



Gemini Solar Project **Alternatives Report**

Prepared April 2019
Updated December 2019

PANORAMA
ENVIRONMENTAL, INC.

717 Market Street, Suite 650 San Francisco, CA 94103 650-373-1200 www.panoramaenv.com

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Prepared for:

Bureau of Land Management
Las Vegas Field Office
4701 North Torrey Pines Dr.
Las Vegas, NV 89130

Prepared by:

Panorama Environmental, Inc.
717 Market Street, Suite 650
San Francisco, CA 94103
650-373-1200
info@panoramaenv.com

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ENVIRONMENTAL, INC.

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ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
BLM	Bureau of Land Management
BMPs	best management practices
CFR	Code of Federal Regulations
CPV	Concentrated Photovoltaic
COC	Corridor of Concern
CEQ	Council on Environmental Quality
DOI	Department of the Interior
FLPMA	Federal Land Policy and Management Act of 1976
EIS	Environmental Impact Statement
gen-tie	generation tie
I-15	Interstate-15
kV	kilovolt
MW	megawatt
NEPA	National Environmental Policy Act
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
O&M	operation and maintenance
OHV	off-highway vehicles
OSNHT	Old Spanish National Historic Trail
PV	photovoltaic
RMP	Resource Management Plan

ACRONYMS AND ABBREVIATIONS

ROW	right-of-way
SWPPP	stormwater pollution prevention plan
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

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1.1 NEPA REQUIREMENTS FOR ALTERNATIVES

1.1.1 Consideration of Alternatives

According to the Council on Environmental Quality's (CEQ) National Environmental Policy Act (NEPA) Regulations (40 Code of Federal Regulations [CFR] 1502.14), an Environmental Impact Statement (EIS) must present the environmental impacts of a proposed action and alternatives in comparative form, defining the issues so they may be readily understood by the public and decision makers, and contributing to a basis for an informed and reasoned decision. The alternatives section shall:

- Rigorously explore and objectively evaluate reasonable alternatives. For alternatives that were eliminated from detailed study, briefly discuss the reasons they were eliminated.
- Devote substantial treatment to each alternative considered in detail including the Proposed Action so that reviewers may evaluate their comparative merits.
- Include reasonable alternatives not within the jurisdiction of the lead agency.
- Include the alternative of no action.
- Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.
- Include appropriate mitigation measures not already included in the Proposed Action or alternatives.

The CEQ has stated that “[r]easonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense rather than simply desirable from the standpoint of the Applicant” (CEQ, 1983).

1.1.2 Purpose and Need

In accordance with the Federal Land Policy and Management Act of 1976 (FLPMA), public lands are to be managed for multiple uses that take into account the long-term needs of future generations for renewable and non-renewable resources. The Bureau of Land Management (BLM) is authorized to grant rights-of-way (ROWs) on public lands for systems of generation, transmission, and distribution of electrical energy (Section 501[a][4]). Taking into account BLM's multiple-use mandate, BLM's purpose and need for this action is to respond to the right-of-way application submitted by Solar Partners XI (the Applicant) under Title V of FLPMA (43 United States Code § 1761) for a ROW grant to construct, operate, maintain, and decommission a solar generation power plant and ancillary facilities on approximately 7,100 acres (2,873 hectares) of BLM land in Clark County, Nevada, (Project) in compliance with FLPMA, BLM

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ROW regulations, the BLM NEPA Handbook, Department of Interior (DOI) NEPA regulations, and other applicable federal and state laws and policies.

The BLM would decide whether to deny the proposed right-of-way, grant the right-of-way, or grant the right-of-way with modifications. 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 route or location of the proposed facilities (43 CFR 2805.10(a)(1)). In the decision process, the BLM must consider how their resource management goals, objectives, opportunities, and/or conflicts relate to this non-federal use of public lands.

1.1.3 Environmental Considerations and Constraints

NEPA does not explicitly require that alternatives reduce environmental effects of the Proposed Action. NEPA, however, directs the lead agency to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources...” (NEPA Section 102(2)(E)). The H-1790-1 BLM NEPA Handbook identifies that alternatives could include, “The proponent’s proposal with additional or different design features recommended by the BLM to reduce environmental effects.”

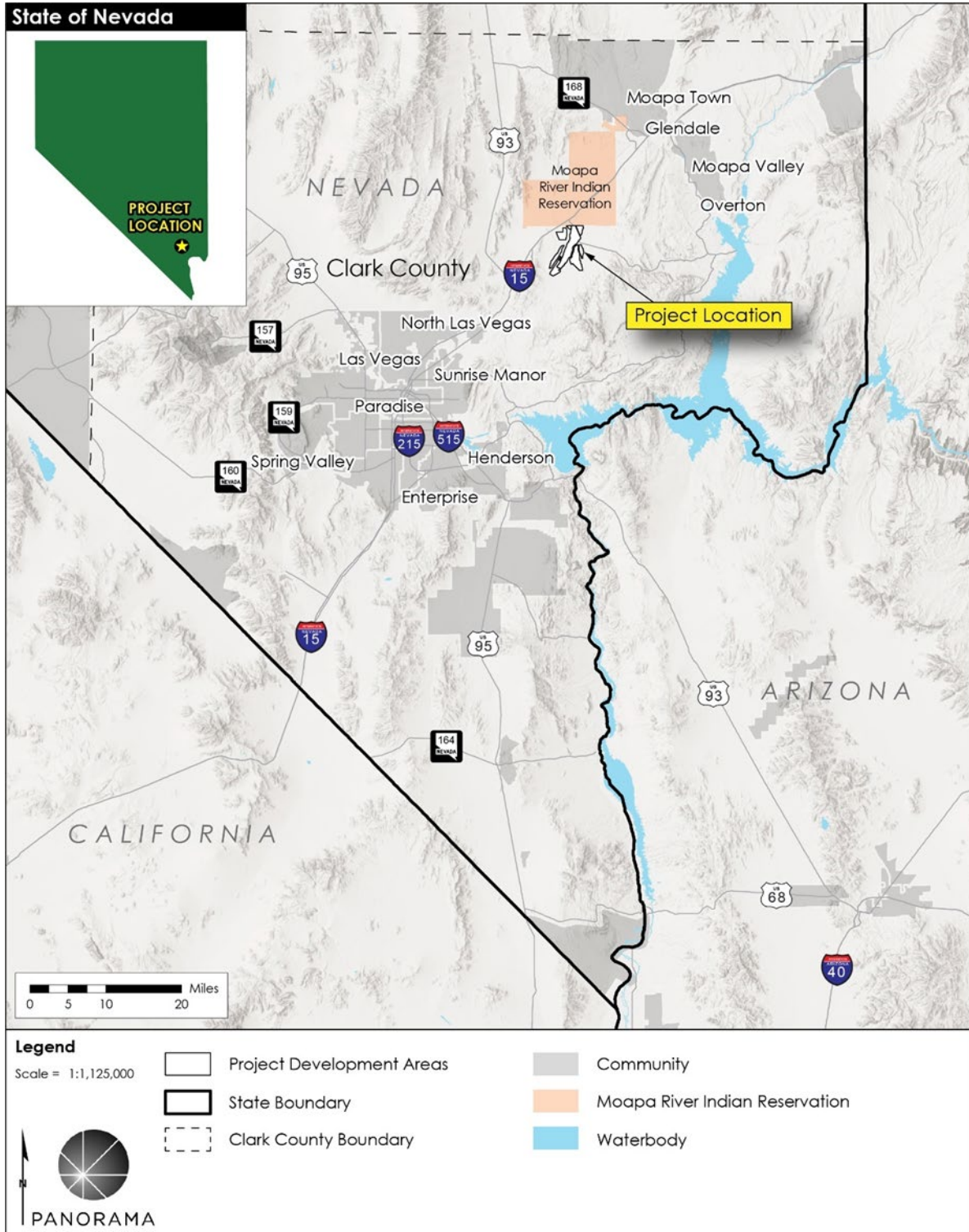
1.2 SUMMARY OF PROPOSED ACTION

1.2.1 Project Location

The Project is located on public land administered by the BLM in the northeastern portion of the Mojave Desert; approximately 33 miles (53 kilometers) northeast of the Las Vegas metropolitan area, in an unincorporated area of Clark County, Nevada (refer to Figure 1). The Project site is situated immediately south of the Moapa River Indian Reservation and less than 0.5 mile (0.8 kilometer) southeast of Interstate 15 (I-15) within the *Piute Point* and *Dry Lake* United States Geographical Survey 7.5-minute topographic quadrangles. A larger area, shown in Figure 2, encompassing 10,670 acres (4,318 hectares), was surveyed in order to define alternative configurations of approximately 7,100 acres (2,873 hectares) that reduce environmental effects. The solar field is divided into development areas, labeled A through G. The Project is located within Mount Diablo Meridian, Nevada, T.17S., R.64E., secs. 10-15, 25, and 36; T.17S., R.65E., secs. 7-9, 16-21, 28-33; T.18S., R.64E., secs. 1 and 2; and T.18S., R.65E., secs. 4-5. All components of the Project are on federal lands administered by the BLM under the 1998 Las Vegas Resource Management Plan (RMP) (BLM, 1998a).

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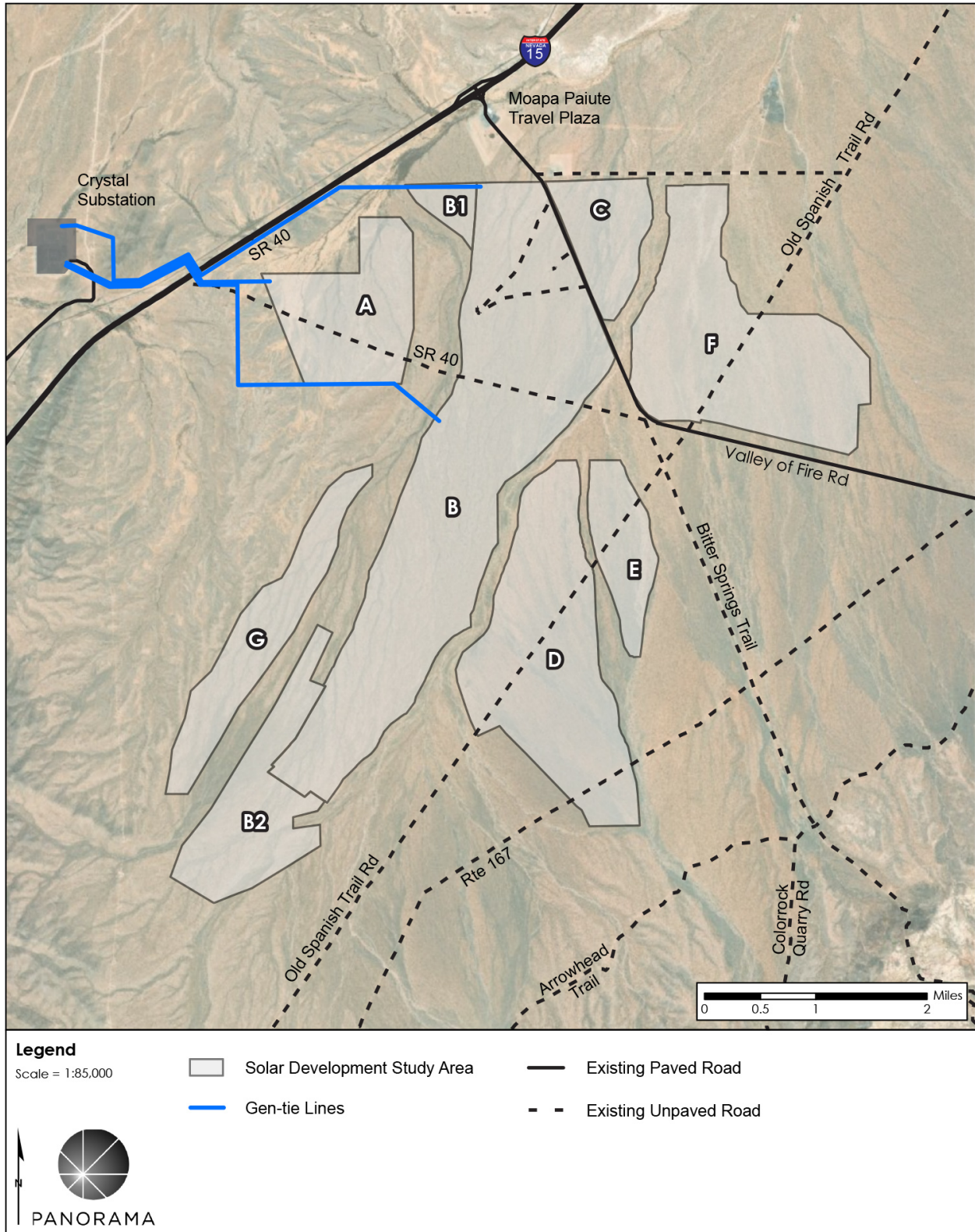
Figure 1 Project Location Map



Sources: (Louis Berger Group, 2018; Esri, 2006; USGS, 2017; The National Map and USGS, 2017; Ventyx, 2010; Tele Atlas, 2010a; Tele Atlas, 2010b)

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Figure 2 Project Development Areas



Sources: (Louis Berger Group , 2018; USDA-FSA-APFO, 2017; Clark County Nevada GIS Management Office, 2018)

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1.2.2 Project Components and Impact Acreage

The Applicant filed an application (serial number N-84631) to construct, own, operate, and decommission the Project, consisting of a nominal¹ 690-megawatt (MW) solar photovoltaic (PV) power generating facility on approximately 7,100 acres (2,873 hectares). The development areas are shown in Figure 2. The Project components are described below.

Solar Field

The solar field would be constructed to include:

- Solar array blocks consisting of solar PV modules mounted on single-axis, horizontal tracker mounting systems supported by driven steel posts (or piers) or other embedded foundation design;
- PV modules with either traditional panels that capture sunlight from one side of the panel, or bifacial panels that absorb light from both sides of the panels, including energy reflected up from the ground surface;
- Integrated, climate-controlled energy storage system (battery system) consisting of approximately 425, 5-megawatt-hour, 4-hour battery systems with approximately 53,550 individual batteries enclosed in a container and installed adjacent to each inverter;
- Direct current (DC) collection system and Power Conversion Stations (PCSs) to collect power from the array blocks, with one PCS for approximately every four array blocks;
- Overhead and underground 34.5 kV AC collection system to convey electricity from the Photovoltaic Combining Switchgear (PVCs) to the substations;
- On-site microwave and wireless systems to collect and send data to a supervisory control and data acquisition (SCADA) system; and
- One meteorological tower (steel lattice), approximately 30 feet (9.1 meters) high, mounted on concrete foundations, installed at the northern boundary of the solar development area near the O&M facilities.

Infrastructure and Ancillary Systems

The infrastructure and ancillary systems that would be constructed to support the Project include:

- A roadway system consisting of an internal grid and perimeter roadways, graded and covered in aggregate (4 inches [10 centimeters] in depth) or compacted soil (12 inches [30 centimeters] of recompacted native material);
- Access roads along Project generation-tie (gen-tie) lines, constructed in accordance for use by NV Energy to be a minimum 20 feet (6.1 meters) wide with an all-weather (aggregate) surface;
- A 10-foot (3-meter) wide firebreak;
- A 2-acre (0.8 hectare) O&M area that would accommodate an O&M building, warehouse, parking area, and other associated facilities such as aboveground water storage tanks and

¹ Nominal power refers to the nameplate or peak capacity of photovoltaic system

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delivery pipelines, septic system, security fencing, signage, lighting, and potentially a flagpole, and a driveway for site access off of Valley of Fire Road near the O&M building and off Valley of Fire Road to access development areas D and E;

- Project security using a combination of perimeter security fencing, controlled access gates, on-site security patrols, lighting, electronic security systems, and/or remote monitoring;
- Desert tortoise exclusion fencing around the Project perimeter;
- Drainage control structures including a detention basin, soil cement channels, and riprap or cement bank protection/berms;
- An option for an on-site water well or a water pipeline extending from the Moapa Paiute Travel Plaza to the Project site, or an alternate option for trucking water; and
- Four temporary on-site water storage ponds or tanks and pump systems of varying sizes during construction.

Gen-Tie/Transmission System

New power line systems that would be constructed to support the Project include:

- Up to three on-site substations hosting on-site ringbus substations;
- Up to three gen-tie lines (typical transmission structures shown in Figure 2-16) extending from the Project substations to NV Energy's Crystal Substation, consisting of two 230 kV circuits and one 500 kV circuit as follows:
 - ROW width of 100 feet (30.5 meters) for each 230 kV line
 - ROW width of 200 feet (61 meters) for the 500 kV line
 - ROW width of 300 feet (91 meters) where the two 230 kV lines and one 500 kV line converge into one corridor; and
- Redundant telecommunication systems and cables installed in tandem with the gen-tie lines as required by NV Energy Large Generator Interconnection Agreement, as well as on-site microwave and wireless systems.

Table 1 summarizes the impact acreage of the Project, by development area. A detailed description of the Project components, as well as a description of the Project's construction is provided in the Plan of Development (Solar Partners, XI, LLC, 2019).

1.2.3 Primary Resource Constraints

As previously stated, NEPA requires consideration of alternatives that addresses alternative uses of available resources. Based on the environmental review for the project, the key resource impacts or constraints are summarized in Table 2. Note that the table focuses on the primary resources of concern and is not a comprehensive list of impacts on all resources addressed in the NEPA analysis. Figure 3 details the various resource constraints.

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Table 1 Summary of Permanent Impact Acreages for the Proposed Action by Component

Disturbance Type	Disturbance, Acres (Hectares)	Notes
Permanent Disturbance		
Entire Solar Facility	7,071 (2,862)	690-MW PV solar facility
Solar Arrays (Traditional Development)	6,810.9 (2,756.3)	Includes the solar PV panels, steel table frames, trackers, and posts
O&M Building	2.1 (0.85)	Includes the O&M building, parking, and water tank storage, all within solar facility footprint
Substations	7.1 (2.9)	Each of the three substations occupies approximately 2.4 acres (0.97 hectare) within the solar facility footprint
Firebreak	42.2 (17.1)	10-foot (3-meter) wide firebreak outside the perimeter fence
Perimeter Road	84.2 (34.1)	Up to 20 feet (6 meters) wide, graded and covered with gravel base or compacted soil. The access roads are included in the solar facility footprint
Internal Access Roads for Solar Field and Utility Corridor	62.9 (25.5)	Up to 20-feet (6 meters) wide with a 30-foot (9-meter) adjacent utility corridor (20 feet [6 meters] on one side and 10 feet [3 meters] on the other), graded and covered with gravel base or compacted soil. The access roads are included in the solar facility footprint
Water Ponds or Tanks	4 (1.6)	Four temporary ¹ water ponds or tanks would be constructed in development areas A, B, and D.
Drainage Features	31.6 (12.7)	Includes channels (2.26 miles [3.64 kilometers]), a 15.4-acre (6.2 hectares) detention basin, and a spillway within the solar facility footprint
Berms	11.2 (4.5)	3.43 miles (5.52 kilometers) of berms within the solar facility footprint
Equipment Area	14.7 (5.9)	425 equipment areas, which include batteries (53,550 individual batteries), inverters, and medium voltage transformers within the solar facility footprint
Gen-tie and Access Roads to Gen-tie	25.9 (10.5)	Gen-tie foundations assumed to fall within acreage for access roads
Total	7,097 (2,872)³	
Temporary Disturbance (granted through a short-term ROW, if outside the project ROW area)²		
Gen-tie structure, laydown, staging, and installation	37.7 (15.3)	Gen-tie laydown and staging, 200 feet by 200 feet (61 meters by 61 meters) at up to 40 poles, outside the solar facility fence
Gen-tie line conductor stringing	14.8 (6.0)	Multiple pulling sites for each gen-tie line where direction changes sharply; 100 feet by 500 feet (30 meters by 152 meters)

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Disturbance Type	Disturbance, Acres (Hectares)	Notes
Total	53 (21)	
GRAND TOTAL	7,150 (2,893)	
1.	Although the water ponds or tanks are temporary and would be removed following construction, the impact would be permanent.	
2.	Overlap with gen-tie access roads was netted out from these temporary impacts as access roads are considered under permanent impacts.	
3.	If selected as the water source, the water pipeline to Moapa Paiute Travel Plaza would be constructed in an already disturbed area along Valley of Fire Road and would not increase permanent disturbance.	

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Table 2 Summary of Key Resource Constraints Identified for the Proposed Action

Resource	Summary of Impacts or Resource Constraints	Development Area where Resource is Present, if Applicable
Biological Resources – Botanical	The Project area includes habitat and known occurrences of the threecorner milkvetch (<i>Astragalus geyeri</i> var. <i>triquetrus</i>), a Nevada fully protected species and on the state Critically Endangered Species List and a BLM special status species.	Habitat and occurrences have been found in development areas C, D and E.
Biological Resources – Mojave Desert Tortoise	The Project area provides suitable to high quality habitat with high-density desert tortoise populations.	Most areas of the project support desert tortoise, with higher densities through most of development area B and the lower two-third of development area D, as well as the eastern half of development area A.
Biological Resources – Jurisdictional Waters of the United States	Jurisdictional waters of the United States in the form of drainages are found throughout the Project site.	All areas of the Project include jurisdictional drainages.
Water Resources – Floodplains and Drainages	Drainages and washes are found throughout the Project site.	Development areas were identified to avoid the 100-year floodplain, which includes major washes. Areas that could become inundated in a 100-year flood event include the northern half of development area B, and large portions of development areas C, D, and E.
Visual Resources	<p>Most of the Project area has some degree of visual disturbance from existing built environment features such as the Moapa Paiute Travel Plaza, I-15, and the Moapa Solar Project.</p> <p>The Project site, however, is undeveloped and provides scenic views across the desert valley and to the Muddy Mountains and Bitter Springs Back Country Byway areas to the east of the Project.</p>	<p>The most visually intact areas of the site are development areas D and E, located between the California Wash and the mountains. Due to the substantial incision of the western bank of the wash and from the distance from built features, development areas D and E provide the most scenic values of any of the development areas.</p> <p>The Project would only be visible in the valley. It is visible coming out of the mountains, heading towards I-15, along Valley of Fire Road and Bitter Springs Back Country Byway, but only once these roads start descending into the valley.</p>

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Resource	Summary of Impacts or Resource Constraints	Development Area where Resource is Present, if Applicable
Recreation – Off-Highway Vehicles (OHV) Use	OHV is allowed along existing roads, trails ² , and washes in the Project area.	Open roads and trails are found in development areas A, B, D and E. Major washes traverse between development areas A and B and B and C/D.
Recreation – Old Spanish Trail/Recreational Trails	<p>Recreational uses in the Project area include hiking, mountain biking, and jeep trails. The primary road through the Project is Old Spanish Trail Road, which is an unpaved and relatively unmaintained road, approximately 10 feet (3 meters) wide, that extends from around Nellis Air Force Base up through the Project and north to Glendale. Another trail along Route 167 connects to the Arrowhead Trail, to the east of the Project.</p> <p>Related to the recreational use, the Congressionally-designated alignment of the Old Spanish Trail is located along the California Wash. Most visitors who come to experience the trail would likely travel along Old Spanish Trail Road.</p>	Development areas D and E primarily impact the Old Spanish Trail Road and Route 167. Old Spanish Trail Road traverses through these development areas.

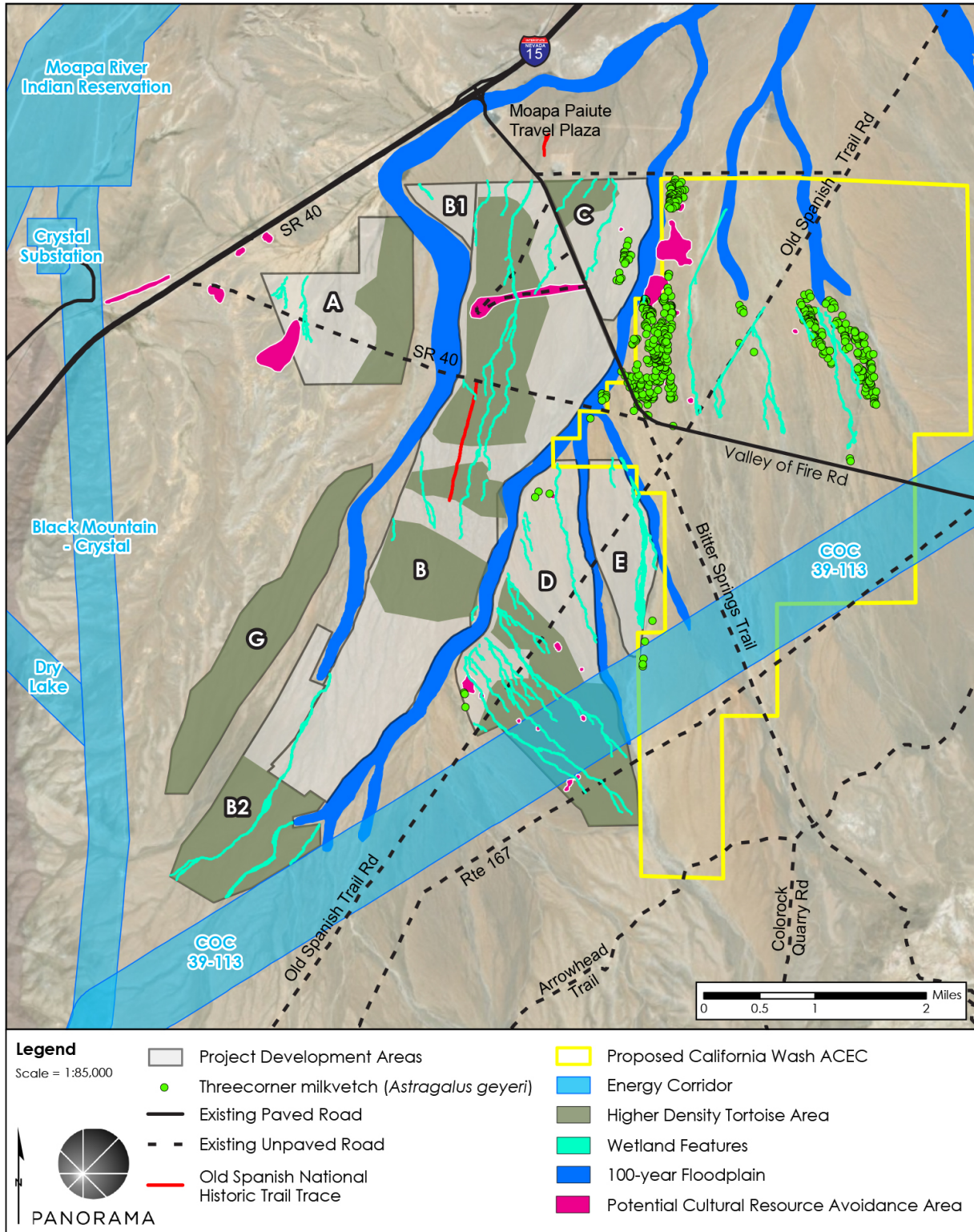
² The term trail is used generally in this document and is intended to mean an existing unmaintained dirt road capable of supporting one or more OHV activities, including motorcycles (single track) or ATV, buggies, or trucks (two track). No BLM-designated trails are located in the Project area. Existing roads and trails in the Project area that are addressed in this document may not be officially recognized or authorized by BLM. The names of some road features were obtained from Google Maps, as no other road names could be found, such as for State Route 40, Route 167, and Colorock Quarry Road.

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Resource	Summary of Impacts or Resource Constraints	Development Area where Resource is Present, if Applicable
Cultural Resources – Old Spanish Trail	As a cultural resource, the entire valley was likely historically used as a travel route along the Old Spanish Trail, now designated to as the Old Spanish National Historic Trail (OSNHT). A National Register of Historic Places – eligible 1,781-meter segment of the Old Spanish Trail was identified in the Project site during 2009/2010, but during 2018/2019 surveys the route was noted as a well-used modern two-track road (AECOM, 2012; Knight & Levitt Associates, 2018). The Project would change the undeveloped setting of the valley that was historically used by travelers along the Old Spanish Trail.	All development areas, particularly development area B.
Cultural Resources – Archaeology and Historic	Some prehistoric and historic resources are found on the Project site.	Significant archaeological resources in development area A must be avoided. Other resources are found in development area C.
Land Use	A Section 368 Energy Corridor that was also identified in the Settlement Agreement as a Corridor of Concern (COC) is located in the Project area. The corridor does not currently include any utilities but is designated for both above ground and underground electric and gas facilities; however, as a COC, development of utilities in this corridor would require more extensive analysis due to natural resource impacts. Clark County proposes an Area of Critical Environmental Concern (ACEC) in the Project area.	The Section 368 Energy Corridor passes through the lower half of development area D. The ACEC overlaps with small portions of development areas D and E.

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Figure 3 Resource Constraint Map of Surveyed Areas



Sources: (BLM and NPS, 2017; BLM, 2018; Phoenix Biological Consulting, 2018a; Phoenix Biological Consulting, 2018b; BLM, 1998b; Knight & Levitt Associates, 2018; FEMA, 2018)

2 ACTION ALTERNATIVES

2.1 INTRODUCTION

Each of the action alternatives described here meet the basic purpose and need of the Project and are economically feasible; however, each alternative addresses a different set of environmental constraints or conflicts. This section describes each alternative and provides a comparison of impacts between each alternative and the Proposed Action for key resource conflicts.

The alternatives that were carried forward are based on different solar field development area configurations, as well as different construction methods within the solar field development areas, as described here.

2.2 ALTERNATIVE SOLAR FIELD DEVELOPMENT AREAS – B1, B2, F, AND G

To develop alternatives, several additional areas within the 44,000-acre (17,806-hectare) application area were studied. These additional areas total approximately 3,600 acres (1,456 hectares), and are identified as development areas B1, B2, F, and G (shown in Figure 2). A total of approximately 10,670 acres (4,318 hectares) have been studied in order to develop alternatives that provide a development acreage of approximately 7,100 acres (2,873 hectares) and to avoid resource constraints. The acreage is needed to meet the purpose and need of the Project to develop a 690-megawatt (MW) solar facility.

2.3 ALTERNATIVE CONSTRUCTION METHODS

2.3.1 Traditional Methods

The Proposed Action would be constructed using methods typical for a utility solar development in the Project area, also referred to as “traditional construction methods” or “traditional methods.” These methods include “disk and roll,” where the vegetation is crushed and mixed into the soil using deep disking, then the soil is compacted so that construction equipment can safely traverse the site to construct the solar arrays and infrastructure. The method does not require grading; however, soils are disturbed, root crowns are buried, and the typical dominant desert vegetation (creosote and white burrobush) do not grow back due to the level of compaction of the soils. Under this traditional method of construction, stormwater retention may be required, and periodic erosion repair is needed in the solar field development areas. Soils are compacted, tackifiers are applied, and weeds are managed with herbicides. The method, including best management practices (BMPs) used during construction, are described in detail in the Plan of Development (Solar Partners, XI, LLC, 2019).

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2.3.2 Mowing

An alternative method of site development is proposed that can be applied to each solar development area configuration alternative. The method is known as mowing. Areas that would be constructed through mowing of vegetation, versus “disk and roll” or “traditional methods of construction” would minimize the areas of direct vegetation removal, thereby maintaining the vegetation community and topsoil seed bank for future regrowth and minimizing weed growth. Areas of the solar field subject to mowing would be designed and constructed differently from the areas cleared using traditional methods. The differences are summarized below.

- Design
 - **Panel heights:** The solar arrays in mowing areas would need to have higher vegetation clearance than is typical, which would increase the total height of the arrays from 12 feet to 14 feet (3.7 to 4.3 meters) tall (24 inches [61 centimeters] taller at the top edge of the panel when the panel is positioned vertically). Vegetation may be trimmed to no less than 18 inches (46 centimeters) tall under justifiable circumstances. The greater height would require approximately 1 to 2 feet (0.3 to 0.6 meter) deeper steel posts to support the solar arrays.
 - **Array Block Configurations and Access Roads:** Array blocks in mowing areas would be consolidated as compared with array blocks for traditional methods, such that less space would be provided between array blocks. Panel spacing would be the same as for traditional methods, which allows light between panels to reach the ground to support plant growth. Internal access roads would be constructed in an east-west alignment approximately every 0.25 mile (0.4 kilometer) to allow for panel maintenance. Access roads would be 15 feet (4.6 meters) wide with every fourth access road 30 feet (9 meters) wide to allow for a utility corridor. For traditional methods, access roads would be 20 feet (6 meters) wide and constructed approximately every 1 mile (1.6 kilometers) in development areas B, D, and E, and every 0.5 mile (0.8 kilometer) in development areas A and C. Access roads in traditional development areas would include a 10-foot (3-meter) buffer on one side of the road and a 20-foot (6-meter) buffer on the other side for utilities. Mowed areas would require more access roads than traditionally developed areas because construction personnel and vehicles would not be able to drive, or easily and safely walk over vegetated areas to access the solar arrays. As such, additional roads to access the site would be required. Internal access roads would primarily be constructed through soil compaction. Aggregate could be used as needed to facilitate drainage, reduce erosion, and/or reduce dust. Typically, roads with aggregate receive approximately 4 inches (10 centimeters) of material on top of compacted soils.
 - **Fencing and Barriers:** The security fencing around the mowed areas would be modified allowing approximately 8 inches (20 centimeters) of space at the bottom of the fence. Once the solar array is constructed, desert tortoises would be allowed to move freely back into the mowed areas of the solar facility. Permanent desert tortoise exclusion fencing would remain around the perimeter of areas where traditional

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methods would be used, and between areas constructed via mowing and traditional methods. Permanent desert tortoise fencing would consist of hardware cloth and T-posts adhered to a fence. A tortoise barrier guard would be required across every access road traveling between areas constructed via mowing and traditional methods.

- **Drainage Features:** Existing drainage would be maintained under the mowing method, as would vegetative cover, which reduces runoff and sedimentation by trapping sediment and debris and slowing the rate of runoff and the effects of scouring. It also provides microhabitat, forage and greater survivability of cryptobiotic crusts along the drainages.
- Construction
 - **Surface Preparation:** Surface preparation would be minimal. The mowing method of construction would also minimize the areas of grading and leveling. Grading would be conducted in areas where existing topography must be modified for installation and operations. Surface drainage channels would remain largely unchanged.
 - **Vegetation Removal:** Vegetation would only be actively and completely removed in the areas of the power blocks; along a series of access roads; and in areas where topography modification is required for access or construction. These areas would be graded and vegetation tilled into the ground.
 - **Vegetation Mowing, Clipping, or Crushing:** In all other areas within the mowed configuration, vegetation would be mowed or clipped to a height of 24 inches (61 centimeters), to allow for panel construction. Vegetation may be trimmed to no less than 18 inches (46 centimeters) tall under justifiable circumstances. Some vegetation would need to be crushed to construct the facility; however, passes taken by tracked equipment to construct each solar array would be minimized to reduce the amount of crushed vegetation. Up to an estimated 20 percent of the vegetation is expected to be crushed in mowed areas for tracked vehicles to bring equipment to the array areas. Typical types of equipment needed could include loaders or skid steers to carry materials to the array rows, pile drivers to pound in steel posts, small cranes to install the solar panels, and some graders to even out small areas, if needed, to place equipment such as the PCs and battery containers. Vehicle tracks are approximately 4 feet (1.2 meters) wide each. One vehicle can likely access two rows at a time so approximately 8 feet (2.4 meters) of vegetation would be crushed every 40 feet (12 meters) in a worst-case scenario. Where vegetation is crushed, root balls would be left in place, tracked vehicles would distribute weight and minimize soil disturbance, and turns would be wide to also minimize soil disturbance. Native vegetation that is crushed during construction is expected to rebound and regrow after construction is complete.

Mowing would occur at a height that would not kill the dominant shrub and bunch grass species and would still result in functional habitat when tortoises are permitted to re-occupy the mowed site. Mowing would only occur in the solar array areas where vegetation can affect the panels, equipment, or access. Utilizing skid steer vehicles or other tracked vehicles and minimizing the construction passes during installation

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would encourage continued viability of the native plant community. Construction would be accomplished through use of equipment selected to maximize slope-climbing capability, minimize width of footprint, minimize weight of equipment and ground pressure, and allow extended reach across multiple solar array rows. A flail-type mower mounted on skids that are mounted on a low-ground pressure tractor, approximately 5 to 6 pounds per square inch (34 to 41 kilopascals), is an example of this type of equipment, as shown on Figure 4. A rubber tracked skid steer, or a steel tracked excavator could also be used.

- **Conduits Installation:** Panels would be electrically connected to each other under the panel face to the inverter for each 4 by 4 array block. Underground conduit is needed to connect the electrical system from the inverter to the nearest substation. Conduits would be installed in or along access roads to the nearest substation and would require a trench up to 10 feet (3 meters) wide and 3 to 5 feet (0.91 to 1.5 meters) deep.
- **Workforce and Schedule:** Similar workforces in both worker type and number would be required for construction of the mowing areas as for the traditional methods. The construction schedule; however, could require up to 40 percent more labor or 40 percent more equipment for construction in areas where the mowing method is used as compared with areas constructed using traditional methods. Little data is available on the increased labor required to construct mowed areas, since few projects have been constructed using these methods. The increase of up to 40 percent was provided by Bombard Construction based on their construction of the Valley Electric Association 15-MW Community Solar Project, located in Pahrump, Nye County, Nevada. Factors that contribute to the increased labor to construct mowed areas include the following:
 - The need for vehicles to travel greater distances to access parts of the site, given that access must remain on access roads located 0.25-mile apart;
 - Use of special equipment that must reach over longer distances to construct facilities, requiring more time to set up and operate;
 - Construction of deeper posts that take longer to install; and
 - The need to potentially perform more work by hand due to reduced accessibility of large equipment that can perform work more quickly.
- An increase of 40 percent in labor is assumed for the mowed areas as a “worst-case” scenario. Only the mowed areas result in increased labor and time. That is, if 65 percent of a site is mowed, only that 65 percent would require the increased labor to construct. Even with a 40 percent increase in labor, the peak number of workers on site at any one time would remain at 900.
- Maintenance
 - **Conditions:** Maintenance of the facility in the mowed areas would occur under the conditions of a Biological Opinion.
 - **Vegetation Trimming:** Vegetation under the solar arrays would be cut or trimmed with motorized equipment during the winter months or by hand during panel washing to a height of 24 inches (61 centimeters) but no less than 18 inches (46 centimeters) under justifiable conditions. This allows the vegetation to maintain its habitat function

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Figure 4 Typical Mowing Equipment

GT-25XP

HEAVY-DUTY MULCHER



LEAN GREEN MULCHING MACHINES

With a 260-horsepower tier III turbo diesel engine, powerful hydraulic pumps and our latest Cutter-head technology, performance, productivity and lack of profitability will NEVER be an issue with Gyro-Trac's heavy-duty GT-25XP.

The GT-25XP, a 260-horsepower, 23,500 pound heavy-duty mulching machine out-performs any 40,000 pound, or heavier, 400-600 HP mulcher with steel tracks and carbide-tipped hammer teeth by a margin of at least 2 to 1! Plus, unlike many hammer-mill type mulchers that cannot even power their way through some extreme hardwoods, the GT-25XP chips away at hardwoods and softwoods of almost any size, including difficult Ironwood, Hickory, Australian hardwoods, petrified Oak and more!





866-800-3900

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DIMENSIONS		
Track Width	28"	71 cm
Overall Length	236"	599 cm
Cutting Width	88"	224 cm
Overall Width	102"	259 cm
Overall Height	110"	279 cm
Weight	23,500 lbs.	10,659 kg
Ground Clearance	14"	356 cm
Ground Pressure	4.2 psi	28.96 kPa

ENGINE		
Cummins Turbo Diesel (QSB 6.7 L Tier-III)		
No. of Cylinders	6	
HP @ 2200 RPM	260 HP	
Torque @ 1400 RPM	730 ft.-lb	990 N.m

CAPACITIES			
Fuel Tank	97 US Gal.	81 Imp. Gal.	368L
Hydraulic Tank	60 US Gal.	50 Imp. Gal.	227 L
Total Hyd. Sys.	72 US Gal.	60 Imp. Gal.	273 L

STANDARD FEATURES	
-	Low-profile, fully-enclosed, tilt-cab
-	Comfortable suspension seat
-	6 halogen lights
-	Lexan™ safety windshield
-	15,000 lb. winch
-	Pressurized cabin (to keep out dust and smoke)
-	Hydraulic Guide-Bar to assist falling trees

CUTTER-HEAD	
-	Exclusive patented spiral-tooth design with a controlled bite that increases productivity with less HP, fuel and weight
-	Variable displacement dual hydraulic work head power supply
-	Individually-mounted teeth replace in just minutes
-	Drum speed: 2350 RPM
-	Optional carbide-tipped hammer teeth for rockier terrain

TRACK SYSTEM	
-	Six ply (6) nylon and polyester reinforced rubber tracks, assembled with heat-treated steel crosslinks
-	Captive-Track system makes throwing a track nearly impossible

HYDRAULICS	
-	Closed-system Sundstrand Series 90™ pumps and Rexroth motors
-	Computerized monitoring and control system optimizes performance while it protects equipment from damage

STEERING	
-	Hydrostatic drive/steer system with single joystick control

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- for desert tortoise and to maintain hydrology patterns on the site while not impacting the functionality of the solar panels. It is anticipated that trimming would occur every few years, but not annually.
- **Herbicide Application:** Herbicides would be one of the methods applied to control non-native and noxious weeds throughout the Project site. Herbicides that are believed to have deleterious effects on reptiles, such as 2,4-D, would not be allowed in mowed areas. The allowed herbicides are identified in the Southern Nevada District Office Programmatic Biological Opinion (File No. 84320-2010-F-0365.R038), and include aminopyralid, clopyralid, imazapr, imazapic, glyphosate, metasulfuron methyl, and rimsulfuron. Aminopyralid would not be used within areas of Nye milkvetch or threecorner milkvetch habitat.
- **Signage and Training:** Signage on roads and worker environmental awareness training would be required to minimize risks of take to desert tortoise during Project maintenance.

2.4 ALTERNATIVES SCREENING

Alternatives to the Proposed Action were screened under NEPA, (refer to BLM NEPA Handbook § 6.6.3) based on the following criteria:

1. Does the alternative respond to BLM's purpose and need?
2. Does it meet most of the basic objectives of the Project?
3. Is its implementation technically and economically feasible³?
4. Is it consistent with the basic policy objectives for the management of the area?
5. Is its implementation remote or speculative?
6. Is it substantially similar in design to an alternative that is analyzed?
7. Would it have substantially similar effects on an alternative that is analyzed?
8. Would it avoid or substantially lessen any significant effects of the Project?

This process for eliminating potential alternatives from detailed analysis complies with 40 CFR Section 1502.14(a), BLM IM 2011-059. A summary of the alternatives screening that was conducted for the Project is provided in Table 3. An economic feasibility assessment was conducted for mowing and is included in Appendix B.

Two alternatives were carried forward as viable alternatives to be addressed in the NEPA EIS. These two alternatives are described in the following sections in greater detail.

³ Economic feasibility does not cover speculation about an applicant's costs or profit. It refers to whether the implementation of the alternative is likely given past and current practice and technology.

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Table 3 Alternatives Screening

Alternative	Consistent with Purpose and Need of the BLM and Objectives of Project	Technically Practical and Economically Feasible	Consistent with Policy Objectives for the Management of the Area	Implementation is Remote or Speculative	Substantially Similar Design and Effects on an Alternative Being Analyzed	Avoid or Substantially Less Significant Effects	Carry Through for Full EIS Analysis?
Traditional Development – Development Areas A, B, B1, B2, C, D, E, and G	Yes	Yes	Yes, same as the Proposed Action	No	Yes	No	No. (substantially similar to the Proposed Action)
All Mowing Alternative – Development Areas A, B, B1, B2, C, D, E, and G	Yes	Yes ⁴	Yes, same as the Proposed Action.	No	No	Yes	Yes
Hybrid Alternative – Development Areas A, B, B1, C, D, and E	Yes	Yes	Yes, same as the Proposed Action.	No	No	Yes	Yes
50/50 Percent Mowing to Traditional Development –Development Areas A, B, B1, B2, C, and F	Yes	Yes	Yes, same as the Proposed Action.	No	No	No. This alternative would reduce some substantial environmental effects but would create new, substantial effects on threecorner milkvetch, a state endangered plant species.	No. (due to increased impacts on threecorner milkvetch)
Other Portions of the 44,000-acre (17,806-hectare) Application Area	Yes	No. Due to increased distance from electric transmissions line and degree of slope.	Yes, same as the Proposed Action.	No	May differ	No. Development in some other portions of the application area would incur more visual conflicts or require more grading and disturbance.	No. This alternative would not be feasible and may result in greater effects.
Alternative Configurations	Yes	Yes	Yes, same as the Proposed Action.	No	May differ, several configurations would result in similar effects as the Proposed Action or other alternatives analyzed.	Yes	No. A range of alternative configurations that are approximately 7,100 acres (2,873 hectares) are already being considered as alternatives and would be analyzed moving forward. No additional alternative configurations are being considered.
Allowance for an Energy Corridor at Tribal Boundary	Yes	No. This alternative is not practical as there is no need for a utility corridor at the Reservation/BLM boundary. Utility corridors are found immediately to the east and west of the Project site.	Yes, same as the Proposed Action.	No	No	No	No. This alternative is not necessary given the two existing energy corridors within and adjacent to the Project ROW application area.

⁴ Economic feasibility does not cover speculation about an applicant’s costs or profit. It refers to whether the implementation of the alternative is likely given past and current practice and technology.

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Alternative	Consistent with Purpose and Need of the BLM and Objectives of Project	Technically Practical and Economically Feasible	Consistent with Policy Objectives for the Management of the Area	Implementation is Remote or Speculative	Substantially Similar Design and Effects on an Alternative Being Analyzed	Avoid or Substantially Less Significant Effects	Carry Through for Full EIS Analysis?	
Private Land	No. Private land available is limited and none that could support a 690-MW project with appropriate access to transmission lines and substations with adequate capacity.	No. The available private land is parcelized and meant to accommodate higher-intensity industrial use, rendering it too expensive for solar PV development.	Not applicable. BLM Policy Objectives do not apply to non-BLM land.	Yes. Limitations on available private land to support a 690-MW project.	No	No	No. Does not meet the purpose and need, nor is it economically reasonable.	
Other BLM-Administrated Land	Mormon Mesa	Yes	Yes	Yes, same as the Proposed Action.	No	May differ	No. Site has similar constraints to the Project site.	No. The site is not a better alternative than the Project site.
	North Las Vegas	Yes	Partial. Land may not be available due to pending solar application.	Yes, same as the Proposed Action.	Yes. Land may not be available.	May differ	No. Site has similar constraints to the Project site.	No. The site is not a better alternative than the Project site.
	Indian Springs	Yes	No. Land may not be available due to pending solar application.	Yes, same as the Proposed Action.	Yes. Land may not be available.	May differ	No. Site has similar constraints to the Project site.	No. The site is not a better alternative than the Project site.
	Jean	No. Unsuitable on-site transmission infrastructure so alternative would not minimize environmental impacts.	Partial. The site is partially within Clark County's Land Disposition Bill and may be sold for private development. Costs of building transmission may make the Project infeasible.	Yes, unless the site is sold for private development and is no longer BLM land.	Yes. Land may not be available.	May differ	No. Site has similar constraints to the Project site.	No. Does not meet the purpose and need.
	Armargosa Valley	Yes	No. Land may not be available due to pending solar application.	Yes, same as the Proposed Action.	Yes. Land may not be available.	May differ	No. Site has similar constraints to the Project site.	No. Not a better alternative than the Project site.
Brownfield/Degraded Lands	No. No identified sites in the region were found that could support a 690-MW project with appropriate access to transmission lines and substations with adequate capacity. Does not meet BLM's purpose and need to response to the application.	Yes	Not applicable. No site was identified to support a 690-MW project.	Yes. No identified site available to support a 690-MW project.	Not applicable. No site was identified to support a 690-MW project.	Not applicable. No site was identified to support a 690-MW project.	No. Does not meet the purpose and need.	
Concentrated Solar Thermal Generation	Yes	No. Is no longer cost effective as compared with PV.	Yes, same as the Proposed Action.	Yes	No	No. Has a larger footprint, requires more water, has more biological and visual impacts.	No. Not economically or environmentally reasonable.	

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Alternative	Consistent with Purpose and Need of the BLM and Objectives of Project	Technically Practical and Economically Feasible	Consistent with Policy Objectives for the Management of the Area	Implementation is Remote or Speculative	Substantially Similar Design and Effects on an Alternative Being Analyzed	Avoid or Substantially Less Significant Effects	Carry Through for Full EIS Analysis?
Technology Considerations (Concentrated Photovoltaic [CPV] Technology)	No. Does not use solar technology that is proven (objectives).	No. CPV technology is relatively new and there are risks for long-term performance reliability. Manufacturing capacity to supply large-scale utility projects has not been proven to date.	Yes, same as the Proposed Action.	Yes	No	No. Structures would incur more visual conflicts due to structure height (as high as 40 feet [12 meters]).	No. Not technically practical and feasible.
Other Renewable Energy Projects	No. Does not meet the objectives to construct and operate a solar PV power-generating facility.	Yes	Yes, same as the Proposed Action.	Yes	No	No	No. Does not meet the purpose and need.
Distributed Generation	No. Does not meet the purpose and need of BLM to respond to the application nor the objective to provide 690-MW to Nevada and neighboring states.	No. Would require the equivalent of 69 10-MW systems at individual locations or near the point of consumption and BLM has no authority or influence over the installation of distributed generation systems, other than on lands that it administers.	Not applicable. BLM Policy Objectives do not apply to non-BLM land.	Yes	No	Yes	No. Does not meet the purpose and need.
Conservation and Demand Side Management	No. Does not meet the objective to construct and operate a solar PV power-generating facility.	No. BLM has no authority or influence over energy conservation and demand-side management, other than on lands that it administers.	Not applicable. BLM Policy Objectives do not apply to non-BLM land.	Yes	No	Yes	No. Does not meet the purpose and need.

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2.5 ALL MOWING ALTERNATIVE—DEVELOPMENT AREAS A, B, B1, B2, C, D, E, AND G

2.5.1 Description of Alternative Development Areas

The All Mowing Alternative includes development of areas A (with a portion removed to avoid a sensitive cultural resource), B, B1, B2, C (with a small portion of area C removed for avoidance of threecorner milkvetch), a portion of area D, area E, and area G (with the southern portion removed), for a total solar field area of 7,115 acres (2,879 hectares). Area F would not be developed. The All Mowing Alternative would involve mowing of all development areas and maintaining vegetation on site for the life of the Project. The All Mowing Alternative is shown in Figure 5.

2.5.2 Comparison of Impacts Between the All Mowing Alternative and the Proposed Action

2.5.2.1 Biological

The All Mowing Alternative would not involve construction in development area F or the portion of development area C with the highest known densities of threecorner milkvetch. Mowing and avoidance would minimize effects on threecorner milkvetch habitat and seed banks. Development within Clark County's proposed ACEC in small portions of development areas D and E would occur, similar to the Proposed Action. Figure 5 shows the All Mowing Alternative development areas.

The All Mowing Alternative would impact a greater number of tortoises than the Proposed Action, due to the increased number of tortoises in the developed areas but would minimize the take of individual desert tortoise by allowing tortoises to be reintroduced into the site. This alternative would benefit desert tortoise compared to the Proposed Action by reintroducing most of the translocated tortoise following construction. Mowed areas would have additional impacts on reintroduced tortoise during operations and maintenance, from human activity during solar facility maintenance.

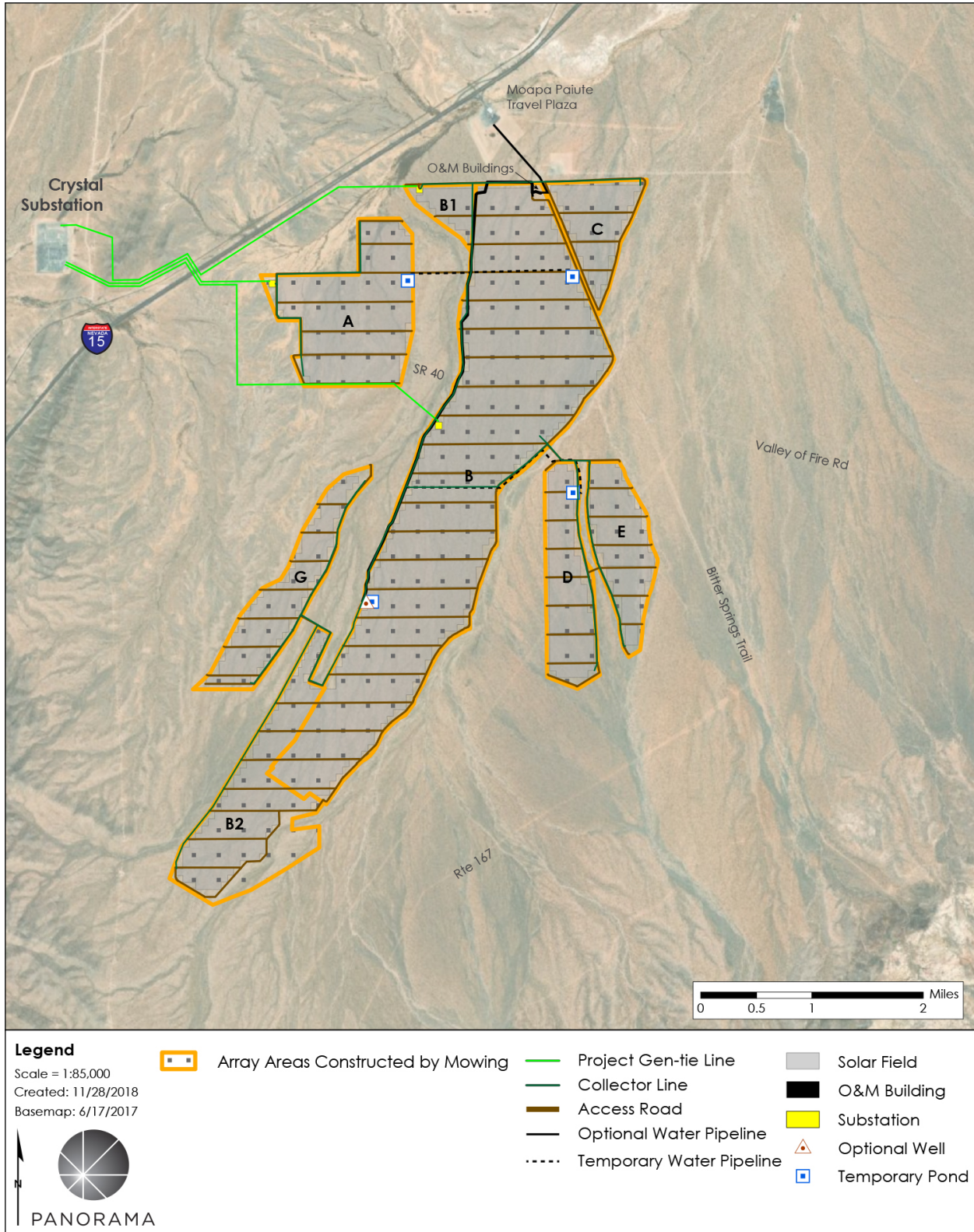
The All Mowing Alternative would minimize the spread of invasive and noxious weeds by not including grading and disk and roll methods that spread invasive and noxious weed seeds into new areas, where the seeds could easily take to the recently disturbed soils.

2.5.2.2 Jurisdictional Waters

The All Mowing Alternative would also reduce impacts on desert washes, as construction in areas of mowing would generally avoid washes and would maintain the existing contours of the land and vegetation. United States Army Corps of Engineers (USACE) jurisdictional waters impacts would be reduced compared with the Proposed Action.

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Figure 5 All Mowing Alternative – Development Areas A, B, B1, B2, C, D, E, and G



Sources: (Louis Berger Group, 2018; USDA-FSA-APFO, 2017; Clark County Nevada GIS Management Office, 2018)

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2.5.2.3 Visual

The All Mowing Alternative would cause a minor increase in visual impacts as mowing requires the height of the solar panels to increase by approximately 1.5 feet (0.46 meter). Most of the visual impacts are from the development of the Project on an undeveloped site and the transmission facilities; therefore, the incremental increase in height would not substantially increase impacts over the Proposed Action.

2.5.2.4 Recreation

The All Mowing Alternative would have similar impacts on recreationalists and recreation facilities as the Proposed Action, except that access along Route 167 would be maintained. Races for OHV have not occurred in the alternative area (similar to Proposed Action areas) since the Mint 400 in 2011.

2.5.2.5 Old Spanish National Historic Trail

The All Mowing Alternative would result in similar direct impacts on the Congressionally-designated trail segment and corridor, by constructing in development area B. Some effects associated with natural landscape resources important to the trail's setting would be reduced. The All Mowing Alternative would also require closure of the existing Old Spanish Trail Road before it reaches Valley of Fire Road, which is not a part of the OSNHT, but may be used as a recreational facility to experience the trail.

Visual impacts on the OSNHT would be the same to those of the Proposed Action.

2.5.2.6 Utility Corridor

The All Mowing Alternative completely avoids the Section 368 Energy Corridor that crosses through development area D.

2.6 HYBRID ALTERNATIVE—DEVELOPMENT AREAS A, B, B1, C, D, AND E

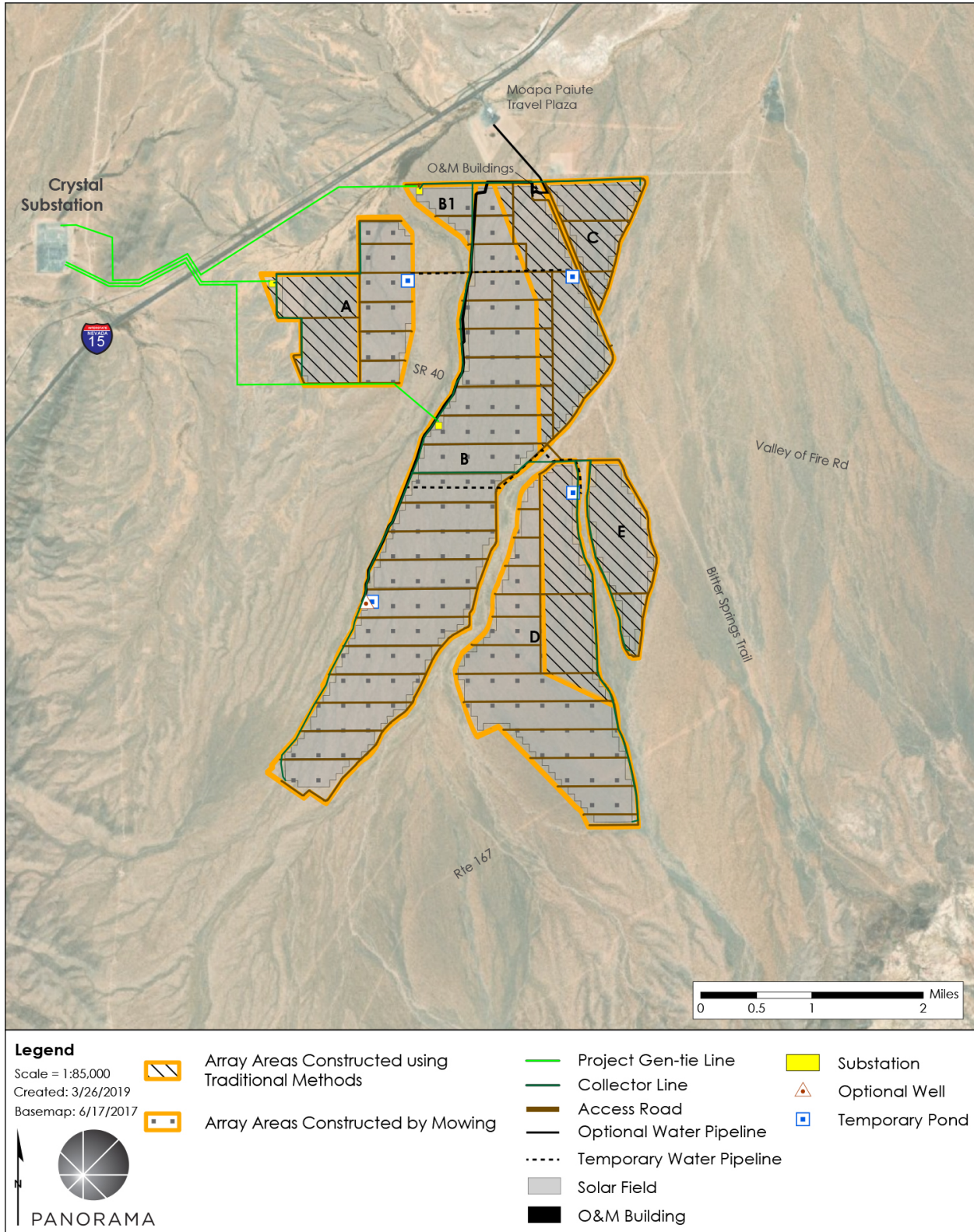
2.6.1 Description of Alternative

The Hybrid Alternative includes development of areas A (with a portion removed to avoid a sensitive cultural resource), B, B1, C (with a small portion of area C removed for avoidance of threecorner milkvetch), D, and E, for a total solar field area of 7,038 acres (2,848 hectares). Development areas B2, F, and G would not be developed. The Hybrid Alternative would involve mowing, as previously described, of roughly 65 percent of the development area, and traditional development methods would be used for the remaining 35 percent.

Approximately 4,587 acres (1,856 hectares) would be developed by mowing, and approximately 2,451 acres (992 hectares) would be developed by traditional methods. The Hybrid Alternative is shown in Figure 6.

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Figure 6 Hybrid Alternative – Development Areas A, B, B1, C, D, and E



Sources: (Louis Berger Group, 2018; USDA-FSA-APFO, 2017; Clark County Nevada GIS Management Office, 2018)

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2.6.2 Comparison of Impacts Between the Hybrid Alternative and the Proposed Action

2.6.2.1 Biological

The Hybrid Alternative would not involve construction in development area F or the portion of development area C with the highest known densities of threecorner milkvetch. Mowing and avoidance would minimize effects on threecorner milkvetch habitat and seed banks.

Development within Clark County's proposed ACEC in small portions of development areas D and E, would occur, similar to the Proposed Action. The Hybrid Alternative would affect a similar number of tortoises as the Proposed Action, but would reduce the level of effect on desert tortoise by utilizing mowing in combination with traditional methods in several development areas.

The Hybrid Alternative would benefit desert tortoise compared to the Proposed Action by reintroducing most of the translocated tortoise following construction. Mowed areas would have greater additional impacts on reintroduced tortoise during operations and maintenance, from human activity during solar facility maintenance.

The Hybrid Alternative would reduce the amount of grading and disk and roll used. Mowing would reduce the spread of invasive and noxious weed seeds into new areas where the seeds could easily take to the recently disturbed soils.

2.6.2.2 Jurisdictional Waters

The Hybrid Alternative would also reduce impacts on desert washes, because approximately 65 percent of the site would remain with existing contours and vegetation. Impacts on USACE jurisdictional waters would be reduced, as compared with the Proposed Action.

2.6.2.3 Visual

Visual impacts would be similar to those of the Proposed Action, as the alternative includes construction of solar arrays in development areas D and E. Mowing requires the height of the solar panels to increase by approximately 1.5 feet (0.46 meter). Most of the visual impacts are from the development of the Project on an undeveloped site and the transmission facilities; therefore, the incremental increase in height would not substantially increase impacts over the Proposed Action.

2.6.2.4 Recreation

The Hybrid Alternative would have similar impacts on recreation as the Proposed Action.

2.6.2.5 Old Spanish National Historic Trail

Impact on the OSNHT and recreational facilities used to experience the trail (i.e., Old Spanish Trail Road) would be the similar to the Proposed Action since the same areas in proximity to the trail would be developed under this alternative as the Proposed Action. Some effects associated with natural landscape resources important to the trail's setting would be reduced.

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2.6.2.6 Utility Corridor

The Hybrid Alternative would involve installation of solar arrays within the Section 368 Energy Corridor, similar to the Proposed Action, creating the same conflict as the Proposed Action.

2.7 SUMMARY OF IMPACT AREAS, ACREAGES, AND EFFECTS BY ALTERNATIVE

Table 4 provides an approximation of the acreage for each alternative, by development area. Permanent and temporary disturbances are identified by alternative in Table 5. Table 6 provides a summary of desert tortoise reintroduction by layout. Table 7 provides a summary comparison of effects by action alternative. The No Action alternative would have no effects and as such, is not included in the table.

Table 4 Approximate Project Acreages by Alternative, Acres (Hectares)

Site	Proposed Action	All Mowing Alternative	Hybrid Alternative
Traditional Methods/Disk and Roll			
A	886 (359)	--	414 (168)
B	3,459 (1,400)	--	711 (288)
B1	--	--	--
B2	--	--	--
C	485 (196)	--	348 (141)
D	1,804 (730)	--	540 (219)
E	438 (177)	--	438 (177)
F	--	--	--
G	--	--	--
Subtotal	7,071 (2,861)	0	2,451 (992)
Mowing			
A	--	856 (346)	442 (179)
B	--	3,459 (1,400)	2,748 (1,112)
B1	--	132 (53)	132 (53)
B2	--	867 (351)	--
C	--	348 (141)	--
D	--	482 (195)	1,265 (512)
E	--	435 (176)	--
F	--	--	--
G	--	535 (216.5)	--
Subtotal	0	7,115 (2,879)	4,587 (1856)
Layout Total	7,071 (2,861)	7,115 (2,879)	7,038 (2,848)

1. Due to rounding, numbers do not add precisely.

2. Values are approximate and do not account for Project facilities such as substations and access roads.

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Table 5 Summary of Permanent and Temporary Disturbance

Disturbance Type	Proposed Action, Acres (Hectares)	All Mowing Alternative, Acres (Hectares) ¹	Hybrid Alternative; Acres (Hectares)	Notes
Permanent Disturbance – Vegetation Removed				
Entire Solar Facility	7,071 (2,862)	176 (71)	2,549.5 (1,031.7)	690-MW PV solar facility
Solar Arrays (Traditional Development)	6,810.9 (2,756.3)	~0 ⁷	2,351.0 (951.4)	Includes the solar PV panels, steel table frames, trackers, and posts
O&M Building	2.1 (0.85)	2.1 (0.85)	2.1 (0.85)	Includes the O&M building, parking, and water tank storage
Substations	7.1 (2.9)	7.1 (2.9)	7.1 (2.9)	Each of the three substations occupies approximately 2.4 acres (0.97 hectare)
Firebreak	42.2 (17.1)	0	0	10-foot (3-meter)-wide firebreak outside the perimeter fence
Perimeter Road/ North-South Connecting Road	84.2 (34.1)	64.6 (26.1)	59.6 (24.1)	Up to 20 feet (6 meters) wide, graded and covered with gravel base or compacted soil.
Internal Access Roads for Solar Field and Utility Corridor	62.9 (25.5)	83.6 (33.8)	110.9 (44.9) ²	Roads would be graded and covered with gravel base or compacted soil. Includes temporary and permanent disturbance related to water infrastructure.
Water Ponds or Tanks	4 (1.6)	4 (1.6)	4 (1.6)	Four temporary ³ water ponds or tanks would be constructed in development areas A, B, and D.

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Disturbance Type	Proposed Action, Acres (Hectares)	All Mowing Alternative, Acres (Hectares) ¹	Hybrid Alternative; Acres (Hectares)	Notes
Drainage Features	31.6 (12.7)	0	0	Includes channels (2.26 miles [3.63 kilometers]), a 15.4-acre (6.2-hectare) detention basin, and a spillway
Berms	11.2 (4.5)	0	0	3.43 miles (5.5 kilometers) of berms
Equipment Area	14.7 (5.9)	14.7 (6)	14.7 (6)	425 equipment areas, which include PCSs, batteries (53,550 individual batteries), inverters, and medium voltage transformers within the solar facility footprint
Gen-tie and Access Roads to Gen-tie	25.9 (10.5)	24.4 (9.9)	24.4 (9.9)	Gen-tie foundations assumed to fall within acreage for access roads
Total	7,097 (2,872) ⁸	200 (81) ⁸	2,574 (1,042) ⁸	
Permanent Disturbance – Vegetation Maintained				
Solar Arrays (Mowing) ⁶	0	6,938.9 (2,808.1)	4,488.5 (1,816.4)	690-MW PV solar facility
Total	0	6,939 (2,808)	4,489 (1,816)	
Temporary Disturbance (granted through a short-term ROW, if outside the Project ROW area) ^{4, 5}				
Gen-tie structure laydown, staging, and installation	37.7 (15.3)	36.1 (14.6)	36.1 (14.6)	Gen-tie laydown and staging, 200 feet by 200 feet (61 meters by 61 meters) at each pole, outside the solar facility fence
Gen-tie line conductor stringing	14.8 (6.0)	14.8 (6.0)	14.8 (6.0)	Multiple pulling sites for each gen-tie line where direction changes sharply; 100 feet (31 meters) by 500 feet (152.4 meters)
Total	53 (21)	51 (23)	51 (23)	
GRAND TOTAL	7,150 (2,893)	7,190 (2,910)	7,113 (2,879)	

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Disturbance Type	Proposed Action, Acres (Hectares)	All Mowing Alternative, Acres (Hectares) ¹	Hybrid Alternative; Acres (Hectares)	Notes
				<ol style="list-style-type: none"> 1. All values presented are approximate and subject to change per final engineering. 2. North-south access roads closest to the boundary of mowing and traditional were determined to be constructed as though within the traditional development. 3. Although the water ponds or tanks are temporary and would be removed following construction, the impact would be permanent. 4. The solar field staging area is assumed to overlap with the access roads, which is considered under permanent impacts. 5. Overlap with gen-tie access roads was netted out from these temporary impacts as access roads are considered under permanent impacts. 6. Mowed areas would be maintained throughout the life of the Project through vegetation trimming. 7. Negligible permanent disturbance would occur from post installation in mowed areas. 8. If selected as the water source, the water pipeline to Moapa Paiute Travel Plaza would be constructed in an already disturbed area along Valley of Fire Road and would not increase permanent disturbance.

3 COMPARISON OF ALTERNATIVES

Table 6 Summary of Reintroduction Acreages and Number of Tortoises to Be Reintroduced for the Proposed Action and Alternatives

Alternative	Development, Acres (Hectares)	Approximate Reintroduction, Acres (Hectares)	Estimated Number of Tortoises for Reintroduction and Short Distance Translocation	Estimated Number of Tortoises for Distant Translocation ¹	Total Number of Tortoises
Proposed Action	7,071 (2,862)	0	0	215 ²	215
All Mowing Alternative	7,115 (2,879)	7,115 (2,879)	220	34	254
Hybrid Alternative	7,038 (2,848)	4,587 (1,856)	183	36	219

Note:

1. Distant translocation in this context refers to a location in the area of the Project site to the south as opposed to another region of the Northeastern Mojave Recovery Unit.
2. A sufficient location for off-site translocation of desert tortoise is not available.

3 COMPARISON OF ALTERNATIVES

Table 7 Comparison of Effects by Action Alternative

Potential Impact	Proposed Action	All Mowing Alternative	Hybrid Alternative
Land Uses			
Lands and Realty	The Proposed Action would cross I-15 and require an encroachment permit. A letter of concurrence with the Union Pacific railroad would be needed prior to issuance of the Notice to Proceed (NTP). The gen-tie lines would cross the 2,000-foot-wide Black Mountain – Crystal utility corridor and comply with transmission line separation guidelines. The gen-tie lines would cross existing and future transmission lines. A cooperative engineering agreement and appropriate approvals would need to be obtained prior to BLM's issuance of an NTP. BLM will decide at the time of the ROD if construction of solar panels will be allowed through the Section 368 Energy Corridor of Concern (COC) in development area D.	Impacts would be similar to the Proposed Action, except the All Mowing Alternative would avoid adverse impacts associated with development in the Section 368 Energy COC.	Same as the Proposed Action.
Specially designated areas	The Proposed Action would have an adverse visual impact on the Bitter Springs Back Country Byway (BSBCB) Specially Designated Area. The Proposed Action would have an adverse effect on the Old Spanish National Historic Trail (OSNHT) (refer to Old Spanish National Historic Trail [Section 3.13] in this table). Mitigation would be required to address adverse effects.	Similar to the Proposed Action.	Similar to the Proposed Action.
Rangeland resources	The Project area is not located within a grazing allotment. No adverse effects would occur.	Same as the Proposed Action.	Same as the Proposed Action.
Air space	The Proposed Action would not conflict with military or civil airspace designations with implementation of mitigation. No adverse impacts from glint and glare or communication system interference would occur. Structures over 200 feet tall could interfere with airspace. An Obstruction Evaluation would be conducted by the Federal Aviation Administration (FAA) for any transmission facilities that are taller than 200 feet, which would need to be received by BLM prior to the ROD.	Same as the Proposed Action.	Same as the Proposed Action.
Recreation			
Change in access to existing recreation opportunities or areas	Approximately 7,071 acres (2,862 hectares) of land open for recreational use would be removed for approximately 30 years (the duration of the ROW grant). The Proposed Action would sever direct access along Old Spanish Trail Road through development areas D and E, thus cutting off access between Old Spanish Trail Road and Valley of Fire Road and would cut off access on Route 167 through development area D, where it connects to the Bitter Springs Back Country Byway and Valley of Fire Road. The Proposed Action would result in the loss of several OHV trails (including 39 miles [63 kilometers] of single- and two-track trails and 7 miles [11 kilometers] of existing unpaved roads). Impacts would be adverse.	Same as the Proposed Action, except access along Route 167 would be maintained through development area D. The All Mowing Alternative would result in the loss of several OHV trails (including 45.9 miles [73.9 kilometers] of single- and two-track trails and 7 miles [11 kilometers] of existing unpaved roads).	Same as the Proposed Action. The Hybrid Alternative would result in the loss of several OHV trails (including 39.4 miles [63.4 kilometers] of single- and two-track trails and 7 miles [11 kilometers] of existing unpaved roads).
Geology, Soils, and Minerals			
Seismic ground shaking and ground failure	The Proposed Action would not substantially increase risk of seismic hazard exposure. There would be no risk of landslides or other destabilization.	Same as Proposed Action.	Same as Proposed Action.
Soil collapse	Potential for soil collapse and liquefaction in the Project area is low and not anticipated.	Same as Proposed Action.	Same as Proposed Action.

3 COMPARISON OF ALTERNATIVES

Potential Impact	Proposed Action	All Mowing Alternative	Hybrid Alternative
Increased erosion and loss of topsoil	The Proposed Action would involve approximately 7,071 acres (2,862 hectares) of surface disturbance and vegetation removal, which would increase the potential for soil erosion. Potential adverse effects would be reduced with implementation of the Stormwater Pollution Prevention Plan (SWPPP) ⁵ during construction and through mitigation, including erosion stabilization, during operation. Grading for site preparation could result in loss of topsoil and would be reduced through Project BMPs, including topsoil salvage.	The All Mowing Alternative would result in the least amount of erosion and loss of topsoil due to most of the development areas being left vegetated. This alternative includes the grading of 176 acres (71 hectares) for roads, equipment, and buildings. Potential adverse effects would be reduced with implementation of the SWPPP during construction and through mitigation, including erosion stabilization, during operation.	The Hybrid Alternative has less potential for direct and indirect effects due to 65 percent (4,489 acres [1,816 hectares]) of the development area being left vegetated, as compared with the Proposed Action. This alternative includes the construction of 2,549 acres (1,032 hectares) using traditional methods and grading as compared with 7,071 acres (2,862 hectares) for the Proposed Action. Potential adverse effects would be reduced with implementation of the SWPPP during construction and through mitigation, including erosion stabilization, during operation.
Loss of minerals	No active mining claims, active oil and gas wells, or geothermal leases or operations are present on the Project site. No adverse effects on availability of mineral resources or mineral extraction would occur.	Same as the Proposed Action.	Same as the Proposed Action.
Paleontological Resources			
Loss of paleontological resources	The Proposed Action would involve ground disturbance within areas of moderately paleontologically sensitive older alluvium. One known paleontological resource would be collected in accordance with mitigation. Previously undiscovered paleontological resources could be affected in areas of disk and roll and grading that would disturb the ground surface. Mitigation would be required to address adverse effects.	The All Mowing Alternative would have the fewest direct and indirect effects on paleontological resources because existing soils would be largely undisturbed. This alternative includes the grading of 176 acres (71 hectares) for roads, equipment, and buildings, where previously undiscovered paleontological resources could be found. Mitigation would be required to address adverse effects.	The Hybrid Alternative would have less impacts on soils over the 65 percent of the site that is mowed, resulting in fewer impacts on paleontological resources as compared with the Proposed Action. Previously undiscovered paleontological resources could be impacted in areas of disk and roll and grading that would disturb the ground surface. Mitigation would be required to address adverse effects.
Water Resources			
Increase in flooding and sedimentation	The Proposed Action would involve approximately 7,071 acres (2,862 hectares) of surface disturbance through traditional construction methods, which could increase erosion and downstream sedimentation and deposition of fine-grained sediments during construction and operation. Implementation of the SWPPP BMPs and other mitigation would reduce the impact.	The All Mowing Alternative would result in much less surface disturbance that could increase sedimentation and runoff. Flows could still increase from clearing of roads, but impacts would be less as compared to the Proposed Action. Implementation of the SWPPP BMPs and other mitigation would minimize the impact.	The Hybrid Alternative would permanently remove 2,549 acres (1,032 hectares) of previously undisturbed native vegetation and involve mowing of 65 percent of the Project site (4,489 acres [1,816 hectares]). Flows could still increase from clearing of roads and in areas of traditional development on 35 percent of the site, but impacts would be less than with the Proposed Action. Implementation of the SWPPP BMPs and other mitigation would minimize the impact.
Potential contamination of surface water	Accidental release of oil, fuel, or other chemicals from mobile sources during construction may occur. Implementation of BMPs in compliance with the SWPPP and mitigation would reduce the impacts.	Same as the Proposed Action.	Same as the Proposed Action.
Changes to groundwater quality and quantity	The Proposed Action would have no impacts on groundwater quality. If the option to develop an on-site groundwater well is exercised, groundwater pumping would not have direct impacts on surrounding water users. Cumulative impacts on groundwater users and surface manifestations of groundwater would be minimized or avoided through the water appropriation review process.	Same as the Proposed Action.	Same as the Proposed Action.
Vegetation and Jurisdictional Waters			

⁵ Under the USEPA's National Pollutant Discharge Elimination System stormwater permitting program, an SWPPP is required for discharges from construction activities that disturb one or more acres.

3 COMPARISON OF ALTERNATIVES

Potential Impact	Proposed Action	All Mowing Alternative	Hybrid Alternative
Native vegetation communities	Approximately 7,071 acres (2,862 hectares) of previously undisturbed native vegetation would be permanently removed by the Proposed Action.	Native vegetation would remain on site except in areas developed for utilities, buildings, and along roads (over approximately 176 acres [71 hectares]), resulting in the fewest impacts to native vegetation of the alternatives. Vegetation would still be altered through drive and crush and mowing.	The Hybrid Alternative would permanently remove 2,549 acres (1,032 hectares) of previously undisturbed native vegetation. Using mowing on 65 percent of the Project site (4,489 acres [1,816 hectares]) would result in fewer impacts on native vegetation as compared with the Proposed Action. Vegetation would still be altered through drive and crush and mowing.
Impacts on special status plant species	The Proposed Action would directly impact known occurrences of threecorner milkvetch in development areas C and D and suitable habitat for threecorner milkvetch and Nye milkvetch in development areas C, D, and E. The permanent loss of 700 acres (283 hectares) of habitat would be an adverse effect and would conflict with the BLM's commitments under the Multi-Species Habitat Conservation Plan (MSHCP). Indirect impacts would occur through spread of invasive species. Implementation of invasive species controls and other mitigation, including use of only drive and crush to construct in threecorner milkvetch habitat, would reduce but not eliminate impacts.	Adverse impacts on suitable threecorner milkvetch habitat would be similar to the Proposed Action. Indirect impacts could occur through spread of invasive species, although the likelihood of spread would be reduced because native vegetation would remain in mowed areas. Mowing would reduce impacts to soils that contain seed banks for special status plant species (threecorner and Nye milkvetch).	Adverse impacts to threecorner milkvetch habitat would be similar to the Proposed Action, with reduced potential for spread of invasive species in mowed areas where native vegetation remains. Traditional development areas correspond to threecorner milkvetch habitat. Mitigation includes construction using drive and crush instead of disk and roll in order to potentially preserve some seed bank for threecorner milkvetch. Mowing would reduce impacts to soils that contain seed banks for special status plant species (threecorner and Nye milkvetch).
Spread of invasive non-native species	Vegetation removal and use of construction equipment would facilitate spread of invasive weeds. The Site Restoration Plan and Weed Management Plan would treat against invasive species, but weeds may persist and have an adverse effect on habitat and wildlife.	The spread of invasive species would also be an impact of the All Mowing Alternative. The spread of invasive species, however, would be less than with the Proposed Action. Weed treatment and herbicide use would therefore likely be less. Mowing all solar development areas would reduce soil impacts and would result in the maintenance of the most native vegetation of the alternatives. A Site Restoration Plan and Weed Management Plan would be required, similar to the Proposed Action.	The spread of invasive species would also be an impact of the Hybrid Alternative, particularly in the 35 percent of the development areas that would be constructed using traditional development methods. The spread of invasive species would be less than with the Proposed Action over 65 percent of the development areas that are mowed. Mowing would reduce soil impacts and would allow native vegetation to remain on site. Weed treatment and herbicide use would be similar to the Proposed Action for 35 percent of the site and similar to the All Mowing Alternative for 65 percent of the site. A Site Restoration Plan and Weed Management Plan would be required, similar to the Proposed Action.
Cacti/Yucca	Construction activities would directly affect approximately 121,300 cacti and yucca individuals on the Project site. The Site Restoration Plan and mitigation would result in salvage of 2.1 percent of cacti and yucca. Most of the cacti and yucca would be permanently removed and destroyed, resulting in an adverse effect.	Cacti and yucca would remain on site except in utility areas and along roads, resulting in the fewest impacts.	The Hybrid Alternative would reduce the number of cacti and yucca impacted to 56,957 individuals by using mowing on 65 percent of the Project site, resulting in less impacts than the Proposed Action. Cacti would be trimmed in accordance with the Site Restoration Plan and mitigation.
Biocrust/Desert Pavement	Approximately 414 acres (168 hectares) of biocrust and 524 acres (212 hectares) of desert pavement would be affected by grading and disk and roll. The loss of biocrust and desert pavement could increase weed infestations and dust. No mitigation is available to reduce effects, which would be adverse.	Biocrust and desert pavement would remain on site except in utility areas and along roads, resulting in the least impacts.	The Hybrid Alternative would reduce the acreage of effects to approximately 117 acres (47 hectares) of biocrust and 142 acres (57 hectares) of desert pavement by using mowing on 65 percent of the Project site, resulting in less impacts than the Proposed Action. The loss of biocrust and desert pavement would remain adverse.

3 COMPARISON OF ALTERNATIVES

Potential Impact	Proposed Action	All Mowing Alternative	Hybrid Alternative
Impacts on ephemeral drainages and waters of the United States	Approximately 62 acres (25 hectares) of potentially jurisdictional ephemeral dry washes or channels would be indirectly or directly affected during construction and operation of the Project. Mitigation requiring avoidance of jurisdictional drainages, including a 27-acre (11-hectare) area in development area E, maintenance of predevelopment hydraulic conditions, implementation of BMPs, and compliance with USACE Section 404 would reduce effects. Fill quantities would likely be around 10 acres.	Permanent impacts would be limited to impacts on drainages from construction of access road crossings, utility trench crossings, and solar panel posts. Mitigation requiring avoidance of jurisdictional drainages, including a 27-acre (11-hectare) area in development area E, maintenance of predevelopment hydraulic conditions, implementation of BMPs, and compliance with USACE Section 404 would reduce effects. Approximately 1 acre (0.4 hectare) of potentially jurisdictional ephemeral dry washes or channels would be filled.	Permanent impacts would be limited to impacts on drainages from construction of access road crossings, utility trench crossings, and piers. Mitigation requiring avoidance of jurisdictional drainages, including a 27-acre (11-hectare) area in development area E, maintenance of predevelopment hydraulic conditions, implementation of BMPs, and compliance with USACE Section 404 would reduce effects. Approximately 1 acre (0.4 hectare) of potentially jurisdictional ephemeral dry washes or channels would be filled.
Wildlife; Migratory Birds; and Special Status Species including Threatened, Endangered, and Candidate Species			
Loss of habitat	The Proposed Action would permanently remove approximately 7,071 acres (2,862 hectares) of suitable habitat for wildlife species.	The All Mowing Alternative would result in the removal of habitat on approximately 176 acres (71 hectares), which is less than the Proposed Action.	The Hybrid Alternative would result in the removal of approximately 2,549 acres (1,032 hectares) of habitat, which is less than the Proposed Action.
Migratory birds	The Proposed Action could result in bird collisions with construction equipment and Project components. Implementation of Avian Power Line Interaction Committee (APLIC) measures and the Bird and Bat Conservation Strategy (BBCS) would reduce impacts.	Same as the Proposed Action.	Same as the Proposed Action.
Threatened, Endangered, and Candidate Species			
Impacts on special status species	The Proposed Action would result in the loss of approximately 7,071 acres (2,862 hectares) of desert tortoise habitat from the Project site. Approximately 215 adult desert tortoises would be displaced. No long-distance translocation areas are available for successful translocation of these tortoises in the greater Northern Mojave Recovery Unit. The Proposed Action would result in the loss (mortality take) of these tortoises, which would be a substantial adverse effect on the species and the local population. Several mitigation measures are proposed to reduce effects to desert tortoise during construction and operation of the gen-tie lines. Indirect effects would also be adverse, including loss of connectivity.	The All Mowing Alternative would result in a small loss of vegetation (approximately 176 acres [71 hectares]); however, all desert tortoise habitat would be substantially modified. This alternative allows desert tortoise the opportunity to reoccupy all development areas after construction. Approximately 220 adult desert tortoises (and an unknown number of juveniles) would be allowed to reoccupy the Project site or translocated a short distance away, and 34 adults desert tortoises (and an unknown number of juveniles) would be moved to an area south of development areas B and D. Several mitigation measures would reduce effects to desert tortoises during construction and operation of the solar facility. Indirect effects to connectivity would be reduced as compared with the Proposed Action since tortoise could travel through the solar facility.	The Hybrid Alternative would remove less vegetation (approximately 2,549 acres [1,032 hectares]) as compared with the Proposed Action; however, all desert tortoise habitat would be substantially modified. This alternative allows desert tortoise the opportunity to reoccupy 65 percent of the development areas after construction. Approximately 183 adult desert tortoises (and an unknown number of juveniles) would be allowed to reoccupy the site or would be moved within the Project area, and 36 desert tortoises (and an unknown number of juveniles) would be moved to an area south of development areas B and D. Several mitigation measures would reduce effects to desert tortoise during construction and operation of the solar facility. Indirect effects to connectivity would be less than with the Proposed Action because tortoises could travel through 65 percent of the solar facility. Fencing around areas of traditional development would have some effects on habitat connectivity.
Air Quality and Climate Change			
Impacts on air quality from dust and vehicle emissions	The Proposed Action would involve approximately 7,097 acres (2,872 hectares) of ground-disturbance on the Project site and along the gen-tie lines and use of construction vehicles that would result in fugitive dust and vehicle emissions during construction and decommissioning. Mitigation would minimize effects, but concentrations of nitrous oxides and particulate matter greater than 10 micrometers in diameter would still exceed standards. Dust generation during O&M would not exceed standards with controls in place.	The All Mowing Alternative would involve mowing all development areas, which would reduce fugitive dust generation. Construction emissions of criteria pollutants would increase due to mowing, based on a greater duration of equipment use. Dust generation during O&M would be reduced because vegetation would be left in the solar development areas.	Hybrid Alternative would involve mowing of a portion of the Project site, thus minimizing ground disturbance from disk and roll as well as grading to 2,574 acres (1,042 hectares). Less fugitive dust would be generated than with the Proposed Action. Construction emissions of criteria pollutants and ambient pollutant concentrations would increase for the Hybrid Alternative, based on a greater duration of equipment use or a greater number of equipment pieces needed for construction. Dust generation during O&M would be reduced as compared with the Proposed Action.

3 COMPARISON OF ALTERNATIVES

Potential Impact	Proposed Action	All Mowing Alternative	Hybrid Alternative
Visual Resources			
Contrasting visual elements	Project features would be visible from Key Observation Points (KOPs). The Proposed Action is within Visual Resource Management (VRM) Class III area and would require an amendment to the 1998 Las Vegas RMP to Class IV objective. The VRM Class IV objective allows for management activities that require major modifications of the existing landscape character, such as the transmission facilities associated with the Project.	Maintaining the vegetation under the solar arrays (6,939 acres [2,808 hectares]) would reduce some contrast, but the most adverse impacts would occur from the transmission facilities, which would be the same as with the Proposed Action.	Impacts would be the same as with the Proposed Action. Maintaining the vegetation under 65 percent of the solar arrays (4,489 acres [1,816 hectares]) would reduce some contrast, but the most adverse impacts would occur from the transmission facilities, which would be the same as with the Proposed Action.
Acoustics			
Impacts on noise levels	Noise associated with construction, operation, and decommissioning would be negligible due to the distance of the Project to sensitive residential receptors.	Same as the Proposed Action.	Same as the Proposed Action.
Cultural Resources			
Disturbance to archaeological or historic sites, including traditional cultural properties	Two National Register of Historic Places (NRHP)-eligible cultural sites, in development areas A and C, have the potential to be adversely affected by the Proposed Action. An NRHP-eligible contributing segment of the Old Spanish Trail is located in development area B and would be removed as a result of Project development. Previously undiscovered cultural resources could be impacted in areas of disk and roll and grading that would disturb the ground surface. Mitigation would reduce but not eliminate adverse effects.	The All Mowing Alternative could adversely affect three NRHP-eligible resources located in development areas A, B2, and C and the NRHP-eligible contributing segment of the Old Spanish Trail in development area B. The All Mowing Alternative would have the least potential for impacts on previously undiscovered cultural resources because most of the development areas would be left vegetated (and, thus, relatively undisturbed). This alternative includes the disturbance of 176 acres (71 hectares) for grading for roads and equipment areas in the Project site. Mitigation would reduce but not eliminate adverse effects.	The Hybrid Alternative could adversely affect two NRHP-eligible resources located in development areas A and C and the NRHP-eligible contributing segment of the Old Spanish Trail in development area B. The Hybrid Alternative would permanently remove 2,549 acres (1,032 hectares) of previously undisturbed native vegetation from the Project site by disk and roll as well as grading. Mowing on 65 percent of the Project site (4,489 acres [1,816 hectares]) would result in less impacts on previously undiscovered cultural resources than with the Proposed Action. Mitigation would reduce but not eliminate adverse effects.
Native American Religious Concerns			
Loss of culturally-important plants and wildlife habitat	The Proposed Action would result in the loss of culturally important plants, but none would be lost that are rare medical or food source plants that cannot be found in the surrounding areas.	Native vegetation would remain on site except in utility areas and along roads, resulting in the least impacts of the action alternatives.	The Hybrid Alternative would permanently remove 2,549 acres (1,032 hectares) of previously undisturbed native vegetation from the Project site by disk and roll as well as grading. Mowing on 65 percent of the Project site (4,489 acres [1,816 hectares]) would reduce the loss of culturally important plants as compared with the Proposed Action.
Old Spanish National Historic Trail			
Impacts on Old Spanish National Historic Trail	Development of the Project would result in modern, built features across a large portion of the valley in which the OSNHT occurs. The development of the solar facility would have adverse effects on the natural and cultural setting of the valley due to the degree of modern change that it introduces as well as impacts to recreation and public access, which would be considered a substantial interference with and a substantial interference with the nature, purpose, and primary uses of the trail. Commensurate mitigation (BLM MS-6280) and cultural resources laws and policies requires developing a Memorandum of Agreement (MOA) with the National Park Service Trail Administration Office, in consultation with the BLM Old Spanish Trail Administrator Co-Administrators to define additional measures to minimize effects to the OSNHT and its nature and purposes and primary uses.	Impacts would be similar to the Proposed Action for the 30 years of the ROW grant. The All Mowing Alternative includes minimizing disturbance and maintaining the native vegetation, soils, hydrology, and fauna in the solar array areas, which protects some of the important aspects of the setting of the trail, such that the trail's purpose, need and primary uses could be restored shortly after decommissioning.	Impacts would be a combination of those described for the Proposed Action and the All Mowing Alternative. Mitigation requires that drive and crush methods to preserve soils, vegetation root structures, and hydrology be used in portions of development areas D and E instead of disk and roll in traditional development areas and requires restoration in traditional development areas immediately following construction. Similar to the Proposed Action, Substantial interference with the nature, purpose, and primary uses of the trail could remain for the portions of the Project site developed with traditional methods.
Socioeconomics and Environmental Justice			

3 COMPARISON OF ALTERNATIVES

Potential Impact	Proposed Action	All Mowing Alternative	Hybrid Alternative
Employment	The Proposed Action workforce is expected to average 500 to 700 workers (with a maximum of 900) during construction and 19 workers during operation. The workforce is anticipated to be sourced from the labor pool within Clark County. The increased opportunity of employment would be considered beneficial to the local community.	Similar to the Proposed Action, but a larger workforce may be needed to construct the entire solar field with mowing. Greater job opportunities and benefits could result.	Similar to the Proposed Action but a larger workforce may be needed to construct 65 percent of the solar field with mowing. Greater job opportunities and benefits could result.
Economics	The employment associated with construction and operation of the Proposed Action would have beneficial effects beyond just labor income, and effects on the regional economy as a result of constructing the Proposed Action would be beneficial.	The larger workforce size, if needed, would result in a marginally greater economic benefit to the regional economy than the Proposed Action.	Similar to the All Mowing Alternative.
Housing	Vacancy rates of 10 percent (38,583 units) and availability of temporary accommodations would accommodate the potential influx of workers during construction. Effects on the housing market from O&M workers would be negligible.	Similar to the Proposed Action.	Similar to the Proposed Action.
Public services	The Proposed Action and influx of workers during construction would minimally affect public services. Additional public services would not be required due to construction or operation.	Similar to the Proposed Action.	Similar to the Proposed Action.
Disproportionate effects on minority or low-income populations	The Proposed Action would not result in a disproportionate effect on the minority population and low-income population of Native Americans on the Moapa River Indian Reservation. The employment associated with construction of the Proposed Action would have beneficial effects. Adverse health or cultural impacts are not anticipated.	Similar to the Proposed Action.	Similar to the Proposed Action.
Travel and Transportation Management			
Roadway operations	Under the Proposed Action during peak construction activity, roadways and freeways used to support the Project would operate at a volume lower than the LOS C capacity. Implementation of a Traffic and Transportation Plan would minimize impacts related to roadway operations and traffic hazards.	Similar to Proposed Action.	Similar to the Proposed Action.
Public Health and Safety			
Occupational Health and Safety	Adverse effects on workers could occur during construction as well as O&M; any adverse effects would be minimized through safety standards, protective equipment, and mitigation.	Same as the Proposed Action.	Same as the Proposed Action.
Electric and Magnetic Fields (EMF)	The closest residences are approximately 13 miles (21 kilometers) north of the Project site. No residences or other uses would be subject to EMF exposure from the proposed transmission interconnection line.	Same as the Proposed Action.	Same as the Proposed Action.
Environmental Site Contamination	No known spills or uncontrolled releases of hazardous materials or wastes, or other issues associated with chemicals, were identified for the Project area. Mitigation would minimize the potential exposure of workers to existing unknown hazardous materials.	Same as the Proposed Action.	Same as the Proposed Action.
Risk of Hazardous Materials Accidents or Spills	Accidental spills of chemicals and fuels could occur during construction or operation and would be handled in accordance with the Spill Prevention, Control, and Countermeasure (SPCC) plan. Implementation of the SWPPP, mitigation measures, and compliance with regulations would minimize risk of hazards associated with accidents and spills.	Same as the Proposed Action.	Same as the Proposed Action.
Solid waste management	Solid waste generated during construction, operation, and decommissioning would not exceed the capacity of local landfills. Batteries and hazardous wastes would be disposed of in accordance with a Waste Management Plan.	Same as the Proposed Action.	Same as the Proposed Action.
Emergency response interferences	Construction could require short-term closure of I-15 during installation of the gen-tie lines. With proper coordination with the Nevada Department of Transportation (NDOT) and implementation of encroachment permit requirements, adverse effects would not occur. An Emergency Response Plan would be prepared to address worker evacuation in an emergency.	Same as the Proposed Action.	Same as the Proposed Action.
Public health	The Proposed Action would not increase risks of bringing West Nile Virus and Zika to the area. Implementation of mitigation measures to control fugitive dust would minimize the risk to workers of contracting valley fever.	Same as the Proposed Action. Herbicide use that can have impacts on applicator and worker safety would be reduced.	Same as the Proposed Action. Herbicide use that can have impacts on applicator and worker safety would be reduced by 65 percent as compared with the Proposed Action.

3 COMPARISON OF ALTERNATIVES

Potential Impact	Proposed Action	All Mowing Alternative	Hybrid Alternative
Intentionally destructive acts	The risk to workers or the public from intentionally destructive acts is low. Public access would be controlled by security and fencing.	Same as the Proposed Action.	Same as the Proposed Action.
Fire risk	The Project area is within a low-risk area for fires, and implementation of a Fire Prevention and Safety Plan would further minimize adverse effects related to fires. Fire risks would be lowest for this action because no vegetation that could ignite and spread fires would remain after site development. If weeds spread to surrounding areas or are contained and removed on site, fire risks could increase. An Integrated Weed Management Plan and Site Restoration Plan would address weeds, although weed spread could still occur, given the amount of exposed soil.	Fire risks would be similar to existing conditions, which is low risk for fire. Weed spread would be reduced under this alternative because more native vegetation would remain in place. An Integrated Weed Management Plan and Site Restoration Plan would address weeds.	Fire risks in traditional development areas (35 percent of the site) would be similar to the Proposed Action, and the fire risks in mowed areas (65 percent of the site) would be similar to the All Mowing Alternative. An Integrated Weed Management Plan and Site Restoration Plan would address weeds.

3 COMPARISON OF ALTERNATIVES

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3 NO ACTION ALTERNATIVE

CFR Section 1502.14(d) requires the alternatives analysis in the EIS to "include the alternative of no action." In this case, "No action" would mean the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward.

Under the No Action Alternative, the BLM would not authorize a ROW grant for the Project nor amend the 1998 Las Vegas RMP to identify the site as suitable for the proposed use. No solar arrays, substation, switchyard, collector routes, O&M facilities, or other Project components would be constructed.

Because the Project would not be approved, no new structures or facilities would be constructed, operated, maintained, or decommissioned on the site, and no related ground disturbance or other Project impacts would occur. The BLM would continue to manage the land consistent with the site's multiple use classification as described in the 1998 Las Vegas RMP. Based on the Solar Programmatic EIS Record of Decision, for future applications, the site would be identified primarily as variance areas open to future applications for solar development, subject to the procedures identified in the Solar PEIS. In the case of variance areas, future projects would still require a 1998 Las Vegas Resource Management Plan Amendment to move forward. These projects would be subject to applicable laws and land use plans.

3 NO ACTION ALTERNATIVE

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4 ALTERNATIVES CONSIDERED BUT REJECTED

4.1 OVERVIEW

In accordance with 43 CFR 2804.10, the BLM worked closely with the prior Applicant during the pre-application phase to identify appropriate locations and configurations for the Project. The BLM generally discourages applicants from including alternative BLM land locations with significant environmental concerns in their applications, such as critical habitat, Areas of Critical Environmental Concerns, Desert Wildlife Management Areas, designated OHV areas, wilderness study areas, and designated wilderness areas. Other alternative sites, technologies, and methods were considered but eliminated from detailed analysis based on the screening factors outlined in Section 2.4. Each rejected alternative is discussed below.

4.2 ON-SITE ALTERNATIVES

4.2.1 Other Portions of the 44,000-acre Application Area

The Applicant examined the 34,000 acres (13,759 hectares) of land within the 44,000-acre (17,806-hectare) ROW application area that are not proposed for development, to determine whether other suitable sites could be found within the application area for the Project. The criteria for a suitable solar site included access to highways, proximity to electric transmission lines, a relatively flat slope, and minimal visual conflicts.

Approximately 3,881 acres (1,571 hectares) of the application area were immediately ruled out due to a slope of greater than five percent. A relatively flat slope of five percent or less is necessary for siting of solar facilities. Large areas of the remaining application area were not considered due to proximity to slopes greater than five percent, which would disallow a contiguous area large enough to support a solar layout.

The remaining acres were then reviewed for feasibility as potential sites. Two relatively flat areas located on the northeast side of the application area, one south and one north of Valley of Fire Road, were reviewed. Both sites are in close proximity to Valley of Fire Road, providing suitable access. However, both sites are located adjacent to the eastern boundary of the application area, which abuts the Muddy Mountains. Proximity to the Muddy Mountains increases the scenic quality of these two sites, which would be more visible to recreationalists in the mountains. Development on these two sites would increase the visual impacts from the Project, therefore, these sites were eliminated from further review.

The southern portion of the application area includes a large swath of relatively flat land not included in the 10,000-acre (4,046-hectare) proposed development area that was reviewed for

4 ALTERNATIVES CONSIDERED BUT REJECTED

suitability. This area is located further from both I-15 and Valley of Fire Road than the proposed development, which would impede access and would locate the solar facility further from existing transmission lines, requiring construction of longer gen-tie lines. For these reasons, this area was eliminated from further consideration.

4.2.2 Alternative Configurations

For the reasons provided above, the area of development is limited to the proposed 10,670-acre (4,318-hectare) study area within the application area. Within the 10,670-acre (4,318-hectare) study area, various alternative configurations were developed that meet the basic purpose and need of the Project and are economically feasible, with considerations for site constraints such as biological resources, visual resources, recreation, Old Spanish Trail experience, and utilities. Alternative configurations that are at least 7,100 acres (2,873 hectares) are being considered as alternatives. Development area F was not included in any of the alternative configurations carried forward for analysis because of the large number of threecorner milkvetch found in the area.

4.2.3 Allowance for an Energy Corridor at the Tribal Boundary

The BLM suggested an alternative that eliminates development at the northern boundary of the Project site to allow for an energy corridor between the Project site and the Moapa River Indian Reservation. The energy corridor was considered but determined to be unnecessary due to the existing NV Energy utility corridor located approximately 2 miles (3.2 kilometers) west of the application area, on the west side of I-15. There is an additional west-wide energy corridor, designated by the BLM under the direction of Section 368 Energy Policy Act of 2005, that runs in a south-north direction within the eastern portion of the ROW application area. Given these two existing energy corridors within and adjacent to the Project application area, allowance for an additional energy corridor was not carried forward.

4.3 OFF-SITE ALTERNATIVES

4.3.1 Overview

Potential site alternatives to the Project were considered but not carried forward for detailed analysis, as described below.

4.3.2 Private Land Alternatives

The Applicant examined private land in the region to determine whether a suitable private site could be found for the Project. Much of the available private land in the region is parcelized and served by nearby utility systems to accommodate higher-intensity industrial uses, which renders the land too expensive for solar PV development. Additionally, 85 percent of the land mass in Nevada is owned by the federal government, limiting the amount of available private land available for development while increasing the cost of that land.

4 ALTERNATIVES CONSIDERED BUT REJECTED

Development of the Project on private land would not meet BLM's purpose and need to respond to the Applicant's application under Title V of the FLPMA for a ROW grant under the authorities or to meet BLM's goals to promote the responsible production of renewable energy on BLM-administered lands, and for the purposes described above.

4.3.3 Other BLM-Administrated Land Alternatives

4.3.3.1 Requirements for Other Site Alternatives

A successful 690-MW solar facility must have a number of characteristics. The property must have:

- At least 7,100 acres (2,873 hectares) of land
- Proximity to a transmission line with available capacity
- Vehicular access
- Limited environmental conflicts
- Good solar insolation
- Flat slope (under five percent)

Most BLM-administered land in the Project region was eliminated from consideration. These potential site alternatives would have responded to BLM's purpose and need; however, these potential site alternatives were rejected from detailed review because they did not meet the requirements listed above. Sites that meet these criteria, and why they were not considered, or are not a better alternative to the Project site are discussed below. Site selection was ultimately based on opportunity, given the availability of the existing ROW application from Bright Source, its size and flat topography, its proximity to the I-15, and existing major transmission infrastructure with available capacity adjacent to the site.

4.3.3.2 Review of Other Sites

A GIS-based search of variance areas within Clark County was conducted with the following constraints:

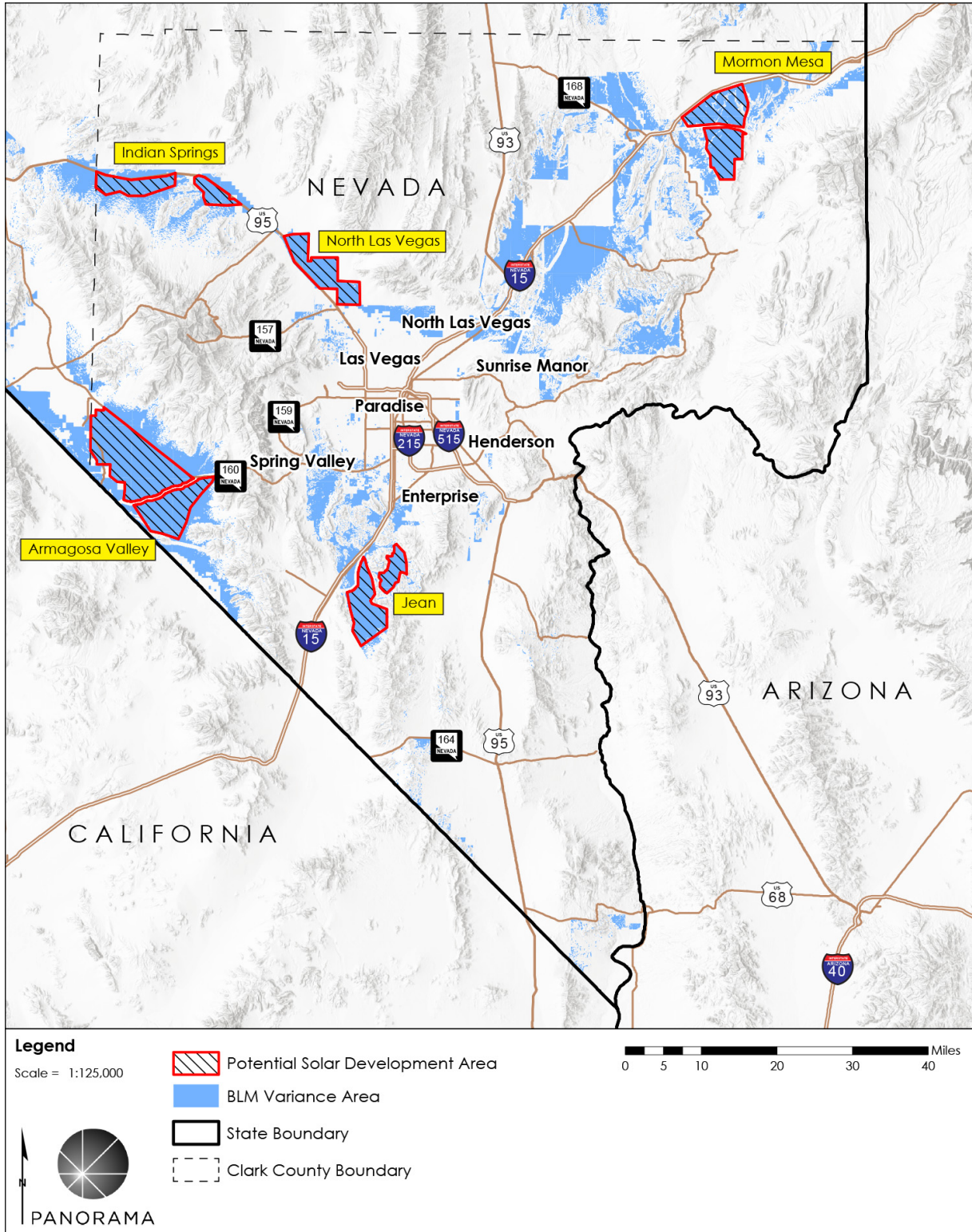
- Limited to variance areas identified in the Solar Programmatic EIS, only
- At least 7,100 contiguous developable acres (2,873 hectares) in the variance area
- Slopes less than five percent
- Does not already have a solar field on it
- Near a major transportation/transmission facility

The results of the search are shown in Figure 7. Five general areas were found to meet the criteria:

- Mormon Mesa (I-15)
- North Las Vegas (Highway 93)
- Indian Springs (Highway 93)
- Jean (I-15)
- Armargosa Valley (Highway 160)

4 ALTERNATIVES CONSIDERED BUT REJECTED

Figure 7 Clark County Potential Solar Development Areas



Sources: (Louis Berger Group, 2018; Esri, 2006; Tele Atlas North America, Inc., 2010; Bureau of Land Management, National Operations Center, National Applications Office, 2009; Airbus, USGS, NGA, NASA, CGIAR, NCEAS, NLS, OS, NMA, Geodatastyrelsen, GSA, GSI and the GIS User Community, 2018; USGS, 2017)

4 ALTERNATIVES CONSIDERED BUT REJECTED

4.3.3.3 Mormon Mesa

The Mormon Mesa area is located approximately 20 miles (32 kilometers) north of the Project site, on the southeast side of I-15. The Applicant currently has an application for this site and it may be developed in the future. The site itself includes the same constraints as the Project, including threecorner milkvetch habitat and desert tortoise habitat.

A segment of the congressionally designated Old Spanish Trail runs in an east-west direction through the Mormon Mesa site. Given the similar constraints to the Project site, the Mormon Mesa site was eliminated from further review as it is not a better alternative than the Project site.

4.3.3.4 North Las Vegas and Indian Springs

North Las Vegas and Indian Springs are two sites located along Highway 93, northwest of Las Vegas. Several ROW applications that overlap the North Las Vegas site were previously submitted, but the applications were withdrawn and closed. These applications include the following:

- Lone Valley LLC, 20-MW PV Solar Project Solar Facility
- First Solar Development LLC, Northwest Project Solar Facility
- First Solar Incorporated, Desert Jade Project Solar Facility

The Indian Springs site also has several overlapping closed ROW applications. One pending ROW application, the Southwest Solar Land Company LLC South Solar Ridge Solar Facility, is for 2,640 acres (1,068 hectares) and overlaps the Indians Springs area. Both the North Las Vegas and the Indian Springs sites are within priority 1 desert tortoise connectivity habitat, identified by United States Fish and Wildlife Service (USFWS). The North Las Vegas and Indian Springs sites were rejected based on the desert tortoise priority 1 habitat, which presents an environmental resource constraint similar to the Project. The Indian Springs site has a pending solar application and the land may not be available for development by the Project.

4.3.3.5 Jean

The Jean site is located approximately 30 miles (48 kilometers) south of Las Vegas, east of I-15 and adjacent to the Town of Jean. Several ROW applications were submitted within the Jean area, including:

- Solstar Gen IV LLC, Sloan Solar Right of Way
- Cogentrix Solar Services LLC, Primm Jean Solar Project Solar Facility
- Cogentrix Solar Services LLC, Primm, Clark Co. Solar Facility (overlapping the above application)
- Cogentrix Solar Services, LLC, McCullough Pass Solar Facility
- Element Power, Jean Solar Facility
- Bright Source Energy Solar, Nelson, NV Solar Facility

The applications for these developments were withdrawn by the applicants and then closed. For at least one of the applications, unsuitable on-site transmission infrastructure for solar development was the cited reason for withdrawal of the application. Clark County's Land

4 ALTERNATIVES CONSIDERED BUT REJECTED

Disposition Bill proposes to expand the current BLM disposal boundary, which would allow for the sale of federal lands for private development. The Jean site is partially within the disposal boundary expansion, as currently identified. The Jean site is also located within USFWS-designated priority 1 desert tortoise habitat and is popular for off-highway vehicle racing. For these reasons, this site alternative was eliminated from further consideration.

4.3.3.6 Armargosa Valley/Pahrump

The Amargosa Valley/Pahrump site is located approximately 10 miles (16 kilometers) south of Pahrump and 32 miles (51 kilometers) west of Las Vegas. The Yellow Pine Solar Project overlaps the Amargosa Valley/Pahrump site and proposes to develop approximately 3,000 acres (1,214 hectares) within a 9,290-acre (3,759-hectare) pending application area. The Copper Rays Solar Facility is a 2,560-acre (1,035-hectare) pending solar energy application adjacent to the Yellow Pine ROW application.

The Armargosa Valley/Pahrump site is located within USFWS-designated priority 2 desert tortoise habitat, defined as other blocks of habitat with the greatest potential to support populations of desert tortoises, outside least cost corridors (priority 1). Given the similar desert tortoise constraint as the Project site and the several pending applications within the Armargosa Valley site, this site was eliminated from further consideration.

4.3.4 Brownfield/Degraded Lands Alternatives

The United States Environmental Protection Agency tracks 480,000 contaminated sites for potential reuse for renewable energy development as part of its RE-Powering America's Lands Initiative. As with the private land alternatives described above, it would be technically possible to develop solar energy on these contaminated sites. However, there were no identified sites in the region that would be sufficiently large enough to support a 690-MW project with appropriate access to transmission lines and substations with adequate capacity.

4.4 TECHNOLOGY CONSIDERATIONS

4.4.1 Solar Thermal Power Generation

BrightSource's 2008 SF 299 application included a request for a ROW grant to develop a solar-thermal renewable energy power generation facility of up to 1,200-MW on approximately 12,000 acres (4,856 hectares) of the 44,000-acre (17,806-hectare) application area. One of the primary reasons for rejecting the solar thermal power option is that the economics of solar thermal are no longer cost competitive to solar PV. A solar thermal project would have similar or considerably greater environmental impacts related to biological resources, including on desert tortoises and birds; water consumption, as mirrors require washing; and visual impacts associated with glare from the mirrors and the high visibility of the 450-foot (137-meter) power towers (BrightSource Energy Inc. , 2008).

4 ALTERNATIVES CONSIDERED BUT REJECTED

4.4.2 Concentrated Photovoltaic Technology

CPV technology uses layers of wafers to absorb different wavelengths of sunlight and provide more power conversion efficiency than typical PV panels. This technology requires dual tracking technology to provide critical alignment with the direct sunlight in order to be efficient. CPV is generally mounted on taller structures than traditional PV (as high as 40 feet [12 meters] above the surface). Because this technology is relatively new, there are risks for long-term performance reliability and manufacturing capacity to supply large-scale utility projects has not been proven to date. Therefore, this alternative has not been carried forward for detailed analysis.

4.5 OTHER TYPES OF RENEWABLE ENERGY PROJECTS

Other types of renewable energy projects, including wind, geothermal, and other solar technologies, were rejected from detailed consideration because they would not meet BLM's purpose and need to respond to the Applicant's application under Title V of the FLPMA for a ROW grant to construct, operate, maintain, and decommission a solar PV facility on public lands.

4.6 DISTRIBUTED GENERATION

Distributed generation solar also was rejected from detailed consideration. Distributed generation refers to the installation of small-scale solar energy facilities at individual locations at or near the point of consumption (e.g., use of solar PV panels on a business or home to generate electricity for on-site consumption). Distributed generation systems typically generate less than 10-MW. To be a viable alternative to the Project, there would have to be sufficient newly installed solar panels to generate up to 690-MW of capacity, approximately the equivalent of 69 typical systems. The rate of PV manufacturing and installation is expected to continue to grow and larger distributed solar PV installations are becoming more common.

An alternative involving distributed generation was eliminated from detailed analysis because it would not respond to BLM's purpose and need for the Proposed Action, which is to respond to the Applicant's application for a ROW grant to construct, operate, and decommission a solar PV facility on public lands in compliance with FLPMA, BLM ROW regulations, and other federal applicable regulations. Additionally, distributed generation would not meet BLM's goals to promote the responsible production of renewable energy on BLM-administered lands. Current research indicates that development of both distributed generation and utility-scale solar power would be needed to meet future energy needs in the United States, along with other energy resources and energy efficiency technologies (NREL, 2010). For a variety of reasons (e.g., upper limits on integrating distributed generation into the electric grid, costs, lack of electricity storage in most systems, and continued dependency of buildings on grid-supplied power), distributed solar energy alone cannot meet the goals for renewable energy development. Ultimately, both utility-scale and distributed generation solar power would need to be deployed at increasing levels, and the highest penetration of solar power overall would

4 ALTERNATIVES CONSIDERED BUT REJECTED

require a combination of both types (NREL, 2010). Furthermore, the BLM has no authority or influence over the installation of distributed generation systems, other than on lands that it administers.

4.7 CONSERVATION AND DEMAND SIDE MANAGEMENT

This potential alternative to utility-scale solar PV energy development consists of a variety of approaches to reduce electricity use, including energy efficiency and conservation, building and appliance standards, and load management and fuel substitution. With population growth and increasing demand for energy, conservation and demand-side management alone is not sufficient to address energy needs. These efforts also do not respond to federal mandates to promote, expedite, and advance the production and transmission of environmentally sound energy resources, including renewable energy resources and in particular, cost-competitive solar energy systems at the utility scale. Accordingly, this potential alternative was rejected from detailed consideration. Conservation and demand-side management approaches also were rejected from detailed consideration because they would not meet BLM's purpose and need to respond to the Applicant's application under Title V of the FLPMA for a ROW grant to construct, operate, maintain, and decommission a solar PV facility on public lands. Additionally, conservation and demand-side management would not meet BLM's goals to promote the responsible production of renewable energy on BLM-administered lands. Furthermore, the BLM has no authority or influence over energy conservation and demand-side management, other than on lands that it administers.

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APPENDIX A LEGAL DESCRIPTION OF ALTERNATIVES

The development areas studied are located on the property identified below. This legal description includes the solar field, gen-tie lines, ancillary facilities, and BLM segment of Valley of Fire Road that would be used by the Project as primary access.

Mount Diablo Meridian, Nevada

T. 17 S., R. 64 E.,

sec. 10, S1/2;

sec. 11, S1/2;

sec. 12;

sec. 13;

sec. 14, N1/2 and SE1/4;

sec. 15, N1/2;

sec. 24, S1/2;

sec. 25;

sec. 26, SE1/4;

sec. 35;

sec. 36, E1/2 and SW1/4;

T. 17 S., R. 65 E.,

sec. 7;

sec. 8;

sec. 9;

sec. 10, W1/2;

sec. 14, W1/2;

sec. 16, W1/2;

secs. 15 thru 22;

sec. 23, W1/2;

sec. 28, W1/2;

secs. 29 thru 32;

sec. 33, W1/2;

T. 18 S., R. 64 E.,

sec. 1;

sec. 2;

sec. 3, SE1/4;

sec. 11;

sec. 12, NW1/4;

T. 18 S., R. 65 E.,

sec. 4, W1/2;

sec. 5;

sec. 6, NE1/4.

The areas described aggregate 10,692 acres (4,327 hectares).

The legal description would further encompass a water pipeline constructed from the Moapa River Indian Reservation to the Project site, if this water source is selected.

T. 16S., R. 65 E.,

sec. 31, W1/2 and SE ¼.

APPENDIX B ECONOMIC ANALYSIS OF MOWING ALTERNATIVES



Arevia Power
1044 10th Avenue
Redwood City, CA 94063

October 4, 2018

Bureau of Land Management
Southern Nevada District Office
4017 N. Torrey Pines Drive
Las Vegas, NV 89130
Attn: Gayle Marrs-Smith, Field Office Manager

Subject: Gemini Solar Project - Economic Viability Concern Regarding “Mowing” and Concerns Around Lack of Long-Term Effects of Desert Tortoise Reintroduction

Dear Ms. Marrs-Smith:

As you are aware, the BLM, in conjunction with guidance from the USFWS, is exploring two different types of construction methods for the Gemini Solar Project due to the presence of Desert Tortoises within the Gemini Solar Project site. The first is the “traditional” method of construction that requires either short or long-distance translocation of the Desert Tortoise population identified on the project site. The second is a new concept of “mowing” the project which would allow those portions of the project that employ this method to “reintroduce” Desert Tortoises after construction through slots in the security fencing. Although the “mowing” method is a less invasive approach to construction the nature of implementing a project in this manner would add *new* and *significant* costs which solar projects built in a “traditional” method do not incur. The purpose of this letter is to officially notify the BLM of the negative impact that mowing would have on the project, and to express Arevia Power’s (“Arevia”) concerns over the potential selection of an alternative requiring a new site preparation technique that is experimental in nature with unknown effects on the desert tortoise population.

NEPA Regulation Requires Rejection of Mowing of Significant Portions of the Gemini Solar Site

40 CFR Sec. 1502.14(a); Forty Questions no. 1a states that “Once the agency has considered a reasonable range of alternatives, it may reject others it reasonably concludes are: ‘infeasible, or inconsistent with the basic policy objectives for the action at issue’ (*State of South Carolina ex rel. Campbell v. O’Leary*, 64 F.3d 892, 900 (4th Cir. 1995) quoting *Headwaters v. Bureau of Land Management*, 914 F.2d 1174, 1180 (9th Cir. 1990)). The superiority of the preferred alternative is irrelevant to the reasonableness of a rejected alternative; the rejection of an alternative needs to be reasonable itself (*Citizens for a Better Henderson v. Hodel*, 768 F.2d 1051, 1057 (9th Cir. 1985)).



The concept of “reasonableness” is further evaluated in the BLM’s NEPA Handbook, which states that “Reasonable Alternatives include those that are practical or feasible from the technical and *economic* standpoint and using common sense, rather than simply desirable from the standpoint of the applicant”. Emphasis added. Accordingly, the economics of an alternative is a necessary part of the evaluation of that alternative, and, as set for below, mowing and reintroduction of significant portions of the Gemini Solar site (fifty percent or more), would render the project uneconomic and not viable.

Only one utility scale solar project to-date that has had “mowing” implemented as the site preparation technique - the Valley Electric Association (“VEA”) Community Solar Project, a 15MW solar project located near Pahrump, in Nye County, Nevada. Arevia obtained information regarding the costs associated with the VEA project, and, applying that information to the Gemini Solar Site, was able to determine the cost *adders* and *savers* that would result from the implementation of *any* mowing on the project site versus implementation of the traditional method of site preparation. The cost impact summary is as follows:

Mowing Cost Impacts Analysis (based on costs obtained from VEA Community Solar Project 15MW)	DC/watt
Addition of DT Openings in Fence (Adder)	\$0.0005
Longer Piles above grade (Adder)	\$0.0170
Labor (Adder)	\$0.0150
Interest During Construction Adder (due to increase in construction duration)	\$0.0045
Civil Work/ Site Prep (Savings)	-\$0.0100
SWPPP Costs (Savings)	-\$0.0050
Cost of Capital Risk to Adders (15% contingency)	\$0.0033
Total Cost Impact (\$/Wdc)	\$0.0253
Total Cost Impact per MW (1:1.5 AC/DC)	\$37,950
Total Cost Impact for 690MW (1:1.5 AC/DC)	\$26,185,500

Thus, based upon the only real-world experience with mowing and tortoise re-introduction, the cost to Arevia to mow and re-introduce a 690 MW project would be at least **\$26,185,500**.

The Gemini Solar Project has not yet secured a power purchase agreement (“PPA”) for the project, and, as you are aware, the project is sited in Nevada, one of the most competitive solar markets from a pricing perspective in the United States. The most recent renewables Request For Proposal solicitation conducted by NV Energy, a likely and natural buyer of the solar power from Gemini, contracted pricing as low as \$23.76 per megawatt hour with no escalator for over 25 years (*see* 2018 IRP filed with the PUCN in June of 2018). Adding \$0.0253 per watt DC in cost to the project is the equivalent of *adding* \$1.00 per megawatt hour to a 25-year PPA price which could be the difference between winning or losing a PPA opportunity in a hypercompetitive bid solicitation process. Therefore, imposing this additional cost to Gemini in an already ultracompetitive PPA environment renders the project much less competitive, perhaps to the point of being uneconomic. Accordingly, requiring mowing and reintroduction of such



significant portions of the Gemini Solar site that the project is rendered uneconomic is prohibited by 40 CFR Sec. 1502.14(a).

Lack of Long-Term Data on Mowing and Reintroduction

There is, to date, no hard data upon which to evaluate the longer term affects to the desert tortoise from the VEA project, the only project where mowing and introduction have been tried. As such, the mowing and reintroduction are *experimental* at best and need to be implemented cautiously and in a measured fashion. The VEA project is 80 acres. The Gemini Solar Project site will be approximately 7,100 acres. Currently two of the alternatives proposed by the BLM (100% mowing and 50% mowing) implements this methodology. ~7,100 acres (100%) and ~3,550 acres (50%) alternatives propose to implement mowing on a significantly grander scale, and indeed is a very *giant* step from the first attempt of 80 acres. A more reasonable approach would be 500-1000 acres of mowing (which is close to one of the alternatives proposed) which would allow for a significant increase over the 80-acre experiment being conducted at the VEA site, while attempting to minimize the Gemini Solar project from becoming uneconomic or unfinanceable.

Limiting the Area of Reintroduction Allows for Greater Percentage of Tortoises Short-Distance Translocated

Moreover, limiting mowing to 500-1000 acres can be complemented by more short-distance translocation which, based on Arevia's biologist expert's analysis, would *decrease* the density of desert tortoise in the area. By limiting mowing and reintroduction to 1000 or less acres, a much higher percentage of tortoises can be short-distance translocated, a concept that is regarded as highly preferable to longer distance translocation.

Conclusion

Mowing and reintroduction of 500-1000 acres of the Gemini Solar project, when combined with short-distance translocation is a win-win proposition in that it allows for study of these techniques in true "utility scale" solar facility setting, while not making the project either uneconomic and unfinanceable, and by limiting the number of tortoises subject to translocation, allowing for a much larger percentage of them to be short distance translocated.

Arevia appreciates your consideration of the contents of this letter and welcomes questions or further discussion on any of these issues.

Best Regards,

A handwritten signature in black ink, appearing to read "Ricardo Graf", is written over a light blue horizontal line.

Ricardo Graf
Managing Partner, CDO
Arevia Power
949.275.7538
ricardo@areviapower.com