DRAFT FINDING OF NO SIGNIFICANT IMPACT AND ENVIRONMENTAL ASSESSMENT FOR IMPLEMENTATION OF NET ZERO ENERGY GOALS AT SIERRA ARMY DEPOT

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DECEMBER 2013

DRAFT FINDING OF NO SIGNIFICANT IMPACT

INTRODUCTION

Sierra Army Depot (SIAD) occupies approximately 36,000 acres in Herlong, California, located in Lassen County just east of the Sierra Nevada Mountains in the northeast portion of California approximately 4 miles west of the California-Nevada border (Figure 1). In April, 2011, the Assistant Secretary of the Army for Installations, Energy, and Environment identified SIAD as one of the Army's pilot installations for implementation of Net Zero energy. As of December 2013, SIAD does not meet the Army's needs for energy sustainability or security. SIAD has prepared an Environmental Assessment (EA) to identify and evaluate potential environmental impacts associated with implementing Net Zero energy goals at SIAD by 2020.

1. PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to implement the Army's Net Zero energy goals at SIAD in order to reduce consumption, conserve resources, and increase efficiencies in energy usage while protecting future operations. The Army partnered with the National Renewable Energy Laboratory (NREL) and the U.S. Department of Energy Federal Management Program (DOE-FEMP) to assess opportunities for increasing energy security through increased energy efficiency and optimized renewable energy strategies at SIAD. Solar photovoltaic (PV) was identified as a viable technology for renewable energy production at SIAD.

2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Proposed Action: The Proposed Action is to develop up to approximately 2.5 megawatts of direct current (MWdc) of solar PV.

Alternatives Considered and Evaluated: Chapter 2 of this EA presents a discussion of the alternatives evaluated. A variety of technologies and locations were initially considered for achieving Net Zero at SIAD. Based on the screening criteria analysis presented in Section 2.3 of the EA, three Alternatives and a No Action Alternative were analyzed:

- **No Action Alternative**: Under the No Action Alternative, SIAD would not construct a solar PV array for solar energy generation. The No Action Alternative does not meet SIAD and Army goals for Net Zero energy.
- **Alternative 1**: Alternative 1 would implement the Net Zero energy goals at SIAD by construction, operation, and maintenance of a solar PV system for energy generation of up to 2.5 MWdc on Site 1 (Figure 2). Site 1 consists of

approximately 13 acres in the western portion of the abandoned landfill west of the access road and directly north of the substation. This site is part of the buffer zone to the abandoned landfill and has been undisturbed and undeveloped.

- **Alternative 2 (Preferred Alternative)**: Alternative 2 would implement the Net Zero energy goals at SIAD by construction, operation, and maintenance of a solar PV system for energy generation of up to 2.5 MWdc on Site 2 (Figure 2). Site 2 consists of approximately 30 acres in the eastern portion of the abandoned landfill located east of the access road and west of Main Magazine Road in the south-central portion of the Installation. This site was used as the main disposal area from the early 1940s to 1965, so the land is previously disturbed.
- **Alternative 3**: Alternative 3 would implement the Net Zero energy goals at SIAD by construction, operation, and maintenance of a solar PV system for energy generation of up to 2.5 MWdc on a combination of Sites 1 and 2.

3. ENVIRONMENTAL ANALYSIS

Chapter 3 of the EA discusses affected environment and potential environmental consequences of the No Action Alternative and Alternatives 1, 2, and 3. This EA addresses environmental, cultural, and socioeconomic impacts associated with the implementation of Net Zero energy goals at SIAD.

Environmental Consequences and Comparison of Alternatives: The Environmental Consequences to Valued Environmental Components (VECs) were analyzed in relation to the Proposed Action and No Action Alternatives. VECs are categories of environmental and socioeconomic effects that enable a managed and systematic analysis of these resources.

Cumulative impacts, also discussed in Chapter 3 of the EA, are the combination of impacts of the Proposed Action, when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes those actions (40 Code of Federal Regulations [CFR] 1508.7). Cumulative impacts can result from actions occurring over a period of time that are minor when each is considered individually, but are significant when viewed collectively. Affected Environment and Environmental Consequences, to include cumulative impacts, were analyzed, as appropriate, by VEC categories. Table 1 summarizes these findings of Chapter 3.

Table 1. Level of Impact to each VEC under each Alternative

Alternative	Activity	Level of Impact	Cumulative Impact	Impact Reduction Measure
Land Use				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible	Negligible	
	Operation			
Alternative 2	Construction			
	Operation			
Alternative 3	Construction			
	Operation			
Air Quality and GHG				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Minor	Negligible	
	Operation	Moderate Beneficial		
Alternative 2	Construction	Minor		
	Operation	Moderate Beneficial		
Alternative 3	Construction	Minor		
	Operation	Moderate Beneficial		
Noise				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible	Negligible	
	Operation			
Alternative 2	Construction			
	Operation			
Alternative 3	Construction			
	Operation			
Geology and Soils				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible to Minor	Negligible	Timing of construction & BMPs for erosion control
	Operation			SWPPP
Alternative 2	Construction			Timing of construction & BMPs for erosion control
	Operation			SWPPP
Alternative 3	Construction			Timing of construction & BMPs for erosion control
	Operation			SWPPP
Water Resources				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible	Negligible	
	Operation			
Alternative 2	Construction			
	Operation			
Alternative 3	Construction			
	Operation			
Biological Resources				
No Action	N/A	Negligible	Negligible	N/A

Alternative 1	Construction	Minor	Negligible	
	Operation	Negligible		
Alternative 2	Construction	Minor		
	Operation	Negligible		
Alternative 3	Construction	Minor		
	Operation	Negligible		
Cultural Resources				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible	Negligible	
	Operation			
Alternative 2	Construction			
	Operation			
Alternative 3	Construction			
	Operation			
Socioeconomics				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Minor Beneficial	Negligible	
	Operation	Negligible		
Alternative 2	Construction	Minor Beneficial		
	Operation	Negligible		
Alternative 3	Construction	Minor Beneficial		
	Operation	Negligible		
Transportation				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible	Negligible	
	Operation			
Alternative 2	Construction			
	Operation			
Alternative 3	Construction			
	Operation			
Airspace				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible	Negligible	
	Operation			
Alternative 2	Construction			
	Operation			
Alternative 3	Construction			
	Operation			
Utilities				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible	Negligible	N/A
	Operation			SWPPP
Alternative 2	Construction			N/A
	Operation			SWPPP
Alternative 3	Construction			N/A
	Operation			SWPPP
Hazardous and Toxic Substances				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible to Minor	Minor	BMPs
	Operation	Negligible	Negligible to Minor	

Alternative 2	Construction	Negligible to Minor	Minor	
	Operation	Negligible	Negligible to Minor	
Alternative 3	Construction	Negligible to Minor	Minor	
	Operation	Negligible	Negligible to Minor	

4. PUBLIC REVIEW AND COMMENTS

The Draft EA and Draft Finding of No Significant Impact (FNSI) will be made available for public review and comments from 25 March to 24 April, 2014. Documents will be available at the Herlong, Lassen County Public, and Washoe County Main Libraries and a Public Notice was published in the Reno Gazette Journal and Lassen County Times newspapers. All documents have been posted on SIAD's website, http://www.sierra.army.mil/Public/. Comments can be sent to Mr. Jake Barlow, NEPA Coordinator at Sierra Army Depot, ATTN: TASI-GRE, 74 C Street, Building 63, Herlong, California 96113, by phone at (530) 827-4698, or by email at jeffrey.j.barlow2.civ@mail.mil. Comments received within the 30-day public review period will be made part of the Administrative Record. The Army will make revisions, as appropriate, to the EA and FNSI based on the comments received.

5. FINDING OF NO SIGNIFICANT IMPACT

I have considered the results of the analysis in the EA, comments received within the public review period, and SIAD Net Zero needs. Based on these factors, I have decided to implement the Net Zero energy goals at SIAD by construction, operation, and maintenance of a solar PV system for energy generation of up to 2.5 MWdc. Alternative 2 (Preferred Alternative) will be chosen for implementation due to the adequate acreage and previously disturbed land available at Site 2. Implementation of the Preferred Alternative will not have a significant impact on the quality of human life or natural environment.

Alternative 2 will be presented for private sector investment for development proposals. We recognize our continuing obligation to consult under Section 106 of the National Historic Preservation Act (NHPA), the Endangered Species Act (ESA), and that additional interagency coordination and permitting would be required during any phase of the project if unanticipated events occur, such as the discovery of archeological relicts or an endangered species.

This analysis fulfills the requirements of the National Environmental Policy Act (NEPA) of 1969, as implemented by the Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508), as well as the requirements of the Environmental Analysis of Army Actions (32 CFR 651). Therefore, issuance of a FNSI is warranted and an Environmental Impact Statement (EIS) is not necessary.

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ROBERT C. SLOSSON Date
LTC, LG
Commanding

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1.0 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The Department of the Army (Army) must meet near-term (as soon as 2013) requirements of Federal statutes and Executive Orders (EOs) which mandate changes in U.S. energy production and consumption toward more sustainable technologies and strategies. The Army, and by extension, Sierra Army Depot (SIAD), must support the following Federal goals, mandates, and directives which highlight and address the need to increase the production and use of power derived from renewable energy sources (any naturally occurring, theoretically inexhaustible source of energy that is not derived from fossil or nuclear fuel):

- *Energy Policy Act of 2005* (EPAct)
- *Energy Independence and Security Act* of 2007 (EISA)
- The *National Defense Authorization Act* of 2007 (NDAA)
- EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*
- EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance.*

Specific to the Department of Defense (DoD), the 2011 Strategic Sustainability Performance Plan (SSPP) and the DoD 2010 Quadrennial Defense Review (QDR) highlight the importance of managing climate change effects and DoD's critical interests therein. The QDR states the climate change/energy security issues as follows:

> *Climate change and energy are two key issues that will play a significant role in shaping the future [U.S.] security environment. Although they produce distinct types of challenges, climate change, energy security, and economic stability are inextricably linked. The actions that the Department takes now can prepare us to respond effectively to these challenges in the near term and in the future.*

Likewise, the SSPP notes the ability of unrestrained climate change to "directly interfere with an installation's ability to carry out its mission." In an effort to meet Federal renewable energy mandates and the goals and issues addressed by the SSPP and QDR, the Army is pursuing the Net Zero initiative, which focuses on installation specific needs. In 2011, the Army announced the initiative, which encourages installations to produce as much on-site energy as it consumes on an annual basis. Through this initiative, the Army, in collaboration with the National Renewable Energy Laboratory (NREL) and with support from the U.S. Department of Energy Federal Management Program (DOE-FEMP), has identified installations which have renewable energy resources which are sufficient to meet installation energy needs. These installations

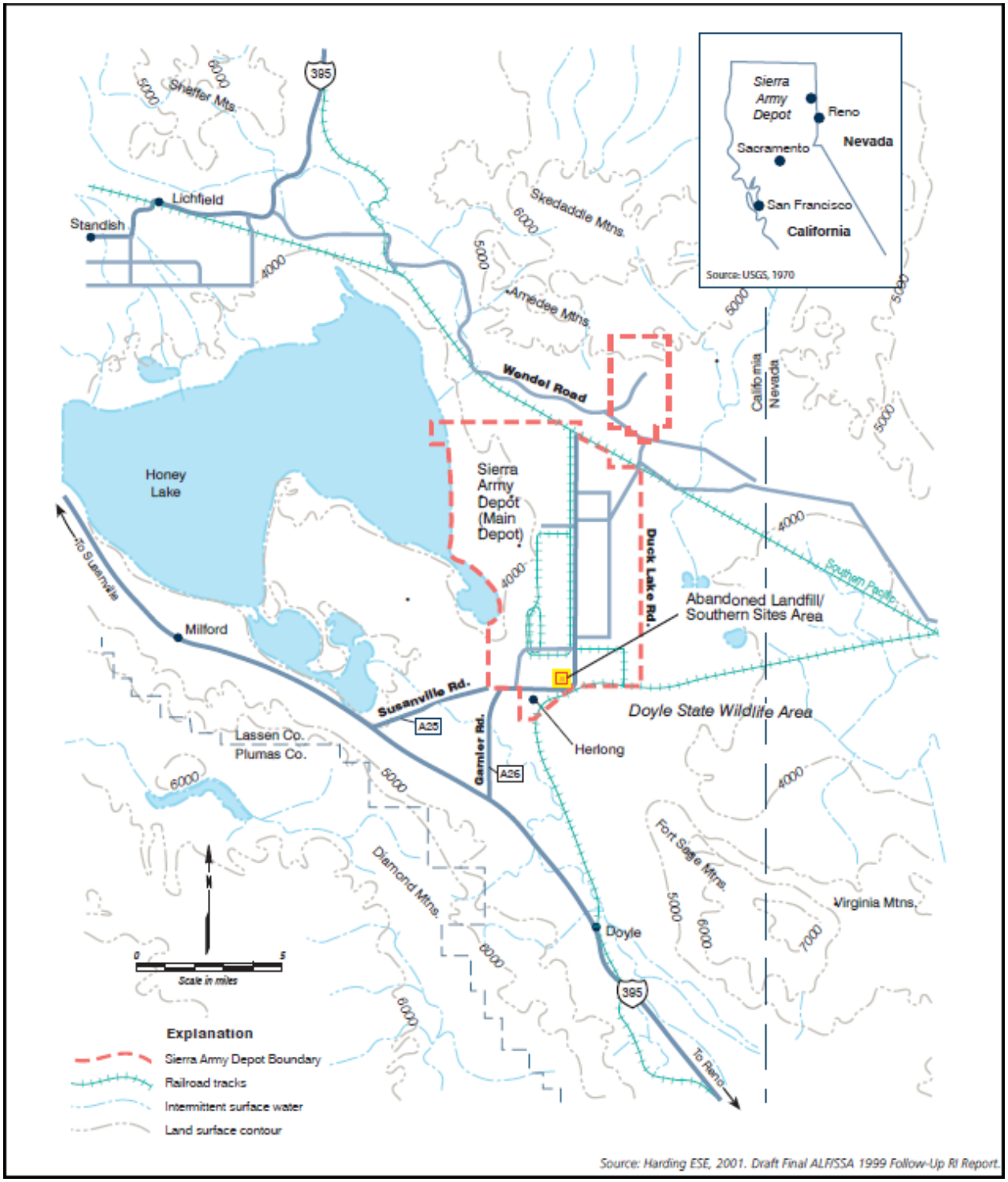
have been encouraged to develop and implement energy efficiency programs which reduce total energy consumption while developing renewable energy resources through public private partnerships (PPPs). The Army has identified SIAD as a site with viable renewable energy resources that can feasibly be developed in a cost effective manner to meet the Installation's and the Army's renewable energy goals.

The primary renewable energy resource that is available and may potentially be developed on SIAD for this EA is solar photovoltaic (PV).

1.2 INSTALLATION BACKGROUND

SIAD occupies approximately 36,000 acres in Herlong, California, located in Lassen County just east of the Sierra Nevada Mountains in the northeast portion of California approximately 4 miles west of the California-Nevada border (Figure 1). SIAD was established in 1942 for the storage of general supplies. Its mission expanded in 1947 to include renovation and demilitarization of ammunition. Most recently, with the 2005 Base Realignment and Closure (BRAC) decision, SIAD was realigned by reducing its conventional ammunition mission to closure in September 2010 and increasing its emphasis on the receipt, storage, Care of Supplies in Storage (COSIS), repair, assembly, and disassembly and shipment of major and secondary items and Container Management (SIAD, 2009). SIAD has been designated as the Center for Industrial Technical Excellence (CITE) for all Petroleum and Water Distribution Systems (PAWS) (SIAD, 2013a).

Figure 1. Sierra Army Depot Location



1.3 PURPOSE AND NEED

Currently, less than 2.1 percent (%) of the energy consumed by the Army comes from renewable energy sources. In 2005, the Energy Policy Act mandated Federal facilities use at least 5% renewable energy by 2010 and 7.5% in 2013 and thereafter. As an installation, SIAD currently generates less than 1% of renewable energy. Total energy consumption for SIAD in fiscal year (FY) 2011 was 162,930 Million Metric British Thermal Units (MMBTUs) (47,750 megawatt-hours (MWh)). SIAD's total cost of energy consumption in FY2011 was $6.5 million (NREL, 2012).

The purpose of the Proposed Action is to implement Net Zero energy goals at SIAD to secure the Installation's mission moving into the future. By implementing Net Zero at SIAD, the Installation would meet and exceed Federal and state requirements for improving energy efficiency, increase the use of renewable energy sources, and enhance the Installation's energy security.

1.4 SCOPE OF THE ANALYSIS AND DECISION TO BE MADE

This Environmental Assessment (EA) identifies, documents, and evaluates the potential effects of the Proposed Action and No Action Alternatives on the natural and human environment of SIAD and the region. This EA has been developed in accordance with the National Environmental Policy Act (NEPA) of 1969; the regulations issued by the Council on Environmental Equality (CEQ), 40 Code of Federal Regulations [CFR] 1500-1508; and the Army's implementing procedures published in 32 CFR Part 651, Environmental Analysis of Army Actions.

NEPA requires all Federal agencies to give appropriate consideration to potential environmental effects of proposed major actions in planning and decision-making. The Army is completing this EA to evaluate the potential impacts and involve the public as it pursues the Net Zero energy goals.

The following Valued Environmental Components (VECs) were identified by SIAD as having the potential for impacts, and are therefore, analyzed for the Proposed Action and No Action alternatives:

- Land Use
- Air Quality and Greenhouse Gas (GHG)
- Noise
- Geology and Soils
- Water Resources
- Biological Resources
- Cultural Resources
- Socioeconomics
- Transportation

- Airspace
- Utilities
- Hazardous and Toxic Substances.

As detailed in Section 2.0 below, the Proposed Action consists of three alternatives (including a preferred alternative) that may be necessary to implement Net Zero energy goals, comply with Federal and Army energy mandates, and meet the Army's energy security objectives. The final decision of which alternative to be implemented will, therefore, be covered within the Finding of No Significant Impact (FNSI), assuming that the decision made is a FNSI. If it is determined that implementation of the selected Proposed Action Alternative would result in unavoidable or non-mitigable significant environmental impacts, the Army would publish a notice of intent (NOI) and initiate the preparation of an Environmental Impact Statement (EIS). The geographical scope of the analysis includes alternatives being considered for implementation on SIAD.

1.5 PUBLIC REVIEW PROCESS

As required by NEPA, SIAD invites public participation in the EA process. Comments from all interested persons promote open communication and enable better decision-making. All agencies, organizations, and members of the public with a potential interest in the Proposed Action, were provided the opportunity to participate in this process.

This EA process includes a 30-day public review period. Newspaper announcements have occurred in the Reno Gazette Journal and Lassen County Times regarding the availability of this Draft EA and FNSI, the duration of the public comment period, and how to obtain information about this Draft EA and FNSI and provide comments. Copies of this Draft EA and FNSI have also been placed at local libraries. This document has also been placed for review on SIAD's website at the following URL address: http://www.sierra.army.mil/Public/. Comments can be sent to Mr. Jake Barlow, NEPA Coordinator at Sierra Army Depot, ATTN: TASI-GRE, 74 C Street, Building 63, Herlong, California 96113, by phone at (530) 827-4698, or by email at jeffrey.j.barlow2.civ@mail.mil. Public comments received within the 30-day comment window will be made part of the Administrative Record. The Army will make revisions, as appropriate, to the EA and FNSI based on the comments received.

Table 2. Summary of Media and Locations for Public Comment Review

Media	Contact
Herlong Library	P.O. Box 775 Herlong, CA 96113

Lassen County Public Library	1618 Main Street Susanville, CA 96130-4505 http://lassenlibrary.org/go/
Washoe County Main Library	301 S. Center Street Reno, NV 89501 http://www.washoecounty.us/library/
Reno Gazette Journal	955 Kuenzli Street Reno, NV 89502-2000 http://www.rgj.com/
Lassen County Times	100 Grand Avenue Susanville, CA 96130 http://www.lassennews.com/
SIAD Website	http://www.sierra.army.mil/Public/

2.0 PROPOSED ACTION, ALTERNATIVES, AND SCREENING CRITERIA

2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, SIAD would not leverage the Net Zero Energy Installation (NZEI) initiative to accelerate reduction of energy consumption beyond those policies and procedures that are currently in place. SIAD's energy use would continue to be approximately 162,930 MMBTUs (47,750 MWhs) (at a cost of $6.5 million, FY2011) per year, and building energy efficiency would not improve. The consumption of energy derived from renewable sources on SIAD would continue to be less than 1% of the Installation's overall energy use (NREL, 2012).

2.2 PROPOSED ACTION AND ALTERNATIVES

The Army's proposed action is to implement Net Zero energy goals at SIAD while meeting energy mandates for renewable energy production and GHG emissions reduction. Implementation of the proposed project would increase SIAD energy security and ensure future mission support at SIAD. The Project discussed may not be implemented to the full extent presented. It is recognized that technological advancements, legislative changes, changing economics and other factors may drive changes to the proposed project. However, the document will be framed to address a potential project that may move forward in the mid-long term (next 3-5 years).

The Army identified that development of up to approximately 2.5 megawatts of direct current (MWdc) of solar PV is viable at SIAD on up to approximately 15 acres of SIAD land. A feasibility study, completed by NREL in September 2013, looked at different sizes of solar PV systems to determine the largest alternating current (AC) capacity that

could be installed without causing significant impact to the voltage regulation on the distribution system. The results of the study indicated that a 2 MW AC (2.5 MWdc) system is the largest feasible size to interconnect at SIAD without significant impact to the voltage stability on the distribution system. A larger PV system could require significant upgrades to the SIAD electrical distribution system that would be costly and make the project uneconomical. A 2.5 MWdc system could achieve 30% of the Net Zero electric goal.

The PV technology converts sunlight directly into electric current through the use of semiconductors. Semiconductors are usually composed of crystalline silicon wafers, either single crystal or polycrystalline, and thin film amorphous silicon. When semiconducting materials are exposed to light, they absorb some of the sun's energy in the form of photons and emit electrons in the form of electricity. The electricity produced is direct current (DC).

The basic PV cell produces only a small amount of power. To produce more power, PV cells are wired in a series to form panels that can range in output from 10 to 300 watts. Several PV panels are installed in a rack to form a photovoltaic array. Arrays can be mounted at a fixed angle facing south or they can be mounted on a tracking system that follows the sun's path to optimize and increase power production.

The power-producing components of a PV facility consist of the solar array field (the PV panels), the power conditioning system (PCS), which contains an inverter to convert the energy produced from DC to AC for use on the electrical grid, and a transformer to boost voltage for feeding the power into the electrical grid. Tracking systems utilize hydraulic or electric motors, which are closed systems, to rotate the solar panels so that they are continuously perpendicular to the sun. The PCS also contains devices that can sense grid destabilization and automatically disconnect the PV facility from the grid, if needed. PV panels are commonly installed on racks and can be mounted to the ground, rooftops, poles, or carports.

Construction: This technology generally requires flat or gently rolling terrain with unobstructed southerly views. Approximately six acres are required to produce one MW of electricity per year. State prescribed Best Management Practices (BMPs) would be utilized to control fugitive dust and erosion during construction. Following construction, disturbed areas, including maintenance roads, would be surfaced with gravel. Stormwater drainage would comply with Section 438 of the Energy Independence and Security Act (EISA) 2007 and other Federal and state requirements.

The PV arrays would be approximately 15 feet high, depending upon on panel type (fixed or tracking), ballasting requirements (concrete pier up to 10 feet in depth), and tilt of the panels. They would be placed in rows with access routes between rows.

Electrical conduits between the solar panels and the feeder line would be underground, and the electric feeder line to connect the arrays to the electrical grid would either be buried or overhead. The electrical conduits and feeder lines would be installed adjacent to existing roads or utility right-of-ways. Overhead electric lines would be constructed in accordance with avian protection guidelines, as described in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee [APLIC], 2006). The depth of all underground lines would be dependent upon the voltage, in accordance with the National Electric Safety Code (NESC). Final siting of utility lines would be reviewed by Directorate of Base Support personnel prior to construction to ensure no unforeseen environmental impacts arise; if so, additional NEPA analysis may be required.

The number of PV arrays, their arrangement, and the length of the electric feeder line would be dependent upon the dimensions of each site, the power requirements of the end-using facility, and the distance and route of the electric feeder line from the site to the substation.

Electrical Tie-In: The PV array would tie into the SIAD substation.

Operation and Maintenance: Occasional maintenance would be required for the PV arrays, including panel washing and panel replacement. Water use for operations and maintenance would include washing of the solar panels when necessary. The estimated water use for panel washing is approximately 0.007 acre-feet (ac-ft)/year (yr)/MW (BLM and DOE, 2010).

Estimated Capacity: SIAD would develop up to approximately 2.5 MWdc of solar PV, which would require a total footprint area of approximately 15 acres with additional acreage potentially required for electrical interconnection.

Location Alternatives: The location options of the solar PV arrays form the basis for the alternatives in this EA and are discussed in detail in Sections 2.2.1 and 2.2.2. SIAD would pursue the use of solar PV technology at one or a combination of two sites.

Emissions Control: There are no emissions control technologies anticipated to be necessary as a result of implementing solar PV at SIAD.

2.2.1 ALTERNATIVE 1

Alternative 1 would implement the Net Zero energy goals at SIAD by construction, operation, and maintenance of a solar PV system for energy generation of up to 2.5 MWdc on Site 1 (Figure 2). Site 1 consists of approximately 13 acres in the western portion of the abandoned landfill west of the access road and directly north of the substation. This site is part of the buffer zone to the abandoned landfill and has been

undisturbed and undeveloped.

2.2.2 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

Alternative 2 would implement the Net Zero energy goals at SIAD by construction, operation, and maintenance of a solar PV system for energy generation of up to 2.5 MWdc on Site 2 (Figure 2). Site 2 consists of approximately 30 acres in the eastern portion of the abandoned landfill located east of the access road and west of Main Magazine Road in the south-central portion of the Installation. It was used as the main disposal area from the early 1940s to 1965, so the land is previously disturbed (SIAD, 2007).

2.2.3 ALTERNATIVE 3

Alternative 3 would implement the Net Zero energy goals at SIAD by construction, operation, and maintenance of a solar PV system for energy generation of up to 2.5 MWdc on a combination of Sites 1 and 2 (Figure 2).

Figure 2. Site Locations

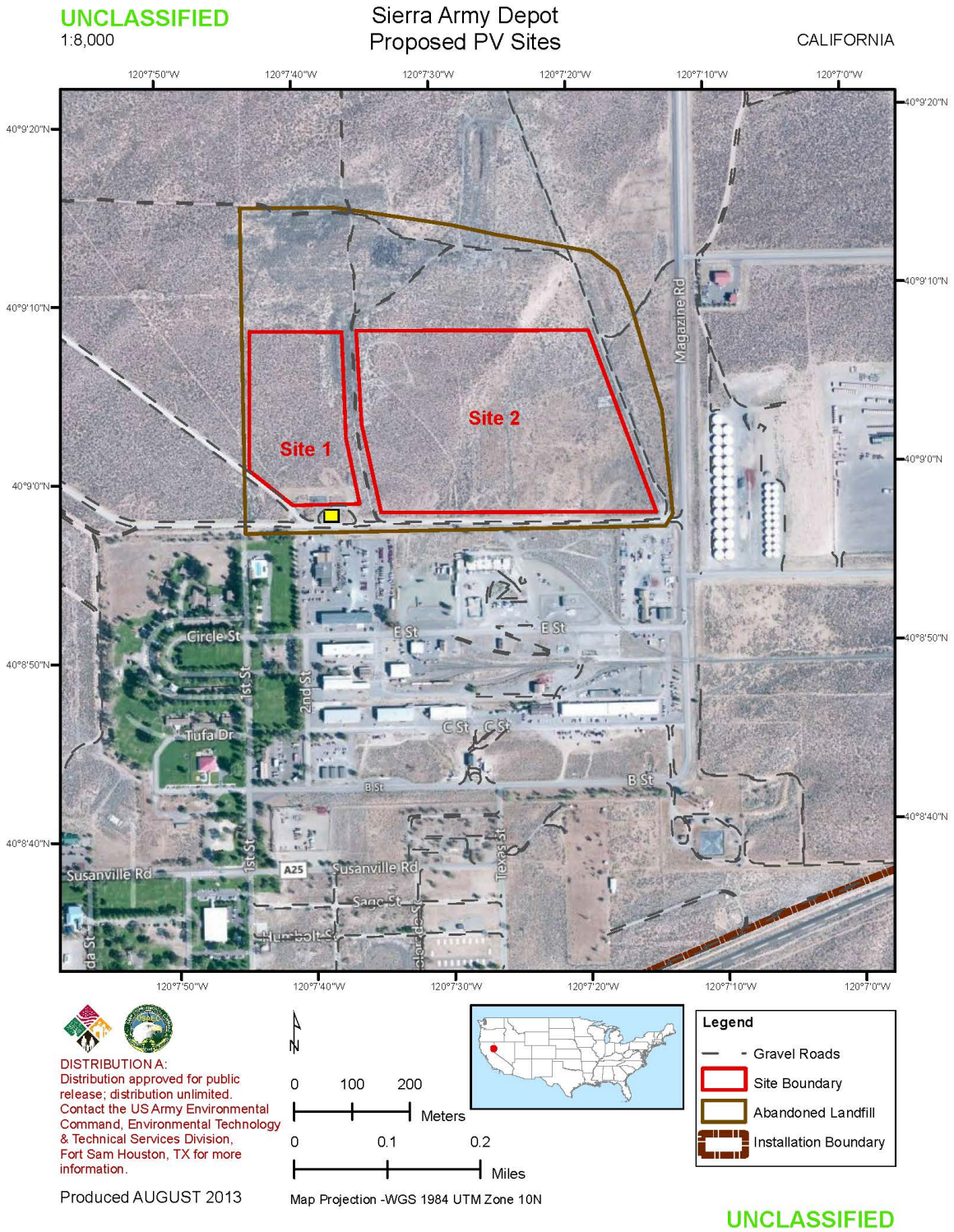
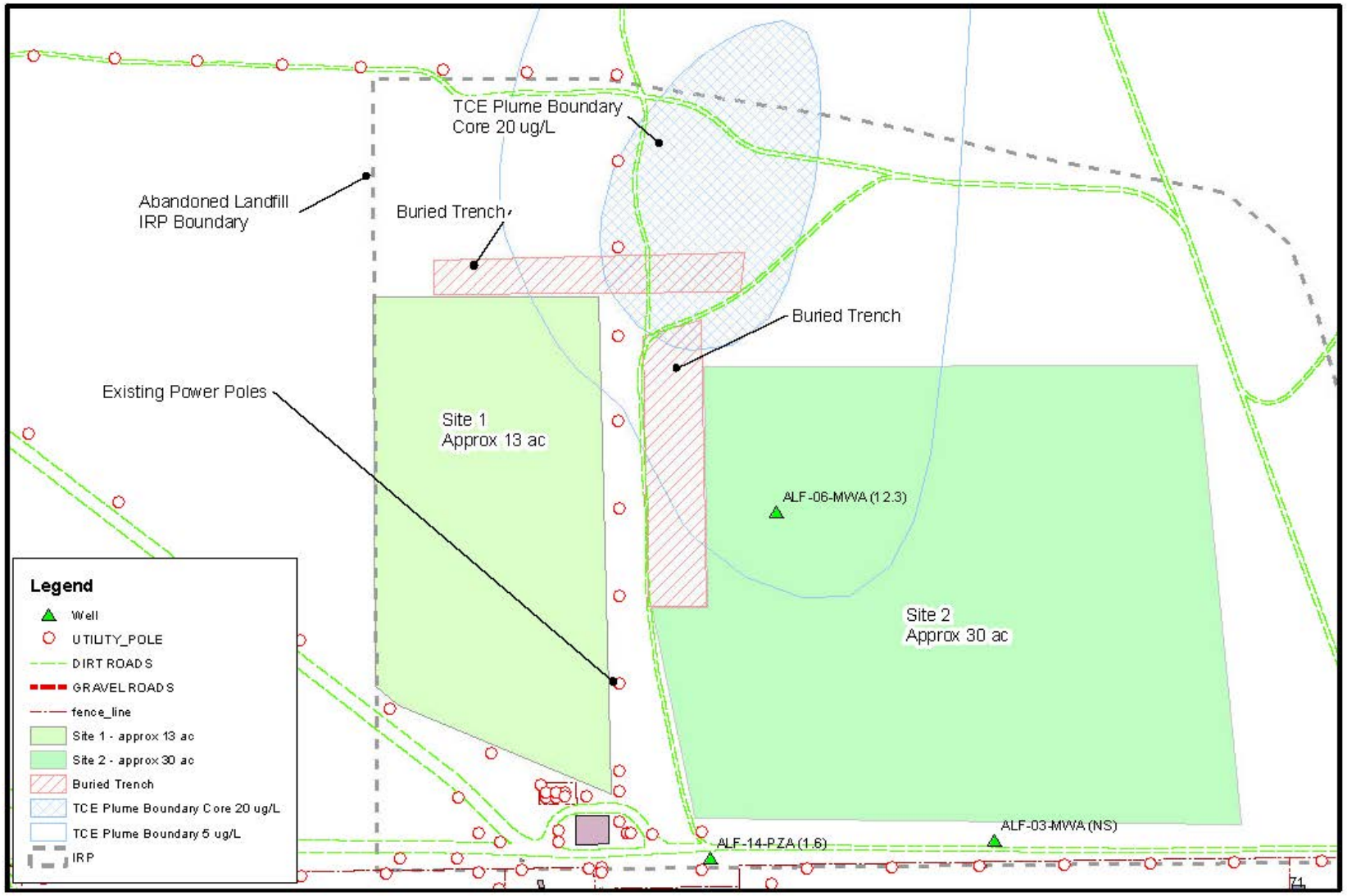


Figure 3. Detailed Site Locations



N

SIERRA ARMY DEPOT

0 70 140 280 420 560 Feet

2.3 SCREENING CRITERIA

SIAD has performed rigorous screening to determine which technologies and Installation sites are available to support the implementation of Net Zero energy goals. In order to be considered a viable alternative and carried forward for analysis, the alternatives must meet the following screening criteria:

- **Mission Compatibility:** Must be compatible with the military missions and training occurring at SIAD and on other nearby military installations. Site development and operations may not adversely impact training activities or future planned development activities.
- **Grid Access and Electrical Tie-in Potential (Renewable Energy):** Must be close to transmission facilities (substations) or have technical viability and economic justification to building new electrical lines for interconnection to the SIAD distribution system or the grid. The grid infrastructure must be capable of transporting, or being upgraded to transport, electricity generated by the alternative.
- **On-Installation Energy Generation Potential for Increased Energy Security:** Must allow SIAD to have greater control of and access to its energy supplies while reducing the possibility of external distribution failures. Preference should be given to site locations allowing maximum use of the energy produced.
- **Geophysical Factors:** Must have topography, aspect, slope, and soils compatible with the proposed infrastructure.
- **Environmental Factors:** Sensitive species or habitat, archaeological resources, or environmental safety hazards should be avoided to the maximum extent practicable.
- **Safety & Unexploded Ordnance (UXO):** Must involve minimized exposure to UXO and damage from munitions. Must not jeopardize personal safety of those constructing, operating, or maintaining the facilities.
- **Project Financeability & Use of Proven Technologies:** Must use proven renewable energy technologies that may be financed at reasonable rates.
- **Compliance with Federal Mandates and DoD or Army Goals:** Must enhance compliance with government mandates and DoD or Army goals and objectives regarding renewable energy production, energy security, increased energy efficiency, water conservation, and waste and GHG emissions reduction.
- **Utility Considerations:** Must be reasonably acceptable to the current electric supplier and not unreasonably interfere with their ability to absorb intermittent impacts and variance in peak energy generation.

2.4 ALTERNATIVES SCREENED FROM FURTHER CONSIDERATION

The following alternatives have been considered, but have been excluded from further consideration in this EA. Although these alternative technologies would not meet the

near-term energy goals of SIAD, they could be considered later under appropriate NEPA analysis.

2.4.1 CONSTRUCT AND OPERATE RENEWABLE ENERGY FACILITY OFF-POST

The construction and operation of a renewable energy facility off-post would not provide SIAD with the necessary energy security to guarantee that power could be reliably delivered to support SIAD's operations. Energy supply and transmission must be protected, where possible, through on-post energy generation. In addition, EO 13423, section 2(b), states a preference that federal agencies implement new renewable energy generation projects on agency property for agency use. Likewise, to reinforce that preference, EPAct 2005, section 203, provides Federal agencies a double credit toward the agencies' renewable energy consumption mandate if the renewable energy is produced and used on-site.

2.4.2 PURCHASE RENEWABLE ENERGY CREDITS

The purchase of Renewable Energy Credits would not provide renewable energy development on SIAD and would therefore not enhance the Installation's energy security posture. Credits are purchased on the open market and/or through a Renewable Energy Credit brokerage. A credit typically represents delivery of one megawatt-hour (MWh) of renewable energy to the grid and all associated environmental benefits of displacing one MWh of conventional energy. Credits allow the environmental attributes associated with renewable energy production to be monetized and marketed. This alternative would not alleviate the energy threats to installations or enhance energy security. Energy dependence on off-post electrical supplies and transmission would continue. Moreover, since Renewable Energy Credits may arise from renewable energy production that occurs at facilities far distant from the Installation, the credit purchases are unlikely to provide the environmental and socio-economic benefits associated with localized renewable energy production (Fort Carson, 2012).

2.4.3 CONSTRUCT AND OPERATE OTHER RENEWABLE ENERGY TECHNOLOGIES

The uses of the technologies listed below are not included in this EA as they are either not currently economically feasible on SIAD or are typically installed on a building rather than a particular land area:

- **Wind:** Economic wind resource development typically requires wind speeds of 7 meters/second or better at 50 meters (height). While a detailed wind study has not been completed at SIAD, regional wind data strongly suggests SIAD does not have economically developable wind resources.
- **Geothermal:** There are currently no verified geothermal resources of sufficient size to make operation of such a facility economically feasible.

- **Solar Hot Water (SHW)**: SHW collectors are typically installed on the roofs of viable buildings and consist of a thin, flat, rectangular box with a transparent cover that faces the sun. Small tubes run through the box and carry the fluid – either water or other fluid to be heated. The tubes are attached to an absorber plate, which is painted black to absorb the heat. As heat builds up in the collector, it heats the fluid passing through the tubes. A storage tank then holds the hot fluid. NREL has identified a limited number of SHW systems to be potentially located at SIAD, and would be located where there is a sufficient hot water demand (i.e. gymnasium, barracks). However, SHW systems will not be discussed as an alternative in this EA as they are typically roof-mounted systems, will not be located on or adjacent to the solar PV sites, and further economic assessment is required to confirm their economic viability.
- **Solar Ventilation Preheating (SVP):** SVP typically uses a transpired collector, which consists of a thin, black metal panel mounted on a south-facing wall to absorb the sun's heat. Air passes through the many small holes in the panel. A space behind the perforated wall allows the air streams from the holes to mix together. The heated air is then sucked out from the top of the space into the ventilation system. NREL has identified a small number of instances of SVP to be potentially utilized at SIAD, but will also not be discussed as an alternative in this EA. SVP is building-mounted and will not be located on or adjacent to the solar PV location alternatives, and will not be considered in this EA.
- **Ground Source Heat Pumps (GSHPs):** GSHP units use the constant temperature of the earth to heat or cool buildings instead of using outside air temperature. GSHP systems are generally composed of geothermal heat pumps, fluid circulating pumps, and a buried ground loop heat exchanger usually associated with a specific building. NREL has identified GSHPs to be potentially viable at SIAD in the future, particularly if natural gas prices rise substantially from most long-term forecasts, but would require detailed financial analysis and projections to confirm their economic viability. Additionally, GSHPs would not be located on or adjacent to the solar PV location alternatives. Therefore, GSHPs will not be included in this EA.

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3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 APPROACH FOR ANALYZING IMPACTS

Impacts on each resource can vary in degree or magnitude from a slightly noticeable change to a total change in the environment. For the purpose of this analysis, the intensity of impacts will be classified as negligible, minor, moderate, significant, or beneficial. The intensity thresholds are defined as follows:

- **Negligible:** A resource would not be affected or the effects would be at or below the level of detection, and changes would not result in any measurable or perceptible consequences.
- **Minor:** Effects on a resource would be detectable, although the effects would be localized, small, and of little consequence to the sustainability of the resource. Mitigation measures, if needed to offset adverse effects, would be simple and achievable.
- **Moderate:** Effects on a resource would be readily detectable, long-term, localized, and measurable. Mitigation measures, if needed to offset adverse effects, would be extensive and likely achievable.
- **Significant:** Effects on a resource would be obvious, long-term, and would have substantial consequences on a regional scale. Extensive mitigation measures to offset the adverse effects would be required and success of the mitigation measures would not be guaranteed.
- **Beneficial:** Effects on a resource would be beneficial.

3.1.1 CUMULATIVE IMPACTS

CEQ Regulations implementing NEPA defines a “cumulative impact” as follows:

> *Cumulative impact is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).*

EPA guidance to reviewers of cumulative impacts analyses further adds:

> *…the concept of cumulative impacts takes into account all disturbances since cumulative impacts result in the compounding of the effects of all actions over time. Thus, the cumulative impacts of an action can be viewed as the total effects on a resource, ecosystem, or human community of that action and all*

other activities affecting that resource no matter what entity (Federal, non-Federal or private) is taking the action (EPA, 1999).

For the purposes of this EA, cumulative impacts result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable actions regardless of who undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. For the purposes of the cumulative impacts analysis, the Proposed Action's region of influence (ROI) is limited to SIAD and adjacent lands (including communities around the Installation). This ROI includes areas where the Proposed Action's effects would most likely contribute to cumulative environmental effects.

Cumulative impacts are addressed within each resource section following the discussion of environmental consequences for each alternative. This analytical approach provides a more complete understanding of resource conditions that implementation of the Proposed Action might magnify, amplify, or otherwise exacerbate or cause beneficial or adverse effects to resources on a regional or temporal scale.

3.2 LAND USE

3.2.1 AFFECTED ENVIRONMENT

SIAD occupies approximately 36,000 acres in Herlong, California, located in Lassen County just east of the Sierra Nevada Mountains in the northeast portion of California near the Nevada border.

3.2.2 ENVIRONMENTAL CONSEQUENCES

3.2.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no land use compatibility issues or land use conflicts would occur on-Post or to adjacent lands off-Post. SIAD would not leverage the Net Zero energy initiative to accelerate reduction of energy consumption beyond those policies and procedures that are currently in place.

3.2.2.2 ALTERNATIVE 1

Land use would be impacted by the construction, use, and maintenance of the components of the proposed solar PV array. Despite Site 1 being a buffer zone to the abandoned landfill and thus undisturbed and undeveloped, the loss or degradation of this land is minimal in comparison to the amount of similar land available within the region and at SIAD. Therefore, the proposed solar PV array is consistent with land use plans at SIAD and would not affect those resources that are required for, support, or benefit current land use. Thus, the proposed solar PV array would have negligible impacts on land use.

3.2.2.3 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

Land use would be impacted by the construction, use, and maintenance of the components of the proposed solar PV array. The loss or degradation of this land is minimal in comparison to the amount of similar land available within the region and at SIAD. Therefore, the proposed solar PV array is consistent with land use plans at SIAD and would not affect those resources that are required for, support, or benefit current land use. Thus, the proposed solar PV array would have negligible impacts on land use.

3.2.2.4 ALTERNATIVE 3

Land use impacts would be the same as Alternatives 1 and 2.

3.2.3 CUMULATIVE IMPACTS

No large-scale projects or proposals at SIAD have been identified that when combined with the Preferred Alternative, would contribute to land use; therefore, cumulative impacts to land use are anticipated to be negligible.

3.3 AIR QUALITY AND GREENHOUSE GAS (GHG)

3.3.1 AFFECTED ENVIRONMENT

3.3.1.1 NATIONAL AMBIENT AIR QUALITY STANDARDS AND ATTAINMENT STATUS

The U.S. Environmental Protection Agency (USEPA) established National Ambient Air Quality Standards (NAAQS) for specific pollutants determined to be of concern with respect to the health and welfare of the general public (USEPA, 2010). Ambient air quality standards are classified as either "primary" or "secondary." The major pollutants of concern, or criteria pollutants, are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$), and lead. NAAQS represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect the public health and welfare. The NAAQS for NO_2 is 100 micrograms per cubic meter (µg/m^3), or 0.05 parts per million (ppm) on an annual average. The NAAQS for CO is 10,000 µg/m^3, or 9 ppm, for an 8-hour averaging period and 40,000 µg/m^3, or 35 ppm, for a 1-hour averaging period. The NAAQS for O_3 is 235 µg/m^3, or 0.08 ppm, for an 8-hour averaging period.

Areas that do not meet NAAQS standards are called non-attainment areas; areas that meet both primary and secondary standards are known as attainment areas. The Federal Conformity Final Rule (40 CFR Parts 51 and 93) specifies criteria or requirements for conformity determinations for Federal projects. The Federal Conformity Rule was first promulgated in 1993 by the USEPA, following the passage of Amendments to the Clean Air Act in 1990. The rule mandates that a conformity

analysis must be performed when a Federal action generates air pollutants in a region that has been designated a non-attainment or maintenance area for one or more NAAQS.

A conformity analysis is the process used to determine whether a Federal action meets the requirements of the General Conformity Rule. It requires the responsible Federal agency to evaluate the nature of a proposed action and associated air pollutant emissions, and calculate emissions as a result of the proposed action. If the emissions exceed established limits, known as *de minimis* thresholds, the proponent is required to implement appropriate mitigation measures.

Federal and most states' agencies segregate air sheds by county boundaries. In Lassen County, the state of California has classified the air quality as:

- Attainment for $PM_{2.5}$, PM_{10}, NO_2, SO_2, O_3 8-hour, CO, and lead.

3.3.1.2 GREENHOUSE GASES

Greenhouse gases (GHGs) are chemical compounds in the Earth's atmosphere that allow incoming short-wave solar radiation but absorb long-wave infrared radiation re-emitted from the Earth's surface, trapping heat. Most studies indicate that the Earth's climate has warmed over the past century due to increased emissions of GHGs, and that human activities affecting emissions to the atmosphere are likely an important contributing factor.

Gases exhibiting greenhouse properties come from both natural and human sources. Water vapor, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) are examples of GHGs that have both natural and manmade sources, while other GHGs such as chlorofluorocarbons are exclusively manmade. In the U.S., most GHG emissions are attributed to energy use. Such emissions result from combustion of fossil fuels used for electricity generation, transportation, industry, heating, and other needs.

The principal GHGs that enter the atmosphere due to human activities are:

- **Carbon Dioxide (CO_2)**: CO_2 enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). CO_2 is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.
- **Methane (CH_4)**: Methane is emitted during the production, transport, and combustion of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.

- **Nitrous Oxide (N_2O)**: Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
- **Fluorinated Gases**: Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone (O_3)-depleting substances. These gases are typically emitted in smaller quantities, but because they are potent GHGs, they are sometimes referred to as High Global Warming Potential gases.

3.3.2 ENVIRONMENTAL CONSEQUENCES

3.3.2.1 NO ACTION ALTERNATIVE

The No Action Alternative would result in continued deterioration of air quality from the failure to implement cleaner technologies. Levels of GHG emissions would continue to increase at present rates under the status quo.

3.3.2.2 ALTERNATIVE 1

Short-term minor adverse impacts and long-term moderate beneficial effects on air quality would be anticipated. The short-term minor adverse effects would be from air emissions during construction and installation of the solar PV systems, and long-term beneficial effects from indirect reductions in the use of fossil-fuel-based electricity.

3.3.2.3 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

Short-term minor adverse impacts and long-term moderate beneficial effects on air quality would be anticipated. The short-term minor adverse effects would be from air emissions during construction and installation of the solar PV systems, and long-term beneficial effects from indirect reductions in the use of fossil-fuel-based electricity.

3.3.2.4 ALTERNATIVE 3

Air Quality and GHG impacts would be the same as Alternatives 1 and 2.

3.3.3 CUMULATIVE IMPACTS

No large-scale projects or proposals at SIAD have been identified that when combined with the Preferred Alternative, would contribute to air quality and GHG; therefore, cumulative impacts to air quality and GHG are anticipated to be negligible.

3.4 NOISE

3.4.1 AFFECTED ENVIRONMENT

Noise is generally described as unwanted sound, which can be based either on objective impacts (i.e., hearing loss, damage to structures, etc.) or subjective judgments (e.g., community annoyance). Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as sound level.

The threshold of human hearing is approximately 3 dB, and the threshold of discomfort or pain is around 120 dB. Some statistical noise levels are stated in terms of decibels on the A-weighted scale (dBA). Noise levels stated in terms of dBA reflect the response of the human ear by filtering out some of the noise in the low and high frequency ranges that the ear does not detect well. The A-weighted scale is used in most ordinances and standards.

Onsite noise levels are regulated, in a sense, through the Occupational Safety and Health Administration (OSHA). The noise exposure level of workers is regulated at 90 dBA, over an 8-hour work shift to protect hearing (29 CFR 1910.95). Onsite noise levels are anticipated to be in the 70 to 85 dBA range. Areas above 85 dBA would be posted as high noise level areas and hearing protection would be required.

3.4.2 ENVIRONMENTAL CONSEQUENCES

3.4.2.1 NO ACTION ALTERNATIVE

Selecting the No Action Alternative would result in no impact to the ambient noise environment.

3.4.2.2 ALTERNATIVE 1

No noise generated by either construction or operational activities would leave SIAD; therefore, no impacts on noise as it relates to the general public would occur. Within SIAD, noise generated by the construction and operational activities would be intermittent and temporary. The implementation of this alternative would result in negligible impacts on the noise environment within SIAD since the PV panels would operate in silent mode and there are no sensitive noise receptors near Site 1.

3.4.2.3 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

No noise generated by either construction or operational activities would leave SIAD; therefore, no impacts on noise as it relates to the general public would occur. Within SIAD, noise generated by the construction and operational activities would be intermittent and temporary. The implementation of this alternative would result in negligible impacts on the noise environment within SIAD since the PV panels would operate in silent mode and there are no sensitive noise receptors near Site 2.

3.4.2.4 ALTERNATIVE 3

Noise impacts would be the same as Alternatives 1 and 2.

3.4.3 CUMULATIVE IMPACTS

No large-scale projects or proposals at SIAD have been identified that when combined with the Preferred Alternative, would create areas of incompatible land use or violate any Federal, state, or local noise ordinance; therefore, cumulative impacts to noise are anticipated to be negligible.

3.5 GEOLOGY AND SOILS

3.5.1 AFFECTED ENVIRONMENT

A majority of SIAD is located in the southeastern section of the Honey Lake Basin, which consists of consolidated and unconsolidated sediments of silt clay and sand. Local faults break up the basin into a series of sub-basins. Three faults are located within SIAD's boundaries. The Fort Sage Fault and an unnamed fault exist under the Cantonment Area and the depot community of Herlong. The other fault is unnamed and runs across the central eastern boundary of SIAD, underlying a portion of the ammunition storage area. Historically, moderate earthquakes have occurred in Honey Lake Valley ranging in magnitude from 5.6 to 5.9 on the Richter scale (USACE, 1998). The most damaging earthquake occurred in 1950 along the Fort Sage fault about 3 miles south of Herlong. The earthquake caused damage to water mains, electrical conduits, and sewers throughout SIAD.

A majority of the soils at SIAD are characterized as Epot-Playas, Calneva silt loam, and Lieberman complexes. These soils are well drained with slow permeability. Throughout the Main Parcel, the alkali flats in the central and northern parts are mapped in slowly permeable soil series that are reported to include playa inclusions. Most of the soils in the alkaline flat are well drained, except for the playas and playa inclusions, which are poorly drained (SIAD, 2001).

3.5.2 ENVIRONMENTAL CONSEQUENCES

3.5.2.1 NO ACTION ALTERNATIVE

No ground-disturbing actions would occur as a result of the construction of solar PV panels; therefore, no impacts on soils would occur.

3.5.2.2 ALTERNATIVE 1

Ground disturbance would be necessary to construct the solar PV array and would directly impact soils at any of the proposed sites. Long-term direct impacts would result from the disturbance of surface and near-surface soil horizons through heavy machinery and vehicle traverses associated with the construction of the solar PV panels. Although these impacts are considered long-term, they would not result in major impacts based upon the minimal amount of soils affected versus the overall area within the study area.

Temporary indirect impacts would consist of possible soil erosion during construction activities; however, these impacts would be negligible to minor with the use of erosion control measures and the short duration of the construction process. Development of Site 1 would require BMPs following SIAD's Stormwater Pollution Prevention Plan (SWPPP) guidance to control temporary fugitive dust and erosion during clearing and construction activities. The use of the BMPs such as the silt fences, water bars,

gabions, and re-vegetation of any denuded soils would dramatically reduce potential erosion impacts.

3.5.2.3 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

Ground disturbance would be necessary to construct the solar PV array and would directly impact soils at any of the proposed sites. Long-term direct impacts would result from the disturbance of surface and near-surface soil horizons through heavy machinery and vehicle traverses associated with the construction of the solar PV panels. Although these impacts are considered long-term, they would not result in major impacts based upon the minimal amount of soils affected versus the overall area within the study area.

Temporary indirect impacts would consist of possible soil erosion during construction activities; however, these impacts would be negligible to minor with the use of erosion control measures and the short duration of the construction process. Development of Site 2 would require BMPs following SIAD's Stormwater Pollution Prevention Plan (SWPPP) guidance to control temporary fugitive dust and erosion during clearing and construction activities. The use of the BMPs such as the silt fences, water bars, gabions, and re-vegetation of any denuded soils would dramatically reduce potential erosion impacts.

3.5.2.4 ALTERNATIVE 3

Geology and Soil impacts would be the same as Alternatives 1 and 2.

3.5.3 CUMULATIVE IMPACTS

No large-scale projects or proposals at SIAD have been identified that when combined with the Preferred Alternative, would contribute to geology and soils; therefore, cumulative impacts to geology and soils are anticipated to be negligible.

3.6 WATER RESOURCES

3.6.1 AFFECTED ENVIRONMENT

3.6.1.1 GROUNDWATER

The main components of groundwater recharge into Honey Lake Basin come from precipitation in upland areas and infiltration of stream flow in alluvial fans and river channels at the basin margins (Varian, 1997). Some groundwater recharge also comes from seepage of irrigation water and subsurface inflow from adjacent areas. The recharge rate for the entire basin is estimated to be between 45,000 and 60,000 ac-ft/yr (Rose et al, 1997). Most of the groundwater discharge is by evapotranspiration, withdrawals from wells, and subsurface outflow. The estimated rate of discharge is about 145,000 ac-ft/yr (USACE, 1998).

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The water supply wells at SIAD range in depth from approximately 350 to 500 ft and have an average static depth to groundwater of 105 to 121 ft below ground surface (bgs). SIAD currently has four groundwater wells (two active) producing 1,150 gallons per minute (gpm) of potable water (WRMP, 2011).

The groundwater resources at SIAD are primarily used for drinking water, irrigation, and industrial purposes (SIAD, 2001).

3.6.1.2 SURFACE WATER

SIAD is located in the Great Basin where water flow is terminated in isolated, topographic depressions containing pluvial lakes or playas with no outlets (BRE, 1996). There are several ephemeral and intermittent streams located throughout SIAD. Spencer Creek is located at the upper reach of one of the streams in the Open Burning/Open Detonation (OB/OD) area. The creek contains pockets of shallow standing water and saturated soils within its banks. There are short segments within the upper reach of Spencer Creek that are intermittent, carrying baseflow from seepages inside the channel for short distances. The lower reach includes tributaries to Spencer Creek and an unnamed stream, which is likely to carry surface runoff following rainfall. The streams flow southward into Honey Lake Valley, but their channels dissipate gradually, and they do not flow into Honey Lake; the water leaches into the ground as it flows downhill.

3.6.1.3 WETLANDS

Based on the findings in the wetland delineation performed in 1996 and after BRAC actions reduced the acreage of SIAD, there is only one remaining area on SIAD delineated as a wetland: a small, isolated seep in the northwestern part of the main parcel that meets National Wetlands Inventory's (NWI's) definition and criteria for a wetland. This small seep is located in Township 28N, Range 16E, Section 28. The seep is an isolated, topographic depression that supports rushes, sedges, and other wetland plants. The seep is circular, roughly 50 ft in diameter, and has short and steep sides that are approximately 2 ft high. The water table at this wetland is approximately 3 ft below the surface, and the soils are extremely high in organic matter. This seep is typical of many seeps that are scattered throughout Honey Lake Valley.

Playas also exist throughout SIAD property. Playas are defined as flat expanses that are at or near the lowest point of the desert basin (BRE, 1996). These isolated basins become shallowly inundated with surface runoff following heavy rainfall and quickly dries out by evaporation. The playas at SIAD are typically barren and support sparse vegetative cover that has adapted to the seasonally saturated and alkaline conditions. The playas are often encrusted by salt, and the clay surface soils are hard, cracked, and extremely dry, preventing growth of most vegetation (SIAD, 2001).

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3.6.2 ENVIRONMENTAL CONSEQUENCES

3.6.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, impacts to water resources from current ongoing activities would persist within the current Installation boundary. No land development activities would occur within the study areas, and therefore, surface water quality would remain unchanged. There would be no new adverse impacts to the groundwater or surface water.

3.6.2.2 ALTERNATIVE 1

Groundwater would be used for dust suppression during the construction of the solar PV array. Impacts associated with the use of water for dust suppression would be minimal and temporary, lasting only during construction activities. The estimated water use for panel washing is approximately 0.007 acre-feet (ac-ft)/year (yr)/MW (BLM and DOE, 2010). Water trucks would be used to wash panels in accordance with manufacturer specifications and frequencies. Due to the minimal amount of water needed as a result of the proposed solar PV array, any impacts related to groundwater are considered long-term but negligible.

No Federally regulated waters of the U.S. would be impacted, as none are located near Site 1. Therefore, no impacts would occur on surface waters.

3.6.2.3 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

Groundwater would be used for dust suppression during the construction of the solar PV array. Impacts associated with the use of water for dust suppression would be minimal and temporary, lasting only during construction activities. The estimated water use for panel washing is approximately 0.007 acre-feet (ac-ft)/year (yr)/MW (BLM and DOE, 2010). Water trucks would be used to wash panels in accordance with manufacturer specifications and frequencies. Due to the minimal amount of water needed as a result of the proposed solar PV array, any impacts related to groundwater are considered long-term but negligible.

No Federally regulated waters of the U.S. would be impacted, as none are located near Site 2. Therefore, no impacts would occur on surface waters.

3.6.2.4 ALTERNATIVE 3

Water resources impacts would be the same as Alternatives 1 and 2.

3.6.3 CUMULATIVE IMPACTS

No large-scale projects or proposals at SIAD have been identified that when combined with the Preferred Alternative, would contribute to water resources; therefore, cumulative impacts to water resources are anticipated to be negligible.

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3.7 BIOLOGICAL RESOURCES

3.7.1 AFFECTED ENVIRONMENT

3.7.1.1 VEGETATION

There are two main vegetative community types on SIAD, shrublands and grasslands. The most common species found is Wyoming big sagebrush (*A. tridentate* spp. *wyomengisis*), greasewood (*Sarcobatus vermiculatus*), desert peach (*Prunus andersonii*), Indian ricegrass (*Achnatherum hymenoides*), and cheatgrass (Bromus *tectorum*). Shrub cover varies throughout areas of shrublands, with frequent openings between shrubs and is under grown with herbaceous cover and dominated by grasses, primarily cheatgrass and mustards. In addition, some areas of SIAD contain no vegetation, designated as salt flats or playas (Tetra Tech, 2002).

3.7.1.2 THREATENED AND ENDANGERED SPECIES, SPECIES OF CONCERN

There are no state or Federally listed threatened or endangered species known to occur within, or may be affected by activities on SIAD (Tetra Tech, 2002). The Bald Eagle (*Haliaeetus leucocephalus*), known to occur in close proximity to the Installation, was removed from the Federal List of Endangered and Threatened Wildlife due to the recovery of the species (USFWS, 2007).

3.7.1.3 WILDLIFE

There are approximately 368 species of birds, mammals, reptiles, amphibians, and fish at SIAD. Various surveys and assessments conducted by SIAD indicate that approximately 80 mammal species are represented on SIAD property (SIAD, 1995b). Common mammalian species include the coyote (*Canis latrans*), pronghorn antelope (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), desert cottontail (*Sylvilagus auduboni*), and pygmy rabbit (*Sylvilagus idahoenis*).

Based on several assessments and surveys performed on SIAD, there are potentially 239 bird species that reside or migrate through SIAD (SIAD, 1995b). Common species include the golden eagle (*Aquila chrysaetos*), California quail (*Callipepla californica*), common raven (*Corvus corax*), horned lark (*Eremophila alpestris*), black-billed magpie (*Pica pica*), and white-crowned sparrow (*Zonotrichia leucophrys*).

There are 22 reptile species that may potentially occur in the SIAD vicinity. Reptiles are well-adapted to the arid environment of SIAD. Common species at the depot include the Great Basin gopher snake (*Pituphis melanoleucos*), Great Basin rattlesnakes (*Crotalus viridis*), collared lizard (*Crotaphytus collaris*), leopard lizard (*Crotaphytus wislizeni*), horned lizards (*Phryhosoma platyrhinos*), sagebrush lizard (*Sceloporus graciosus*), and Great Basin fence lizard (*Sceloporus occidentalis*) (SIAD, 1995b).

There are 9 amphibian species known to occur at SIAD. Common species observed on SIAD include the Great Basin spadefoot toad (*Scaphiopus intermentanus*), Western toad (*Bufo boreas*), and Pacific tree frog (*Hyla regilla*) (SIAD, 1995b).

3.7.2 ENVIRONMENTAL CONSEQUENCES

3.7.2.1 NO ACTION ALTERNATIVE

No impacts on biological resources would occur because no construction would take place.

3.7.2.2 ALTERNATIVE 1

Construction of solar PV on Site 1 would result in temporary minor adverse impacts to vegetation. In areas where grading is required to meet specifications, top soils would be removed, grading accomplished, and top soils replaced with subsequent planting of native grasses or seed mixtures. In addition, during installation activities, it is expected that some vegetation cover would be lost due to vehicles carrying supplies, movement of workers, and general activity on site. The amount of temporarily disturbed area would depend on the size and configuration of the solar PV system designed, and would not likely require entire site-wide disturbance to vegetation.

3.7.2.3 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

Construction of solar PV on Site 2 would result in temporary minor adverse impacts to vegetation. In areas where grading is required to meet specifications, top soils would be removed, grading accomplished, and top soils replaced with subsequent planting of native grasses or seed mixtures. In addition, during installation activities, it is expected that some vegetation cover would be lost due to vehicles carrying supplies, movement of workers, and general activity on site. The amount of temporarily disturbed area would depend on the size and configuration of the solar PV system designed, and would not likely require entire site-wide disturbance to vegetation.

3.7.2.4 ALTERNATIVE 3

Biological resources impacts would be the same as Alternatives 1 and 2.

3.7.3 CUMULATIVE IMPACTS

No large-scale projects or proposals at SIAD have been identified that when combined with the Preferred Alternative, would contribute to biological resources; therefore, cumulative impacts to biological resources are anticipated to be negligible.

3.8 CULTURAL RESOURCES

3.8.1 AFFECTED ENVIRONMENT

Cultural resources include expressions of human culture and history in the physical environment, such as prehistoric or historic archaeological sites, buildings, structures,

objects, districts or other places including natural features and biota, which are considered to be important to a culture, subculture or community. Cultural resources also include traditional life ways and practices and community values and traditions. SIAD is currently finalizing its Integrated Cultural Resource Management Plan (ICRMP), which provides the basis for the majority of this section. Unless otherwise noted, this cultural resource discussion is a compilation of information gathered from the ICRMP and previous surveys conducted at SIAD.

SIAD consults with the State Historic Preservation Officer (SHPO) and federally recognized Native American groups prior to planned excavations or undertakings under the National Historic Preservation Act. If Native American remains were found on the Installation, consultations would be required under the Native American Graves Protection and Repatriation Act (NAGPRA), and Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*.

The nature and location of cultural resources cannot be disclosed to the public unless the Federal land manager determines that such disclosure would provide further protection, and there is no risk of harm to the site. The legal authority to restrict the dissemination of cultural resource information is provided in Section 304 of the National Historic Preservation Act of 1966 (NHPA), as amended, and Section 9(a) of the Archaeological Resources Protection Act of 1979 (ARPA). To adequately address the existing condition, only the general types of cultural resources present at SIAD and a limited description of their nature is discussed in the following sections.

3.8.1.1 HISTORY

Prior to contact with White peoples, Honey Lake Valley was occupied by three linguistically distinct groups of hunter-gatherers. Mountain Maidu lived on the northwest side of Honey Lake, Northern Paiute occupied areas east of the lake, and Washoe used lands to the south. After 1700, Northern Paiute bands acquired horses from the Spanish in California and became militaristic, which presumably distorted ethnographic recollection of cooperative interaction and resource use. The Paiute raided Maidu and Washoe groups and drove them from the most favorable areas. The Maidu retreated to the west side of the valley near present-day Susanville, while the Washoe remained in the vicinity of historic Amedee or resettled near present-day Milford.

Between 1860 and 1880, Indian resistance succumbed to harsh retaliation by White settlers in Honey Lake Valley. After the 1887 Dawes Act, numerous Indians briefly occupied allotments that they later sold or lost to lumber companies. Ensuing years saw Indians settling near towns where they obtained food and employment. The Susanville Rancheria, established in 1923, is home today to approximately 1,054 members.

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Euroamerican incursion into Honey Lake Valley began in 1850 with the advent of gold exploration by Peter Lassen and J. Goldsborough Bruff. Lassen's mining discoveries attracted emigrants who by 1856, laid claim to 36,000 acres of Honey Lake Valley. Development east of Honey Lake, where the present-day SIAD is situated, focused on homesteading and agriculture, on railroading, and on land speculation and attendant irrigation schemes. Land speculation and irrigation schemes continued into the early twentieth century. An 18-yr drought began in 1919 and parched Honey Lake. The Bly Eagle Lake project failed in 1925 due to drought, loss of the railroad, and the lure of jobs at local lumber mills. Today, there is geothermal development in the vicinity of Amedee, but elsewhere winter grazing and hay production sustains the sparse population of the valley.

During the summers of 1931 and 1932, the Army began training pilots in aerial maneuvers and gunnery over the Honey Lake playa. A 1932 Presidential EO withdrew Honey Lake from the public domain and, in 1933, California ceded the 60,523-acre lakebed to the U.S. government for aerial training and military camps. In 1942, the Army leased 16,283 acres of land adjacent to Honey Lake from the State of California and established the Sierra Ordnance Depot, complete with personnel housing and support facilities, in line with government mandates to store munitions far from heavily populated coastal areas. The ammunition storage igloos, magazines, and administration facilities were constructed first, and most were completed by 1943. The ammunition storage area included 802 barrel-vaulted, earth-covered, reinforced concrete igloos, arranged in blocks of 100 with 10 concrete "safe houses" in each block.

The Army also built the town of Herlong, between 1942 and 1944, to provide local housing and services for installation workers. The town consisted of community facilities and more than 1,000 units of housing during the war. Following the war, a smaller work force manned the installation, which saw stepped-up activity during the Korean and Vietnam conflicts. Sierra Ordnance Depot was redesignated Sierra Army Depot in 1962. New mission facilities included special weapons (1956, 1979, and 1980), guided missile surveillance (1966), and ammunition maintenance (1968). The Army constructed new family housing and barracks during the 1970s, replacing the World War II housing. The present mission of SIAD is to provide rapid expeditionary logistics support and long-term sustainment solutions to the Army and the Joint Force (SIAD, 2013c).

3.8.2 ENVIRONMENTAL CONSEQUENCES

3.8.2.1 NO ACTION ALTERNATIVE

No impacts on cultural resources would occur because no construction would take place.

3.8.2.2 ALTERNATIVE 1

No impacts on cultural resources would occur because no cultural resources exist at Site 1.

3.8.2.3 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

No impacts on cultural resources would occur because no cultural resources exist at Site 2.

3.8.2.4 ALTERNATIVE 3

No impacts on cultural resources would occur because no cultural resources exist at the proposed solar PV array sites.

3.8.3 CUMULATIVE IMPACTS

No cumulative impacts on cultural resources would occur because no cultural resources exist at the proposed alternative sites.

3.9 SOCIOECONOMICS

3.9.1 AFFECTED ENVIRONMENT

Lassen County, with a size of approximately 2.9 million acres (4,541 square miles), is sparsely populated with densities being less than 8 people per square mile. The estimated total county population in 2010 was 34,895, a 3.2% increase from 2000 (33,828). The demographic break down for Lassen County in 2010 is as follows:

- White – 73.2%
- Hispanic – 17.5%
- Black – 8.1%
- Native American – 3.5%
- Asian – 1.0%
- Native Hawaiian – 0.5%
- Other – 10.2%
- Persons reporting two or more races – 3.5%

Housing statistics in Lassen County are as follows:

- Home Owner Occupied Percentage – 65.2%
- Renter Occupied Percentage – 34.8%
- Median Value Owner Occupied Units – $199,200
- Median Gross Monthly Rental – $855

The median household income in Lassen County was $52,484 per year in 2010. The percentage of households accepting public assistance in 2010 was 5.4%. The

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percentage of persons below the poverty line in 2010 was 14.6%. The unemployment rate in Lassen County is 3.9%.

The largest employment sectors in Lassen County are public administration, educational services/health care, arts/entertainment/recreation, retail trade, and agriculture/forestry/fishing and hunting/mining. Public administration accounts for 30% (3,138 jobs), educational services/health care accounts for 22.5% (2,356 jobs), arts/entertainment/recreation accounts for 8.6% (900 jobs), retail trade accounts for 8.2% (858 jobs), and agriculture/forestry/fishing and hunting/mining accounts for 4.8% (500 jobs) (U.S. Census Bureau, 2010).

EO 12898, Environmental Justice, was signed by President Clinton in February 1994. This action requires all Federal agencies to identify and address disproportionately high and adverse effects of programs, policies, and activities on minority and low-income populations. All activities would be located within SIAD where no minority populations exist.

EO 13045, Protection of Children, requires each Federal agency "to identify and assess environmental health risks and safety risks that may disproportionately affect children" and "ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." This EO was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. All activities would be within the boundaries of SIAD, in remote areas located away from neighborhoods, parks, or places that could potentially create a risk to children.

3.9.2 ENVIRONMENTAL CONSEQUENCES

3.9.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no new construction or operations of proposed facilities and socioeconomics would remain unchanged; therefore, no new direct or indirect impacts would occur. There would be no increase in employment and in turn, no increase in demand for temporary or permanent housing. Furthermore, no impacts to low income or minority populations would be anticipated. Minor adverse impacts would occur as a result of the forgone economic benefit to the region from increased spending and increase in employment.

3.9.2.2 ALTERNATIVE 1

Implementation of the proposed solar PV array could provide a beneficial impact on the local economies due to minimal increases in revenues for local business as a result of construction activities and materials obtained. Most of the increase in workforce and revenue; however, would be temporary, lasting only as long as construction. In

addition, there would be some residual work required for long-term operation and maintenance of the solar PV array.

No disproportionate health or environmental effects on minorities or low-income populations or communities would occur as a result of the proposed solar PV array. Additionally, since there are no communities near Site 1, no impacts on children would occur.

3.9.2.3 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

Implementation of the proposed solar PV array could provide a beneficial impact on the local economies due to minimal increases in revenues for local business as a result of construction activities and materials obtained. Most of the increase in workforce and revenue; however, would be temporary, lasting only as long as construction. In addition, there would be some residual work required for long-term operation and maintenance of the solar PV array.

No disproportionate health or environmental effects on minorities or low-income populations or communities would occur as a result of the proposed solar PV array. Additionally, since there are no communities near Site 2, no impacts on children would occur.

3.9.2.4 ALTERNATIVE 3

Socioeconomics impacts would be the same as Alternatives 1 and 2.

3.9.3 CUMULATIVE IMPACTS

No large-scale projects or proposals at SIAD have been identified that when combined with the Preferred Alternative, would contribute to the local economy; therefore, cumulative impacts to socioeconomics are anticipated to be negligible.

3.10 TRANSPORTATION

3.10.1 AFFECTED ENVIRONMENT

SIAD is located in Lassen County just east of the Sierra Nevada Mountains in the northeast portion of California near the Nevada border. SIAD is bounded by Honey Lake and Pole Line Road to the west, Duck Lake Road to the east, Wendel Road and railroad tracks to the north, and Herlong Access Road/Susanville Road to the south. The closest major metropolitan area is Reno, NV, approximately 61 miles southeast of SIAD, accessible by U.S. Route 395, Garnier Road, and Herlong Access Road/Susanville Road. The main gate is located along Herlong Access Road/Susanville Road.

There are over 200 miles of roadway on SIAD, including about 40 miles of asphalt concrete, 100 miles of medium bituminous, and 60 miles of gravel or other surfaces (SIAD, 1994).

At the north end of SIAD, there are government-owned railroad tracks that connect with the Union Pacific Railroad, Batten Station (SIAD, 1995a). The Union Pacific Railroad connects with the Herlong Station at the south end of the depot. The railways at SIAD provide approximately 60 miles of track, 34 miles of main line, 15 miles of siding, and 11 miles of classification yard trackage (SIAD, 1994).

The Amedee Army Airfield runway in the north portion of the Installation is 10,000 ft long, expanded to its current size in 2005 and includes visual approach lights (SIAD, 2009).

3.10.2 ENVIRONMENTAL CONSEQUENCES

3.10.2.1 NO ACTION ALTERNATIVE

No impacts on transportation would occur, as no construction activities would take place.

3.10.2.2 ALTERNATIVE 1

Traffic may become slightly heavier on Herlong Access Road/Susanville Road, Garnier Road, and U.S. 395 during construction of the solar PV array. Maintenance and ongoing operations of the PV panels would not impact traffic or transportation within SIAD or the region because passenger transport vehicles would be used, and only periodically. Therefore, potential impacts on traffic and transportation as a result of the proposed solar PV array would be negligible and temporary.

3.10.2.3 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

Transportation impacts would be the same as Alternative 1.

3.10.2.4 ALTERNATIVE 3

Transportation impacts would be the same as Alternative 1.

3.10.3 CUMULATIVE IMPACTS

No large-scale projects or proposals at SIAD have been identified that when combined with the Preferred Alternative, would contribute to local traffic and transportation; therefore, cumulative impacts to transportation are anticipated to be negligible.

3.11 AIRSPACE

3.11.1 AFFECTED ENVIRONMENT

The Army manages airspace in accordance with DoD Directive 5030.19, Responsibilities on Federal Aviation and National Airspace System Matters. The Army

implements these requirements through AR 95-2, Air Traffic Control, Airspace, Airfields, Flight Activities, and Navigational Aids.

3.11.2 ENVIRONMENTAL CONSEQUENCES

3.11.2.1 NO ACTION ALTERNATIVE

No impacts on airspace operations would occur because no construction would take place.

3.11.2.2 ALTERNATIVE 1

Solar PV systems are inherently non-reflective as a function of their ability to convert sunlight into energy, and therefore, are not considered to produce glare beyond acceptable limits.

3.11.2.3 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

Airspace impacts would be the same as Alternative 1.

3.11.2.4 ALTERNATIVE 3

Airspace impacts would be the same as Alternative 1.

3.11.3 CUMULATIVE IMPACTS

No large-scale projects or proposals at SIAD have been identified that when combined with the Preferred Alternative, would contribute to airspace operations; therefore, cumulative impacts to airspace are anticipated to be negligible.

3.12 UTILITIES

3.12.1 AFFECTED ENVIRONMENT

3.12.1.1 DRINKING WATER

SIAD operates a Public Water System (PWS) that supplies potable water to approximately 1,500 people on and off the Installation. The system is classified as a C3 Community System from the California Department of Public Health (CDPH). SIAD currently has four groundwater wells (two active) producing 1,150 gallons per minute (gpm) of potable water. The wells range in depth from approximately 350 to 500 feet. SIAD has two active water treatment systems, removing iron, manganese, and uranium from the raw water to comply with CDPH Maximum Contaminant Levels (MCLs). The system includes a covered 1.25 million gallon (MG) in-ground reservoir and three elevated steel tanks of 0.125, 0.04, and 0.06 MG capacity. The total storage capacity at SIAD is 1.47 MG (WRMP, 2011).

3.12.1.2 STORMWATER DISCHARGE

SIAD manages stormwater discharge through a SWPPP and Best Management Practices (BMPs). Due to the high infiltration rates of the soil and low annual rainfall,

the natural surface drainage is adequate for the runoff capacities at SIAD. For the Mission Area, the stormwater runoff is collected in multiple drop inlets into an underground conveyance system, and then discharged into unlined v-ditches on the north, east, and west sides. SIAD has an active Industrial Stormwater Permit, and eight active National Pollutant Discharge Elimination System (NPDES) permits (WRMP, 2011).

3.12.1.3 WASTEWATER DISCHARGE

SIAD currently operates a wastewater treatment system consisting of five lined lagoons in two separate locations; the Cantonment Lagoons (3) and the Warehouse Lagoons (2). In the Cantonment Lagoon area, an engineered wetland was installed in September 2002 to handle overflows, assist with treatment of the greywater by biological activity, and improve percolation. The current operation of the waste treatment ponds and associated engineered wetlands are currently operated under the Lahontan Region Water Quality Control Board (Lahontan RWQCB) Waste Discharge Requirements (WDR) permit. The Cantonment Lagoons process the majority of the wastewater on SIAD and have a permitted throughput of up to 0.160 million gallons per day (mgd) (160,000 gallons per day (gpd)). The Warehouse Lagoons handle wastewater generated in the Mission Area of SIAD and have a permitted throughput of up to 0.009 mgd (9,000 gpd). The current wastewater treatment system on SIAD is adequate to meet the wastewater discharge needs of the Installation (WRMP, 2011).

3.12.1.4 IRRIGATION SYSTEMS

Irrigation systems on SIAD consist of landscaped lawns, shrubs, and trees. SIAD uses both automatic watering and drip irrigation systems. The Directorate of Base Support has a Water Conservation Plan for irrigation use in the Residential area of SIAD (WRMP, 2011).

3.12.1.5 ELECTRICITY

Electrical power for SIAD comes from Plumas-Sierra Rural Electric Cooperative (PSREC). Electricity consumption accounts for 31.9% of the total energy consumed at SIAD (Johnson, 2013).

3.12.1.6 HEAT

SIAD central steam plants have been replaced by individual building heating systems. The major source of heating fuel is natural gas at 65.7% of the total energy consumed at SIAD. The rest of SIAD heating is by propane gas, which accounts for 2.4% of the total energy consumed (Johnson, 2013).

3.12.1.7 COMMUNICATIONS SYSTEMS

The communications systems on SIAD are managed by the Directorate of Information Management (DOIM). The directorate is responsible for managing, fielding, and

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sustaining information technologies on the Installation. DOIM's mission includes an integrated information processing center facilitating worldwide telecommunications services, operation of a local area network, telephone, and a records holding facility (SIAD, 2013b).

3.12.1.8 SOLID WASTE AND RECYCLING

The waste that is generated and collected on SIAD is segregated into recyclables, waste wood, undesirables, and solid waste. Solid waste is disposed of on the Installation at a permitted sanitary landfill. The landfill site is approximately 40 acres and is located west of Chewing Gum Road. The sanitary landfill is operated under a Solid Waste Facility Permit, Lahontan RWQCB Permit, and a Lassen County Air Pollution Control Permit. The waste is deposited into an open trench and is covered with loose earth, which is then compacted by earthmoving equipment (Teat, 2013).

A contract using roll-off dumpsters has been implemented to divert landfill "undesirables" to a municipal waste facility. This extends the lifespan of the landfill at SIAD and reduces the operational and maintenance cost to SIAD.

SIAD operates a Qualified Recycling Program (QRP) to remove non-hazardous, recyclable material from the non-hazardous solid waste stream. The QRP provides a continuous effort to identify industrial waste material that can be diverted from traditional disposal methods, extending the lifespan of the SIAD landfill (Barlow, 2013).

3.12.2 ENVIRONMENTAL CONSEQUENCES

3.12.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no construction activities would be required and the sites identified would not be affected. Utility demands and operations would remain consistent with current conditions. Less than significant adverse impacts to utilities would be anticipated as utility upgrades and improvements in efficiency and conservation associated with the Proposed Action Alternatives would not be implemented.

3.12.2.2 ALTERNATIVE 1

Operational use of solar PV technology would require minor to moderate amounts of drinking water for cleaning PV panels. The estimated water use for panel washing is approximately 0.007 ac-ft/yr/MW (BLM and DOE, 2010). Water trucks would be used to wash panels in accordance with manufacturer specifications and frequencies. This alternative is anticipated to have negligible adverse impacts on drinking water.

Regardless of solar PV site(s) selected, each one would be required to adhere to SIAD's SWPPP for post-construction BMPs. Upon meeting these requirements, negligible adverse impacts would be anticipated for stormwater.

Operational use of solar PV technology would not generate wastewater. Therefore, use of this technology would have no adverse impacts on wastewater.

Operation of the solar PV technology would enable SIAD to beneficially increase its overall energy independence by reducing its energy demand. SIAD could also realize a long-term return on investment based on the technology employed. SIAD would reduce its energy demand commensurate with the output levels associated with PV output from each site selected, and would therefore realize long-term cost savings.

Operational use of solar PV technology would create small amounts of solid waste during maintenance activities. Use of this technology would be anticipated to have negligible adverse impacts on solid waste management.

There would be no impacts to irrigation systems, heating, and communications under this alternative.

3.12.2.3 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

Utilities impacts would be the same as Alternative 1.

3.12.2.4 ALTERNATIVE 3

Utilities impacts would be the same as Alternative 1.

3.12.3 CUMULATIVE IMPACTS

No large-scale projects or proposals at SIAD have been identified that when combined with the Preferred Alternative, would contribute to utilities; therefore, cumulative impacts to utilities are anticipated to be negligible.

3.13 HAZARDOUS AND TOXIC SUBSTANCES

3.13.1 AFFECTED ENVIRONMENT

Hazardous materials are substances that pose an immediate threat to health and/or the environment. Materials that are physically hazardous include combustible and flammable substances, compressed gases, oxidizers, etc. Health hazards are associated with materials that cause acute or chronic reactions, including toxic agents, carcinogens, and irritants.

SIAD currently manages hazardous and toxic materials in compliance with Federal, states, and local laws and regulations. A majority of the hazardous chemicals that are stored at the depot occur in small quantities including pesticides, cleaners, janitorial supplies, paints, bleaches, and photographic chemicals. SIAD properly disposes of hazardous wastes, and no hazardous wastes are generated, stored, or disposed of in the undeveloped portions of the depot. In its efforts to effectively manage hazardous and toxic materials at the depot, SIAD implements a spill control and countermeasure

(SPCC) plan to respond to emergencies and spills. No major chemical spills have occurred at SIAD, and minor spills were properly remedied within 24 hours.

3.13.2 ENVIRONMENTAL CONSEQUENCES

3.13.2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, no construction activities would be required and the sites identified would not be affected. Hazardous waste generation amounts and types would remain consistent with current conditions. No impacts to Hazardous Materials and Waste would be expected under the No Action Alternative.

3.13.2.2 ALTERNATIVE 1

Heavy equipment would be used to construct and install the PV panels and would require the use of petroleum, oil, and lubricants (POL). All hazardous and regulated wastes and substances generated during implementation of the solar PV array would be collected, characterized, labeled, stored, transported, and disposed of in accordance with all Federal, state, and local regulations, including proper waste manifesting procedures. All other hazardous and regulated materials or substances would be handled according to materials safety data sheet instructions and would not affect water, soils, vegetation, wildlife, or the safety of SIAD staff. Therefore, hazardous and regulated materials and substances would not impact the public, groundwater, or general environment.

The potential impacts of the handling and disposal of hazardous and regulated materials and substances during project implementation would be minor when BMPs are implemented. BMPs would be implemented as standard operating procedures during all construction activities, including proper handling, storage, and/or disposal of hazardous and/or regulated materials. To minimize potential impacts from hazardous and regulated materials, all fuels, waste oils, and solvents would be collected and stored in tanks or drums within a secondary containment system that consist of an impervious floor and bermed sidewalls capable of containing the volume of the largest container stored therein. The refueling of machinery would be completed following accepted guidelines, and all vehicles would have drip pans during storage to contain minor spills and drips. Although it would be unlikely for a major spill to occur, any spill of a reportable quantity would be contained immediately within an earthen dike, and the application of an absorbent (e.g. granular, pillow, sock) would be used to absorb and contain the spill. Any major reportable spill of a hazardous or regulated substance would be reported immediately to on-site environmental personnel, who would notify appropriate Federal and State agencies.

3.13.2.3 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

Hazardous and toxic substances impacts would be the same as Alternative 1.

3.13.2.4 ALTERNATIVE 3

Hazardous and toxic substances impacts would be the same as Alternative 1.

3.13.3 CUMULATIVE IMPACTS

The Proposed Action would have minor adverse cumulative impacts on hazardous materials and waste. The potential impacts of the handling and disposal of hazardous and regulated materials and substances during project implementation would be minor when BMPs are implemented. BMPs would be implemented as standard operating procedures during all construction activities, including proper handling, storage, and/or disposal of hazardous and/or regulated materials. Any major reportable spill of a hazardous or regulated substance would be reported immediately to on-site environmental personnel, who would notify appropriate Federal and state agencies.

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4.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

This section summarizes the anticipated level of impacts and cumulative impacts to the VECs under the No Action and Proposed Action Alternatives.

Table 3. Level of Impact to each VEC under each Alternative

Alternative	Activity	Level of Impact	Cumulative Impact	Impact Reduction Measure
Land Use				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible	Negligible	
	Operation			
Alternative 2	Construction			
	Operation			
Alternative 3	Construction			
	Operation			
Air Quality and GHG				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Minor	Negligible	
	Operation	Moderate Beneficial		
Alternative 2	Construction	Minor		
	Operation	Moderate Beneficial		
Alternative 3	Construction	Minor		
	Operation	Moderate Beneficial		
Noise				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible	Negligible	
	Operation			
Alternative 2	Construction			
	Operation			
Alternative 3	Construction			
	Operation			
Geology and Soils				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible to Minor	Negligible	Timing of construction & BMPs for erosion control
	Operation			SWPPP
Alternative 2	Construction			Timing of construction & BMPs for erosion control
	Operation			SWPPP
Alternative 3	Construction			Timing of construction & BMPs for erosion control
	Operation			SWPPP
Water Resources				
No Action	N/A	Negligible	Negligible	N/A

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Alternative 1	Construction	Negligible	Negligible	
	Operation			
Alternative 2	Construction			
	Operation			
Alternative 3	Construction			
	Operation			
Biological Resources				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Minor	Negligible	
	Operation	Negligible		
Alternative 2	Construction	Minor		
	Operation	Negligible		
Alternative 3	Construction	Minor		
	Operation	Negligible		
Cultural Resources				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible	Negligible	
	Operation			
Alternative 2	Construction			
	Operation			
Alternative 3	Construction			
	Operation			
Socioeconomics				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Minor Beneficial	Negligible	
	Operation	Negligible		
Alternative 2	Construction	Minor Beneficial		
	Operation	Negligible		
Alternative 3	Construction	Minor Beneficial		
	Operation	Negligible		
Transportation				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible	Negligible	
	Operation			
Alternative 2	Construction			
	Operation			
Alternative 3	Construction			
	Operation			
Airspace				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible	Negligible	
	Operation			
Alternative 2	Construction			
	Operation			
Alternative 3	Construction			
	Operation			
Utilities				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible	Negligible	N/A
	Operation			SWPPP
Alternative 2	Construction			N/A

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	Operation			SWPPP
Alternative 3	Construction			N/A
	Operation			SWPPP
Hazardous and Toxic Substances				
No Action	N/A	Negligible	Negligible	N/A
Alternative 1	Construction	Negligible to Minor	Minor	BMPs
	Operation	Negligible	Negligible to Minor	
Alternative 2	Construction	Negligible to Minor	Minor	
	Operation	Negligible	Negligible to Minor	
Alternative 3	Construction	Negligible to Minor	Minor	
	Operation	Negligible	Negligible to Minor	

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5.0 ACRONYMS

ac-ft	acre-feet
AC	alternating current
APLIC	Avian Power Line Interaction Committee
Army	Department of the Army
ARPA	Archaeological Resources Protection Act of 1979
BLM	Bureau of Land Management
BMP	Best Management Practice
BRAC	Base Realignment and Closure
BRE	Brown & Root
CDPH	California Department of Public Health
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFC	chlorofluorocarbons
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CWA	Clean Water Act
dB	decibel
dBA	decibel on A-weighted scale
DC	direct current
DoD	Department of Defense
DOE	Department of Energy
DOE-FEMP	Department of Energy Federal Energy Management Program
DOIM	Directorate of Information Management
e.g.	exemplī grātiā (for example)
EA	Environmental Assessment
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EO	Executive Order
EPA	Environmental Protection Agency
EPAct	Energy Policy Act of 2005
FNSI	Finding of No Significant Impact
FY	fiscal year
GHG	greenhouse gas
gpd	gallons per day
gpm	gallons per minute
ICRMP	Integrated Cultural Resources Management Plan
MCL	Maximum Contaminant Level
MG	million gallon
mgd	million gallons per day
MMBtu	Million Metric British Thermal Unit
MW	megawatt
MWdc	megawatts of direct current
MWh	megawatt-hour
N_2O	nitrous oxide

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NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NDAA	National Defense Authorization Act of 2007
NEPA	National Environmental Policy Act
NESC	National Electric Safety Code
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act of 1966
NO_2	nitrogen dioxide
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NREL	National Renewable Energy Lab
NWI	National Wetlands Inventory
NZEI	Net Zero Energy Installation
O_3	ozone
OB/OD	open burning/open detonation
OSHA	Occupational Safety and Health Administration
PCS	power conditioning system
PM_{10}	particulate matter measuring less than 10 microns
$PM_{2.5}$	particulate matter measuring less than 2.5 microns
POL	petroleum, oil, and lubricants
ppm	parts per million
PPP	public-private partnership
PSREC	Plumas-Sierra Rural Electric Cooperative
PV	photovoltaic
PWS	Public Water System
QDR	Quadrennial Defense Review
QRP	Qualified Recycling Program
ROI	Region of Influence
RWQCB	Region Water Quality Control Board
SHPO	State Historic Preservation Officer
SHW	Solar Hot Water
SIAD	Sierra Army Depot
SO_2	sulfur dioxide
SPCC	spill control and countermeasure
SSPP	Strategic Sustainability Performance Plan
SVP	Solar Ventilation Preheating
SWMU	solid waste management unit
SWPPP	Stormwater Pollution Prevention Plan
$\mu g/m^3$	micrograms per cubic meter
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UXO	unexploded ordnance
VEC	Valued Environmental Component
WTE	waste-to-energy
yr	year

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