observation Point	Location	Degree of Contrast to Key Observation Points
KOP 1	Eastbound U.S. 95	Visual change and contrast would be weak relative to the natural character of the existing landscape. Contrast with the cleared surface would be weak as the site surface would be obstructed by intervening desert vegetation and obscured by solar panels. View impairment/obstruction of valley floor and background landforms would be minimal at this KOP. Project components would introduce an altogether weak form, line, and color contrast due to their low, horizontal profile (solar panels), thin form and line (gen-tie support poles), and lack of scale dominance in the broad valley landscape. Solar panels and gen-tie support structures would be visible but would not dominate views. The broad flat valley and mountain terrain would remain visually dominant.
KOP 2	Eastbound U.S. 95	Visual change and contrast associated with Project construction and operations would be weak to moderate. Horizontal and diagonal lines of rows of dark solar panels against the low subtle lines of vegetation and dull/drab greens and yellows of desert shrub vegetation. Other Project components (BESS and gen-tie) would be visible but located at a greater distance from viewers. Solar panels would attract the attention of passing motorists on U.S. 95; however, panels would present a low vertical profile, would lack scale dominance, and would not dominate views. Solar panels and gen-tie support structures would be visible but would not dominate views from U.S. 95. Project components would lack scale or spatial dominance in the landscape and the valley and mountain terrain would remain visually dominant.
KOP 3	Temple of Goddess Spirituality site	Overall weak visual contrast would be related to the dark color and largely horizontal lines presented by solar panels from the Project. Thin framing of on-site substation components and the thin, narrow form of gen-tie support poles would be visible but would tend to recede into the tones of the background terrain. No impairment of views to the valley floor or background terrain would occur at this KOP.
KOP 4	BLM OHV Designated Area	The terrain at this KOP drops in elevation so that the Project components including the solar panels and BESS would not be detectable. Form, line, and color contrasts associated with gen-tie poles and the conductor line would be weak on account of existing transmission lines and poles in the landscape. Minimal view impairment of distant background hills and views to visually prominent mountain terrain would not be impaired or obscured.

Key Observation Point	Location	Degree of Contrast to Key Observation Points
KOP 5	Community of Cold Creek (Cold Creek Road)	This KOP has an elevated, clear view of the Project. The Project would occupy a small area within the visible valley landscape and would lack scale or spatial dominance. Due to the expansive nature of available views at this KOP and the spatial dominance of existing landforms, the overall visual prominence of visible Project components would be muted. During operation a weak visual contrast is anticipated from the seemingly flat and narrow horizontal form and dark color of solar panels. Line and texture contrasts associated with the Project would be dulled due to distance and lack of spatial dominance of Project features relative to the broad view available from the KOP. From this vantage point, the thin form and line of gen-tie structures on the valley floor would not be perceptible. The elevated location of the Project at this KOP enhances visibility of the Project and dark color of solar panel surfaces which would begin to attract attention, but it would not dominate the landscape. Line and texture contrasts associated with the Project would be dulled due to distance and lack of spatial dominance of Project features.
KOP 6	National Forest Lands (within Humboldt-Toiyabe National Forest/Spring Mountain National Recreation Area)	This KOP has an elevated and relatively unimpeded (yet distant) view of most of the Project. Due to distance and lack of spatial dominance of Project features, form, line, and color contrasts would be weak to moderate and would not dominate views of the valley floor. The gen-tie infrastructure would be obscured by distance and would not be apparent in the view at this KOP. Solar panels would be visible but not dominate views. The valley and surrounding mountain terrain would remain visually prominent. Solar panels and gen-tie support structures would be visible but would not dominate views. Further, visible Project components would lack scale or spatial dominance in the landscape and the valley and mountain terrain would remain visually prominent.
KOP 7	OHV Route (Indian Springs System)	The Project would not be visible from this KOP due to intervening topography; therefore, Project contrasts would not be perceptible, and the Project would not cause a visual change from existing conditions.

Note: Data from Dudek (2024b:13–16).

Project Lighting and Effects on Visual Resources

Lighting during construction would be limited to the staging area for the construction trailers, parking area, and site security facilities. Lighting and would be limited to the minimum needed to ensure safety. It would be focused downward, shielded, and directed toward the interior of the site to minimize light exposure in areas outside the construction area. While the Project Area does not currently support lighting and construction lighting could result in contrast with adjacent, undeveloped, dark areas, temporary lighting sources that may be potentially visible from off-site locations would be limited in number and intensity and controlled so as to reduce overall contrasts with adjacent undeveloped areas. In addition, and in the context of existing lighting associated with vehicles on U.S. 95 and from the community of Indian Springs, construction night lighting would generally blend in with existing night lighting sources, such as vehicles on U.S. 95 and the town of Indian Springs, as experienced from most KOPs (Dudek 2024b:16–17).

Lighting at the facility would be restricted to areas required for safety, security, and operation. Exterior lights would be hooded, and lights would be directed onto the site so that light or glare would be minimized. Switched lighting or motion detection would be provided for in areas where continuous lighting is not required for normal operation, safety, or security. There would be a small amount of additional visible nighttime lighting associated with Project structures and open site area and given this, contrasts with adjacent off-site areas would be minimal and generally weak (Dudek 2024b:17).

Conformance with Visual Resource Management Classes

Construction, Operations and Maintenance, and Decommissioning

The Project would not conform with VRM Class III objectives as defined by the Las Vegas RMP (BLM 1998b). The Las Vegas RMP states VRM Class III lands shall be managed "for partial retention of the existing character of the landscape. In these areas, authorized actions may alter the existing landscape, but not to the extent that they attract or focus attention of the casual viewer." The introduction of the Project would attract viewers' attention and focus their view on the Project which would not be in conformance with VRM Class III management objectives (Dudek 2024b). Table 3-51 summarizes VRM conformance, by KOP.

Table 3-51. Determination of Visual Resource Management Conformance at Key Observation Points

Key Observation Point	Location	Determination of VRM Conformance
KOP 1	Eastbound U.S. 95	The resulting contrast and level of landscape change associated with the Project would be weak. At this KOP the Project would comply with VRM Class III objectives as defined in the Las Vegas RMP.
KOP 2	Eastbound U.S. 95	The resulting contrast and level of perceived landscape change would be weak. At this KOP the Project would not comply with VRM Class III objectives as defined in the Las Vegas RMP.
KOP 3	Temple of Goddess Spirituality site	Based on limited visibility of Project components and weak visual contrast, the Project would comply with VRM Class III objectives as defined in the Las Vegas RMP.
KOP 4	BLM OHV Designated Area	The resulting contrast and level of landscape change associated with the Project would be weak. At this KOP the Project would comply with VRM Class III objectives as defined in the Las Vegas RMP.
KOP 5	Community of Cold Creek (Cold Creek Road)	The resulting contrast and level of landscape change associated with the Project would be weak. At this KOP the Project would comply with VRM Class III objectives as defined in the Las Vegas RMP.
KOP 6	National Forest Lands (within Humboldt-Toiyabe National Forest/Spring Mountain National Recreation Area)	The resulting contrast and level of landscape change associated with the Project would be weak. At this KOP the Project would not comply with VRM Class III objectives as defined by the Las Vegas RMP.
KOP 7	OHV Route (Indian Springs System)	Due to the lack of available views and imperceptible low form contrast that would occur, the Project would comply with VRM Class III objectives as defined by the Las Vegas RMP.

Note: Data from Dudek (2024b:13–16).

Glint and Glare

Construction, Operations and Maintenance, and Decommissioning

During construction the introduction of the solar panels would begin to introduce effects of glint and glare to aerial and route (vehicular) receptors; however, the greatest glint and glare impacts would occur during the long-term presence of the Project components. The results of the analysis indicate that during the O&M phase the Project would not result in any yellow glare (potential for afterimage) or red glare (potential for permanent eye damage) toward any of receptors associated with operations at KINS. Some glare in the green ocular hazard range (low potential for afterimage) was predicted (Dudek 2024c:12–14).

The modeling indicates that the green glare predicted towards the flight paths associated with KINS would occur in the late afternoon/early evening hours when the sun is less than roughly 3° above the horizon. During this time, the panels would have backtracked to a position where they are relatively flat and the angle of incidence between the sun's rays and the panel surface is greater. This green glare would last between four and 14 discrete minutes per day, on average, depending on the flight path, and is predicted to occur throughout the year, although it would be more common in the fall and winter months. Like the flight paths, the glare towards the single air traffic control tower at KINS would occur in the late afternoon/early evening, when the sun is less than 1° above the horizon. This green glare would occur for about four discrete minutes per day, on average, for about 40 days out of the year (Dudek 2024c:12–14).

The FAA has recently concluded that glare from photovoltaics is similar to the glare pilots routinely experience from water bodies, glass façade buildings, parking lots, and other like features (FAA 2021). At the times that glare is predicted towards receptors associated with KINS, the glare from the setting sun and the glare from the panels would originate from the same general direction, as seen by the receptors. Because of this, and the fact that the intensity of the glare from the setting sun would be significantly higher than the glare from the Project, it is not anticipated that the Project would adversely affect operations at KINS (Dudek 2024c:12–14).

The results of the analysis indicate that all the segments of U.S. 95 analyzed would receive some amount of green glare (low potential for afterimage), and three of the routes would also receive some yellow glare (potential for afterimage).

All the glare predicted towards receptors traveling along U.S. 95 would occur when the sun is less than 2° above the horizon. To visualize this sun elevation, hold your hand out in front of you at arm's length with your hand rotated so that your fingers are parallel to the horizon. The width of one of your fingers will be slightly less than 2°. Motorists traveling on U.S. 95 are predicted to receive between three and six discrete minutes of green glare per day, and between one and two minutes of yellow glare per day, on average. This glare is anticipated to occur primarily during the fall and winter months, and typically during the early morning hours when the sun is just rising over the horizon, although some glare is predicted to occur at sunset as well. Because the duration and intensity of the predicted glare is relatively low compared to the coincident glare caused by the rising and setting sun, it is not anticipated that the Project would adversely affect motorists along U.S. 95 (Dudek 2024c:12–14).

Alternative 1

Under Alternative 1, visual impacts from construction would be less than those from the Proposed Action. Alternative 1 would include 75% perennial vegetation cover in Buildable Areas and a restoration timeframe of two years post-construction which would decrease the degree and duration of visual contrast with increased retention of cover and decreased disturbance of vegetation within the Project boundary. Areas subject to grading and soil removal (D-3 disturbance category) would be limited to 482 acres, reducing the overall footprint of heavy surface disturbance.

Under Alternative 1, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-15 through Figure A-18). This mineral material relocation site would be located immediately adjacent to an existing mineral material site and would increase the amount of visual contrast on the landscape by 120 acres compared to the Proposed Action. The type of surface disturbance from the relocated mineral material site is similar to the surface disturbance from the adjacent, existing mineral material pit as well as the proposed Project, resulting in a marginal, long-term adverse impact to visual resources.

It is anticipated that the changes proposed by Alternative 1 for visual resources (see Appendix A, Figure A-26) during the construction, O&M, and decommissioning phases of the Project, would have minimal impacts on the landscape's scenic quality and the degree of visual contrast introduced by the Project within the characteristic landscape.

Alternative 2 (BLM Preferred Alternative)

Under Alternative 2, visual impacts from construction would be less than those for the Proposed Action. Alternative 2 would include 65% perennial vegetation cover in Buildable Areas and a restoration timeframe of three to five years post-construction, which would decrease the degree and duration of visual contrast with increased retention of cover and decrease of disturbance of vegetation within the Project boundary. Areas subject to grading and soil removal (D-3 disturbance category) would be limited to 592 acres, reducing the overall footprint of heavy surface disturbance.

Under Alternative 2, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-15 through Figure A-18). This mineral material relocation site would be located immediately adjacent to an existing mineral material site and would increase the amount of visual contrast on the landscape by 120 acres compared to the Proposed Action. The type of surface disturbance from the relocated mineral material site is similar to the surface disturbance from the adjacent, existing mineral material pit as well as the proposed Project, resulting in a marginal, long-term adverse impact to visual resources.

Alternative 2 would also reclassify the Application Area from a VRM Class III to a VRM Class IV It is anticipated that the changes proposed by Alternative 2 for visual resources (see Appendix A, Figure A-26) during the construction, O&M, and decommissioning phases of the Project, would have minimal impacts on the landscape's scenic quality and the degree of visual contrast introduced by the Project within the characteristic landscape.

Alternative 3

Under Alternative 3, visual impacts from construction would be similar to those under the Proposed Action. Alternative 3 would include 50% perennial vegetation cover in the Buildable Areas and a restoration timeframe of 2 years post-construction. The Buildable Areas would increase to 2,590 acres compared to the 2,368 acres in the Proposed Action. Areas subject to grading and soil removal (D-3 disturbance category) would be limited to 648 acres, reducing the overall footprint of heavy surface disturbance compared to the Proposed Action but increasing it compared to Alternatives 1 and 2.

Under Alternative 3, approximately 93 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-15 through Figure A-18). This mineral material relocation site would be located near an existing mineral material site and would increase the amount of visual contrast on the landscape by 93 acres compared to the Proposed Action. The type of surface disturbance from the relocated mineral material site is similar to the surface disturbance from the adjacent, existing mineral material pit as well as the proposed Project, resulting in a marginal, long-term adverse impact to visual resources.

It is anticipated that the changes proposed by Alternative 3 for visual resources (see Appendix A, Figure A-26) during the construction, operations and maintenance, and decommissioning phases of the Project would have minimal impacts on the landscape's scenic quality and the degree of visual contrast introduced by the Project within the characteristic landscape.

3.11 Socioeconomics and Environmental Justice

This socioeconomics assessment follows general federal regulations and guidance for performing NEPA analyses. It draws on approaches taken in recent socioeconomic analyses led by the BLM and other federal agencies. Relevant laws include NEPA regulations at 40 CFR 1500–1508.

Questions related to the potential for disproportionate and adverse effects among low-income, minority, or Tribal populations are guided primarily by EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. This analysis, more commonly known as EJ, requires federal agencies to consider EJ to be part of their mission by promoting the fair treatment of people of all races and income levels, so no person or group of people bears a disproportionate share of the negative effects from the country's domestic and foreign programs and policies. Specific to the NEPA process, the EO requires that proposed projects be evaluated for "disproportionately high adverse human health and environmental effects on minority populations and low-income populations."

Recently, the Biden administration issued multiple EOs that emphasize EJ, but do not change the underlying approach to EJ analysis which continues to be based primarily on CEQ guidance (1997). This guidance is supplemented by the Federal Interagency Working Group on Environmental Justice and NEPA Committee (FIWG) (2016), which provides additional guidance on how to identify minority populations under these two standards; FIWG (2019), which identifies and discusses a range of potential approaches to EJ assessment; and BLM (2022c), which provides BLM-specific guidance related to EJ assessment.

BLM (2022c:3) defines EJ as "the fair treatment and meaningful involvement of all potentially affected people—regardless of race, color, national origin, or income—when we in the federal government develop, implement, and enforce environmental laws, regulations, and policies. Fair treatment means that no group should bear a disproportionate share of the adverse consequences that could result from federal environmental programs or policies."

BLM (2022c:27) reports it should be determined whether the effect of an action on an EJ population would "appreciably exceed… those on the general population is a matter of judgment, taking all relevant information into account." The analyst should ask whether members of the EJ community are more sensitive to impacts than the general public because of income status, historical exclusion based on race or ethnicity, an inability to respond to the action, or increased exposure potential.

3.11.1 Issues Identified for Analysis

- How would the influx of Project workers affect the housing market, the labor market, and providers of public services? Would the worker influx impact community cohesion?
- To what extent would disturbances that affect humans (e.g., noise, dust, traffic, visual alterations, electromagnetic fields) impact local property values?
- How would the increase in solar-generated electricity and storage on the southern Nevada electricity grid affect the California and/or Nevada economy and/or development of electricity transmission infrastructure to and from the area?
- To what extent would the Project affect the availability of goods and services and/or change government revenues (taxes)?
- Would any of the impacts of the Project disproportionately and adversely affect low-income, minority, or Tribal populations?

3.11.2 Analysis Area and Methodology

This section defines the analysis areas and methodologies used to assess each of the five socioeconomic analysis issues. Because each issue is associated with its own analysis area and assessment methodology, each issue is addressed in sequence.

Analysis Area and Methods Used to Evaluate Worker-Related Impacts

The Worker-Related Impacts Analysis Area consists of Nye and Clark Counties, Nevada. This two-county area was selected because most worker-related impacts are expected to manifest themselves within the two counties. The county was chosen as the level of geographic organization because worker-related impacts are likely to be felt throughout the two-county area as Project employees move around southern Nevada to work, reside, and recreate.

Worker-related impacts are evaluated as follows:

- The change in demand for local labor is assessed by comparing the number of local construction workers to existing labor force levels while considering unemployment rates.
- The change in demand for temporary housing is assessed by comparing the number of nonlocal workers to the existing pool of temporary housing.
- The change in demand for public services is assessed by comparing the number of construction workers and associated family members to the existing pool of medical, public safety, and public education facilities.
- The potential for a change in community cohesiveness is assessed by comparing the number and demographic composition of the nonlocal workforce to baseline population levels.

Analysis Area and Methods Used to Evaluate Disturbance-Related Impacts

The Disturbance-Related Impacts Analysis Area focuses on areas where commercial/residential development is within 5 miles of the proposed Project location. This area was selected because disturbance-related impacts (e.g., noise, dust, traffic, visual alterations, electromagnetic fields) are most likely to manifest themselves in areas near (within a few miles) the proposed Project location.[7]

Disturbance-related impacts are evaluated as follows:

- Literature describing the effects of solar projects and/or power lines on real estate values was reviewed to determine the Proposed Action's and Action Alternatives' likely effect on local property values.

Analysis Area and Methods Used to Evaluate Grid-Related Impacts

The Grid-Related and Electricity Market Impacts Analysis Area consists of the broader Western Electricity Coordinating Council region of the Western Interconnection and California Independent System Operator–grid-connected areas. The Grid-Related and Electricity Market Impacts Analysis Area was selected because the Proposed Action would affect electric grid reliability across this geography in a two key ways. First, the addition of generating capacity would increase the range of options available to grid operators as they balance supply and demand. Second, the BESS would help protect the interconnected grid from overload conditions, which can occur when electricity demand is low and the supply of renewably generated electricity, which often cannot be turned off, is high.

This EIS/RMPA provides a qualitative description of the expected impacts on grid reliability. To illustrate market-related benefits, this EIS/RMPA 1) reviews the regional economic and GHG emission penalties imposed on society when the grid fails and/or is forced to rely on high carbon-intensity electricity and 2) notes that the Proposed Action is designed to reduce the probability of grid failure while simultaneously reducing the carbon intensity of regionally generated electricity.

Analysis Area and Methods Used to Evaluate Changes in the Availability of Goods and Services and Change in Government Revenue

The Availability of Goods and Services and Change in Government Revenue Analysis Area is Clark and Nye Counties. This area was chosen because Project-related workers are likely to reside and purchase goods and services in one of these two counties. Additionally, most of the taxable assets associated with the Project would be installed in Clark County.

The probability of Project-related spending leading to a shortage of goods or services is evaluated by comparing estimated Project expenditures to total economic activity in Nye and Clark Counties. Similarly, the change in government revenue is evaluated by comparing the Applicant's estimates of tax liabilities to Clark County and Nye County revenue levels.

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[7] See for example Washington State Department of Transportation (2020), Sullivan and Meyer (2014), Terrence J. DeWan and Associates and Scenic Resources Consultants (2015), and Choi et al. (2012).

Analysis Area and Methods Used to Evaluate Environmental Justice

The EJ Analysis Area related to physical disturbances (e.g., air quality, noise, visual) includes all census block groups within 5 miles of the proposed Project. The EJ analysis is organized at the block group level because the block group is the smallest geographic unit for which the demographic data needed to consistently identify low-income and/or minority communities is reported by the U.S. Census Bureau. The 5-mile distance was selected because the potential for disproportionate and adverse effects among low-income, minority, or Tribal populations is largely limited to areas within a few miles of the Proposed Action and Action Alternatives. This conclusion is based on the information in Table 3-52 as described in the following paragraphs.

This EJ assessment considers the full range of changes that could affect humans (e.g., changes in air quality, changes in water quality, degradation of cultural resources, socioeconomic alterations). In each instance, the EJ analyst asks whether minority, low-income, and/or Tribal populations would have different ways, relative to the general population, of being adversely affected by the Proposed Action and Action Alternatives. Three specific questions are posed, and both direct and indirect impacts are considered when answering these questions:

1. Are residents of EJ communities likely to be disproportionately and adversely affected because they are more sensitive to a given level of exposure due to preexisting medical conditions and/or reduced access to health care and/or because they are exposed to higher baseline concentrations of health stressors such as $PM_{2.5}$?
2. Are residents of EJ communities likely to be disproportionately and adversely affected due to lifestyle approaches such as subsistence hunting and/or because they have different cultural, community, or religious practices?
3. Are residents of EJ communities likely to be disproportionately and adversely affected because economic constraints or language barriers prevent them from adopting common mitigative measures, such as purchasing air filtration systems to limit dust exposure or relocating?

Where the answer to any question was "yes," the distance over which disproportionate and adverse effects might reasonably be anticipated is identified and the conclusion explained (see Table 3-52). Where impacts were judged to be so minor as to not warrant further consideration or if the answer to all three questions was "no," the impact was not further considered.

Table 3-52. Primary Impact Conclusions by Resource Area and Implications for Environmental Justice

Resource	Primary Conclusions	Relevant Distance
Air Quality, Climate Change, and GHGs	Project construction would result in a short-term, localized increase in emissions that may affect human health in a localized area. The Project would reduce GHG emissions if it displaces conventional fossil fuel energy generation sources.	1.25 miles
Noise	Construction noise associated with the use of heavy equipment and machinery may travel approximately 0.5 mile before attenuating to the level of the ambient background. Operational noise would be undetectable.	0.5 mile

Resource	Primary Conclusions	Relevant Distance
Transportation	Within the project area, traffic impacts from the transportation of people and materials are not anticipated due to adequate infrastructure through expected transportation routes.	Variable, based on transportation route
Visual Resources	Long-term visual impacts would be introduced. At approximately 3 miles, viewers would no longer be able to differentiate Proposed Action components from the surrounding background.	3.0 miles

When considering the potential for EJ impacts arising from the movements of workers and/or materials, the EJ Analysis Area was extended to consider the routes along which workers and materials will likely travel (primarily U.S. 95) and the locations where workers may be housed (primary Las Vegas with some potential workers staying in Pahrump).

3.11.3 Affected Environment

Worker-Related Existing Conditions

Clark County provides regional services to nearly 2.3 million citizens and an average of more than 45 million Las Vegas visitors each year. The county's public services include the nation's seventh-busiest airport, an air quality compliance division, social services, and the state's largest public hospital, University Medical Center.

Nye County is the largest county, by area, in Nevada and the third-largest county in the contiguous United States. With only 53,450 residents, 83% of whom live in Pahrump, the vast majority of Nye County is rural.

The following text and tables outline relevant conditions and trends in the two counties.[8] The population and workforce in both counties are growing more rapidly than at the state level (Table 3-53). This growth, which is led by the accommodations and food service industry centered in Las Vegas, as well as government employment (Table 3-54), has not resulted in an unusually tight housing market as evidenced by the overall housing vacancy rate (Table 3-55).

With respect to public service provision in Clark County, the municipal services designed to support Las Vegas are also provided to the county's unincorporated areas. This includes fire protection, roads, parks and recreation, planning, and development (Clark County 2013). Public service provision in Nye County is less robust although communities in the southern portion of Nye County, including Pahrump, are near to the Desert View Hospital, Nye County Sheriff, Pahrump Valley Fire and Rescue, and the Bob Ruud Community Center (Town of Pahrump 2023).

Temporary accommodations in Clark County include approximately 825 hotels and 28 recreational vehicle (RV) parks, and temporary accommodations in Nye County include 21 hotels and 12 RV parks, as reported in the Hotel Motels (2023) and County Office (2023) websites, respectively.

[8] Unless otherwise noted, information in the affected environment section was obtained from the U.S. Department of Labor, the USGS Gap Analysis Program, the Bureau of Labor Statistics, the U.S. Department of Commerce, and the Census Bureau, as compiled by the Headwaters Economics Socioeconomic Profiles Tool developed for the BLM (Headwaters Economics 2023).

Table 3-53. Population, Employment, and Income Trends

Parameter	Nye County	Clark County	Combined Counties	Nevada
Population, 2000	32,914	1,393,909	1,426,823	2,018,741
Population, 2021	53,450	2,292,476	2,345,926	3,143,991
Percent Change in Population: 2000 to 2021	62.4%	64.5%	64.4%	55.7%
Employment, 2000	13,863	853,137	867,000	1,254,358
Employment, 2021	17,889	1,368,492	1,386,381	1,875,709
Percent Change in Employment: 2000 to 2021	29.0%	60.4%	59.9%	49.5%
Per Capita Income, 2000 (2022 dollars)	$41,360	$52,859	$52,594	$54,344
Per Capita Income, 2021 (2022 dollars)	$46,219	$62,938	$62,557	$65,030
Percent Change in per Capita Income: 2000 to 2021	11.7%	19.1%	18.9%	19.7%
Average Annual Unemployment, 2021 (pandemic year)	5.9%	7.9%	7.9%	6.9%

Table 3-54. Employment by Industry

Industry	Nye County	Clark County	Combined Counties	Nevada
Nonservices Related	**15.4%**	**8.7%**	**8.7%**	**11.3%**
Farm	1.0%	0.0%	0.0%	0.3%
Forestry, Fishing, and Agricultural Services	0.5%	0.0%	0.0%	0.1%
Mining (including fossil fuels)	6.9%	0.1%	0.2%	1.0%
Construction	5.5%	6.3%	6.3%	6.4%
Manufacturing	1.4%	2.2%	2.2%	3.6%
Services Related	**72.8%**	**82.6%**	**82.5%**	**79.2%**
Utilities	1.3%	0.2%	0.2%	0.2%
Wholesale Trade	1.2%	2.1%	2.1%	2.3%
Retail Trade	13.2%	10.0%	10.0%	9.9%
Transportation and Warehousing	2.7%	7.6%	7.6%	7.3%
Information	1.1%	1.2%	1.2%	1.1%
Finance and Insurance	2.5%	5.9%	5.9%	5.5%
Real Estate and Rental and Leasing	4.8%	5.8%	5.8%	5.9%
Professional and Technical Services	10.4%	5.8%	5.9%	5.8%
Management of Companies	0.3%	1.9%	1.9%	1.7%
Administrative and Waste Services	6.9%	7.6%	7.5%	7.1%
Educational Services	1.5%	1.2%	1.2%	1.2%
Health Care and Social Assistance	7.2%	8.7%	8.6%	8.6%
Arts, Entertainment, and Recreation	4.0%	3.0%	3.0%	2.9%
Accommodation and Food Services	9.5%	16.8%	16.7%	14.8%
Other Services, Except Public Administration	6.1%	4.9%	4.9%	4.8%

Industry	Nye County	Clark County	Combined Counties	Nevada
Government	**11.4%**	**8.7%**	**8.7%**	**9.4%**
Residual	**0.4%**	**0.0%**	**0.0%**	**0.0%**

Note: Totals do not quite sum due to rounding.

Table 3-55. Housing Overview

Parameter	Nye County	Clark County	Combined Counties	Nevada
Total Housing Units, 2021	24,793	910,667	935,460	1,269,846
Occupied	86.4%	89.6%	89.6%	89.9%
Vacant	13.6%	10.4%	10.4%	10.1%
Vacant Units Classified as Seasonal, Recreational, or Occasional	6.5%	3.1%	3.2%	3.1%

Disturbance-Related Existing Conditions

The proposed Project is generally located in rural areas away from residential or commercial development. There are several residences in the unincorporated community of Cactus Springs which is located approximately 1 mile east of the proposed site and the community of Indian Springs which lies approximately 4 miles to the east. The combined population of Cactus Springs, Indian Springs, and the surrounding community is approximately 1,074 (Home Town Locator 2022). There are no other communities within 5 miles of the proposed Project.

Grid-Related and Electricity Markets Existing Conditions

The southern Nevada electrical grid includes regional power generation facilities that rely on natural gas, coal, geothermal, hydroelectric and, increasingly, solar generation (U.S. Energy Information Administration 2023), as well as transmission and distribution systems. This grid serves the Las Vegas metropolitan area, nearby communities in southern Nevada, and, via a series of intra- and interstate transmission lines, northern Nevada, California, Arizona, and New Mexico. A key export market for electricity generated in southern Nevada is California which is under the management of the California Independent System Operator (Federal Energy Regulatory Commission 2023).

Driven by an increasing demand for electricity and a desire to reduce the carbon intensity associated with the generation of electricity, the southwest United States is working to both conserve energy and increase renewable generation. As additional renewable energy generation comes online, the need for energy storage to address overload conditions, which occur when electricity demand is low and the supply of electricity is high, as well as peak demand periods, is increasing. As demand in California increases, there is also a need to increase dispatchable generation to meet bulk load needs during shortage conditions in California.

Availability of Goods and Services and Government Revenue

As reported in Table 3-53, Clark County is home to nearly 2.3 million citizens, and the city hosts an average of more than 45 million visitors each year. The county's estimated revenue for 2023 was approximately $4.9 billion and the total annual business payroll in 2021 was $42.5 billion (Office of the County Manager 2023; Census Bureau 2021a). The area is characterized by an extensive transportation and distribution system designed to serve the needs of a large metropolitan area.

Nye County is home to 53,450 residents, 83% of whom live in Pahrump. The county's budget for the year ending June 30, 2021, included total revenues of $60.8 million (Nye County 2021). Total annual business payroll in 2021 was $525 million (Census Bureau 2021b). Online searches indicate that the area includes several national chains and local stores that supply hardware, construction supplies, food, and clothing.

The following bullets identify key taxes and tax rates:

- There is no state income tax in Nevada.
- The combined sales tax rate in Clark County is 8.25% (4.6% state and 3.65% Clark County) while the combined sales tax rate in Nye County is 7.6% (4.6% state and 3.0% Nye County) (Tax Rates 2023).
- The transient lodging tax rate in Clark County ranges between 10.5% and 13.38% (Clark County 2018) and 6% in Nye County (Nye County 2023).
- Clark County collects, on average, 0.72% of a property's assessed fair market value as property tax while Nye County collects 0.71% (Property Tax 101 2023).

Environmental Justice

Table 3-56 provides information on the low-income, minority, or Native American populations in census block groups potentially affected by physical disturbance. Appendix A, Figure A-21 illustrates the block groups within 5 miles of the proposed Project with respect to their EJ status as determined using the criteria[9] outlined as follows:

- Block groups are identified as an EJ community due to ethnicity if the percentage of the block group's population self-identifying as something other than "white-alone not Hispanic," as reported in Table B03002 of the 2022 American Community Survey (ACS) 5-year estimates (Census Bureau 2023a), exceeds 32.5% or the percentage of the block group's population self-identifying as an American Indian or Alaska Native alone or in combination with one or more other races, as reported in Table B02010 of the 2022 ACS 5-Year estimates (Census Bureau 2023b), meets or exceeds 5.1%.

[9] These criteria are consistent with CEQ (1997) guidance which suggests defining minority areas as those where the percentage of minorities exceeds 50% or is meaningfully greater than the same measures in a reference area. Low-income areas exist if poverty rates exceed a reference. In this EJ assessment, the reference is the Nevada average for nonmetropolitan areas and meaningfully greater is defined as more than 110%.

- Block groups are identified as an EJ community due to income if the proportion of individuals living in the block group that are associated with incomes less than two times the poverty level, as reported in Table C17002 of the 2022 ACS 5-year estimates (Census Bureau 2023c), exceeds 28%.

Given these criteria, all populated block groups in the EJ assessment area for physical disturbance are identified as communities of EJ concern.

It is likely that most workers and materials will come from the greater metropolitan Las Vegas area, located an approximately 45-mile drive east along U.S. 95. This area contains 2.3 million residents living in hundreds of census block groups, many of which are considered EJ communities. Some workers and/or materials may come from Pahrump, located an approximately 50-mile drive southwest of the proposed site. This area contains more than 50,000 residents living in 28 block groups, of which 25 are EJ. These areas are evaluated when considering potential EJ impacts arising from the movement of workers and materials as well as the presence of temporary workers.

Table 3-56. Environmental Justice and Language Screening Data

Geography	Geographic Identifier (GEOID)	Population*	Percent Minority†	Percent Native American‡	Percent Low Income§	Is an EJ Community?¶
United States		331,097,593	41.1%	2.0%	28.8%	
Clark County, Nevada		2,265,926	60.3%	2.3%	32.2%	
Nye County, Nevada		51,698	28.7%	3.2%	38.0%	
Block Group 1, Census Tract 0058.18, Clark County	320030058181	5,033	70.3%	5.1%	Not reported	E
Block Group 2, Census Tract 0058.18, Clark County	320030058182	836	44.0%	0.0%	36.1%	E&I
Block Group 1, Census Tract 0059.02, Clark County	320030059021	868	40.1%	0.0%	24.1%	E
Block Group 1, Census Tract 9604.10, Nye County	320239604101	2,427	28.0%	0.5%	56.6%	I
Block Group 1, Census Tract 9805.00, Nye County	320239805001	0	–	–	–	Not applicable

* Source: Census Bureau (2023a).

† A minority is defined to include anyone self-identifying as something other than "white-alone not Hispanic" (Census Bureau 2023a). Gray shading indicates the area meets the definition of an EJ community based on ethnicity.

‡ Native American is defined to include anyone self-identifying as an American Indian or Alaska Native alone or in combination with one or more other races (Census Bureau 2023b). Gray shading indicates the area meets the definition of an EJ community based on its Native American population.

§ Low income is defined to include anyone associated with a household income less than two times the poverty level (Census Bureau 2023c). Gray shading indicates the area meets the definition of an EJ community based on income.

¶ The entry "E" indicates the area qualifies as an EJ community based on ethnicity only; an "I" indicates the area qualifies as an EJ community based on income only; "E&I" indicates the area qualifies as an EJ community based on both ethnicity and income; "no" indicates the area is not an EJ community. Gray shading identifies criteria indicative of an EJ community or characterization of a geography as an EJ community.

3.11.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed Project would not be constructed, operated, or decommissioned. Existing land uses and authorizations would continue. Therefore, construction-related socioeconomic impacts would not occur and the potential for disproportionate and adverse impacts to EJ communities would be eliminated. Similarly, the generally stimulatory economic impacts associated with large construction projects, increased electrical grid connectedness, increased grid reliability, and reductions in the carbon intensity of electricity would not occur.

Proposed Action

Worker-Related Impacts

Construction

During the 20-month construction phase, the number of construction workers would average 280 individuals, peaking at approximately 500. Some of these workers likely already reside near the Project Area, primarily Las Vegas; others would temporarily relocate to the area. Those temporarily relocating to the area are unlikely to be accompanied by family members (Dudek 2024a:54, 81).

The majority of the construction workers employed by the Project are expected to live in the Las Vegas area located a 45-minute drive southeast of the Project Area. The addition of fewer than 500 workers to Clark County would represent less than a 0.1% increase in population. This level of influx is unlikely to affect Clark County’s 1.4-million-person workforce/labor market or the county’s 0.9-million-unit housing market. Likewise, given Clark County’s 64.5% population growth from 2000 through 2021 and the scale of its public service infrastructure, the increase in demand for public services is not expected to strain existing service providers or disrupt community cohesiveness.

A small number of workers may live in, or temporarily relocate to, Nye County. Those that do would likely reside in or near Pahrump which is a 50-minute drive southwest of the Project Area. As was the case with Clark County, worker-related impacts in Nye County are not anticipated.

Operations and Maintenance

The Project would require eight to 12 full-time staff during operation (Dudek 2024a:68). These workers and their families would not meaningfully affect Clark or Nye County demographics, labor markets, housing markets, demand for public services, or community cohesiveness.

Decommissioning

The decommissioning workforce would likely be similar in size or smaller than the construction workforce. The influx of decommissioning-related workers would not meaningfully affect Clark or Nye County’s demographics, labor markets, housing markets, demand for public services, or community cohesiveness.

Disturbance-Related Impacts

Construction

Construction-related impacts arising from noise, dust, traffic, and viewshed alterations are discussed in Sections 3.12, Public Health and Safety; 3.10, Visual Resources; and 3.8, Air Quality, Climate Change, and Greenhouse Gas Emissions. Given the nature of the impacts described in those sections and because the distance between the Project Area and the nearest sensitive receptors exceeds 1 mile, disturbance-related impacts are not expected to materially affect residents or visitors.

Based on the preceding information, property value impacts are not anticipated. This expectation is consistent with empirical research which indicates that the potential for solar project construction to affect property values is generally localized to properties within 0.5 mile of a solar project. Beyond this distance, any potential impact on property values significantly diminishes, typically not measurable beyond 1 mile. (Al-Hamoodah et al. 2018; Dröes and Koster 2021; Elmallah et al. 2023; Maddison et al. 2023).

Operations and Maintenance

As noted in the preceding text, empirical research indicates that the potential for solar project construction to affect property values is generally localized to properties within 0.5 mile of a solar project (Al-Hamoodah et al. 2018; Dröes and Koster 2021; Maddison et al. 2023) and so impacts to property values during Project operation are not anticipated.

Decommissioning

Decommissioning would reintroduce disturbances similar to those associated with construction. Visual changes during decommissioning would gradually diminish as the site is restored. Impacts to property values are not anticipated.

Grid-Related Impacts

Construction Impacts

Construction activities are not expected to affect electrical grid reliability or transmission capabilities because the Project would not be in service until after construction. However, the observation of construction activity related to solar generation and electricity storage capacity in Clark County may encourage development of transmission infrastructure increasing linkages between Clark County and demand centers.

Operations and Maintenance Impacts

Operation of the proposed Project would enhance electrical grid flexibility by adding low carbon-intensity electric generation capacity and enabling the storage of electricity generated during periods of low demand so it can be dispatched when needed.

The increased flexibility would, in the near term, reduce the probability of blackouts or brownouts and also reduce the social costs associated with those events which include reduced industrial, labor, and household output.

Decommissioning Impacts

Decommissioning and decommissioning activities are not expected to affect electrical grid reliability or transmission capabilities.

Changes in the Availability of Goods and Services and/or Government Revenue

Construction

Project construction is expected to cost approximately $900 million to $1.1 billion with $200 to $300 million allocated to labor over the construction period and $700 to $800 million dedicated to materials and equipment (Zhang 2024). As noted in prior sections, most construction workers would likely reside in Clark County and so the demand for goods and services associated with purchases made by laborers would likely fall primarily in Clark County. Specialized materials like solar panels and racks would likely be purchased from businesses outside of Clark County and/or Nye County. Most materials purchased from within the two-county area would, given the disparity in the size of the Clark County and Nye County economies, likely be purchased in Las Vegas.

Purchases of this magnitude are not expected to noticeably change the availability of goods and services, as purchasers would likely be drawing primarily on the economic resources of Clark County which is home to nearly 2.3 million citizens as reported by Headwaters Economics (2023).

Project-related expenditures would be subject to a range of taxes and fees and so would generate the following government revenue streams:

- While there is no income tax in Nevada, when wages are spent in Clark County or Nye County, they contribute to government revenue via the combined 8.25% sales tax (comprising 4.6% state tax and 3.65% Clark County tax) or 7.6% (comprising 4.6% state sales tax and 3.0% Nye County tax).
- Capital equipment purchased within Clark County or Nye County would be subject to sales tax. When capital equipment is purchased outside of the county where it would be installed, a use tax (calculated as the combined sales tax rate prevailing in the county of installation, minus any sales tax paid in other jurisdictions) would apply.
- Because the Project is located on BLM-administered land, it would not contribute to property tax revenues. The Project would, however, be subject to BLM land use fees for the utilization of federal land for solar energy generation. The BLM land use fee represents a modest but stable source of revenue for the government, albeit with a smaller fiscal impact compared to traditional property tax revenues.

Considering the existing level of annual government revenue in Clark County and Nye County (see Section 3.11.3, Affected Environment), the construction-related increase in government revenue in either county is unlikely to exceed 0.5% during each year of construction.

Operations and Maintenance

Annual labor and non-labor expenditures on O&M are estimated to be $13 to $14 million (Zhang 2024). The demand associated with these expenditures would not noticeably change the availability of goods and services in Clark or Nye County. While the expenditures would be subject to the same set of taxes and fees outlined in the preceding section, the increase in annual government revenue would be less than 0.01%.

Decommissioning

Expenditures during decommissioning are expected to be similar to expenditures during the construction phase and so are not expected to alter the availability of goods or services or noticeably change government revenue.

Environmental Justice

As detailed in Appendix A, Figure A-21 and Table 3-56, the Project is located in EJ communities. While EJ communities may be more sensitive to disturbances such as emissions, noise, and traffic, the Project Area is approximately 4 miles from the nearest community, and so impacts related to air quality, noise, traffic and viewshed alteration are not expected to adversely or disproportionately affect EJ communities.

It is anticipated that most workers would reside in Las Vegas and materials would be transported primarily along U.S. 95. Given the size of U.S. 95 and the population of Las Vegas, impacts related to transportation/commuting and or an influx of workers are not anticipated. However, as previously discussed in the worker-related impacts section, an increase in transportation activities through the Pahrump Valley could affect EJ populations. This effect could be compounded by the simultaneous development of reasonably foreseeable future actions (RFFAs) in the area, potentially leading to increased traffic, strained local services, and increased demand for housing in the smaller area.

Similarly, we consider RFFAs in assessing equity concerns related to the siting of large-scale solar installations, particularly regarding the potential impacts on property values in EJ communities. Al-Hamoodah et al. (2018) highlighted that the largest utility-scale solar facilities are often located in areas where residents earn lower incomes than the national average, thereby exacerbating economic disparities. Additionally, Elmallah et al. (2023) found that homes within close proximity (0.5 mile) to large-scale photovoltaic projects typically experience a decrease in property values. While the distance between the Project Area and the nearest community is approximately 4 miles, more detailed discussions on cumulative impacts and strategies for mitigation are presented in Section 3.13, Cumulative Impacts.

Alternative 1

The socioeconomic and EJ impacts associated with Alternative 1 would be the same as the impacts associated with the Proposed Action for construction, O&M, and decommissioning.

Alternative 2 (BLM Preferred Alternative)

The socioeconomic and EJ impacts associated with Alternative 2 would be the same as the impacts associated with the Proposed Action for construction, O&M, and decommissioning.

Alternative 3

The socioeconomic and EJ impacts associated with Alternative 3 would be the same as the impacts associated with the Proposed Action for construction, O&M, and decommissioning.

3.12 Public Health and Safety

This section describes the potential impacts to public health and safety including noise, fire management, and hazardous waste materials as they relate to the construction, O&M, and decommissioning of the Proposed Action and Action Alternatives for the Project.

Since there are multiple components to public health and safety which are guided by different laws and regulatory guidance, the regulatory background is described in the subsections of Section 3.12.3, Affected Environment, below.

3.12.1 Issues Identified for Analysis

- How would construction, O&M, and decommissioning of the Project affect public health and safety, occupational health and safety, noise, and hazardous waste materials?
- How would construction, O&M, and decommissioning of the Project affect fuels and wildfire risk?
- Would there be sufficient fire services during construction, O&M, and decommissioning of the Project?

3.12.2 Analysis Area and Methodology

The Public Health and Safety Analysis Area is the 5,133-acre Application Area plus a 1-mile buffer, for 24,386 acres in total.

Satellite imagery was reviewed to obtain information regarding existing conditions in and around the Project Area (Google Earth 2024), and publicly available databases were queried to obtain information on Superfund sites, leaking underground storage tanks, and any other potentially hazardous waste sites at a scale requiring notification to the USEPA (USEPA 2023h, 2023i, 2024g; USGS 2023c). These data are regulated by the Comprehensive Environmental Response, Compensation, and Liability Information System, the USEPA-administered Resource Conservation and Recovery Act of 1976 (RCRA), and the state of Nevada.

Noise generated by the Project was analyzed relative to the Project's proximity to noise-sensitive receptors that could detect the sounds. Locations that would be considered noise-sensitive receptors are those where people reside or those where the location's purpose would be adversely affected by the presence of unwanted sound. Examples of nonresidential sensitive receptors include schools, churches, and hospitals. The closest potential sensitive receptor to the Project is the Temple of Goddess Spirituality, approximately 1.25 miles east of the Project Area.

Fire risk was assessed using the BLM Fire Risk Assessment Story Map (FRASM) (BLM 2023e). The FRASM was developed by the BLM National Office of Fire Planning and Fuels Management to predict fire probability and magnitude. The system includes modules for weather generation, wildfire occurrence, fire growth, and fire suppression (Short et al. 2016). In addition, the altered fire regimes (AFR) data generated by the BLM was used to identify areas where current fire regimes have been altered from historical norms. These areas are potentially higher priorities for fire management due to the risk of experiencing uncharacteristic fire. Two datasets served as inputs to calculate AFR: Burn Probability (Short et al. 2016) for current annual burn probability, and a calculated historical mean fire return interval derived from LANDFIRE's Biophysical Settings models and descriptions (USDA, USFS and DOI 2023). The historical mean fire return interval was converted to an annual probability of historical fire occurrence. This dataset is not intended to be a finished product but to serve as an intermediate input into the BLM's Wildfire Risk Assessment (BLM 2023e).

The Project is 6.5 miles east-southeast of the Nevada National Security Site (NNSS). During public scoping, concerns were raised regarding the potential presence of radioactive soils at the Project due to NNSS's historical nuclear detonations. Additional investigations were conducted and found that detectable amounts of human-made radionuclides or radiation are unlikely to be present in the Project Area (Dudek 2023b:5). Therefore, the topic of soil radiation is not carried forward for detailed analysis in this EIS/RMPA.

3.12.3 Affected Environment

Public Health and Safety

Construction, O&M, and decommissioning of solar energy projects may affect public and worker health and safety. According to the Western Solar Plan, worker health impacts may be caused by physical hazards such as exposure to electrical hazards, extreme weather, and glare. Risk to the public may include increased risk of traffic accidents, exposure to glare, and contact with physical hazards from unauthorized access (BLM and DOE 2012). Public infrastructure projects, like the Proposed Action, also present a potential target for intentionally destructive acts.

Within the Public Health and Safety Analysis Area, public health and safety hazards include hazards from existing infrastructure like transmission lines, the potential release of coccidioidomycosis fungal spores, and the potential presence of naturally occurring asbestos in the soil.

Existing high voltage transmission lines, including Valley Electric's 230-kV line (NVNV105896594), Nevada Power Company's 230-kV line (NVNV105974435), and GridLiance West Transco's 230-kV line (NVNV106054061), present a potential public risk due to the presence of electric and magnetic fields (EMFs). EMFs can result from natural sources, like sunlight, and from human-made sources, like power lines. Numerous studies have examined possible links between EMFs and public health, but any potential links to public health concerns have been weak and no mechanisms have been identified. Additionally, the strength of EMFs decreases significantly as distance from the source increases (National Institute of Environmental Health Sciences 2022).

The coccidioidomycosis fungal spores that cause Valley Fever present a potential hazard to both workers and the public. The fungus grows in the soils of regions with low rainfall, high summer temperatures, and moderate winter temperatures. Infection can occur once the fungal spores become airborne and are inhaled by a susceptible person or animal. Valley Fever is characterized by cold and flu-like symptoms but, in extreme cases, it can spread to the bloodstream and cause a more severe illness that requires anti-fungal medication. Usually, cases of Valley Fever are not part of an outbreak; however, outbreaks are more likely to occur after events that disturb large amounts of soil. Not everyone who is exposed to the fungus will become sick and most will recover within weeks (CDC 2020a).

The CDC reports that the coccidioidomycosis fungus is present in the soils of the southwestern United States and southern Nevada (CDC 2020a). In the southwestern United States, cases of Valley Fever are most prevalent in Arizona, with over 100 cases per 100,000 people (Benedict et al. 2019). In Nevada, there were 189 cases of Valley Fever reported in 2020 (CDC 2020b). Clark County recorded 5.9 cases per 100,000 people in 2017, making the region relatively low risk when compared to the State of Nevada and neighboring states (Benedict et al. 2019).

Asbestos has been shown to occur naturally in parts of southern Nevada, particularly in Clark and Nye Counties (Buck et al 2013). It is unclear based on available studies whether naturally occurring asbestos may be present within the Project Area. There are areas south and east of Las Vegas where there are reports of naturally occurring asbestos and, due to the Project's location on an alluvial fan, it is possible that naturally occurring asbestos is present (Buck et al. 2013).

The primary public health and safety regulations that would be applicable to the Project and the existing infrastructure are the OSHA under 29 CFR 1926, Safety and Health Regulations for Construction, which governs industrial construction and routine workplace operations, and Nevada OSHA guidelines.

Noise

Existing noise sources originating from within the Public Health and Safety Analysis Area include vehicles traveling on U.S. 95 and natural occurring sounds such as wind, insects, and animals. While located approximately 5 miles outside the Public Health and Safety Analysis Area, there is potential for noise from flight operations at KINS to be heard at the Project Area. However, according to the Nellis Complex Joint Land Use Study, 60-decibel (dB) noise contours and louder would be located almost entirely within the base boundaries (CCDCP 2020). Noise from the community of Indian Springs would not be perceptible within the Public Health and Safety Analysis Area. Overall, the existing noise levels would be considered low to moderate within the Public Health and Safety Analysis Area (Dudek 2022:7).

Fire Management

Federal agencies conduct a broad range of actions to protect the public, natural landscapes, wildlife habitat, and recreational areas. The National BLM Fire Program focuses on public safety and consists of fire suppression, preparedness, predictive services, vegetative fuels management, prescribed fire, community assistance and protection, and fire prevention education. Fire management has implications across numerous administrative boundaries. Federal and state management plans do not typically have jurisdiction outside their respective planning areas. However, fire protection and management across different administrative boundaries is often conducted under cooperative agreements between federal and state or local agencies.

The BLM FRASM and AFR data indicates fire risk in the Public Health and Safety Analysis Area is the lowest priority for fuels management given that there is higher certainty that conditional fire risk probabilities are low (Short et al. 2020). The AFR data indicates that the alteration from historical norms is primarily low. Thus, the Public Health and Safety Analysis Area is more likely to have fire trends similar to the area's historical norms (Haas et al. 2013; Homer et al. 2020).

The BLM Nevada Fire and Aviation is tasked with fire management of the BLM-administered lands in the Public Health and Safety Analysis Area. The BLM district offices in the Public Health and Safety Analysis Area have approved Fire Management Plans, which describe how and where wildland fires will be managed and what suppression strategies and tactics are appropriate—from aggressive suppression to management flexibility—depending on the specific district office and its identified goals (BLM 2023e).

Hazardous Waste Materials

Existing infrastructure within the Public Health and Safety Analysis Area, including transmission lines and mineral materials sites, may have used, stored, transported, and disposed of potentially hazardous materials. However, there are no reports or indications that any materials from previous activities have been released to the environment at a level requiring notification. This was corroborated by a BLM records search on January 17, 2024, of the following online databases for environmental records related to the Public Health and Safety Analysis Area: USEPA National Priorities List online map, USEPA Envirofacts Database, Underground Storage Tank Finder, and USGS Mineral Resources Data System (USEPA 2023h, 2023i, 2024g; USGS 2023c).

Hazardous materials management is carried out under the authorities contained in the RCRA (as amended); Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977; and Comprehensive Environmental Response, Conservation, and Liability Act of 1980, as amended by the Superfund Amendments and Re-Authorization Act of 1986. In the Project Area, hazardous materials management is further directed by the 1998 Las Vegas RMP. The RMP directs that the release of hazardous materials on public land be prevented, and risks associated with hazardous materials be reduced through evaluation of all actions, completion of site-specific inventories, and inspection of mining and milling sites (BLM 1998).

3.12.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, it is anticipated that the current uses and trends would continue to occur. There would be no impact to public health and safety, including noise, fire management, or hazardous waste materials, due to the construction, O&M, and decommissioning of the Proposed Action.

Proposed Action

Public Health and Safety

Construction, Operations and Maintenance, and Decommissioning Impacts

Occupational hazards that may be encountered during the construction of the facility include the risk of injury from equipment handling, exposure to extreme weather, fire and electrical-related hazards such as electric shocks and burns, interaction with harmful plants and animals, and exposure to hazardous materials. All phases of the Project would require compliance with a site-specific Health and Safety Program, as well as federal OSHA and Nevada OSHA guidelines, which would minimize potential health and safety impacts on personnel. Occupational hazards during construction would be further minimized through staff training, a site-specific Health and Safety Plan, Emergency Response and Inventory Plans, and APM Eco-9, which states that the Project Area would be fenced to restrict public access during construction and operation (Dudek 2024a:42, 69).

A health and safety risk to workers and the general public during construction is the inhalation of the fungal spores that cause Valley Fever. Construction activities that may cause the fungal spores to become airborne, and subsequently inhaled, include grading, vegetation removal, trenching for underground collection lines, and other ground-disturbing work. Construction workers would have the highest risk of exposure, but public exposure to fungal spores is also possible. Since the fungus is found in the soil and could be released through ground disturbance, exposure can be reduced by either by using water for dust suppression or limiting ground-disturbing activities.

Any naturally occurring asbestos that could be present at the Project would also be released through ground-disturbing activities and the production of fugitive dust. Therefore, exposure can be reduced by limiting fugitive dust emissions, either by using water for dust suppression or limiting ground-disturbing activities. APMs Geo-1, Air-1, and Air-2 and Western Solar Plan design features AQC2-1, AQC4-1, and SR2-1 (Appendix B) would minimize the production of fugitive dust and, therefore, asbestos and Valley Fever exposure risk.

Occupational hazards during O&M would be similar to those during construction but would be reduced by having fewer personnel on-site at any given time and the as-needed nature of O&M activities. As described in the Western Solar Plan, health and safety impacts to the public during operation may include increased traffic accidents on roads near solar facilities, risk of eye damage from glare, and aviation safety interference (BLM and DOE 2012). Traffic risk from incoming and outgoing traffic from the Project would be minimized by APM Transport-1 and Western Solar Plan design feature T2-1 (Appendix B). Glint and glare impacts of the Project are analyzed in Section 3.10, Visual Resources.

Public exposure to EMFs from the Project would be limited due to the closest residences being 5 miles from the gen-tie. Therefore, it is unlikely that the Project would result in adverse human health impacts from EMFs.

During operations, the Project could be a target for intentionally destructive acts. For a solar project, these acts may include vandalism of facilities, theft, or destruction of property with firearms. Impacts from these acts could range from aesthetic impacts, such as graffiti, to interruption of the facility's ability to connect to the power grid. Intentionally destructive acts would be minimized through the facilities security measures such as fencing, signage, lighting, and cameras. The site security fencing would be in line with the North American Electric Reliability Corporation (NERC) guidelines (NERC 2021). These measures would also reduce the risk to personnel and the public from these threats. A site-specific Emergency Response Plan would provide guidelines and protocols for if an intentionally destructive act were to be carried out at the facility.

Risks to public health and safety from decommissioning would be similar to those of construction. The Applicant would develop a site-specific Site Restoration Plan that would include measures to reduce potential impacts to personnel and to the public during decommissioning, in accordance with federal and state laws.

Noise

Construction, Operations and Maintenance, and Decommissioning Impacts

Noise impacts from the Project must be considered relative to their proximity to wildlife or persons who would be detecting the sound. Noise impacts to wildlife are discussed in Section 3.4, Federally Listed Species, and Section 3.3, Wildlife, Migratory Birds, and Special Status Species. The closest potential nonwildlife receptors to Project noise are the Temple of Goddess Spirituality and the town of Indian Springs. The eastern Project boundary is approximately 1.25 miles from the Temple of Goddess Spirituality and 4 miles from the town of Indian Springs.

During construction, noise would be generated by equipment such as graders, backhoes, excavators, loaders, cranes, dozers, cement pump trucks, pavers, rollers, welders, concrete saws, and air compressors. The average sound level of any construction activity depends on the amount of time that the equipment operates and the intensity of the construction activities at the time. The maximum noise level of the equipment to be used at the Project ranges from 72 to 92 dB from 50 feet away, attenuating as one moves further away from the noise source (Dudek 2022:10–11). At the Temple of Goddess Spirituality, the maximum noise level from construction would be 34 dB, or comparable to a whisper (Dudek 2022:10–11; Yale University 2023). At the Town of Indian Springs, the construction noise from the Project would effectively be 0 dB (Dudek 2022:10–11).

During O&M, noise would be generated by the inverters and transformers, BESS, and gen-tie. Other noise would be generated by routine maintenance activities and vehicle traffic at the Project Area. The sound generated during O&M would be at the same level or below the level of construction, and therefore would not be audible at the closest sensitive receptors, the Temple of Goddess Spirituality and the town of Indian Springs (Dudek 2022:11). Noise impacts during decommissioning would be similar to those of construction and are expected to be shorter in duration.

Noise impacts from the Project would be further minimized by APM Noise-1 and Western Solar Plan design features N3-1 and N4-1 (Appendix B). This APM would plan noisy construction activities during the least noise-sensitive times of day and on weekdays.

Fire Management

Construction, Operations and Maintenance, and Decommissioning Impacts

The probability of a wildfire resulting from Project construction would be low due to the low wildfire threat rating in the Project Area. The occurrence of wildfires in the majority of the Project Area has historically been low. While natural occurrences have a low probability, the construction activities for the Project would increase the potential risk for fire. Project-related activities such as idling or parking vehicles or equipment, welding, use of torches for cutting, and human-caused ignitions (smoking) increase the possibility for fires. During construction, wildland fires may be ignited naturally, accidentally, or intentionally at any location where there are suitable environmental conditions and fuels for combustion. Direct impacts of wildfire could include damage to the solar facility components, damage to other nearby facilities, spread of wildfire to lands outside the Project Area, impacts on air quality and recreational uses, and mortality of plants and wildlife. Indirect impacts would include changes to the vegetation communities and the wildlife supported by these communities. The spread of invasive plants, especially annual grasses, creates an increased potential for wildfires that could result in significant ecological change but would be mitigated through proper weed management. A Final Weed Management Plan for the Project would be implemented by the Applicant prior to commencing Project construction. The Weed Management Plan would tier from BLM's 2007 Final Vegetation Treatments Using Herbicides on BLM-administered lands in 17 Western States Programmatic Environmental Impact Statement and would describe applicable regulations for the use of herbicides on federally managed lands in Nevada and provide the basis for proper management and use of herbicides at the site (Dudek 2024a:36).

The probability of a wildfire occurring as a result of O&M activities would be low due to the low-risk site conditions, low-level risk associated with the O&M activities, and the Applicant's commitment to maintaining fire suppression measures on-site. Compliance with regulations would reduce but not eliminate fire hazard risks from O&M activities such as usage of hazardous materials, lithium-ion batteries, possible line breakages, blown transformers, and malfunctioning power transmission equipment.

Since BESS are prone to fire from ion batteries, each BESS container would have its own fire detection system and the area surrounding the BESS would be graded and replaced with gravel or rock to minimize fire risks within the facility. In the case of BESS located in buildings, the building would comply with the local fire code and contain equipment in multiple sections of the building for fire detection, suppression, and necessary alarms to alert the local fire authorities. The BESS containers or building would also be located so as to be readily accessible by the fire department. Through coordination with local fire responders, permanent aboveground water storage tanks could be used for O&M tasks and facilities, including on-site firefighting. It is projected that up to two 10,000- to 15,000-gallon storage tanks would be placed—one at the entrance to the Project and at another strategic location within the Project Area boundary—for fire suppression purposes (Dudek 2024a:41).

Potential effects from decommissioning would be similar to those described for construction. When permanent closure is appropriate, a Site Restoration Plan would be developed and submitted to the BLM for review and approval. The plan includes restoration of the land to BLM-approved specifications over a period of approximately 16 months.

Through the development of a Fire Prevention Plan, in coordination with the BLM Fire Management Officer and Clark County Fire, fire risk would be minimized, and there would be protocols in place to ensure sufficient fire services during construction, O&M, and decommissioning. This would include providing adequate access to all areas of the Project via fire truck (Dudek 2024a:41). APM Fire-1 would minimize adverse effects associated with fire hazards from the Project by incorporating fire-related mitigation measures into a WEAP and siting and designing the facilities to provide sufficient room for fire management, minimizing the risk of fire moving outside of the facility or the facility being threatened by external fire. Additionally, and Western Solar Plan design feature WF2-1 (see Appendix B) would also be implemented to minimize fire risk.

Hazardous Waste Materials

Construction, Operations and Maintenance, and Decommissioning Impacts

Within the Public Health and Safety Analysis Area, there are no brownfield properties, RCRA sites, Superfund sites, or other potential locations of hazardous substances, pollutants, or contaminants. Therefore, potential releases of existing hazardous substances during construction would be unlikely.

Some hazardous materials may be used for construction, including paints, thinners, solvents, sealants, fuels, oils and lubricants, and drilling mud (for drilling cable conduits). The exact quantities for these materials proposed for use have not yet been determined, however it is not anticipated that the quantities and concentrations of these materials would reach regulated levels. Fuel tanks and other hazardous materials would be stored at the staging areas, and empty containers and hazardous waste would be collected in appropriate containers prior to disposal. A site-specific Hazardous Materials and Waste Management Plan and a site-specific SPCC would be prepared prior to construction. These documents would include industry standard BMPs to ensure avoidance of hazardous spills and exposure for individuals. Additionally, construction and operation of the Project would occur in accordance with all applicable laws and regulations.

Once construction is complete, there would be minimal hazardous and non-hazardous waste at the site. O&M would still require routine transport, use, and disposal of hazardous materials such as diesel fuel, hydraulic fluid, water treatment chemicals, solvents and adhesives, soil stabilizers, approved herbicides, oily rags, and spent batteries. Any chemicals used on-site would be stored in appropriate chemical storage facilities or in storage tanks. Chemical storage areas would also be designed to contain potential leaks and spills. Any associated chemical release would be appropriately managed in accordance with the site-specific SPCC. Personal protective equipment would be used by all plant personnel during spill containment and cleanup activities and all personnel would be trained in handling of chemicals. Other wastes would be typical of a commercial building and all wastes would be disposed of in accordance with applicable laws.

A comprehensive analysis of hazardous materials and environmental exposure from PV solar panels, batteries, BESS, semiconductors, transformers, and inverters was included in the Western Solar Plan (BLM and DOE 2012). APM Haz-1 would further minimize potential impacts related to hazardous wastes by ensuring all activities are conducted in compliance with applicable federal and state laws and regulations, and ensuring vehicles and equipment are in proper working condition, reducing the potential for leaks.

Risks related to hazardous and solid wastes from decommissioning activities would be similar to the risks associated with construction of the Project. The Applicant would develop a site-specific Site Restoration Plan that would include measures to reduce potential impacts during decommissioning. All potential sources of hazardous materials would be removed from the site (solar panels, BESS, transformers, and inverters) and disposed of or recycled in accordance with manufacturer specifications (Dudek 2024a:59–60). Once decommissioning is complete, there would be no hazardous materials remaining on-site.

Alternative 1

The potential public health and safety impacts of the construction of Alternative 1 would be similar to the Proposed Action, however the higher percentage of vegetation cover and greater limitation to grading would marginally decrease fugitive dust emissions during construction of the Project, therefore potentially decreasing the risks associated with Valley Fever and asbestos. The higher percentage of vegetation cover throughout the Application Area could marginally increase the fire risk at the Project.

Under Alternative 1, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-4). Once developed, this mineral material relocation site would increase fugitive dust, and therefore potentially increase the risks associated with Valley Fever and asbestos.

The potential noise and hazardous waste materials impacts of Alternative Action 1 would remain the same as those described for the Proposed Action.

Alternative 2 (BLM Preferred Alternative)

The potential public health and safety impacts of Alternative 2 would be similar to the Proposed Action. As with Alternative 1, the risks associated with Valley Fever and asbestos from the proposed Project would be slightly reduced, and fire risk would be slightly elevated.

Under Alternative 2, approximately 120 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-4). Once developed, this mineral material relocation site would increase fugitive dust, and therefore potentially increase the risks associated with Valley Fever and asbestos.

The potential noise and hazardous waste materials impacts of Alternative 2 would remain the same as those described for the Proposed Action.

Alternative 3

The potential public health and safety impacts of Alternative 3 would be similar to those under the Proposed Action. As with Alternative 1 and Alternative 2, the risks associated with Valley Fever and asbestos from the proposed Project would be slightly reduced, and fire risk would be slightly elevated.

Under Alternative 3, approximately 93 acres of NDOT mineral material sites that overlap the Project would be relocated to the east side of the Application Area (Appendix A, Figure A-5). Once developed, this mineral material relocation site would increase fugitive dust, and therefore potentially increase the risks associated with Valley Fever and asbestos.

The potential noise and hazardous waste materials impacts of Alternative 3 would remain the same as those described for the Proposed Action.

3.13 Cumulative Impacts

The cumulative analysis addresses the potential for cumulative impacts in the vicinity of the Project. Cumulative impacts are defined by the CEQ regulations as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and RFFAs regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Federal agencies have the responsibility of determining how and the extent to which cumulative impacts are assessed in NEPA documents and documenting that effort. A cumulative impact analysis is generally achieved through the implementation of the following steps:

- Establishment of the geographic scope of the analysis.
- Establishment of the timeframe for the analysis.
- Identification of the significant cumulative effects associated with the Project and Action Alternatives in conjunction with the list of potentially cumulative projects.
- Completion of a cumulative effects analysis and discussion.

The geographic extent of impacts varies by resource area. A discussion of cumulative analysis based on the geographic and temporal nature of the Project and potential impacts is provided under the section for each resource area analyzed within this EIS/RMPA. In addition, a summary of the scope (geographic) and of the cumulative impact analysis for each potentially affected resource in the proposed Project is provided in Table 3-57.

The timeframe for cumulative impact analysis also varies by resource area and includes activities that are ongoing and would occur up to 50 years in the future (40 years for the operational life of the Project plus 10 years for decommissioning and reclamation). The timeframe for cumulative projects is often speculative, as information for future projects becomes more unknown farther into the future.

3.13.1 Analysis Methods

This analysis evaluates the contributions of the Proposed Action and Action Alternatives to cumulative effects, which are assessed in three basic steps. The first step is to identify the CEAA for each resource and relevant period. The next step is to identify and describe past, present, future, and RFFAs that are similar in kind and effect to the Action Alternatives or have considerable impact to environmental resources to which the Action Alternatives' effects would cumulatively contribute. The last step is to evaluate the Action Alternatives for the potential to have cumulative contributions to environmental effects. Quantitative data describing potential effects of RFFAs, or development were used where available. Where reliable quantitative data could not be found, qualitative data were used to best assess the cumulative effects of the Action Alternatives, according to the assessment of resource specialists.

The methods used to assess cumulative effects are resource dependent, and include the following:

- Pre-NOI public workshops, scoping meetings, and interviews were used to identify proposed projects, development plans, environmental resources, local knowledge, and community concerns.
- Trend analysis was used quantitatively where data allowed, such as for renewable energy development, and qualitatively used when interviewing local experts, such as with land use and development patterns.
- GIS overlays and impact analysis were used to understand spatial and temporal relationships of the Proposed Action with past, present, and RFFAs. In addition, a GIS impact analysis was used to analyze direct and indirect effects of the Action Alternatives.

3.13.2 Timeframe of Effects and Cumulative Effects Analysis Area

Past, present, future, and RFFAs are relative to the baseline conditions established for the Bonanza Solar Project. The baseline conditions for the cumulative effects analysis are established by the No Action Alternative. The No Action Alternative indicates the federal ROW agencies would not grant or permit a ROW, the Bonanza Solar facilities would not be built, and the existing environmental conditions would persist.

The proposed Bonanza Solar Project has a life expectancy of 40 years but this may be longer or shorter depending on economic or other circumstances. This cumulative impact analysis includes identification of the potential cumulative impacts that could occur during the construction and operation periods for the Bonanza Solar Project. Cumulative impact analysis assumes that reclamation of the Project would be ongoing over 10 years after the Project is decommissioned.

3.13.3 Cumulative Effects Analysis Area

The geographic extent of cumulative effects varies according to the affected resource or use being analyzed. Table 3-57 provides the defined CEAAs for the Proposed Action by resource or use; they are also graphically represented in Appendix F. Appendix A, Figures A-22 though Figure A-24 illustrate the CEAA for each of the resources analyzed for cumulative effects.

Table 3-57. Cumulative Effects Analysis Areas

Resource	Definition of CEAA	Rationale	Area of CEAA (acres)
Socioeconomics and Environmental Justice	Nye and Clark Counties	County-level captures areas where labor and EJ communities are present, spend money, and recreate.	16,793,513
Air Quality, Climate Change, and Greenhouse Gas Emissions	Indian Springs Valley (Hydrographic Basin 161)	Clark County DAQ uses hydrographic basins for reporting and Nye County portion of gen-tie falls within the same hydrographic basin (161).	429,541
Federally Listed Species – Mojave desert tortoise, three federally protected bird species Native Vegetation Communities and Cacti and Yucca	Valley corridor between State Rouge 160 and U.S. 95 intersection, east to the Red Rock Canyon NCA/Desert NWR border and up to 4,700 feet amsl in elevation	Project is within the Eastern Mojave Recovery Unit for Mojave desert tortoise and the Federally Listed Species CEAA has been reduced to better analyze local regional impacts. A 4,700-foot-amsl elevation contour was used because Project surveys observed Mojave desert tortoise sign up to that elevation. The three federally protected bird species are analyzed at the same level as Mojave desert tortoise. Vegetation is analyzed at the same level as Mojave desert tortoise because vegetation is a driver for passive reoccupation by Mojave desert tortoise of the Buildable Areas.	335,689
Water Resources Federally Listed Species – Groundwater Dependent Species	Indian Springs Valley (161) and Amargosa Desert (230) groundwater basins.	Groundwater basins capture direct and indirect impacts of the Proposed Action.	1,055,188
Cultural Resources Visual Resources	Project Area and 15.0-mile buffer	Visual Resources Analysis Area captures viewshed extent. Indirect Cultural Resources Analysis Area matches the visual viewshed.	693,263
Special Status Wildlife Species – Golden Eagle	Project Area and 10.0-mile buffer	USFWS recommends 10-mile buffers for solar projects.	363,784
Wildlife Special Status Wildlife Species	Project Area and 3.0-mile buffer	Each analysis area represents comparable habitat.	70,989
Earth Resources (soils) Land Use and Realty Public Health and Safety	Project Area and 1.0-mile buffer	Each analysis area would capture all soil map units that may be affected.	23,274
Earth Resources (geology, minerals, and mineral material sites)	Project Area and 0.5-mile buffer	Earth Resources Analysis Area would capture similar earth resources that may be affected.	13,787

3.13.4 Past and Present Actions

On June 24, 2005, the CEQ issued an interpretive memorandum on past actions, stating that "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions" (CEQ 2005). For this cumulative action scenario, the cumulative effects of past actions are accounted for in the description of the affected environment; therefore, no past projects are included in the cumulative action scenario. Present actions are included if they were determined to have ongoing impacts that could result in cumulative impacts when combined with Project-specific impacts.

3.13.5 Reasonably Foreseeable Future Actions

Reasonably foreseeable actions were considered where there is an existing decision (e.g., ROD or issued permit), a commitment of resources or funding, or a formal proposal (e.g., a permit request). In addition, actions for which there is a reasonable expectation that the action could occur based on known opportunities or trends (e.g., land development activities in a historically developed area) are also considered to be reasonably foreseeable. Speculative future developments (such as those that are not formally proposed or do not have enough project details to inform analysis) were not considered.

As part of this cumulative analysis, all RFFAs were evaluated based on project descriptions and spatial data (Appendix F). The list of RFFAs focused on the identification of major projects such as energy-related projects, interstate and state route transportation projects, and general construction projects expected to exceed 5 acres in size.

The RFFAs are projections being made so that future effects, cumulative and otherwise, can be estimated, as required by CEQ. Specific projects within the resource CEAAs have been identified by land management agencies, including the BLM, NPS, USFWS, DOD, NDOT, NDOW, Nevada Division of Forestry, Clark and Nye Counties, and incorporated cities. Table F-2 in Appendix F identifies the name of the RFFA along with a brief description of each project within the CEAAs. Figure F-1 to Figure F-4 in Appendix F provides the general location of the RFFAs by major project type.

Within the CEAAs of the resources analyzed for their contribution to cumulative impacts, there are an estimated 33 pending applications for solar projects proposed over potentially 200,000 acres, primarily on BLM-administered lands in Clark and Nye Counties. The pending applications for solar projects range in size from 2,000 acres to over 10,000 acres.

In addition to solar RFFAs, other types of major projects include transportation improvements primarily in the metropolitan areas of Las Vegas, mineral exploration and mining operations, and general development projects such as utilities and wildlife conservation management and habitat restoration including a nominated 58,000-acre ACEC. Other RFFAs and management activities occurring in the CEAAs that are highly probable include vegetation management, recreation (e.g., hunting, OHV use), road improvements, transmission and distribution lines, telephone lines, communication towers, and community development. Ongoing activities occurring also include wildland fire management activities and programs to minimize the spread of noxious weeds and invasive plant species.

The following assumptions were used when compiling the list of RFFAs:

- The actual acres of the RFFAs most likely would be less than the estimated acres of each of the RFFAs noted in Appendix F.
- All of the RFFAs may not be constructed. This results in an overestimate in the number of RFFAs and the number of acres potentially disturbed by RFFAs.
- The extent to which the RFFAs would be developed concurrently is difficult to predict and depends on their current stage (e.g., design state, undergoing NEPA evaluation, authorized).
- The RFFAs located on federally administered lands or that use federal funds would be subject to environmental review (NEPA, NHPA, ESA, etc.) and would be required to incorporate measures to minimize adverse impacts.
- RFFAs are listed in Appendix F regardless of land ownership. Because the State of Nevada does not have an environmental quality act, how each RFFA on non-federal lands would impact a resource is more uncertain because there are no documents available that are similar to an EIS under NEPA.
- Synergist/non-synergist impacts were not distinguished in the analysis of cumulative impacts.
- Pending applications for solar projects, especially those that have not been prioritized or where variance is not complete, have a high level of uncertainty regarding the project details and subsequent impacts to resources and resource uses.
- The construction of the Bonanza Solar Project is not predicated on the development of the pending applications for solar projects or any other RFFAs in the CEAAs.

3.13.6 Cumulative Impacts to Resources

For this analysis, cumulative resource impacts for the CEAAs are the combined direct and indirect effects of the present actions and the RFFAs, as well as the direct and indirect impacts of the Action Alternatives and No Action Alternative. Based on the analysis of impacts, only short-term impacts would occur from the construction or decommissioning of the Action Alternatives for a resource or use. Therefore, there would be no measurable contribution of the Action Alternatives' short-term impacts to a given resource's or use's cumulative impacts, and no cumulative short-term effects analysis for the respective resource or use has been done.

Vegetation Communities

Proposed Action

The major past, present, and RFFAs that could contribute to cumulative impacts to vegetation include transmission lines, renewable energy development, mining and mineral exploration and operations, roadways, and commercial, industrial, and residential development. There are approximately 15 RFFAs that were identified within the Vegetation CEAA. These projects consist of pending applications for three solar projects, totaling 16,125 acres; one wind testing project totaling 6 acres; one communication project (acreage unknown); seven transportation/recreation use improvement projects; two transmission line projects; and two conservation and wildlife management projects totaling over 58,000 acres. The RFFAs with publicly available, quantifiable project areas represent 4.8% of the Vegetation CEAA. The majority of threats to the vegetation communities are associated with actions that result the removal and/or crushing of vegetation; the removal and/or compactions of soils; the introduction and spread of noxious weeds and nonnative invasive plants; large-scale renewable energy projects; commercial, industrial, and residential development projects; and projects that may increase vehicle use on existing weed vectors or create new ones, such as roads. The past, present, and RFFAs have and would result in permanent and temporary disturbance, removal of native plants, reduction in biodiversity, compaction of soil, removal of seedbanks, the introduction and spread of noxious weeds and nonnative invasive plants, increased negative impacts associated with herbicide use and drift to non-target vegetation, increased risk of wildfire frequency and intensity, and dust from construction activities that would indirectly reduce photosynthesis and hinder plant growth. The combination of removal of vegetation, soil disturbance, seedbank removal, and the introduction and spread of noxious weeds and nonnative invasive plants in conjunction with the development of RFFAs listed above would result in cumulative impacts to vegetation communities. Most of the Vegetation CEAA encompasses federally administered lands and would have measures implemented to minimize potential effects to vegetation communities. Requests for authorizations in the nominated Cactus Springs ACEC would have to comply with interim special management until a decision is made whether an ACEC would be designated. The interim special management requires grading limits and retention of certain vegetation amounts that would limit impacts to vegetation.

Under the Proposed Action, the Buildable Areas would total 2,368 acres and up to 1,027 acres would be subject to grading and adverse impacts to vegetation communities. Cumulatively, an estimated 18,499 acres of adverse impacts to vegetation would occur from the RFFAs and the Proposed Action, representing 5.5% of the Vegetation CEAA.

Alternative 1

The cumulative impacts to vegetation communities associated with Alternative 1 are generally similar to those associated with the Proposed Action. Under Alternative 1, 120 acres of NDOT mineral material sites would be relocated to the east side of the Application Area. This would result in 120 acres of additional long-term disturbance to vegetation. In addition, Alternative 1 includes Buildable Areas totaling 2,413 acres and limited grading on no more than 482 acres with a 75% vegetation standard to be met within two years post-construction. Cumulatively, an estimated 18,664 acres of adverse impacts to vegetation would occur from the RFFAs and Alternative 1, representing 5.6% of the Vegetation CEAA.

Alternative 2 (BLM Preferred Alternative)

Under Alternative 2, 120 acres of NDOT mineral material sites would be relocated to the east side of the Application Area. This would result in 120 acres of additional long-term disturbance to vegetation. Under Alternative 2, Buildable Areas would total 2,413 acres and there would be grading of 592 acres with 65% vegetation cover standard within three to five years post-construction. Cumulatively, an estimated 18,664 acres of adverse impacts to vegetation would occur from the RFFAs and Alternative 2, representing 5.6% of the Vegetation CEAA.

Alternative 3

Under Alternative 3, 93 acres of NDOT mineral material sites would be relocated to the east side of the Application Area. Additionally, Alternative 3 would utilize 2,590 acres of Buildable Areas. These would result in additional acres of surface disturbance compared to the other Action Alternatives and the No Action Alternative. Alternative 3 would have a 65% vegetation cover standard within three to five years post-construction, which would result in higher cover of native vegetation than the Proposed Action. Cumulatively, an estimated 18,814 acres of adverse impacts to vegetation would occur from the RFFAs and Alternative 3, representing 5.6% of the Vegetation CEAA.

No Action Alternative

The RFFAs would be implemented, and other development and management trends and patterns would continue in the No Action Alternative. As previously described, these actions along with past and present projects would result in cumulative impacts to vegetation communities. However, the Bonanza Solar Project would not be constructed and there would be no contribution by the Project to cumulative impacts to vegetation communities within the Vegetation CEAA.

Wildlife, Migratory Birds, and Special Status Species

Proposed Action

The major past, present, and RFFAs that could contribute to cumulative impacts to special status species consist of commercial, industrial, and residential development, utility development, roads, and conservation projects. Transmission and power distribution lines that do not utilize avian protection hardware could result in injury to or mortality of golden eagles and other migratory birds. Construction occurring during breeding season can interfere with breeding activity and reduce parental care, resulting in a decrease in productivity or even nest abandonment. Development projects may impact special status species through habitat removal resulting in the loss of nesting, foraging, and shelter habitat; anthropogenic disturbance (e.g., noise, human presence); habitat fragmentation; collisions; and introduction and spread of toxic materials. Solar development projects can also result in avian collisions with panels. RFFAs located on federal or state lands or that utilize federal funding would be subject to environmental review and would be required to incorporate measures to minimize impacts to special status species. These measures could include timing work outside of the breeding season, constructing power lines consistent with APLIC suggested practices (APLIC 2006 and 2012), and siting projects away from active nests.

Currently there are 11 RFFAs that were identified within the Special Status Species CEAA. These projects consist of pending applications for three solar projects (approximately 16,125 acres), two road improvement projects (approximately 55 miles), two communication sites (acreage unknown), two transmission line projects, and two conservation and wildlife management projects (842,326 acres). The RFFAs with publicly available, quantifiable project areas represent 22.7% of the Wildlife CEAA. The road improvement projects would primarily contribute to impacts to golden eagles and migratory birds during their construction phases where noise and human presence would deter special status species from utilizing the area.

Following construction, traffic noise would continue to be present along the roadways, impacting special status wildlife species in the long term. Solar projects are normally sited on level terrain that is not typically suitable for golden eagle nesting but may provide high-quality foraging habitat. The RFFA solar facilities would result in a loss of this foraging habitat for birds and an increased risk of spread of noxious weeds could reduce habitat quality for other special status species. During construction, additional risk of displacement due to noise and human presence would be present. In combination, past, present, and RFFAs would result in cumulative impacts to special status species from construction activity and habitat degradation. However, most of the Special Status Species CEAA encompasses federally administered lands and would have measures implemented to minimize potential effects to special status species and their respective habitats. Requests for authorizations in the nominated Cactus Springs ACEC would have to comply with interim special management until a decision is made whether an ACEC would be designated. The interim special management requires grading limits and retention of certain vegetation amounts that would limit impacts to habitats important to wildlife, migratory birds, and special status species.

Under the Proposed Action, the Buildable Areas would total 2,368 acres and up to 1,027 acres would be subject to grading and adverse impacts to wildlife, migratory birds, and special status species. Cumulatively, an estimated 18,493 acres of adverse impacts to wildlife would occur from the RFFAs and the Proposed Action, representing 26.1% of the Wildlife CEAA.

Alternative 1

The cumulative impacts to wildlife, migratory birds, and special status species associated with Alternative 1 are generally similar to those associated with the Proposed Action. Under Alternative 1, 120 acres of NDOT mineral material sites would be relocated to the east side of the Application Area. This would result in 120 acres of additional disturbance to species' habitat. In addition, Alternative 1 includes Buildable Areas totaling 2,413 and there would be limited grading on no more than 482 acres with a 75% vegetation standard to be met within two years post-construction. The limited grading and increased requirement for vegetation cover would reduce impacts to wildlife, migratory birds, and special status species habitat compared to the Proposed Action. Cumulatively, an estimated 18,658 acres of adverse impacts to wildlife would occur from the RFFAs and Alternative 1, representing 26.3% of the Wildlife CEAA, a 0.2% increase from the Proposed Action.

Alternative 2 (BLM Preferred Alternative)

Compared to the Proposed Action, the limited grading and increased vegetation cover requirements of Alternative 2 would result in a more intact landscape and a lowered likelihood of wildlife, migratory birds, and special status species impacts during construction and operation. Under Alternative 2, the Buildable Ares would total 2,413 acres and there would be grading of 592 acres with 65% vegetation cover standard within three to five years post-construction. Cumulative impacts from RFFAs and Alternative 2 would be the same as for Alternative 1.

Alternative 3

Compared to the Proposed Action, the limited grading and increased vegetation cover requirements of Alternative 2 would result in a more intact landscape and a lowered likelihood of wildlife, migratory birds, and special status species impacts during construction and operation. Under Alternative 3, Buildable Areas would total 2,590 acres and there would be grading of 648 acres with 65% vegetation cover standard within three to five years post-construction. Cumulatively, an estimated 18,808 acres of adverse impacts to vegetation would occur from the RFFAs and Alternative 3, representing 26.5% of the Wildlife CEAA, 0.4% more than the Proposed Action, when comparing Buildable Areas of each alternative.

No Action Alternative

The RFFAs would be implemented, and other development and management trends and patterns would continue in the No Action Alternative. As previously described, these actions along with past and present projects would result in cumulative impacts to special status species. However, the Bonanza Solar Project would not be constructed and there would be no contribution by the Project to cumulative impacts to special status species within the Special Status Species CEAA.

Federally Listed Species

Proposed Action

There are two CEAAs for federally listed species: the Mojave Desert Tortoise CEAA for impacts to Mojave desert tortoise and federally protected bird species, and the Water Resources CEAA which is used for cumulative analysis for groundwater dependent species in Ash Meadows NWR. The major types of past, present, and RFFAs that could contribute to cumulative impacts to Mojave desert tortoise, federally protected bird species, and groundwater dependent species with the Ash Meadows NWR include transmission lines, renewable energy development, mining and mineral exploration and operations, roadways, and commercial, industrial, and residential development.

There are 15 RFFAs that were identified within the Mojave Desert Tortoise CEAA. These projects consist of pending applications for three solar projects totaling 16,125 acres, one wind testing project totaling 6 acres, one communication project (acreage unknown), six road/recreation use improvement projects, two transmission line projects, and two conservation and wildlife management projects totaling over 58,000 acres. The RFFAs with publicly available, quantifiable project areas represent 4.8% of the Mojave Desert Tortoise CEAA.

The majority of threats to the Mojave desert tortoise and connectivity habitat are associated with actions that result in mortality of Mojave desert tortoise and permanent habitat loss across large areas, such as urbanization, large-scale renewable energy projects, and projects that fragment and degrade habitats such as roads and mining exploration. The past, present, and RFFAs have and would result in Mojave desert tortoise mortality and injury due to collisions with vehicles and crushing of burrows and eggs, harassment during translocation, increased stress which could contribute to a weakened immune system and reduced reproductive success, an increase in predation from an increase in roosting and foraging structures, habitat fragmentation, restricted gene flow, and a reduction in quality habitat from vegetation disturbance (USFWS 2011a). Natural and anthropomorphic constrictions (such as development and highways) can limit gene flow and the ability of Mojave desert tortoises to move between larger blocks of suitable habitat and populations (Dutcher 2020). In the Mojave Desert Tortoise CEAA, existing anthropogenic constrictions in conjunction with the development RFFAs listed above compound effects of natural barriers on Mojave desert tortoise population connectivity. The combination of habitat loss and fragmentation from existing roadways in conjunction with the development RFFAs listed above would result in adverse cumulative impacts to Mojave desert tortoise populations and connectivity. This species in particular requires large expanses of lower-elevation Mojave vegetation to survive, and the more vegetation that is permanently removed, the harder it is for this species to persist. Due to the large amounts of habitat that would be excluded from Mojave desert tortoises and removed and/or degraded from construction once all of the other RFFAs are developed in this area, it is possible that Mojave desert tortoise would not be able to reoccupy the areas covered by RFFAs until the vegetation has been sufficiently restored. If not enough native seed is available, or if climatic conditions change such that vegetation cannot be restored, Mojave desert tortoise may never reoccupy the approximately 16,125 acres of habitat loss.

The proposed Project is in one of the most important Mojave desert tortoise connectivity corridors in southern Nevada as it is essential to maintain Mojave desert tortoise connectivity and population genetics between the Eastern and Northeastern Recovery Units (USFWS 2023c) as well as being the only remaining corridor connecting Mojave desert tortoise populations on the west side of the Spring Mountains to those on the east side. The Mojave Desert Tortoise CEAA contains 67,263 acres of Priority 1 connectivity habitat (20% of the Mojave Desert Tortoise CEAA) and 1,831 acres of Priority 2 connectivity habitat (less than 1% of the Mojave Desert Tortoise CEAA) identified under the Western Solar Plan (BLM and DOE 2012) (Appendix A, Figure A-23). In addition to the proposed Project, within the Mojave Desert Tortoise CEAA, the pending large-scale solar project RFFAs Aypa Vegas Valley Solar Project (9,000 acres), Kawich Solar Project (4,352 acres), and South Solar Ridge Project (2,773 acres) are also proposed within Priority 1 connectivity habitat (Appendix A, Figure A-23 and Appendix F, Figure F-2). The pending large scale solar RFFAs within the Mojave Desert Tortoise CEAA total 16,125 acres (4.8% of the Mojave Desert Tortoise CEAA and 24% of Priority 1 connectivity habitat within the Mojave Desert Tortoise CEAA). These RFFAs would adversely impact Mojave desert tortoise habitat because it is assumed that much, if not all, of the project areas would exclude Mojave desert tortoises, at least until vegetation objectives that may be set for the project are achieved. The cumulative effects of all of these projects would have a high risk of severing Mojave desert tortoise connectivity and be substantially adverse to the species.

The RFFAs in the Mojave Desert Tortoise CEAA would likely result in increased spread of noxious weeds and nonnative invasive plants which would degrade the species habitat and increase the risk of wildfire frequency and intensity. Mojave desert tortoise and their connectivity may be adversely impacted within the Mojave Desert Tortoise CEAA by future fires, drought conditions, and changes in climatic conditions which were not considered in the Project-specific connectivity modeling (Nussear 2023). Some of the impacts to Mojave desert tortoise could be mitigated depending on use of Mojave desert tortoise fencing and wildlife crossing culverts suitable for Mojave desert tortoise use and restoration of disturbance areas. Additionally, ESA compliance that requires payment into a mitigation fund would help offset impacts to ESA-listed species. Requests for authorizations in the nominated Cactus Springs ACEC would have to comply with interim special management until a decision is made whether an ACEC would be designated. The interim special management requires grading limits and retention of certain vegetation amounts that would limit impacts to Mojave desert tortoise habitat.

The main threat to the three federally protected bird species is potential injury or mortality to migrating individuals from risk of collision with PV solar modules and other Project components, or electrocution associated with transmission lines. The major past, present, and RFFAs that could contribute to cumulative impacts to federally protected bird species consist of 16,125 acres of solar development projects, one wind testing project, and two transmission line projects. The past, present, and RFFAs would result in increased potential injury or mortality to migrating individuals and large areas of PV solar modules would cause increased potential of the lake effect (Horváth et al. 2009) which would further cumulatively increase the potential risk of collision and result in adverse cumulative impacts.

Within the Water Resources CEAA, which is used for cumulative impact analysis for groundwater dependent species within the Ash Meadows NWR, there are pending applications for solar projects that could affect 149,211 acres and there are transportation and transmission RFFAs which would total over 792 miles (several projects have unknown lengths). The RFFAs with publicly available, quantifiable project areas represent 12.9% of the Water Resources CEAA. The pending solar projects would require a substantial amount of water for construction. If groundwater were to be used for construction and/or operation these proposed solar projects, they would cumulatively contribute to lowered water levels at Devils Hole and possibly to lowered groundwater levels within Ash Meadows NWR. The RFFAs could expedite the timeframe in which the minimum mandated water level at Devils Hole would be reached. The base case scenario in the Death Valley Groundwater Flow System model (USGS), which continues 2010 pumping into perpetuity, shows Devils Hole reaching its minimum water level in 2078. The additional scenarios presented by USGS (2020a) increase total pumping in the system by 13%, 9%, and 94% of the base case, respectively. Each of these additional scenarios expedites when Devils Hole reaches its minimum water level. Therefore, pumping groundwater under existing unused allocations for the Proposed Action in Indian Springs, when considered with the effects of new pumping at other RFFAs within the system, contributes an adverse, cumulative impact to groundwater in the Death Valley Groundwater Flow System and to the groundwater dependent habitat at Ash Meadows NWR. These adverse impacts could extend beyond decommissioning of the Project due to characteristics of the mega channel (USGS 2020a, 2020b).

Under the Proposed Action, the Buildable Areas would total 2,368 acres and up to 1,027 acres would be subject to grading and adverse impacts to federally listed species. Cumulatively, an estimated 16,131 acres of impacts to Mojave desert tortoise and the three federally protected bird species from the RFFAs and the Proposed Action and 149,828 acres of impacts to groundwater dependent species would occur, representing 5.5% and 13.1% of the Mojave Desert Tortoise CEAA and Water Resources CEAA respectively.

Alternative 1

Under Alternative 1, Buildable Areas would total 2,368 acres and grading would be limited to 482 acres and retention of perennial vegetation would be required across 75% of the Buildable Areas. Approximately 120 acres of NDOT mineral materials sites would be relocated to the east side of the Application Area. Alternative 1 would reduce impacts to Mojave desert tortoise connectivity habitat compared to the Proposed Action. While this alternative would still result in long-term impacts to habitat, requiring more limited surface disturbance would preserve better habitat function and could help preserve connectivity for Mojave desert tortoise (Carter et al. 2020). Cumulatively, an estimated 18,664 acres of adverse impacts to Mojave desert tortoise would occur from the RFFAs and Alternative 1, representing 5.6% of the Mojave Desert Tortoise CEAA, a 0.1% increase from the Proposed Action.

The cumulative impacts to federally protected bird species Alternative 1 are similar to the impact described under the Proposed Action. An estimated 18,664 acres of adverse impacts to Mojave desert tortoise would occur from the RFFAs and Alternative 1, representing 5.6% of the Mojave Desert Tortoise CEAA, a 0.1% increase from the Proposed Action.

The cumulative impacts to groundwater dependent species within Ash Meadows NWR under Alternative 1 are similar to the impact described under the Proposed Action. An estimated 138,536 acres of adverse impacts to groundwater dependent species would cumulatively occur from the RFFAs and Alternative 1, representing 13.1% of the Water Resources CEAA, the same percentage as the Proposed Action.

Alternative 2 (BLM Preferred Alternative)

Under Alternative 2, Buildable Areas would total 2,413 acres and grading would be limited to 592 acres and retention of perennial vegetation would be required across 65% of the Buildable Areas. Approximately 120 acres of NDOT mineral materials sites would be relocated to the east side of the Application Area. Alternative 2 would reduce impacts to Mojave desert tortoise connectivity habitat compared to the Proposed Action. While this alternative would still result in long-term impacts to habitat, requiring more limited surface disturbance would preserve better habitat function and connectivity for Mojave desert tortoise (Carter et al. 2020). Cumulatively, an estimated 18,664 acres of adverse impacts to Mojave desert tortoise would occur from the RFFAs and Alternative 2, representing 5.6% of the Mojave Desert Tortoise CEAA, a 0.1% increase from the Proposed Action.

The cumulative impacts to federally protected bird species under Alternative 2 are similar to the impact described under the Proposed Action. An estimated 18,664 acres of adverse impacts to Mojave desert tortoise would occur from the RFFAs and Alternative 1, representing 5.6% of the Mojave Desert Tortoise CEAA, a 0.1% increase from the Proposed Action.

The cumulative impacts to groundwater dependent species within Ash Meadows NWR under Alternative 2 are similar to the impact described under the Proposed Action. An estimated 138,536 acres of adverse impacts to groundwater dependent species would cumulatively occur from the RFFAs and Alternative 2, representing 13.1% of the Water Resources CEAA, the same percentage as the Proposed Action.

Alternative 3

Under Alternative 3, Buildable Areas would total 2,590 acres and grading would occur on 648 acres and vegetation objectives would require 65% cover based on pre-construction conditions, 15% more than the Proposed Action. Cumulatively, an estimated 18,814 acres of adverse impacts to Mojave desert tortoise would occur from the RFFAs and Alternative 3, representing 5.6% of the Mojave Desert Tortoise CEAA, a 0.1% increase from the Proposed Action.

The cumulative impacts to federally protected bird species Alternative 1 are similar to the impact described under the Proposed Action. An estimated 18,814 acres of adverse impacts to Mojave desert tortoise would occur from the RFFAs and Alternative 1, representing 5.6% of the Mojave Desert Tortoise CEAA, a 0.1% increase from the Proposed Action.

The cumulative impacts to groundwater dependent species within Ash Meadows NWR under Alternative 3 are similar to the impact described under the Proposed Action. An estimated 138,686 acres of adverse impacts to groundwater dependent species would cumulatively occur from the RFFAs and Alternative 2, representing 13.1% of the Water Resources CEAA, the same percentage as the Proposed Action.

No Action Alternative

The RFFAs would be implemented, and other development and management trends and patterns would continue in the No Action Alternative. As previously described, these actions, along with past and present projects, would result in cumulative impacts to federally listed species. However, the Project would not be constructed and there would be no contribution by the Project to cumulative impacts to federally listed species within the Mojave Desert Tortoise CEAA or the Water Resources CEAA.

Earth Resources

Proposed Action

Of the past, present, and future projects within the area, five projects have been identified to have potential to have cumulative impacts within the Earth Resources CEAAs: the U.S. 95 Northwest Corridor Improvement Project, the Interstate 11 (I-11) proposed upgrade, the nominated Cactus Springs ACEC, and the Greenlink and GridLiance West transmission line projects. Overall, past, present, and RFFA activities have no means of influencing geology or geologic hazards. However, as more projects are sited to avoid geological hazards, suitable siting locations may become increasingly occupied, forcing future projects towards areas of greater geological hazard. Construction of RFFA projects could affect slope stability for other nearby projects located upslope or downslope. In general, local and state building requirements and federal regulations to minimize encroachment on floodways would be adequate to prevent or substantially reduce cumulative impacts that may be created by geologic hazards.

Existing actions that affect soil stability and quality include ROWs for roads and vegetation treatments. The most prevalent indicator of cumulative soil loss throughout the Soil Resources CEAA is the proportional disturbance to the soil's surface. The use of land through activities such as mining, ranching, roads, solar projects, transmission lines, and OHV use have all shaped the current condition of the soil resources. The impacts of present actions in the Soil Resources CEAA would be very similar to those of the past actions. Any disturbance to surface soils through grading or other ground disturbance can potentially result in accelerated erosion at any one project site. There are three RFFAs (Appendix F, Table F-2) that would have the potential to impact the Soil Resources CEAA. The U.S. 95 Northwest Corridor Improvement Project and I-11 proposed upgrade have the potential to disturb soils, remove topsoil, compact soil, and increase erosion. These projects do not have publicly available, quantifiable acreage associated with them. However, these improvement projects are located in already disturbed areas, so impacts to soils would likely be minimal. Requests for authorizations in the nominated Cactus Springs ACEC would have to comply with interim special management until a decision is made whether an ACEC would be designated. The interim special management requires grading limits and retention of certain vegetation amounts that would limit impacts to soils.

Cumulative effects to mineral resources would primarily be associated with ground disturbance and surface occupation of mineral resource areas that would remove or restrict access to mineral resources, such as the NDOT mineral material sites. The three RFFAs discussed above are within the Mineral Resources CEAA but would have no impact.

The effects of the Bonanza Solar Project, when combined with past, present, and RFFAs would result in minimal cumulative impacts to earth resources within the Mineral and Soil Resources CEAAs, because measures would be implemented, and agencies' regulations adhered to, minimizing the effects of geological hazards and routine wind and water erosion.

Alternative 1

The cumulative impacts to earth resources associated with Alternative 1 are generally similar to those associated with the Proposed Action. Under Alternative 1, 120 acres of NDOT mineral material sites would be relocated to the east side of the Application Area. This would result in 120 acres of additional disturbance to vegetation and exposure of sensitive soils to erosion. Mineral materials would be extracted from the relocated site over the long term. In addition, Alternative 1 includes limited grading on no more than 482 acres and a 75% vegetation standard to be met within two years post-construction. The limited grading and increased requirement for vegetation cover would reduce impacts to soils compared to the Proposed Action but, cumulatively, the impacts would not be materially different because the same RFFAs are anticipated to occur.

Alternative 2 (BLM Preferred Alternative)

Compared to the Proposed Action, the limited grading to 592 acres and 65% vegetation cover standard within three to five years post-construction under Alternative 2 would result in a more intact landscape and reduced impacts to soils during construction and operation. However, cumulative impacts to soils would be very similar to those from the Proposed Action.

Alternative 3

Compared to the Proposed Action, the limited grading of 648 acres and 65% vegetation cover standard within three to five years post-construction under Alternative 3 would result in a more intact landscape and reduced impacts to soils during construction and operation. However, cumulative impacts to soils would be very similar to those from the Proposed Action.

No Action Alternative

The RFFAs would be implemented, and other development and management trends and patterns would continue in the No Action Alternative. As previously described, these actions, along with past and present projects, would result in cumulative impacts to earth resources. However, the Project would not be constructed and there would be no contribution by the Project to cumulative impacts to earth resources within the Earth Resources CEAAs.

Water Resources

Surface Water

Proposed Action

While the Water Resources CEAA includes the Indian Springs Valley groundwater basin and the Amargosa Valley groundwater basin, cumulative surface water impacts would generally be confined to the Lower Indian Springs Valley watershed (HUC 10: 1606001419). Within the entire Water Resources CEAA, there are 40 RFFAs, consisting of pending applications for 22 solar projects, one wind testing project, three mining projects, six transportation projects, four telecommunication projects, two transmission line projects, the nominated Cactus Springs ACEC, and a revegetation project. The RFFAs in the Water Resources CEAA cover approximately 195,199 acres. The non-linear RFFAs would generally involve grading and removing vegetation across large areas and increasing the coverage of impervious surfaces in some areas. It is likely that natural surface hydrologic processes would be interrupted by the installation of these facilities in a manner that would be similar to the Proposed Action; however, the scale of cumulative impact on surface waters would depend on the proximity of these Projects to each other. The Proposed Action constitutes 0.26% of the more than 1-million-acre Water Resources CEAA and is within a closed basin within the Water Resources CEAA; therefore, while some cumulative impacts to surface water resources would occur, they would be mostly limited to the closed Lower Indian Springs Valley watershed. The RFFAs within the Lower Indian Springs Valley watershed would cumulatively contribute to sedimentation and flood risk as the natural hydrologic function of the watershed is more greatly modified. However, APMs GEO-1, WR-1, and WR-2, and applicable Western Solar Plan design features (Appendix B) would minimize impacts to surface water resources, such as sedimentation and flooding, from the Proposed Action.

Requests for authorizations in the nominated Cactus Springs ACEC would have to comply with interim special management until a decision is made whether an ACEC would be designated. The interim special management requires grading limits and retention of certain vegetation amounts that would limit impacts to surface water resources. Revegetation RFFAs may protect surface hydrologic function within the Water Resources CEAA if they were to be approved.

Alternative 1

The surface water resource impacts associated with Alternative 1 are generally similar to those associated with the Proposed Action. The increased requirement for intact vegetation does moderately decrease surface water impacts compared to the Proposed Action while the relocation of 120 acres of NDOT mineral material sites moderately increases surface water impacts compared to the Proposed Action. Cumulatively, the Alternative 1 surface water impacts would not be materially different. This is true of construction, O&M, and decommissioning.

Alternative 2 (BLM Preferred Alternative)

The surface water resource impacts associated with Alternative 2 are generally similar to those associated with the Proposed Action. The increased requirement for intact vegetation does moderately decrease surface water impacts compared to the Proposed Action while the relocation of 120 acres of NDOT mineral material sites moderately increases surface water impacts compared to the Proposed Action. Cumulatively, the Alternative 2 surface water impacts would not be materially different. This is true of construction, O&M, and decommissioning.

Alternative 3

The surface water resource impacts associated with Alternative 2 are generally similar to those associated with the Proposed Action. The increased requirement for intact vegetation does moderately decrease surface water impacts compared to the Proposed Action while the relocation of 120 acres of NDOT mineral material sites moderately increases surface water impacts compared to the Proposed Action. Cumulatively, the Alternative 3 surface water impacts would not be materially different. This is true of construction, O&M, and decommissioning.

No Action Alternative

The RFFAs would be implemented, and other development and management trends would continue under the No Action Alternative. As previously described, these actions, along with past and present projects, would result in cumulative impacts to water resources. However, the Project would not be constructed and there would be no contribution by the Project to cumulative impacts to water resources within the Water Resources CEAA.

Groundwater

Proposed Action

As described above, there are 40 RFFAs, consisting of pending applications for 22 solar projects, one wind testing project, three mining projects, six transportation projects, four telecommunication projects, two transmission line projects, the nominated Cactus Springs ACEC, and a revegetation project, which cover approximately 195,199 acres of the Water Resources CEAA. There is potential for all 40 RFFAs to require groundwater for construction and operation, although the solar and mining projects would likely require the highest volume of groundwater for construction and mining projects would likely require the highest volumes of water for operation. The RFFAs that would be drawing water from within the Indian Springs groundwater basin could contribute cumulatively to impacts on the local aquifer system, which is already overallocated and overpumped relative to its assigned perennial yield. RFFAs could obtain changes in use of existing appropriations, which could increase total pumpage within the basin. Cumulative effects to the basin would be characterized by drawdown at existing local wells and potential stress to the basin by further exceeding its assigned perennial yield (Dudek 2023a; NDWR 1970).

The Water Resources CEAA also includes the Amargosa Desert groundwater basin, due to the Indian Springs Valley groundwater basin's connection to Amargosa Desert via the mega channel. Therefore, cumulative impacts must consider RFFAs in both groundwater basins and their connection to Ash Meadows NWR and Devils Hole. Within the Water Resources CEAA, there are 135,997 acres of pending applications for solar projects and those projects would require a substantial amount of water for construction. If groundwater were to be used for construction and/or operation of these proposed solar projects, they would cumulatively contribute to lowered water levels at Devils Hole and expedite the timeframe in which the minimum mandated water level at Devils Hole would be reached. The base case scenario in the Death Valley Groundwater Flow System model (USGS), which continues 2010 pumping into perpetuity, shows Devils Hole reaching its minimum water level in 2078. The additional scenarios presented by USGS (2020a) increase total pumping in the system by 13%, 9%, and 94% of the base case, respectively. Each of these additional scenarios expedites when Devils Hole reaches its minimum water level. Therefore, pumping groundwater for the Proposed Action in Indian Springs, when considered with the effects of new pumping at other RFFAs within the system, contributes an adverse, cumulative impact to groundwater in the Death Valley Groundwater Flow System and specifically to the groundwater dependent habitat at Devils Hole.

Alternative 1

The groundwater resource impacts associated with Alternative 1 are not materially different from those associated with the Proposed Action. This is true of construction, O&M, and decommissioning.

Alternative 2 (BLM Preferred Alternative)

The groundwater resource impacts associated with Alternative 2 are not materially different from those associated with the Proposed Action. This is true of construction, O&M, and decommissioning.

Alternative 3

The groundwater resource impacts associated with Alternative 3 are not materially different from those associated with the Proposed Action. This is true of construction, O&M, and decommissioning.

No Action Alternative

The RFFAs would be implemented, and other development and management trends and patterns would continue under the No Action Alternative. As previously described, these actions, along with past and present projects, would result in cumulative impacts to groundwater resources. However, the Bonanza Solar Project would not be constructed and there would be no contribution by the Project to cumulative impacts to groundwater resources within the Water Resources CEAA.

Cultural Resources and Native American Concerns

Proposed Action

There are likely additional undocumented cultural resources within the Cultural Resources CEAA. Past, present, and future projects that could have contributing impacts within the Cultural Resources CEAA include commercial, industrial, and residential development; transportation; utilities; mining; and renewable energy development. These project types may directly impact cultural resources through physical disturbance or major visual intrusion. Indirect impacts to cultural resources could include increased access to archaeological sites, and thus an increased risk of vandalism. Projects led by, or funded by, federal agencies would consider impacts to cultural resources. Measures to avoid, reduce, or mitigate impacts on historic properties would likely be implemented in accordance with Section 106 of the NHPA. Compliance with Section 106 ensures avoidance, minimization, or mitigation of impacts to cultural resources at the project level.

Of the known RFFAs, nine fall within the Cultural Resources CEAA, consisting of the Aypa Vegas Valley Solar Project, Kawich Solar Project, South Solar Ridge Project, U.S. 95 Northwest Corridor Improvement Project, I-11 Proposed Upgrade, Mercury Telecommunication Tower Facility Project, Stimulus Technologies Beacon Hill Communication Site/Communication Use Lease Project, and Greenlink and GridLiance West transmission line projects. The transportation and communication RFFAs would likely occur in previously disturbed areas and would not be expected to have substantial impacts on cultural resources. The solar RFFAs would be large landscape-scale projects that would encompass the most undeveloped public land. Given this, they would likely be subject to compliance with Section 106. Any impacts to cultural resources would be avoided or mitigated to the maximum extent practicable. In combination, past, present, and RFFAs would result in cumulative impacts to cultural resources within the Cultural Resources CEAA.

Alternative 1

Alternative 1 includes the Proposed Action with the addition of replacing 120 acres of the NDOT mineral material sites. The new location of the NDOT mineral materials sites has been determined to be within the Cultural Resources CEAA, and thus has the potential for impacting cultural resources through ground disturbance.

Cumulative impacts from Alternative 1 would be the same as the Proposed Action.

Alternative 2 (BLM Preferred Alternative)

Cumulative impacts from Alternative 2 would be the same as the Proposed Action and Alternative 1.

Alternative 3

Alternative 3 would avoid a Tribally identified trail within the Application Area, which would reduce impacts to cultural resources within the Cultural Resources CEAA. Up to 93 acres of the NDOT mineral material site would be replaced. Cumulative impacts from Alternative 3 would be the same as the Proposed Action.

No Action Alternative

The RFFAs would be implemented, and other development and management trends and patterns would continue in the No Action Alternative. These actions, along with past and present projects, would result in cumulative impacts to cultural resources. However, the Bonanza Solar Project would not be constructed and there would be no contribution by the Project to cumulative impacts to cultural resources associated with the Cultural Resources CEAA.

Air Quality, Climate Change, and Greenhouse Gas Emissions

Proposed Action

Proposed Action impacts on air quality in the form of criteria pollutants and HAPs are generated from vehicular exhaust and the disturbance of dust from construction areas. Most of the present and reasonably foreseeable actions identified are solar, communications, conservation and wildlife management, and transportation projects. These projects would more predominately produce particulate matter (PM_{10} and $PM_{2.5}$) from the disturbance of land but would also emit criteria pollutants from equipment vehicle exhaust.

The impacts of Proposed Action emissions would be low compared to the Air Quality Analysis Area's existing emissions (see Table 3-30 and Table 3-31). Construction activities are temporary and transient in nature; therefore, impacts from these types of activities would be short term and localized to the construction area. Cumulative impacts, if any, would only occur if Project construction occurred at the same time and geographically near the RFFAs.

Air quality in the Air Quality Analysis Area and GHG Emissions Analysis Area could be improved in the long term because additional renewable generation would offset emissions from fossil fuel–generated energy sources. Considering the comparatively low potential emissions from the Proposed Action, as well as the intermittent nature of the emissions generated from present and reasonably foreseeable impacts, the cumulative impacts would be minor and would have a long-term minor beneficial impact to air quality due to reduced reliance on fossil fuel-generated energy sources.

The Air Quality, Climate Change, and GHG Emissions CEAA (collectively referred to as the Air CEAA) is defined as the Indian Springs Valley (Hydrographic Basin 161) in which the Project would be located. The cumulative impact analysis for air quality considers the NAAQS set by the USEPA and for climate change and GHG emissions it includes consideration of state and national GHG emission reduction efforts. Current federal and state practices include the inventory of GHG emissions to compare the relative contribution of different emission sources and GHG emissions to climate change. Within Nevada, CO_2 emissions resulting from fossil fuel combustion totaled 39.0 million metric tons in 2021. Of these, activities related to the generation of electric power accounted for 13.7 million metric tons of CO_2 emitted in Nevada (NDEP 2023).

The major types of past, present, and RFFAs within the Air CEAA that could contribute to cumulative impacts include projects for commercial, industrial, and residential development; transportation; mining; roadways; and renewable energy development. These types of projects may directly impact air quality, climate change, and GHG emissions through project construction activities. Certain developments such as industrial and/or manufacturing facilities, transportation, and mining, may also impact air quality during O&M but to a lesser degree than construction. There are approximately 16 known RFFAs that were identified within the Air CEAA. The RFFAs that would encompass the most land would be the five pending applications for solar projects estimated at 29,259 acres, which is approximately 6.8% of the 429,541-acre Air CEAA and seven pending applications for transportation projects estimated at 105 miles total. Effects from the RFFAs could result from fugitive dust and GHG emissions during construction activities. Cumulative GHG emissions would be offset in the long term by the use of renewable energy resources. In combination, past, present, and RFFAs would result in minimal cumulative impacts.

<u>Alternative 1</u>

The implementation of Alternative 1 would result in undetectable impacts to air quality, climate change, and GHG emissions from construction, O&M, and decommissioning of the facilities. Alternative 1 includes limited grading on no more than 482 acres and a 75% vegetation standard to be met within two years post-construction. Construction would result in temporary GHG emissions from fuel combustion and fugitive dust raised by construction vehicles, as well as worker travel. Operational emissions of GHGs are estimated to be less than 8,600 metric tons of CO_2e for the life of the Project, which is well below the permitting threshold. Anticipated emissions and dust would disperse quickly and have no measurable effect and would not be sufficient to trend toward NAAQS nonattainment.

Decommissioning would result in GHG emissions; however, emissions would be less than those associated with construction. In addition, implementation of the Action Alternatives would allow for greater transmission of renewable energy and contribute to the state and federal efforts to minimize GHG emissions and mitigate climate change.

Under Alternative 1, 120 acres of NDOT mineral material sites would be relocated to the east side of the Application Area. This would result in 120 acres of additional ground disturbance, resulting in a long-term impact to air quality, especially during high wind events.

The effects of the Alternative 1, when combined with past, present, and RFFAs would result in minimal cumulative impacts on air quality, climate change, and GHG emissions within the Air CEAA. The Project would result in a minimal contribution to cumulative effects on air quality, climate change, and GHG emissions within the Air CEAA.

<u>Alternative 2 (BLM Preferred Alternative)</u>

The implementation of Alternative 2 would result in minimal impacts to air quality, climate change, and GHG emissions from construction, O&M, and decommissioning of the facilities. Alternative 2 includes limited grading on no more than 592 acres and a 65% vegetation standard to be met within two years post-construction. The cumulative air quality, climate change, and GHG emission impacts under Alternative 2 would be the same as those for Alternative 1.

<u>Alternative 3</u>

The implementation of Alternative 3 would result in minimal impacts to air quality, climate change, and GHG emissions from construction, O&M, and decommissioning of the facilities. Alternative 3 includes limited grading on no more than 648 acres and a 65% vegetation standard to be met within two years post-construction.

The effects of the Alternative 3, when combined with past, present, and RFFAs would result in minimal cumulative impacts on air quality, climate change, and GHG emissions within the Air CEAA. Alternative 3 would result in a minimal contribution to cumulative effects on air quality, climate change, and GHG emissions within the Air CEAA.

No Action Alternative

The RFFAs would be implemented, and other development and management trends and patterns would continue in the No Action Alternative. As previously described, these actions, along with past and present projects, would result in cumulative impacts to air quality, climate change, and GHG emissions. However, the Project would not be constructed and there would be no contribution by the Project to cumulative impacts to air quality, climate change, and GHG emissions within the Air CEAA.

Land Use and Realty

Proposed Action

Five RFFAs were identified within the Land Use and Realty CEAA which consist of the U.S. 95 Northwest Corridor Improvement Project, the I-11 Proposed Upgrade, the Greenlink and GridLiance West transmission line projects, the nominated Cactus Springs ACEC. Construction of the U.S. 95 Northwest Corridor Improvement Project involves the improvement of approximately 5 miles of U.S. 95 and the I-11 Proposed Upgrade involves the improvement of approximately 50 miles. Both have the potential to temporarily impact land uses until construction is completed. The nominated Cactus Springs ACEC could limit ROW development for certain types of projects in the Land Use and Realty CEAA.

The BLM requires the applicants for the cumulative projects to coordinate with ROW holders/applicants through the NEPA and ROW grant process to identify any mitigation measures, as well as any potential conflicts. To avoid any conflicts, ROW facility adjustments would be incorporated into final designs and plans, including construction activity schedules. With the implementation of mitigation measures, adverse effects with other existing or proposed transmission line and solar energy would be reduced.

Alternative 1

The cumulative impacts to land use and realty associated with Alternative 1 are very similar to those associated with the Proposed Action. Under Alternative 1, 120 acres of NDOT mineral material sites would be relocated to the east side of the Application Area. This would result in 120 acres of land use dedicated to mineral materials compared to the Proposed Action. Alternative 1 would result in additional realty constraints within the Land Use and Realty Analysis Area compared to the Proposed Action, however, cumulative impacts would not be materially different from the Proposed Action.

Alternative 2 (BLM Preferred Alternative)

The cumulative impacts of Alternative 2 would be the same as the cumulative impacts of the Proposed Action.

Alternative 3

The cumulative impacts of Alternative 3 would be the same as those of the Proposed Action.

No Action Alternative

The RFFAs would be implemented, and other development and management trends and patterns would continue in the No Action Alternative. As previously described, these actions, along with past and present projects, would result in cumulative impacts to land use and realty. However, the Bonanza Solar Project would not be constructed and there would be no contribution by the Project to cumulative impacts to land use and realty within the Land Use and Realty CEAA.

Visual Resources

Proposed Action

Past, present, and RFFAs that could contribute to impacts to visual resources include transmission lines, renewable energy development, mining and mineral exploration operations, and military, industrial, transportation development, and certain conservation actions. The combination of these past, present, and future actions generally results in a change in the natural characteristic landscape to a more developed setting; conservation actions can help protect areas from this change to a more developed setting. There are 10 RFFAs that were identified within the Visual Resources CEAA. Three of these RFFAs are pending applications for solar projects totaling 16,125 acres, one is a wind testing project, one is a road improvement project, two are communication site and tower projects, two are transmission line projects, and one is the nominated Cactus Springs ACEC.

The expansion of industrial areas in areas that currently do not contain development or infrastructure results in greater noticeable changes to the landscape and views of the Visual Resources CEAA than those that occur within, nearby, or visible from another existing development, such as a proposed transmission line parallel to an existing transmission line with a similar appearance. Of the 10 total RFFAs identified in the Visual Resources CEAA, the solar, wind testing, and transmission line projects would collectively result in greater noticeable change to the characteristic landscape, scenic quality, and views from sensitive viewing platforms as compared to the other RFFAs. In total, these future projects represent only approximately 2% of the total Visual Resources CEAA, the Proposed Action would consist of only 0.39% of the Visual Resources CEAA and less than 1% of the BLM-administered lands in SNDO.

Cumulative impacts on the existing landscape character, scenic quality, and views from KOPs or sensitive viewing platforms would vary depending on the setting, presence of existing built features, visibility conditions, and distance to and the contrast created by the components of the Action Alternatives. Across the majority of the Visual Resources CEAA, visual impacts would range from not being visually discernible to attracting attention in the setting, resulting in cumulative impacts on visual resources within the Visual Resources CEAA.

The introduction of the Project introduces the potential for glint and glare into the landscape setting to be experienced by travelers on U.S. 95 and other vehicular travel routes as well as pilots along common flightpaths associated with KINS. The glare analysis for the Bonanza Solar Project anticipates vehicular travelers being exposed to some amount of green glare (low potential for after-image) and yellow glare (potential for after-image) as well as pilots along common flightpaths experiencing some green glare. The determined degree of glare is not anticipated to adversely affect vehicular travelers or pilots (Dudek 2024c:V, 7–14). The development of the three solar RFFAs within the Visual Resources CEAA could increase the amount of time and degree of glint and glare to which vehicular travelers or pilots would be exposed.

Alternative 1

The cumulative visual resource impacts associated with Alternative 1 are the same as those described for the Proposed Action.

Alternative 2 (BLM Preferred Alternative)

The cumulative visual resource impacts associated with Alternative 2 are the same as those described for the Proposed Action.

Alternative 3

The cumulative visual resource impacts associated with Alternative 3 are the same as those described for the Proposed Action.

No Action Alternative

The Project would not be constructed and there would be no contribution by the Project to cumulative impacts to visual resources within the Visual Resources CEAA. The identified RFFAs would be implemented, assuming development and management trends and patterns would continue in the No Action Alternative there would be cumulative impacts to visual resources from the RFFAs.

Socioeconomics and Environmental Justice

Proposed Action

The Project's construction and operation schedule overlaps with many RFFAs, including 33 pending applications for solar projects. The overlapping construction phases would increase demand for skilled labor, particularly among electricians and heavy equipment operators. Clark County, with its substantial construction workforce, is likely to satisfy much of the increased labor demand. If there is a labor shortage, the resulting increase in wages would cause laborers with the appropriate skills to relocate to the area temporarily or permanently. Given the capacity of Clark County to absorb new residents, adverse cumulative impacts on housing, public services, community cohesion and/or environmental justice communities are not anticipated.

However, unlike Clark County, areas like the Pahrump Valley may have more difficulties handling pressures from increased labor demand and new residents. The concentration of solar projects planned in this region could significantly escalate environmental and economic pressures on its communities. These areas are already economically vulnerable and lack the necessary infrastructure to effectively manage increased transportation activities, heightened service demands, and escalating environmental disturbances such as noise and air pollution. Additionally, research by Al-Hamoodah et al. (2018) and Elmallah et al. (2023) underscores how such developments can diminish property values and deepen economic disparities, particularly in regions with lower income levels. This disparity could be exacerbated by the simultaneous development of multiple large-scale solar installations.

Adverse cumulative socioeconomics and environmental justice impacts could result from an increase in construction activities, surface disturbance, and infrastructure that would have a potential adverse impact on visual resources, water resources, vegetation, and wildlife habitat in the areas where these activities occur. Together, the Bonanza Solar Project, along with 33 pending applications for solar projects, could cover more than 200,000 acres with solar panels. This would transform the current viewshed and reduce access to some recreational sites, which may affect economic activity related to tourism. However, as some tourists may seek out opportunities to view the transformation, the net effect of cumulative development on tourism is challenging to accurately forecast.

The cumulative effect of multiple solar projects with BESS on the electricity grid would increase the reliability and flexibility of additional generation sources. In addition, the combined tax and fee contributions from multiple projects could be substantial. For Clark County, the influx of additional revenue would be modest; in Nye County, the influx would be more substantial given the county's much smaller baseline revenue stream, resulting in beneficial socioeconomic and environmental justice impacts.

Alternative 1

The socioeconomic and EJ impacts associated with Alternative 1 are not materially different from those associated with the Proposed Action.

Alternative 2 (BLM Preferred Alternative)

The socioeconomic and EJ impacts associated with Alternative 2 are not materially different from those associated with the Proposed Action.

Alternative 3

The socioeconomic and environmental justice impacts associated with Alternative 3 are not materially different from those associated with the Proposed Action.

No Action Alternative

Under the No Action Alternative, existing development trends and RFFAs would continue, but the Project would not be constructed, operated, or decommissioned. This absence means that, while the area would still face cumulative socioeconomic and EJ impacts from RFFAs and ongoing and past projects, the Project would not contribute to these impacts.

Public Health and Safety

Proposed Action

Past, present, and RFFAs that could contribute to cumulative impacts to public health and safety, which also consist of noise, fire management, and hazardous waste materials, include existing transmission infrastructure and highway improvement and maintenance projects. There are currently four known RFFAs, two highway improvement or upgrade projects on U.S. 95 and two transmission line projects within the Public Health and Safety CEAA.

These RFFAs would primarily contribute to public health and safety impacts during their construction phases. During construction, additional risk to members of the public traveling on U.S. 95 would be present. Risk to workers would be present during construction, O&M, and decommissioning; however, the risks would generally decrease following construction due to decreased worker presence during O&M. The risks to workers during construction would include injury from heavy equipment, weather exposure, chemical hazards, and working in traffic. Risks to the public and to workers would be amplified if construction of the Project and the RFFAs were to overlap.

Cumulative noise impacts would be present during RFFA construction. Cumulative noise impacts may mean a longer duration of construction noise, or amplified construction noise that is audible at further distances. Following construction, construction noise would no longer be present, but traffic noise would continue to be audible along U.S. 95. Fire risk would also be present during RFFA construction but would decrease during operation. Lastly, hazardous materials and hazardous waste could be present during construction within the Public Health and Safety CEAA and during typical O&M activities. However, projects on state and federal land would be required to incorporate measures to minimize impacts to public health and safety, including noise, fire management, and hazardous waste materials.

In combination, past, present, and RFFAs would result in noticeable yet minor cumulative impacts on public health and safety within the Public Health and Safety CEAA.

<u>Alternative 1</u>

The public health and safety impacts associated with Alternative are not materially different from those associated with the Proposed Action. This is true of construction, O&M, and decommissioning.

<u>Alternative 2 (BLM Preferred Alternative)</u>

The public health and safety impacts associated with Alternative are not materially different from those associated with the Proposed Action. This is true of construction, O&M, and decommissioning.

<u>Alternative 3</u>

The public health and safety impacts associated with Alternative are not materially different from those associated with the Proposed Action. This is true of construction, O&M, and decommissioning.

<u>No Action Alternative</u>

The RFFAs would be implemented, and other development and management trends and patterns would continue in the No Action Alternative. These actions, along with past and present projects would, result in cumulative impacts to public health and safety. However, the Bonanza Solar

Project would not be constructed and there would be no contribution by the Project to cumulative impacts to public health and safety associated with the Public Health and Safety CEAA.

3.14 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of resources refer to impacts on or loss of resources that cannot be reversed or recovered, respectively.

3.14.1 Vegetation Communities

Implementation of the Project would result in irreversible or irretrievable impacts on up to 2,590 acres of native vegetation across the Buildable Areas. The project could result in the permanent loss of native vegetation on up to 1,027 acres (D-3), with additional loss and degradation of vegetation across the remaining acreage where drive and crush methods would be implemented (D-1 and D-2). Site reclamation efforts are not expected to restore these impacted areas to pre-construction conditions. Restoration could take decades in an arid environment, such as the Mojave desert. Many species would not be expected to recolonize the site, and changes to native species composition would be permanent. Indirect impacts from the Project (e.g., dust, spread of invasive weed species) would persist beyond the anticipated duration of the Proposed Action.

Due to the time scale to restore desert vegetation communities (70 to over 200 years) (Abella 2010), habitat loss in disturbed areas could also be considered irreversible. Many cacti and yucca species would not be expected to recolonize the site, and changes to native species composition would be permanent.

3.14.2 Wildlife, Migratory Birds, and Special Status Species

Implementation of the Proposed Action would result in irreversible or irretrievable impacts on up to 1,027 acres of wildlife habitat across the largest Buildable Area configuration under the Proposed Action. The other Action Alternatives would result in less habitat loss due to the higher retention of ground cover and less site grading.

Across all Action Alternatives, the implementation of Project design features would minimize many of the construction and O&M impacts to special status species; however, some impacts would remain, including the potential harm and loss of special status species during the lifespan of the Project. Consultation with wildlife agencies would help to improve mitigation of adverse impacts and/or reduce the risk to special status species. The loss of habitat productivity would occur for the life of the Project (approximately 40 years) and during decommissioning and reclamation activities (approximately 10 years), which would return the site to pre-Project conditions. Final restoration success would be based on criteria approved by the BLM and other applicable agencies within the final Site Restoration Plan.

3.14.3 Federally Listed Species

Implementation of the Project would result in irreversible or irretrievable impacts on up to 1,027 acres of Mojave desert tortoise connectivity habitat resulting from grading and soil removal (D-3). The loss of habitat would result in Mojave desert tortoises having to rely more heavily on habitat outside of the Project footprint. Site reclamation, even with substantial effort, is not expected to restore these impacted areas to pre-construction conditions.

There would be no irreversible or irretrievable impacts to federally protected bird species, as impacts to these species are associated with Project components and would be eliminated upon the completion of decommissioning and removal of all Project components.

Irreversible impacts to groundwater dependent species within Ash Meadows NWR and BLM-administered lands around Ash Meadows NWR would be present in the declining water level at Devils Hole. Even though the Project itself has a very small, modeled impact on the declining water level at Devils Hole, it contributes to a system that is already in decline and slow to recover.

3.14.4 Earth Resources

Surface-disturbing activities associated with blading, grading, vegetation removal, and soil compaction would result in the permanent loss of soil health, soil productivity, and sensitive soils. Soil compaction could decrease water infiltration and runoff, leading to a redistribution of soil moisture and vegetation productivity response within the immediate landscape. Biotic soils cannot be salvaged, so the Project would result in a long-term loss of these sensitive soils.

3.14.5 Water Resources

Following decommissioning of the Project, the Project Area would be recontoured and revegetated, but surface hydrologic function would never operate the same as it did pre-construction. The adverse impacts would be limited, as the Project Area is in a closed basin that flows to a dry lakebed.

Irreversible impacts to groundwater would be present in the declining water level at Devils Hole. Even though the Project itself has a very small, modeled impact on the declining water level at Devils Hole, it contributes to a system that is already in decline and slow to recover.

3.14.6 Cultural Resources and Native American Concerns

For cultural resources, this would include destruction or displacement of artifacts, features, or midden contained within historic properties or impacts to any of the seven aspects of site integrity (association, workmanship, feeling, materials, location, setting, and design) used in evaluating historic properties for NRHP inclusion. Irreversible and irretrievable impacts to cultural resources would occur if the Tribally identified trail (26CK11556) is not avoided and if APM Cultural-1 is not implemented. Additionally, irreversible and irretrievable impacts may occur while encountering unidentified historic properties.

3.14.7 Air Quality, Climate Change, and Greenhouse Gas Emissions

The Project would impose irretrievable impacts as degradation of air quality during construction activities would not be retrievable. The Project would not impose irreversible impacts to air quality and GHGs/climate change.

3.14.8 Land Use and Realty

There would be no irreversible or irretrievable impacts to land use and realty resources, as the Project Area would be reclaimed after the termination of the Project.

3.14.9 Visual Resources

Irreversible or irretrievable visual resource impacts are those that cannot be fully reversed or recovered. This analysis considers irreversible impacts as those that permanently affect visual uses (e.g., not addressable through Project restoration or reclamation). Irretrievable impacts are lost visual resource opportunities that occur during the lifespan of a project, which would be reinstated only after project reclamation is complete. The following impacts are common to all Action Alternatives:

- Irreversible: Project components would be visible.
- Irretrievable: Landscape scarring and revegetation would be visible long (5+ years) after Project decommissioning and reclamation.

Changes to the characteristic landscape over the 40-year life of the Project would represent an irretrievable impact but would not create irreversible impacts. After the life of the Project is over, the visible structures and materials would be removed from the Project Area. However, in sensitive desert conditions, it could take years beyond the life of the Project before the Project footprint is no longer visible and the vegetation returns to its pre-construction condition. The vegetation that would be reestablished during reclamation efforts would take several growing seasons, and the composition of species in the recovery area would be visibly different than the original and surrounding vegetation communities for several seasons, depending on the alternative selected. This visible difference would allow for the Project footprint to be visible for many years beyond Project completion and would represent an irreversible impact. If environmental conditions and the associated levels of soil and vegetation disturbance allow, these visible differences could be reduced under the Alternatives 1, 2 ,and 3 compared to the Proposed Action due to the increased numbers of vegetation that would be left intact during Project implementation and the extent to which revegetation is successful after decommissioning.

3.14.10 Socioeconomics and Environmental Justice

With the potential exception of irretrievable groundwater resource depletion and commitments of labor and fiscal resources, the Project would not impose irreversible and/or irretrievable impacts to socioeconomic resources or among EJ communities.

3.14.11 Public Health and Safety

Irreversible or irretrievable impacts related to public health and safety could include serious injuries to workers or the public, severe illness due to exposure to Valley Fever fungal spores, or vehicle accidents on the adjacent U.S. 95. However, although possible, these impacts are unlikely due to the APMs, applicable design features in the Western Solar Plan (BLM and DOE 2012) (Appendix B), and compliance with federal OSHA and Nevada OSHA.

Irreversible or irretrievable impacts related to wildland fire include damages to the town of Indian Springs, roadways, U.S. 95, native vegetation, and wildlife are possible but unlikely. A fire caused by Project activities is not expected to occur but would be minimal with implementation of design features, applicable design features in the Western Solar Plan (BLM and DOE 2012) (Appendix B), and APMs.

No irreversible or irretrievable impacts related to noise are expected. All noise impacts would be temporary and not discernable at the closest sensitive receptors.

Impacts related to hazardous waste materials would only occur in the event of a hazardous materials spill, which is not expected to occur and would have minimal impact with the implementation of a Hazardous Materials and Waste Management Plan and SPCC. If irretrievable damages due to an unlikely hazardous materials spill were to take place, it would impact water quality, soils, native vegetation and wildlife, and other present resources.

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Chapter 4 Resource Management Plan Amendments

The BLM must take into account current RMPs and other BLM Land Use Plans when deciding whether to authorize a ROW grant, taking into account how the proposed authorizations and actions either conform to the RMP or would require an amendment to the RMP (43 CFR 1610.0-5(b)). The BLM is required to "develop, maintain, and when appropriate, revise land use plans" (43 USC 1712) in compliance with the FLPMA. The responsible official may reject a proposal, change the plan to authorize the action, or modify the proposed decision to conform to the applicable plan if a proposed site-specific decision does not conform to the applicable plan. Before the BLM could authorize the ROW grant, the Proposed Action and other Action Alternatives would require amendments to existing, relevant BLM RMPs, as explained in more detail below.

The BLM plan amendments are subject to public review and follow the procedures outlined in BLM's planning regulations (43 CFR 1610.2). In accordance with these regulations, outreach activities were conducted to solicit public feedback on the Project and proposed amendments, planning criteria were developed and distributed for use in amendment evaluation, and an analysis of where plan amendments would be required was incorporated into this EIS/RMPA. In addition, an extended 90-day public review of proposed plan amendments is required by the BLM plan amendment procedures, to be held in conjunction with the release of the EIS/RMPA. With the release of the Final EIS/RMPA, the BLM's regulations in 43 CFR 1610.3-2 require a concurrent 30-day public protest period (43 CFR 1610.5-2) and a 60-day Governor's Consistency Review.

The public was informed about the possibility of plan amendments for the Project, as stated in the NOI that was published in the *Federal Register* on June 5, 2023. If the BLM chooses an action alternative that deviates from the relevant resource management decision or objectives, a plan amendment might be necessary. The Project has been designed in accordance with the current Las Vegas RMP (BLM 1998a), with the exception of the RMPA proposed here.

This section takes into account the BLM RMP Amendments associated with the Proposed Action and Action Alternatives proposed in Chapter 2 as well as the residual impacts from the Project-specific impact analysis in Chapter 3. The boundaries of the Planning Area for the BLM RMP Amendments considered in this document are limited to the Project Application Area and utility corridors proposed for modification.

4.1 Applicable Resource Management Plans

Decisions documented in the relevant RMP serve as a guide for actions taken on federal lands under the BLM's administration, including the granting of ROWs under Title V of FLPMA. Parts of the Action Alternatives, according to the BLM, would not comply with specific requirements of the Las Vegas RMP (BLM 1998a).

4.2 Planning Issues and Criteria

The following are general planning criteria developed for potential plan amendments, as noted in the NOI published in the *Federal Register* on June 5, 2023, to help focus the analysis of the impacts of amending the various RMPs.

- The BLM will use a systematic interdisciplinary approach to integrate physical, biological, economic, and other sciences.
- The BLM will use the best available data regarding natural resources.
- The BLM will consider the present and potential uses of public lands and where existing RMP decisions are valid, those decisions will remain unchanged.
- The BLM will consider the relative scarcity of values and availability of alternative means and sites for recognizing those values.
- Any plan amendments will be completed in compliance with FLPMA, NEPA, and all other relevant federal laws, executive orders, and BLM policies.
- The BLM will seek coordination and consistency with other government programs including Tribal plans and policies.
- Existing valid plan decisions will not change, and any new plan decisions will not conflict with existing plan decisions.
- Any plan amendments will recognize valid existing rights.

4.3 Proposed Plan Amendment with Realignment of Utility Corridor

Within the Planning Area for the RMPA, there is one Legacy Locally Designated Corridor designated by the 1998 Las Vegas RMP and referred to as U.S. 95/Crater Flat Corridor. The corridor is aligned longitudinally through the proposed Project Area (Appendix A, Figure A-25). The second corridor is a WWEC, commonly known as the Section 368 Designated Corridor or Corridor 223-24 and is located south of the Project Area (Appendix A, Figure A-25). This corridor was designated in BLM's 2009 Approved RMP Amendments/ROD for Designation of Energy Corridors on BLM-Administered Lands in the 11 Western States (BLM 2009) under the authority of Section 368 of the Energy Policy Act. These corridors are recognized across multiple federal agencies as existing utility corridors and are identified as the preferred siting for new utility infrastructure (BLM and DOE 2012, 2022).

As shown in Appendix A, Figure A-25, these previously designated utility corridors overlap (Table 4-1).

Table 4-1. Las Vegas Resource Management Plan Utility Corridor Proposed Plan Amendment by Action Alternative

Utility Corridor Action	Proposed Action (acres)	Alternative 1 (acres)	Alternative 2 (acres)	Alternative 3 (acres)
1998 Las Vegas RMP Utility Corridor (U.S. 95/Crater Flat Corridor) Portion De-Designated and Realigned into Greenlink West Modified	4,153 (1,585 acres within Application Area)	4,153 (1,585 acres within Application Area)	4,153 (1,585 acres within Application Area)	4,153 (1,585 acres within Application Area)

4.4 Proposed Plan Amendment with Visual Resource Management Classifications

The Application Area is classified as VRM Class III lands, which requires partial retention of the existing character of the landscape. In these areas, authorized actions may alter the existing landscape, but not to the extent that they attract or focus attention of the casual viewer. Under all action alternatives, the BLM is proposing to reclassify the lands within the 5,133-acre Application Area from Class III to Class IV (Table 4-2 and Figure A-26 in Appendix A). Class IV allows for major modifications of the existing landscape character with the application of mitigation measures; this would be necessary due to the results of a Visual Resources Study that determined strong visual contrast and long-term impacts to viewers may occur from constructing the Project. The reclassification to VRM Class IV would allow for activities that may dominate the view and be the major focus of the viewer attention (BLM 1998a). The Updated ROD for the Las Vegas RMP states 1,579,800 acres are managed as VRM Class III and 559,300 acres are managed as VRM Class IV (BLM 2019:14). Therefore, the proposed RMPA would decrease the amount of VRM Class III lands by 0.3 percent and increase the amount of VRM Class IV lands by 0.1 percent (Table 4-2).

Table 4-2. Las Vegas Resource Management Plan Visual Resource Management Proposed Plan Amendment by Action Alternative

Action Alternative	Current VRM Class	Proposed VRM Class	Current VRM Class III in Updated ROD for Las Vegas RMP (acres)	Difference from Existing VRM Class III (percent)	Current VRM Class IV in Updated ROD for Las Vegas RMP (acres)	Difference from Existing VRM Class IV (percent)
Proposed Action	5,133 acres Class III	5,133 acres Class IV	1,579,800	-0.3	559,300	1
Alternative 1	5,133 acres Class III	5,133 acres Class IV	1,579,800	-0.3	559,300	1
Alternative 2	5,133 acres Class III	5,133 acres Class IV	1,579,800	-0.3	559,300	1
Alternative 3	5,133 acres Class III	5,133 acres Class IV	1,579,800	-0.3	559,300	1

Based on the Visual Resources Study, development of the Proposed Action would attract the attention of observers from the segment of U.S. 95 adjacent to the site and from recreation areas atop mountainous terrain in the Humboldt-Toiyabe National Forest/Spring Mountain National Recreation Area. From the segment of U.S. 95, approximately 265 feet from the Project Area, the dark solar panels would not dominate the views. The BESS enclosures and the gen-tie would be visible but would also result in comparatively weak visual contrast. However, the solar panels could attract the attention of motorists on U.S. 95 adjacent to the Project and would therefore not conform to VRM Class III objectives. Similarly, the solar facility, as seen from the elevated vantage point in the Humboldt-Toiyabe National Forest/Spring Mountain National Recreation Area, could attract the attention of visitors. From the remaining public viewing locations, including from non-adjacent viewpoints along U.S. 95, visual contrasts would be less noticeable, ranging from levels of weak to moderate (Dudek 2024b).

4.5 Effects from Potential Resource Management Plan Amendments

The effects on the resources and resource uses from amending decisions in the RMPs to accommodate the Bonanza Solar Project would be similar to the indirect effects of construction, O&M, and decommissioning. When a ROW application is submitted for processing, the BLM reviews the application to determine if it would be in conformance with the current RMP. If the ROW application is consistent with the existing RMP, then it would be subject to environmental review under NEPA. If the application is initially determined to be not in conformance with the existing RMP, the BLM could reject the ROW application, or the BLM may process the ROW application and evaluate the changes needed to the existing RMP through the NEPA process. The impacts would differ according to the type of project, its location, and its stage (construction, operation).

Effects of the Action Alternatives have been described in Chapter 3. Table 4-3 describes the potential environmental impacts that would indicate potential effects based on the proposed RMPA to realign the utility corridor and to reclassify the area as VRM Class IV.

Table 4-3. Summary of Effects from Resource Management Plan Amendments

Resource/Use	Potential Effects
Federally Listed Species, Special Status Species, and General Wildlife	Allowing for potential future development of utilities in new areas could result in habitat loss, fragmentation, increased human disturbance, and wildlife mortalities. During construction, the clearing, grading, and operation of heavy equipment could result in habitat loss, fragmentation, and increased human disturbance. Potential impacts could include incremental loss of habitat, reduction of potential coverage and forage, and increased fragmentation. Surveys would be required on BLM-administered lands prior to construction in potential or known habitats of federally listed species. The surveys would determine the presence of the federally listed species, the extent of their habitat, and protective measures to minimize or avoid disturbance prior to permitting proposed projects.
Vegetation Communities and Earth Resources	Allowing for potential future development of utilities in new areas would result in surface disturbance associated with new development, including loss of vegetation and potential soil erosion where new utilities are constructed. Impacts would depend on the specifics of proposed future projects. During construction, clearing, grading, and the operation of heavy equipment would reduce vegetative cover and increase the soil's susceptibility to erosion. These impacts would be temporary and local during construction and would be minimized by implementing appropriate mitigation measures.
Water Resources	Impacts to water resources would depend on the specifics of proposed future projects within the amended utility corridor. Potential impacts from the construction of future projects could include increased potential for soil erosion and sedimentation during precipitation events which could affect water quality in areas downstream of the ground disturbance. Impacts to water resources from ground-disturbing activities would be minimized by implementing appropriate mitigation measures. These impacts during the construction phase would be temporary and local and would be much less during the O&M phase.
Cultural Resources	Cultural resources located in the amended utility corridor would be potentially subjected to higher levels of activities that could disturb the ground and could increase the potential for unanticipated surface and subsurface discoveries. Additionally, the utility corridor could result in a potentially higher level of visual intrusions from the placement of structures and facilities, which could affect cultural resources where setting is an aspect of their integrity.
Land Use and Realty	Impacts to land use and realty in the amended corridor would depend on the specifics of proposed future projects within the corridor. The construction of future projects could disrupt existing land use authorizations, causing short-term access delays, noise, and dust. Future utility ROW sitings in the amended corridor would need to be compatible with other ROWs within the corridor.
Public Health and Safety	Impacts to public health and safety would be negligible as a result of the plan amendments. The impacts from future projects in the corridor would be evaluated once an application has been submitted.

Resource/Use	Potential Effects
Socioeconomic Resources and Environmental Justice	Impacts to socioeconomic resources and environmental justice would be negligible as a result of the plan amendments. The impacts from future projects in the corridor would be evaluated once an application has been submitted.
Visual Resources	Visual resources could be affected by the realignment of the utility corridor and the change in VRM classification. Impacts to visual resources would depend on the specifics of the proposed Project but could impact visual resources on federal and non-federal lands within and adjacent to areas that are within the viewshed. Potential visual impacts would be associated with surface-disturbing activities, structures, and facilities. These may include access roads, construction equipment, cleared and graded ROWs, transmission lines, and vertical structures. The purpose of the utility corridor would be to concentrate future utility development in these areas. The concentration of development in the corridor could alter landscape settings while conforming to VRM Class IV objectives. Reclassifying the VRM Class designation from the existing VRM Class III to VRM Class IV would allow changes to the characteristic landscape that would allow for major modification of the landscape character. VRM Class IV objectives would allow for projects to dominate the view and be a major focus of viewer attention.
Air Quality, Climate Change, and Greenhouse Gas Emissions	Impacts to air quality, climate change, and GHG emissions would depend on the specifics of proposed future projects within the amended utility corridor. During construction, the operation of heavy equipment would release regulated pollutants. Surface-disturbing activities such as clearing and grading could contribute to fugitive dust that could be dispersed beyond the construction area.

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Chapter 5 Consultation, Coordination, and Public Involvement

5.1 Introduction

The purpose of consultation, coordination, and public involvement is to encourage interaction between the BLM and other federal, state, and local agencies; Native American Tribes; and the public. The BLM's role is to inform the public about the Bonanza Solar Project and solicit input to assist in analysis and decision-making. The BLM has made formal and informal efforts to involve, consult with, and coordinate with these entities to ensure that the most appropriate data have been gathered and analyzed and that agency policy and public sentiment and values are considered and incorporated. The BLM began conducting consultation, coordination, and public participation in preparation for drafting this EIS/RMPA prior to the start of the official NEPA process (i.e., publishing of the NOI), continued after the start of NEPA, and will continue throughout the EIS process.

5.2 Consultation and Coordination

Agencies and organizations that have jurisdiction and/or special expertise in the Application Area were contacted prior to scoping, at the start of scoping, during resource inventory, and before the publication of the EIS/RMPA. This section describes the consultation and coordination activities with agencies, Tribes, stakeholders, and the public that occurred throughout the NEPA process, including the scoping process and public review of the EIS/RMPA.

5.2.1 Cooperating Agencies

The BLM, through the Nevada State Office, is the lead federal agency responsible for preparing this EIS/RMPA in accordance with the May 2022 CEQ NEPA regulations (85 FR 43304, 87 FR 23453. The BLM has the authority to permit construction on affected BLM-administered land through their decision-making process. The federal, state, and local Cooperating Agencies and their roles are described in Chapter 1 and listed in Appendix I.

5.2.2 Section 106 Consultation

In accordance with Section 106 (54 USC 306108) of the NHPA, federal agencies are required to consider the effects of the agencies' undertakings on historic properties listed in, or eligible for listing in, the NRHP. Given this, the BLM prepared this EIS/RMPA in coordination with studies and analyses required by the NHPA, as amended (54 USC 300101 et seq.). The regulations also specify that the BLM must conduct, or attempt to conduct, consultation with applicable SHPOs, THPOs, Native American Tribes, and other interested parties during all phases of Section 106 compliance. Tribes identified for consultation are listed in Table 5.1 below; the chairperson, cultural point of contact, and THPO (when available) from each tribe were invited to participate in consultation. In addition to the Nevada SHPO, the ACHP will be invited to all Section 106 consultation efforts. The Applicant will be invited to all consultation meetings with the SHPO as a consulting party. Pursuant to 36 CFR 800, and as the lead federal agency for the undertaking, the BLM has initiated Section 106 consultation by inviting Tribes to participate in the process (see specifics on Tribal outreach in Section 5.2.3 below) and by reaching out to the SHPO for comment on established CRAAs (see Section 3.7.3 Analysis Area and Methodology). The BLM conducted consultation under the NHPA Substitution regulations located at 36 CFR 800.8(c). The Section 106 consultation letters and meeting materials are included in the Project record and additional details about how the BLM has met its obligations under the 36 CFR 800.8(c) process can be found in Appendix H.

On May 28, 2024, SWCA, on behalf of the BLM, provided the SHPO with maps of the preliminary CRAAs. The SHPO responded to these maps in a letter dated June 18, 2024, providing input on analysis area terminology, methodology for establishing CRAAs, and suggestions for how to complete inventory within each CRAA. The map submittal to the SHPO and the SHPO's response are provided in Appendix H.

At the time of public distribution and comment on the draft EIS, Section 106 consultation is ongoing and will be completed before finalization of the EIS. Future Section 106 consultation meetings will include further consultation on the methodology for establishing CRAAs, consultation on resource eligibility, consultation on determination of effects to cultural resources, and consultation on mitigation measures for eligible resources, should such properties be determined.

5.2.3 Government-to-Government Consultation

As sovereign nations, Native American Tribes have legal rights and benefits with respect to their relationships with the U.S. Government. This relationship is founded on the U.S. Government's trust responsibilities to safeguard Tribal sovereignty and self-determination, as well as Tribal lands, assets, and resources reserved by treaty and other federally recognized rights. On federal actions or undertakings that my affect "trust assets," federal agencies are required to consider the effects of their actions on cultural and natural resources that are of significance to Tribal communities and consult with Native American Tribes on a government-to-government basis. Pursuant to Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, November 6, 2000, the BLM recognizes Tribal sovereignty, self-determination, and self-government in the development of agency policy, land use decisions, and other actions that may impact Tribal communities. The BLM participates in regular, meaningful consultation and collaboration with Tribal governments following established policy direction in BLM Manual 1780, Tribal Relations, implemented through BLM Handbook H-1780-1, Improving and Sustaining BLM–Tribal Relations (BLM 2016b, 2016c). Government-to-government consultation involves seeking, discussing, and considering Tribes' views on policies, undertakings, and decisions, such as the environmental review of this Project. Government-to-government consultation has generally involved formal letters, submission of material via U.S. Postal Service Certified Mail and e-mail, with follow-up telephone contact, virtual and in-person meetings, and site visits.

In September 2022 and August, October, and November 2023, the BLM formally initiated consultation with Native American Tribes that had previously expressed claims to cultural affiliation with the Application Area to inform them of the Project; to inquire about their interest in continuing government-to-government consultation (Table 5-1) and participating in Section 106 consultation; and to ask that Tribes share indigenous knowledge and relevant information about sacred sites, TCPs, cultural landscapes, and/or natural resources that could be affected by the Project. Individual government-to-government meetings were held with the Timbisha Shoshone Tribe (Chairwoman Margaret Cortez and THPO Mandi Campbell in attendance) and the Moapa Band of Paiute Indians (Chairman Vickie Simmons, Executive Assistant Allison White, and Attorney Pilar Thomas in attendance) on February 14, 2024, and June 13, 2024, respectively. During those meetings the BLM provided a brief project overview and updates to project activity. Neither the Timbisha Shoshone Tribe or the Moapa Band of Paiute Indians offered specific comments or concerns for the project. A formal government-to-government virtual meeting with all Tribes was offered and held on May 7, 2024, with no attendance by Tribes as shown in Table 5-1.

At the time of public distribution and comment on the draft EIS, government-to-government consultation is ongoing and will be completed before finalization of the EIS. Additional government-to-government meetings are planned prior to issuance of the ROD. The BLM will continue to consult and coordinate with the Tribes listed in Table 5-1 and with any additional Native American Tribes who request government-to-government consultation for the Bonanza Solar Project.

Table 5-1. Summary of Government-to-Government Consultation to Date

Native American Tribes	August and September 2022 Consultation Letters Sent	August, October, and November 2023 Consultation Letters Sent	Responded to Consultation Letter(s)	Attended May 2024 Consultation Meeting
Bishop Paiute Tribe	Yes	Yes	No	No
Chemehuevi Indian Tribe	Yes	Yes	No	No
Colorado River Indian Tribes	Yes	Yes	No	No
Fort Independence Indian Community	Yes	Yes	No	No
Fort Mojave Indian Tribe	Yes	Yes	No	No
Hopi Tribe	Yes	Yes	No	No
Hualapai Indian Tribe	Yes	Yes	No	No
Kaibab Band of Paiute Indians	Yes	Yes	Yes (deferred to other Tribes)	No
Las Vegas Paiute Tribe	Yes	Yes	No	No
Moapa Band of Paiute Indians	Yes	Yes	Yes	No
Paiute Indian Tribe of Utah	Yes	Yes	No	No
San Juan Southern Paiute Tribe of Arizona	Yes	Yes	No	No
Timbisha Shoshone Tribe (and THPO)	Yes	Yes	Yes	No
Twenty-Nine Palms Band of Mission Indians	Yes	Yes	Yes (declined)	No
Utu Utu Gwaitu Paiute Tribe	Yes	Yes	No	No
Big Pine Paiute Tribe of Owens Valley	No	Yes	No	No
Lone Pine Paiute-Shoshone Tribe	No	Yes	No	No

5.2.4 Other Tribal Coordination

The Native American Tribes most actively involved in the Bonanza Solar Project are the Timbisha Shoshone and Moapa Band of Paiutes. Both responded positively to being Cooperating Agencies during the NEPA process. The Kaibab Band of Paiutes responded to the initial consultation letter indicating that they would defer to, and support decisions of, the Moapa Band of Paiutes and Las Vegas Paiute Tribe for the Project. The Twenty-Nine Palms Band of Mission Indians responded to the initial consultation letter indicating that the project area was outside of known traditional use areas for their Tribe. The Moapa Band of Paiutes THPO Darren Daboda responded to BLM outreach on August 25, 2022, with a list of concerns for the Bonanza Solar Project spanning a variety of resource topics. The BLM responded to that list of concerns on September 26, 2022, and those concerns also provided a basis for further consultation with Tribes. The concerns voiced, and the BLM's responses, are included in Appendix H. Included in that list of concerns, the Moapa Band of Paiutes requested Tribal monitor presence during ground disturbance within traditional Nuwuvi lands. The BLM coordinated Tribal monitors for the archaeological fieldwork and facilitated field visits to archaeological sites with Tribes. See Section 3.7, Cultural Resources, for more information about cultural resource and cultural landscape concerns voiced by tribes. In addition to cultural resources, during outreach, Tribes expressed concern for native vegetation, Mojave desert tortoise, and water resources. Impacts to these resources are analyzed in Chapter 3, Sections 3.2 (Vegetation Resources), 3.4 (Federally Listed Species, including impacts to Mojave desert tortoise habitat), and 3.6 (Water Resources).

On June 29, 2023, the BLM conducted a site visit of the Application Area with the Timbisha Shoshone THPO Mandi Campbell. An additional field visit was conducted on February 23, 2024, with Timbisha Shoshone Chairperson Margaret Cortez, THPO Campbell, and Moapa Band of Paiutes THPO D. Daboda. Both field visits included an examination of cultural resources identified during the Class III pedestrian survey (see Section 3.7, Cultural Resources) under review by the BLM, and a discussion of potential Tribal concerns. Chairperson M. Cotez, THPO Campbell, and THPO Daboda provided insightful information about the cultural resources and potential sources for additional investigation. The Tribal representatives did not express any issues with the current analysis efforts or results. THPO D. Daboda noted concerns about impacts to native flora including yucca, pencil cholla, cholla, prince plume, and beavertail cacti, while Chairperson M. Cotez and THPO M. Campbell noted concerns about impacts to creosotebush. Analysis of impacts to native vegetation communities are discussed in Section 3.2, Vegetation Communities. All Tribal representatives noted concerns about impacts to Mojave desert tortoise habitat, analysis of which, and mitigation measures for impacts, are discussed in Section 3.4, Federally Listed Species, including impacts to Mojave desert tortoise habitat.

On July 3, 2024, the BLM held a meeting with the Moapa Band of Paiutes Chairman Vickie Simmons to discuss project information. No concerns about the project were voiced by Chairman V. Simmons during that meeting. Additional information was shared with the Moapa Tribal Council via email following that meeting.

At the time of public distribution and comment on the draft EIS, additional Tribal coordination is ongoing and will be completed before finalization of the EIS. Future coordination efforts will include site visits to the Tribally identified trail, if requested, and to the Application Area or cultural resources documented within. The BLM will also conduct additional meetings with individual Tribal representatives, or councils, if and when requested.

5.2.5 Endangered Species Act Section 7 Consultation

The BLM's obligations under Section 7 of the ESA include using agency authorities in furtherance of the purposes of the act by carrying out programs for the conservation of endangered species and threatened species. Relevant actions can include providing up-front exclusion areas and design features to protect and assist in recovery of threatened and endangered species, and early coordination with the USFWS to allow development of appropriate conservation efforts. BLM has coordinated and communicated with the USFWS throughout the NEPA process for the Project, including Cooperating Agency meetings and document reviews, working group meetings, and other coordination meetings prior to formally initiating consultation. As part of ongoing communication between federal agencies, the USFWS was invited to review internal documents that preceded publication of the draft EIS/RMPA. Information received from the USFWS has been incorporated into the draft EIS/RMPA. Additionally, the BLM prepared a Biological Assessment to evaluate the potential impacts of the Project on species listed as threatened or endangered under the ESA and on designated Critical Habitats within the Project Area. The BLM will submit the Biological Assessment to the USFWS to initiate formal Section 7 consultation. The BLM would not sign the ROD until the USFWS issues a Biological Opinion and the formal Section 7 consultation is complete.

5.2.6 Scoping Process

The BLM initiated the public scoping process with the publication of a NOI in the Federal Register on June 5, 2023. The public comment period was open for 45 days and closed on July 20, 2023. The BLM published a news release, emailed 192 recipients and mailed 229 scoping notices to the Project mailing list, and hosted one virtual and two in-person public scoping meetings. The virtual meeting was held on June 27, 2023. The two in-person meetings were held on June 28, 2023, at the Centennial Hills Library Multipurpose Room at 6711 North Buffalo Drive in Las Vegas, Nevada, and on June 28, 2023, at the Indian Springs Community Center at 715 Gretta Lane in Indian Springs, Nevada. In total, 20 people attended the virtual meeting, 15 at the Las Vegas meeting, and 22 at the Indian Springs meeting.

The Scoping Report is available at: https://eplanning.blm.gov/eplanning-ui/project/2020905/570.

5.3 Preparers and Contributors

Appendix G lists the individuals from the BLM and the third-party contractor team who were responsible for preparing the EIS/RMPA.

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