Final

Environmental Assessment

for

East Housing Area Solar Energy Project

Vandenberg Air Force Base
California

July 2014

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East Housing Area Solar Energy Project

Vandenberg Air Force Base, California

Prepared for:

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FINDING OF NO SIGNIFICANT IMPACT

East Housing Area Solar Energy Project
Vandenberg Air Force Base, California

This Finding of No Significant Impact (FONSI), was prepared per the National Environmental Policy Act (NEPA), 42 U.S. Code 4321 et seq., implementing Council on Environmental Quality (CEQ) Regulations, 40 Code of Federal Regulations (CFR) 1500-1508, and 32 CFR Part 989, Environmental Impact Analysis Process.

This FONSI hereby incorporates by reference and attaches hereto the *Environmental Assessment, East Housing Area Solar Energy Project, Vandenberg Air Force Base, California* (2014). This Environmental Assessment (EA) considered all potential environmental impacts of the Proposed Action and the No-Action Alternative, in addition to cumulative impacts, and identified measures to avoid and/or minimize environmental impacts.

PROPOSED ACTION

The Proposed Action (Alternative A) is a Federal project on Federal land that was developed based on the purpose, need, and selection criteria discussed in Chapter 1 and 2 of the attached EA. After evaluating eight renewable energy technologies and seven solar site locations, no other feasible action alternatives were identified that would meet the Project's purpose and need.

The Proposed Action hereinafter "Project" includes leasing land to and entering into a Power Purchase Agreement (PPA) with a private developer who would design, construct, operate and maintain an unmanned photovoltaic (PV) solar energy facility at the former East Housing Area (EHA) on and for the benefit of Vandenberg Air Force Base (VAFB). The portion of the EHA selected for the Proposed Action is approximately 182 acres in size, was cleared of buildings and structures, is mostly graded, and has few environmental constraints. The EHA exhibits topographic and other locational characteristics needed for cost-effective renewable energy generation, including existing on-site presence of key infrastructure (e.g., roads, power lines, water). The Project is projected to provide almost 25 percent of VAFB's electrical energy and is not expected to export energy to PG&E's distribution system. The Project is designed to have a useful life of 20 to 30 years, although the life span could be extended by upgrades and refurbishments. The Project is expected to be operational in 2016.

NO-ACTION

Under the No-Action (Alternative B), the proposed project would not be developed at the former EHA. Based on the VAFB General Plan, the No-Action Alternative might result in the EHA being developed as a business park or for other commercial uses that can be expected to have environmental impacts similar to or greater than the Proposed Action. Under the No-Action Alternative, VAFB could do the following:

- Continue to purchase electricity from PG&E and be exposed to expected but unknown increases in energy costs;
- Choose to develop other renewable energy sources and sites, which are likely to be more costly and have environmental impacts similar to or greater than the Proposed Action; or
- Purchase renewable energy certificates (RECs), which, unlike the Proposed Action, would not protect the Base from unanticipated increases in energy costs.

The No-Action Alternative would not meet the project's purpose and need; however, it was analyzed in the EA as required by NEPA.

SUMMARY OF FINDINGS

The attached EA analyzed the potential environmental consequences of activities associated with the Proposed Action and the No-Action Alternative.

Based on the analysis, neither the Proposed Action nor the No-Action Alternative would result in individual or cumulatively significant impacts to any resources. However, adverse impacts were noted for the Proposed Action during construction and/or operation to the following resources: air quality, biological resources, noise, transportation, visual resources and water resources. Beneficial impacts were noted for air quality under the Proposed Action as a result of the future use of a renewable energy source at VAFB. Adverse impacts from the No-Action Alternative could be greater than the Proposed Action, if the project site is developed as suggested in the VAFB General Plan. Otherwise, the No-Action Alternative would result in impacts less than the Proposed Action if left undeveloped. Environmental protection measures (mitigation measures) that are incorporated into the Proposed Action (identified as required in the EA) would be implemented to avoid and/or minimize the potential adverse impacts. No discretionary environmental protection measures, as discussed in the EA, will be implemented as part of the Proposed Action. However, since the publication of the Draft Final EA and Draft FONSI, some discretionary environmental protection measures have been reclassified as mandatory measures.

PUBLIC REVIEW AND COMMENT

The EA and FONSI were made available for public review and comment for 30 days following the publication of the Notice of Availability (NOA) in the following newspapers: Lompoc Record and Santa Maria Times. The Draft Final EA and Draft FONSI were also distributed per the current VAFB NEPA Distribution List. Public comments were received and have been reviewed and considered. In response, the Final EA contains an augmented analysis as to bats while clarifying and amending the environmental protection measures for air quality, migratory birds, the protection of Coast live oak trees, and the management of invasive species. Since the initiation of the public comment period, SHPO concurrence has been received for the Proposed Action (Appendix C). The new information incorporated into the Final EA does not represent a substantive change to the EA such that additional public comment is required. Appendix E contains a copy of the NOAs, proofs of library delivery, VAFB's NEPA distribution list, and public comments received including VAFB responses.

CONCLUSION

Based on my review of the facts and analyses contained in the attached EA, I conclude that implementing the Proposed Action (chosen alternative), with incorporation of required environmental protection measures, will not significantly effect the human environment. Therefore, further analysis in the form of an environmental impact statement is not required.

14 JUL 14

KEITH W. BALTS, Colonel, USAF
Commander, 30th Space Wing

Date

Attachment: FINAL ENVIRONMENTAL ASSESSMENT (2014)
EAST HOUSING AREA SOLAR ENERGY PROJECT
VANDENBERG AIR FORCE BASE, CALIFORNIA

Executive Summary

In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, Council on Environmental Quality (CEQ) regulations, and the U.S. Air Force's (USAF) *Environmental Impact Analysis Process* (EIAP) regulations, this Environmental Assessment (EA) evaluates the potential environmental impacts associated with constructing, operating and maintaining (O&M) a solar photovoltaic (PV) energy facility to provide electricity to Vandenberg Air Force Base (VAFB) in Santa Barbara County, California. The NEPA of 1969, as amended, and CEQ regulations require lead agencies to evaluate the potential impacts of major federal actions on the surrounding environment. The USAF is the lead agency.

Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to provide approximately 25 percent of VAFB's electrical power needs from a cost-effective renewable energy source.

The Proposed Action is needed to help comply with 10 US Code § 2911 Energy Performance Goals and Master Plan for the Department of Defense (DoD) that states that it shall be DoD's goal to produce or procure no less than 25 percent of its facility energy needs from renewable energy sources by the year 2025 (10 USC 2911) Title II, Subtitle A, Sec. 203).

The Proposed Action is part of the Air Force's plan to achieve a "Net Zero" posture for installation energy, water and waste, as detailed in the Air Force "Net Zero" Energy, Water, and Waste Policy memorandum dated June 23, 2012 (see Appendix D). The project is also needed to help control the Base's electrical energy costs, which have risen by approximately 40 percent since 2006.

Description of Alternative A (Proposed Action)

The Proposed Action is a Federal project on Federal land that includes leasing land to and entering into a Power Purchase Agreement (PPA) with a private developer who would design, construct, operate and maintain an unmanned PV solar energy facility at the former East Housing Area (EHA) on VAFB. The Proposed Action will serve the Base's energy needs and is not expected to export energy to PG&E's distribution system. The Project is designed to have a useful life of 20 to 30 years, although the life span could be extended by upgrades and refurbishments. The Proposed Action includes environmental protection measures and minimization that would be implemented to avoid and minimize adverse impacts.

Description of Alternative B (No–Action Alternative)

Under the No-Action Alternative, the proposed solar project would not be developed at this location. Based on the VAFB General Plan, the No-Action Alternative might result in the EHA being developed as a business park or for other commercial uses. Under the No-Action Alternative, the Base would need to develop another site or other source of renewable energy if it were to meet the need. Impacts from developing another site or source could result in environmental impacts similar to or greater than the Proposed Action, depending upon location. Environmental protection and minimization measures similar to those identified for the Proposed Action would also be implemented under the No-Action Alternative.

Preferred Alternative

Alternative A is the preferred alternative because it is the only alternative that fulfills

the purpose and need for the Proposed Action.

Alternatives Considered but Eliminated

As part of the Air Force's decision-making process, a number of alternative energy sources and alternative solar sites were considered but not carried forward for detailed analysis as they were determined infeasible because they do not meet the project purpose and need, and would not minimize environmental impacts compared to the Proposed Action. Alternative renewable energy sources considered but rejected based on costs, schedule, mission and/or environmental constraints include wind, wave, geothermal, biomass, landfill gas capture, concentrated solar, and rooftop solar. Seven alternative site locations for the Proposed Action were considered and rejected based on a consideration of costs, schedule, mission constraints, environmental constraints and other site selection criteria described in Section 2.1 of this EA.

Resource Areas Evaluated

The resources analyzed in this EA include: air quality; biological resources; cultural resources; geology and earth resources; land use and coastal zone resources; noise; public health and safety; transportation; visual resources and water resources.

Summary of Environmental Impacts

The environmental consequences associated with implementation of the Proposed Action and alternatives are presented and compared in Table ES-1. For a detailed description and analysis, refer to Chapter 4, Environmental Consequences.

Table ES-1. Summary of Potential Environmental Consequences

Resource	Alternative A (Proposed Action)	Alternative B (No-Action Alternative)
Air Quality	Proposed emissions associated with construction activities would not exceed the significance thresholds for criteria pollutants or greenhouse gases. O&M activities would consist of a few trips per year. The solar project would reduce emissions of criteria pollutants and greenhouse gases over its lifetime compared to a traditional fossil fuel-based electrical generating system. This is an overall beneficial effect. Therefore, the Proposed Action would not have adverse impacts on air quality.	Based on the V AFB General Plan, the No-Action Alternative might result in the EHA being developed as a business park or other commercial uses. Such a development, which would attract workers and consumers, can be expected to have environmental impacts greater than the Proposed Action as a result of greater vehicle emissions. The Base may also develop renewable energy sources at other sites, in which case air quality impacts can be expected to be similar to or greater than the Proposed Action, depending on location. The No-Action Alternative may also result in no development of a renewable energy source on the Base. Under this scenario, there would be no air quality benefits because the Base would continue to rely on existing electricity sources that for the most part rely on traditional fossil-fuels.
Biological Resources	The Proposed Action would be constructed on a highly degraded site that was formerly a residential neighborhood. The Proposed Action would avoid impacts to listed species; however direct and/or indirect effects may occur to other biological resources. Wetlands and non-wetland waters of the U.S. are not present within the site and indirect effects off-site would be avoided. Possible short-term and long-term effects of the Proposed Action include: soil erosion and sedimentation in adjacent and downstream habitats; displacement of sensitive habitat for rare species due to dispersal of non-native invasive plant species from the project site; possible removal of at least 16 coast live oak trees; possible removal of 4 acres of degraded Burton Mesa chaparral and 0.11 acre of arroyo willow thicket if the site were completely disturbed; night lighting that could disrupt wildlife activity in adjacent habitat areas; bird mortality due to physical appearance of the array of solar panels; dust and noise during construction; and loss of foraging habitat for loggerhead shrike. Specific environmental protection measures listed in Section 4.2 would be implemented to reduce all impacts to acceptable limits.	Development of the site with a business park or other commercial uses can be expected to have impacts to biological resources similar to or greater than the Proposed Action. The Base may also develop renewable energy sources at other sites, in which case biological resource impacts can be expected to be similar to or greater than the Proposed Action, depending on location.
Cultural Resources	The proposed solar site was previously surveyed; two cultural resources are present within the Area of Potential Effect (APE): CA-SBA-3270 and CA-SBA-3487. CA-SBA-3270 has not been evaluated for eligibility for the National Register of Historic Places and will be assumed eligible for the purposes of this project only and protected with temporary exclusionary fencing to keep vehicles and equipment from inadvertently entering site boundaries. CA-SBA-3487 was determined ineligible for the Register by consensus determination. In the event previously undocumented cultural resources are discovered during construction activities, environmental protection measures listed in Section 4.3 would minimize impacts on any undiscovered eligible sites within the project area.	Not constructing and operating the solar site would avoid affecting historic properties. Development of the site as a business park or for other commercial uses would require assessment of effect based on the details of the specific development plan. The Base may also develop renewable energy sources at other sites, in which case cultural resource impacts can be expected to be similar to or greater than the Proposed Action, depending on location.

Resource	Alternative A (Proposed Action)	Alternative B (No-Action Alternative)
Geology and Earth Resources	With the use of Best Management Practices (BMPs) and implementation of a Storm Water Pollution Prevention Plan (SWPPP), adverse impacts to geology and earth resources would not occur.	Development of the site with a business park or other commercial uses can be expected to have impacts to geology and earth resources, similar to or greater than the Proposed Action. The Base may also develop renewable energy sources at other sites, in which case impacts to geology and earth resources also can be expected to be similar to or greater than the Proposed Action, depending on location.
Land Use	The Proposed Action is consistent with the Base's General Plan and would have no land use impacts. The site is more than 6 miles from the coast and the Proposed Action would not impact coastal resources.	Based on the AFB General Plan, the No-Action Alternative might result in the EHA being developed as a business park or other commercial uses. Such a result would be consistent with the General Plan and compatible with adjacent land uses (Commercial/Services). Therefore, the No-Action Alternative would have no impacts on land use and coastal zone resources. The Base may also develop renewable energy sources at other sites, in which case land use impacts can be expected to be similar to or greater than the Proposed Action, depending on location.
Noise	Implementation of the Proposed Action would temporarily increase noise in the project vicinity due to construction activities. Construction activities could result in substantial increases of ambient sound above existing conditions. However, during construction, environmental protection measures listed in Section 4.6 would be implemented to reduce noise at the schools to acceptable limits. Noise generated from normal operation of the PV solar facility and its routine maintenance activities would not substantially differ from sound sources that contribute to the existing noise environment near the project vicinity. No environmental protection measures are proposed for operations and maintenance as the project will not result in an adverse change in existing conditions. Noise impacts thus would be temporary and reduced to acceptable limits.	Based on the VAFB General Plan, the No-Action Alternative might result in the East Housing Area being developed as a business park or other commercial uses. Such development would require more workers and attract consumers that can be expected to have noise impacts greater than the Proposed Action. The Base may also develop renewable energy sources at other sites, in which case noise impacts can be expected to be similar to or greater than the Proposed Action, depending on location.
Public Health and Safety	Proposed construction activities would require the use of typical hazardous materials found at most construction projects; however, compliance with all applicable federal, state and local rules during proposed activities would minimize the potential for adverse effects. All relevant Air Force regulations would be specified in construction contractor contracts and implemented with standard BMPs and environmental protection measures listed in Section 4.7. Therefore, adverse impacts on public health and safety would not occur.	Based on the VAFB General Plan, the No-Action Alternative might result in the EHA being developed as a business park or other commercial uses. If such uses were developed, impacts to public health and safety can be expected to be similar to or greater than the Proposed Action. The Base may also develop renewable energy sources at other sites, in which case impacts to public health and safety can be expected to be similar to the Proposed Action. Any development under the No-action Alternative would be subject to the same compliance requirements and environmental protection measures as the Proposed Action and thus adverse effects on public health and safety should not occur.

Resource	Alternative A (Proposed Action)	Alternative B (No-Action Alternative)
Transportation	Implementation of the Proposed Action would temporarily affect the local roadway network during project construction. However, during construction specific environmental protection measures listed in Section 4.8 would be implemented to reduce traffic impacts to acceptable limits during construction. Increases in traffic volumes would be temporary and no long-term impacts to the regional transportation network would occur. Proposed operations and maintenance activities at the unmanned solar facility would only involve periodic visits by a small number of people that would not substantially increase traffic volumes or affect circulation patterns within the Base. Therefore, adverse impacts to transportation would not occur.	Development of a business park or commercial development, which would attract more workers and consumers, can be expected to have environmental impacts greater than the Proposed Action. The Base may also develop renewable energy sources at other sites, in which case transportation impacts can be expected to be similar to or greater than the Proposed Action, depending on location.
Visual Resources	No important or designated scenic resources are present. The proposed facility would not be visible from most areas within a 2-mile perimeter of the project site. The site is highly disturbed from previous development and contains no unique visual features. Much of the site when viewed from State Route 1 (SR-1) is largely screened by large windrows of mature trees. Some viewers at some locations at the school sites and some travelers on nearby roadways will have views of the project and some may consider the visual change as adverse since the project will remove mature trees from the interior of the site and introduce industrial elements. Some large trees along SR-1 may be removed if needed to improve solar exposure. Replacing such trees with lower-growing native vegetation would screen the project to some extent, from motorists and thus would reduce adverse effects. Lighting will be directed downward and shielded to focus illumination on desired areas. The Proposed Action includes non-reflective PV solar module arrays and no substantial changes in light and glare would result. Overall, there would be a change in visual setting but no important or designated scenic resources would be affected.	Based on the VAFB General Plan, the No-Action Alternative might result in the EHA being developed as a business park or other commercial uses. In terms of mass, height and lighting, commercial developments constructed at the site pursuant to the VAFB General Plan can be expected to be more noticeable than the Proposed Action and some may find the change in visual characteristics adverse although such developments would not result in any effect on important or designated scenic resources. The Base may also develop renewable energy sources at other sites, in which case impacts to visual resources can be expected to be similar to or greater than the Proposed Action, depending on location.
Water Resources	Proposed grading and construction activities would result in temporary soil disturbance, thus increasing the potential for short-term erosion within the immediate area. No surface water bodies are present but an existing storm drain is located along the site's southwestern border parallel to SR-1. The project design would be required to match predevelopment hydrology. Implementation of a SWPPP and standard BMPs during construction and operations would ensure the Proposed Action would not result in adverse impacts to water resources.	Development of a business park or other commercial uses, which would attract workers and/or consumers, can be expected to have impacts to water resources that are potentially greater than the Proposed Action. The Base may also develop renewable energy sources at other sites, in which case impacts to water resources can be expected to be similar to or greater than the Proposed Action, depending on location. However, implementation of environmental protection measures, BMPs, and other standard design features can be expected to avoid and reduce potential adverse effects to acceptable levels.

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Acronyms and Abbreviations

30 CES	30th Civil Engineer Squadron
30 CES/CEIEA	30th Civil Engineer Squadron, Installation Management Flight, Natural Resources Management
30 CES/CEIEC	30th Civil Engineer Squadron, Civil Engineering Installation Management Environmental Compliance
30 SW/SEW	30th Space Wing Safety-Weapon Safety
30 CES/CEI	30th Civil Engineer Squadron, Installation Management Flight
30 CES/CEIEEC	30th Civil Engineer Squadron, Installation Management, Environmental Compliance Element
30 SW/SE	30 SW Safety Office
30 SWP 32-7043A	Vandenberg AFB *Hazardous Waste Management Plan*
AB	Assembly Bill
AFB	Air Force Base
AFI	Air Force Instruction
AOC	Area of Concern
AOI	Area of Interest
ATC	Authority to Construct
Basin Plan	Central Coast Water Quality Control Plan
BMP	Best Management Practice
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Act
CAP	Collection Accumulation Point
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CDMG	California Division of Mines and Geology
CEQ	Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CWA	Clean Water Act
CY	calendar year
CZMA	Coastal Zone Management Act
dB	Decibel
dBA	A-Weighted Sound Level
DoD	Department of Defense
EA	Environmental Assessment
EISA	Energy Independence and Security Act
EESOH-MIS	Enterprise Environmental, Safety, and Occupational Health Information Management System
e-GGRT	Electronic GHG reporting tool

EO	Executive Order
EOD	Explosive Ordnance Disposal
EPM	Environmental Protection Measures
EPP	Environmental Protection Plan
ESA	Endangered Species Act
FHWA	Federal Highway Administration
Fisheries Service	National Marine Fisheries Service
FTA	Federal Transit Administration
GHG	Greenhouse Gas
GWP	Global Warming Potential
HazMart	Vandenberg Hazardous Materials Pharmacy
Hz	Frequency
IRP	Installation Restoration Program
kV	Kilovolt
L_{eq}	Equivalent Noise Level
LOS	Level of Service
MBTA	Migratory Bird Treaty Act
mph	Miles Per Hour
MRR	EPA Mandatory Reporting Rule
MT	Metric tons
MW	Mega Watts
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NCA	Noise Control Act
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NO_X	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
O_3	Ozone
OSHA	Occupational Safety and Health Act
PCBs	Polychlorinated Biphenyls
PM10	Particulate Matter Less Than 10 Microns in Diameter
PM2.5	Particulate Matter Less Than 2.5 Microns in Diameter
ppm	Parts Per Million
PTO	Permit to Operate
PV	Photovoltaic
ROG	Reactive Organic Gases
RWQCB	Central Coast Regional Water Quality Control Board
SAPs	Authorized satellite accumulation points
SARA	Superfund Amendments and Reauthorization Act
SBCAPCD	Santa Barbara County Air Pollution Control District
SCCAB	South Central Coast Air Basin
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLC	Vandenberg AFB Space Launch Complex
SO_2	Sulfur dioxide
SR	State Route
SWP	Space Wing Plan

SWRCB	State Water Resources Control Board
TPH	Total Petroleum Hydrocarbons
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound
Western Range	Western Test Range/Pacific Missile Range
$\mu g/m^3$	Micrograms per cubic meter

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Chapter 1. Purpose and Need for the Proposed Action

This Environmental Assessment (EA) has been prepared per: the National Environmental Policy Act (NEPA) of 1969, as amended; the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR §§ 1500-1508); and the Air Force's supplemental NEPA regulations (32 CFR Part 989). Specifically, this EA evaluates the potential environmental impacts associated with constructing, operating and maintaining (O&M) a solar photovoltaic (PV) energy facility on Federal land to provide electricity to Vandenberg Air Force Base (VAFB) in Santa Barbara County, California. The United States Air Force (USAF) is the lead agency.

1.1 Purpose of the Proposed Action

The purpose of the Proposed Action is to provide approximately 25 percent of VAFB's electrical power needs from a cost effective renewable energy source.

1.2 Need for the Proposed Action

The Proposed Action is needed to help comply with 10 US Code § 2911 Energy Performance Goals and Master Plan for the Department of Defense (DoD) that states that it shall be DoD's goal to produce or procure no less than 25 percent of its facility energy needs from renewable energy sources by the year 2025 ((10 USC 2911) Title II, Subtitle A, Sec. 203). A 20 megawatt (MW) solar facility would provide approximately 24.5 percent of VAFB's current electrical energy needs.

The Proposed Action is part of the Air Force's plan to achieve a "Net Zero" posture for installation energy, water and waste, as detailed in the Air Force "Net Zero" Energy, Water, and Waste Policy memorandum dated June 23, 2012 (Appendix D). A Net Zero Energy posture is defined as reducing energy demand, improving the assured availability of facility/process energy for mission-critical operations, and increasing generation of renewable energy to the greatest extent practicable in order to consume no more energy than is generated. The Air Force Net Zero policy supports and builds upon the sustainability goals and objectives already established in Executive Order (EO) 13514, "Federal Leadership in Environmental, Energy and Economic Performance," the 2012 National Defense Authorization Act (NDAA), the Air Force Energy Plan, the 2011 Air Force Implementation Plan for the DoD Strategic Sustainability Performance Plan, and the Air Force policy memorandum on Pollution Prevention, dated April 27, 2012. Further information about the Air Force Net Zero Plan may be found at http://www.afcec.af.mil/energy/ratesandrenewables/index.asp.

The project is also needed to reduce the Base's energy costs. Since 2006, electricity costs to the Base have risen approximately 40 percent (King 2014).

1.3 Project Location

VAFB is located on the south-central coast of California, approximately 55 miles northwest of Santa Barbara (Figure 1-1). The Base covers approximately 99,000 acres in western Santa Barbara County. The Santa Ynez River and State Route (SR) 246 divide VAFB into two distinct areas: north VAFB and south VAFB. The Proposed Action is located on north VAFB adjacent to the Main Gate near the intersection of State Route 1 (SR-1) and California Boulevard. The Proposed Action is located outside the Base's secured perimeter and is located on the U.S. Geological Survey (USGS) Surf and Casmalia 7.5 minute topographic quadrangles (Figure 1-2).

1.4 Legal Requirements

A critical component of preparing this EA is a thorough identification of all environmental laws, regulations, and directives that may apply to the Proposed Action and alternatives.

Figure 1-1. Project Region

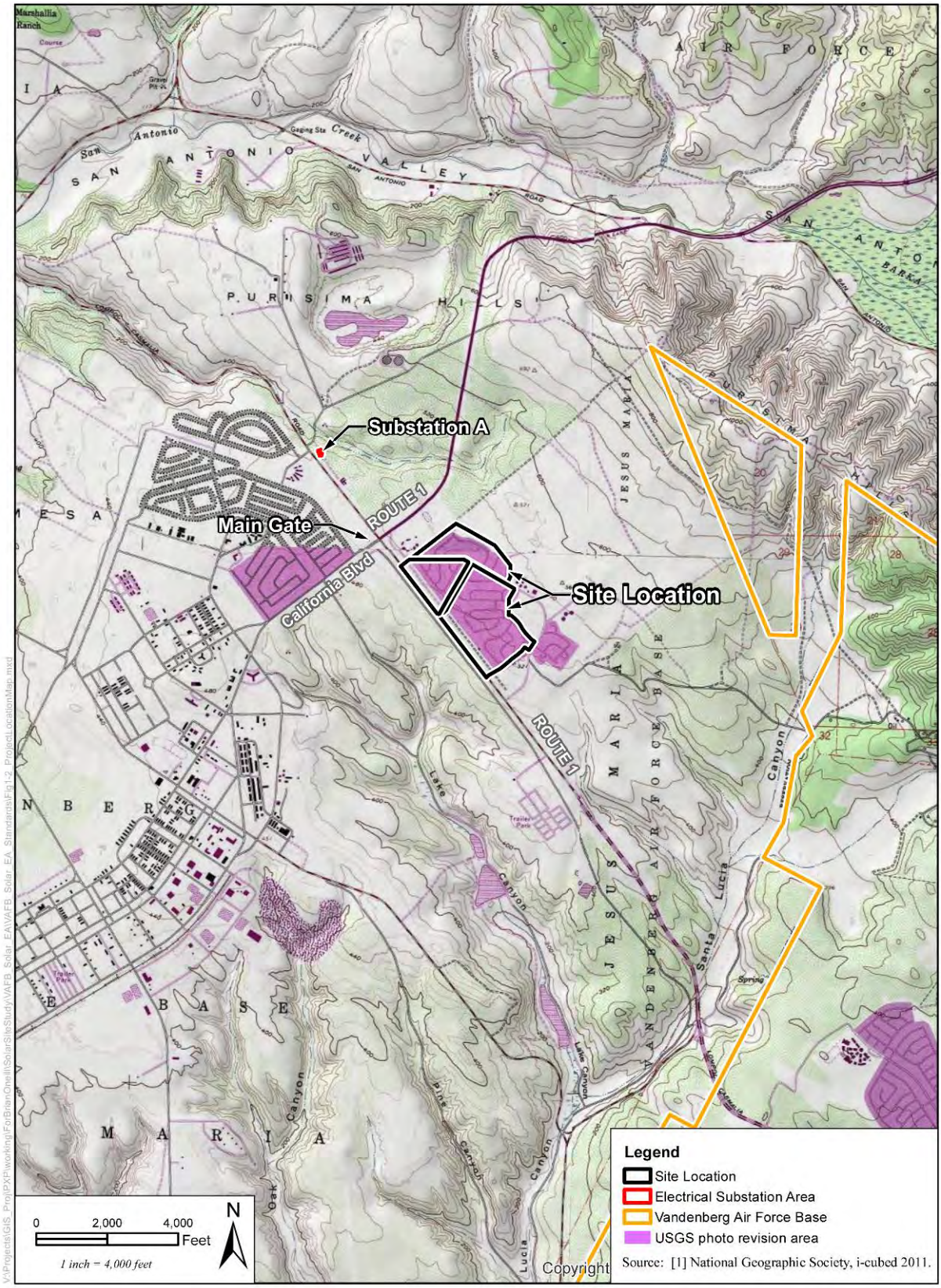

Figure 1-2. Project Location

Federal Laws and Regulations
American Indian Religious Freedom Act of 1978 (42 United States Code [U.S.C.] 1996)
Archaeological and Historic Preservation Act of 1974 (16 U.S.C. 469a et seq.)
Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa-mm), Supplemental Regulations of 1984
Clean Air Act (CAA) of 1970 (42 U.S.C. 7401 et seq.)
Clean Water Act (CWA) of 1977 as amended (33 U.S.C. 1251 et seq.)
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9601-9675),
Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. 1451-1464)
Energy Independence and Security Act of 2009 (EISA)
Energy Policy Act of 1992 as amended (42 U.S.C. 8256 et seq.)
Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.)
EO 11990-Protection of Wetlands
EO 12088, Federal Compliance with Pollution Control Standards
EO 12898--Environmental Justice
EO 13045 - Protection of Children from Environmental Health Risks and Safety Risks
EO 13112—Invasive Species
EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management
EO 13432— Cooperation Among Agencies in Protecting the Environment with Respect to Greenhouse Gas Emissions from Motor Vehicles, Nonroad Vehicles, and Nonroad Engines
EO 13514--Federal Leadership in Environmental, Energy and Economic Performance
Migratory Bird Treaty Act (MBTA) of 1918 as amended (16 U.S.C. 703-712)
NEPA of 1969 as amended (42 U.S.C. 4321-4347)
National Historic Preservation Act (NHPA) of 1966 as amended (16 U.S.C. 470 et seq.)
Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001-3013)
Noise Control Act (NCA) of 1972 (42 U.S.C. 4901 et seq.)
Occupational Safety and Health Act (OSHA) of 1970 (29 U.S.C. 659-678)
Pollution Prevention Act of 1990 (42 U.S.C. 13101-13109)
Presidential Memorandum on Federal Leadership on Energy Management (5 Dec 2013)
Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6901 et seq.)
Superfund Amendments and Reauthorization Act (42 U.S.C. 9601-9675)
Title II of the Toxic Substances Control Act of 1976 (15 U.S.C. 2601 et seq.)
10 US Code § 2911 Energy Performance Goals and Master Plan for the Department of Defense
State Laws and Regulations
California Coastal Act of 1976
California Clean Air Act of 1988
Porter-Cologne Water Quality Control Act
California Endangered Species Act
California Integrated Waste Management Act of 1989, California Assembly Bill (AB) 939

The Air Force determined that the following licenses, permits, and/or other authorizations are required for the implementation of the Proposed Action (Alternative A):

- Issuance of real property authorization by VAFB to the private contractor to conduct, operate, and maintain the facility on behalf of VAFB;
- Permits for use of equipment used in the construction and/or operation of the solar facility if equipment is not registered in the California Air Resources Board's (CARB) Portable Equipment Registration Program (PERP) (see Section 4.1);
- EISA Section 438. A Maximum Extent Technically Feasible Determination will be submitted as part of the design to 30 CES/CEIEC (See Section 4.9);
- A Notice of Intent to comply with the California National Pollutant Discharge Elimination System (NPDES) Construction General Permit (Order No. 2009-0009-DWQ); and
- A discharge-to-grade form for panel washing will be submitted for approval to 30 CES/CEIEC (see Section 4.9).

1.5 Interagency Coordination and Consultation

The Proposed Action is a federal undertaking subject to compliance with Section 106 of the NHPA. VAFB initiated consultation with the State Historic Preservation Officer (SHPO) under 36 CFR Part 800. VAFB determined that the Proposed Action would have no adverse effect to any properties listed in or potentially listed in the National Register of Historic Places. The SHPO has concurred with VAFB's determination of no adverse effect to historic properties and has confirmed that both CA-SBA-3270 and CA-SBA-3487 were previously determined ineligible for listing in the National Register of Historic Places by the SHPO (see Appendix C). At this time no changes to the environmental protection measures in Section 4.3 have been made; however, future discussion with the SHPO and consulting tribes may result in modification to those measures if determined to be unnecessary.

VAFB determined that the Proposed Action will not affect threatened or endangered species or their designated critical habitat and therefore consultation with the United States Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service per Section 7 of the Endangered Species Act is not required.

1.6 Objectives of the Environmental Assessment

This EA describes the affected environment, environmental consequences of the Proposed Action and No-Action Alternative, and identifies measures to prevent or minimize environmental impacts. Consistent with 32 CFR Part 989 and CEQ regulations (40 CFR 1500-1508), the scope of analysis presented in this EA is defined by the potential range of environmental impacts that could result from implementing the Proposed Action and the No-Action Alternative.

The resources analyzed in this EA include: air quality; biological resources; cultural resources; geology and earth resources; land use; noise; public health and safety; transportation; visual resources; and water resources. These resources are considered in more detail to determine whether additional analysis, in the form of an environmental impact statement, is required.

The following resources were considered but eliminated from detailed analysis in this EA since potential impacts would be non-existent or considered negligible:

- **Environmental Justice.** Pursuant to EO 12898, Environmental Justice, the potential effects of the Proposed Action on minority and low-income communities were considered. Minority and/or low-income populations occur within the region of influence (VAFB, Lompoc and Santa Maria Valleys), including the schools located near the project site. Both Manzanita Public Charter School and Vandenberg Middle School would be impacted by temporary noise during construction. However, Environmental Protection Measures are required and shall be implemented as part of the Proposed Action to avoid excessive noise impacts to the schools and potential health and safety effects on children consistent with EO 13045. The Proposed Action therefore would not disproportionally affect minority and low-income communities. For more information on potential noise impacts, see Section 3.6.
- **Socioeconomics.** Construction and operation of the Proposed Action would not have a substantial effect on the socioeconomic conditions of the region (Lompoc and Santa Maria Valleys). Some short-term economic benefits are likely during project construction but no long-term effects are expected due to the unmanned nature of the facility.
- **Public Services and Utilities.** There would be no additional military, government/civilian, and contractor

support personnel stationed at VAFB as a result of the Proposed Action. The solar facility would be unmanned and monitored remotely. Upgrades to the electrical transmission system would be located on the Base and would not generate electricity to the public utility system. Consequently, the Proposed Action would not result in a need for substantial increases in public services or utilities.

- **Recreation.** The electrical power facility would not result in population increases that could result in increased use of recreational resources or a need for additional recreational facilities. The electrical facility would be closed to the public for safety reasons and would not provide recreational opportunities.

Chapter 2. Proposed Action and Alternatives

This chapter includes the selection criteria for alternatives, and describes Alternative A (Proposed Action), Alternative B (No-Action Alternative), and alternatives considered but rejected.

2.1 Selection Criteria for Alternatives

The range of reasonable alternatives in this EA was identified by evaluating their ability to meet the project purpose and need, and by their consistency with priorities and screening criteria outlined in the President's memorandum *Federal Leadership on Energy Management* (December 5, 2013) and with siting guidelines developed by DoD in collaboration with the Natural Resources Defense Council: *Working with the Department of Defense: Siting Renewable Energy Development* (DoD 2013).

The selection process began with the application of a broad set of criteria to evaluate the type of renewable energy technology that would best meet the purpose and need. The evaluation, described in Section 2.5.1, determined that a ground-mounted system of photovoltaic solar panels was the most feasible source of renewable energy. After that determination, solar-specific criteria were developed and applied to evaluate seven potential solar sites (Section 2.5.2). This evaluation, described further in Section 2.5, selected the EHA site for the Proposed Action because it alone met all specific site selection criteria.

Solar-specific siting criteria used to develop the Proposed Action in this EA are as follows:

- Technological and Constructability Considerations:
  - Most easterly side of VAFB property to maximize solar resources
  - Higher in altitude to minimize marine fog influences
  - Generally flat topography with southern exposure to minimize grading costs and maximize solar resources
  - Adequate contiguous acreage with room for growth (120-170 acres)
- Security/Mission Compatibility:
  - Segregated from the installation's main cantonment area and outside the secured perimeter to avoid mission impacts and to facilitate access during O&M
- Access and infrastructure:
  - Proximity to existing roads to minimize construction costs and environmental impacts
  - Proximity to existing power transmission lines/poles to minimize interconnection construction costs and environmental impacts
  - Proximity to water mains to minimize truck trips and associated air emissions
- Minimal environmental constraints:
  - Previously disturbed site to minimize environmental conflicts
  - Absence of threatened and endangered species conflicts to avoid impacts and schedule delays
  - Absence of cultural resource conflicts to avoid impacts and schedule delays
  - Minimal impacts from unexploded ordnance (Military Munitions Response Program sites) and/or

site contamination (Installation Restoration Program sites)

- Cost and schedule requirements:
  - Must be cost effective (economically feasible at the scale needed)
  - Must be operational by 31 December 2016 to secure Investment tax credits that would lower solar energy costs to the Base.

Section 2.5 provides additional details of the selection process used to identify the Proposed Action and alternatives.

2.2 Alternative A: Proposed Action (Preferred Alternative)

The Proposed Action is a Federal Project on Federal land that includes leasing land to and entering into a Power Purchase Agreement (PPA) with a private developer, who would design, construct, operate and maintain an unmanned PV solar energy facility at the former EHA on VAFB. The Project will serve the Base's energy needs and is not expected to export energy to PG&E's distribution system. The Project is designed to have a useful life of 20 to 30 years, although the life span could be extended by upgrades and refurbishments. In the event that the Project is decommissioned, the facility would be removed and the site prepared for subsequent land use according to the terms of the real property authorization.

Currently, a 20 MW solar energy facility would provide sufficient energy to meet the Base's peak load and would meet the project's 25 percent renewable energy goal. Future increases in the Base's energy needs or future escalations in renewable energy goals could require a larger solar facility and the EHA site could support a larger solar project (e.g., 30 MW). The future developer would determine the most efficient and cost effective layout of the facility in coordination with the Base. Therefore, to allow for design flexibility and future needs, the Proposed Action assumes the entire site could be developed subject to Base approval. The analysis thus assumes any resource within the project site could be affected; environmental protection measures are identified to ensure avoidance of sensitive resources adjacent to the project site.

The Proposed Action would reduce risk and achieve important financial benefits for the Base, including: (1) no initial capital investment is required; (2) the Base only pays for the solar electricity that is produced; (3) electricity is purchased at fixed rates that are locked in over the term of the contract; (4) the Base has no responsibility for owning, operating, or maintaining the equipment; and (5) the Base can indirectly benefit from the Business Energy Investment Tax Credit (ITC) and accelerated depreciation, which are not directly available to the Base but can be passed to it in the form of lower PPA rates.

2.2.1 Project Site

The proposed solar facility is located on a part of a highly disturbed site known as the East Housing Area (EHA) located near the VAFB main gate at the intersection of SR-1 and California Boulevard in northern Santa Barbara County, California. The solar site measures approximately 182-acres in size (Figures 2-1 and 2-2).

The EHA was developed as a residential neighborhood in the late 1950s and early 1960 and once included several hundred homes, utilities, roads, and schools. The EHA was demolished between 2006 and 2012 as part of a long-term project addressed in a 1996 Environmental Assessment for the Replacement of Military Family Housing. Demolition included removal of structures, building slabs, most streets, curbs and gutters, sidewalks, fire hydrants, manholes, power poles, catch basins, fences, and abandoned utilities. Most underground utilities were cut, capped and abandoned in

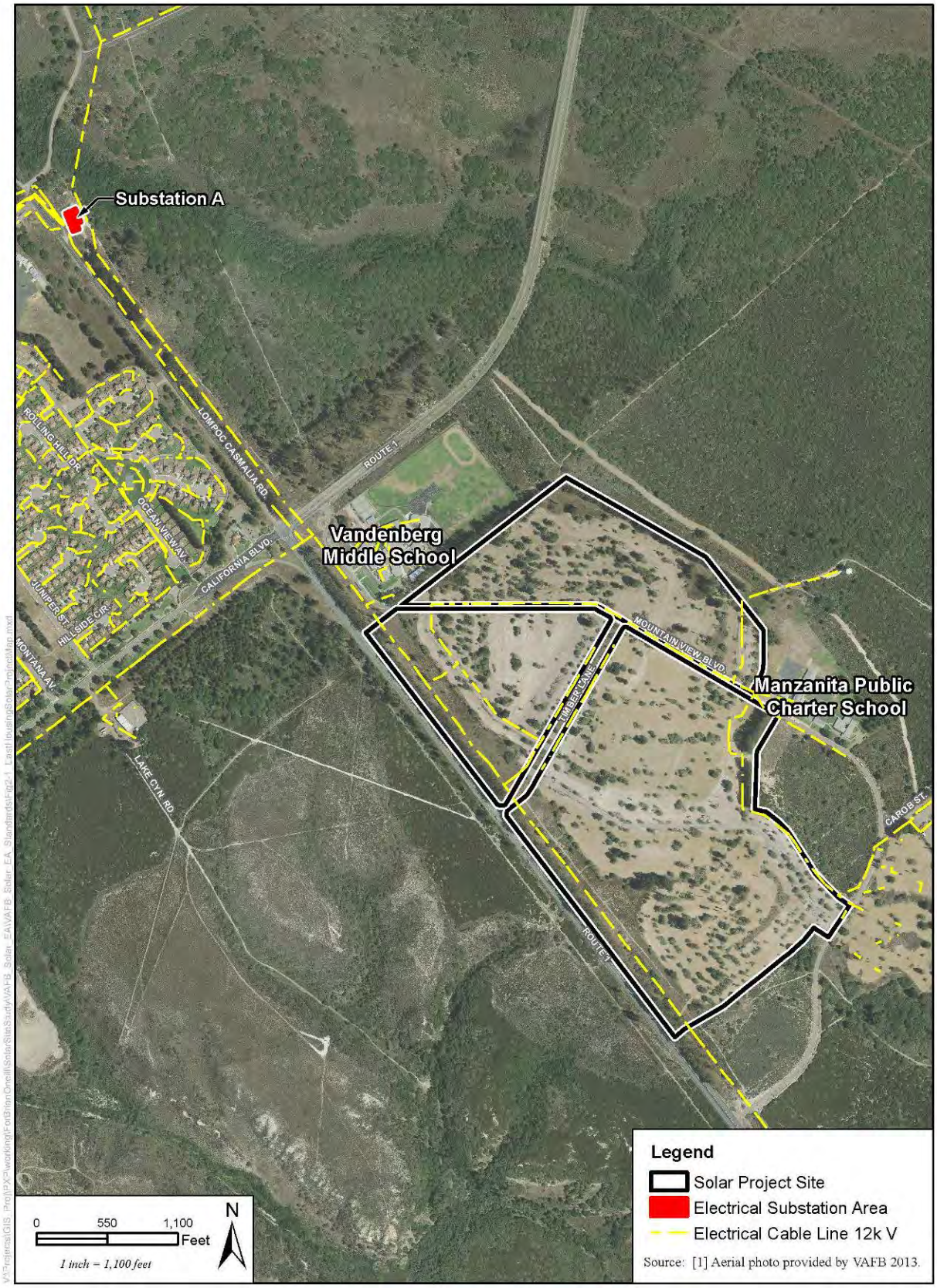

Figure 2-1. East Housing Area Solar Project

Figure 2-2. East Housing Area Solar Project Detail

place as close to the mains as practicable, although electrical, water and gas lines along Mountain View Boulevard and Timber Lane remain in service and will continue to be in service. The most visible reminders of the former housing area are a few asphalt-paved streets and ornamental and native trees. See Figure 2-2 for a 2013 aerial view of the site. Since the aerial photo was taken, the site has remained unused; however, vegetation has re-grown to cover graded areas to some extent (varies across site).

Two schools are located adjacent to the proposed solar site along Mountain View Boulevard, including Manzanita Public Charter School (K-6) and Vandenberg Middle School (see Figure 2-2). Manzanita Public Charter School is authorized by the Lompoc Unified School District (LUSD) to operate independently. Vandenberg Middle School is operated by LUSD.

2.2.2 Project Design and Construction

The site facility would include the following major components: non-reflective PV solar module arrays mounted on a fixed tilt racking system supported by embedded piers (preferred), buried collector lines, and electrical equipment on small concrete pads. The solar power generation facility would also include a small, unmanned communications enclosure that would contain supervisory control and data acquisition equipment. The photograph below provides a close view of a typical PV solar panel array.

Internal site circulation would include a perimeter road with an all-weather surface and interior roadways (minimally graded, dirt or gravel) to provide maintenance access to the solar panels. A chain link security fence will be installed around the facility. All Project lighting will be designed to provide the minimum illumination needed to achieve safety and security objectives. Lighting will be directed downward and shielded to focus illumination on desired areas.

Power from the proposed solar facility would be transmitted approximately 0.75-mile north to Substation A on an existing distribution line (12 kV or 70 kV) along SR-1 and Lompoc-Casmalia Road (see Figure 2-1). To deliver the power, upgrades to the existing distribution line, including installing new cross arms, adding or replacing conductors (electrical lines), and installing or upgrading other equipment as needed to safely interconnect the system would be required. No new power poles or pole relocations are expected. Any upgrades at the substation are expected to be minor (King, 2014).

Construction of the proposed Project is estimated to require approximately 80 workers at its peak. Construction is currently estimated to start in 2015 or early 2016. Construction duration will depend on final project design but is estimated to be completed within an 8 to 12 month period. Construction activities at the Project site include vegetation clearing, grubbing, grading, trenching for buried cables and installation of pile-driven pier foundations to support the solar panels. Grading is estimated to include approximately 20,000 to 35,000 cubic yards of cut and fill that would be balanced on-site. Several paved roads inside the site are likely to be retained and used to access the solar panels, although they could be removed and replaced if their current configuration is deemed problematic during project design. Any new interior roads would be pervious and likely surfaced with gravel.

Environmental protection measures described throughout Chapter 4 would avoid and minimize potential impacts to the nearby schools from dust, traffic and noise.

The row of eucalyptus between the solar site and Vandenberg Middle School would be preserved. The row of eucalyptus trees along SR-1 south of Timber Lane may need to be removed to reduce shading and improve solar exposure, although such removal is considered unlikely at this point. If the trees were removed, they could be replaced with lower-growing native shrubs to help screen the facility.

Approximately 10 to 20-acre-feet of water would be used during construction for dust suppression and ancillary construction activities. Water would be provided by an on-site water truck that would be filled from existing fire hydrants located along Mountain View Boulevard.

During peak months, the workforce is estimated to include approximately 80 workers that would likely commute from Lompoc and Santa Maria. Carpooling can be expected and would be encouraged. Construction deliveries of local construction materials, solar panels and other materials are expected to range from an estimated 4 trucks per day at the beginning of the project up to approximately 20 per day during the peak month. Commuters and truck deliveries would enter the site via Timber Lane or at the southern intersection of SR-1 and Mountain View Boulevard. No commuters or construction trucks would be allowed to enter the site at the northern SR-1/Mountain View Boulevard intersection while Vandenberg Middle School is in session.

2.2.3 Operations/Maintenance

The proposed solar facility would be unmanned. Several part-time employees would visit the site periodically. A few times per year, designated representatives would visit the site to wash the PV panels. Panel washing may require approximately 1-2 acre-feet of water per year. Panel washing will be conducted with water from existing on-site fire hydrants without the addition of chemicals in a manner that water run-off will infiltrate prior to reaching the storm drain system along SR-1.

2.3 Alternative B: No-Action Alternative

Under the No-Action Alternative, the proposed solar project would not be developed at this location. Based on the VAFB General Plan, the No-Action Alternative might result in the EHA being developed as a business park, shopping center or for other commercial uses that can be expected to have environmental impacts similar to or greater than the Proposed Action.

Under the No-Action Alternative, AFB could:

- Continue to purchase electricity from PG&E and be exposed to expected but unknown increases in energy costs;
- Choose to develop other renewable energy sources at other sites, which would be much more costly because such developments could not be completed in time to take advantage of tax credits that expire on December 31, 2016. Development of other projects at other sites would have environmental impacts similar to or greater than the Proposed Action, depending on location (see Section 2.5); or
- Purchase renewable energy certificates (RECs), which are costly and, unlike the Proposed Action, would not protect the Base from unanticipated increases in energy costs.

The No-Action Alternative thus would not meet the project's purpose and need.

2.4 Environmental Protection Measures

Environmental Protection Measures (EPM) have been identified for the Proposed Action. The specific EPMs are discussed in Chapter 4 for each resource for which they have been identified. Mandatory EPMs (denoted by "shall" or "would") are part of the project design and will be implemented as part of the Proposed Action so as to avoid, minimize, and/or reduce anticipated environmental impacts. Discretionary measures (denoted by "may" or "could") may or may not be implemented to further reduce environmental impacts.

2.5 Other Alternatives Considered

As part of the Air Force's decision-making process, a number of renewable energy technologies and alternative solar sites were considered but not carried forward for detailed analysis as they were determined infeasible because they do not meet the project purpose and need.

2.5.1 Alternative Energy Sources

A wide variety of alternative energy sources were considered and rejected because they are not consistent with the purpose and need with regard to the mission, timeframe or cost. These alternative renewable energy sources and their constraints are briefly described below and summarized in Table 2.5-1. Based on this analysis, a ground-mounted photovoltaic solar system was selected as the basis of the Proposed Action. The following alternative energy sources were considered:

Table 2.5.1. Summary of Alternative Energy Sources and Constraints

Selection Criteria	Wind	Wave	Geothermal	Biomass	Landfill Gas Capture	Concentrated Solar	Rooftop Solar	Solar PV (Ground Mount)
Proven technology/ feasible at VAFB in quantities needed	+	-	-	-	-	-	-	+
Security/Mission Compatibility	-						+	+
Access and infrastructure	-	-			+		+	+
Minimal environmental constraints	-	-	-	+	+	-	+	+
Cost effective	-	-	-	-			-	+
Minimal schedule constraints	-	-	-				-	+

Notes: "+" = meets criteria; "-" = does not meet criteria
Blank cells represent Not Applicable or unknown constraints. Missing data are not considered essential as other constraints noted in the table are sufficient to determine feasibility.

- Wind:
  - Potential mission impacts. Wind turbines pose potential impacts on mission-critical infrastructure including local radar, telemetry and tracking.
  - Costs. Wind generation of sufficient energy output would require multiple wind turbines in high ridge top locations. Such locations typically have high developmental costs (budget and schedule) because they are not located near needed infrastructure such as transmission lines and access roads.
  - Environmental constraints. Wind turbines have a high potential for impacts to avian species protected by the Endangered

Species Act (ESA) and the Migratory Bird Treaty Act (MBTA). Construction of a new transmission line poses a high potential to other environmental resources, such as cultural resources.

- Schedule constraints. A large wind project could not be operational by December 31, 2016.

- Wave:
  - Jurisdictional issues. VAFB does not extend into the Pacific Ocean and coastal areas applicable to wave generation are not within the Base's land rights. Wave generation thus poses leasing, environmental and politically complex issues.
  - Unproven technology. Wave energy is not a proven source at the output level needed.
  - Cost. Wave energy is not proven to be a cost effective source.
- Geothermal:
  - Potential siting problems. Siting geothermal facilities requires exploratory drilling to locate geothermal bodies and identify cost effective regions to drill.
  - Costs. Not considered economically feasible at the scale required for this program.
  - Schedule. A geothermal project at the scale needed could not be sited, approved, constructed and operational by December 31, 2016.
- Biomass:
  - Costs. Pacific Northwest National Lab (PNNL) evaluated biomass energy generation at V AFB using agricultural feedstock from the Lompoc area. It was not considered economically feasible.
  - Insufficient supply. Applicable waste streams from VAFB have already been committed to other sources and are not available in the quantity needed.
- Landfill Gas Capture:
  - Insufficient supply. The VAFB landfill does meet the minimum requirements to support methane capture (waste stream, size, etc.).
- Solar Alternatives:
  - Concentrated solar (power tower, parabolic trough). The Base does not have the solar resources to support this technology. These technologies also pose potential impacts to avian species protected by the ESA and the MBTA.
  - Roof Top Panel Systems. Roof top installations are possible on some buildings but military construction (MILCON) issues prevent development at the scale required to meet the project need. Generally the industry prefers to retrofit roofs less than 5 years old and limited warranties usually would be voided by solar installation.
  - Photovoltaic solar panel technologies. Thin-film panels have lower efficiencies and higher costs compared to crystalline silicon PV panels.

Due to recent reductions in cost and increase in efficiency, crystalline silicon panels represent the most economical PV panel technology.

- Tracking technologies. Solar tracking technologies (single and dual tracking systems) have higher installation and O&M costs than do fixed tilt racking systems.

2.5.2 Alternative Sites

Once photovoltaic solar was selected as the preferred renewable energy source, seven alternative site locations were evaluated. Six locations were rejected based on site selection criteria detailed in Section 2.1. This evaluation is summarized in Table 2.5-2 and described below. Based on this evaluation, the EHA was selected as the Proposed Action site because it alone met all criteria.

Table 2.5-2. Summary of Alternative Solar Site Locations and Constraints

Selection Criteria	Antennae Farm	Flight Line Primary Approach	Base Landfill	Trailer Park Site	Area North of Water Wells	Old Vandenberg Tracking Site	East Housing Area
Easterly side of VAFB property	+	-	+	+	+	+	+
Minimize marine fog influences	+	-	+	+	+	+	+
Flat w/ southern exposure	+	+	-	+	-	-	+
Security/Mission Compatibility	+	-	-	+	+	+	+
Adequate contiguous acreage	+	+	-	-	+	-	+
Access to power transmission lines/poles	-	+	+	+	-	+	+
Access to other needed infrastructure	+	+	-	-	-	-	+
Minimal environmental constraints	+	-	-	+	-	-	+
Cost effective	-	-	-	-	-	-	+
Minimal schedule constraints	-	-	-	-	-	-	+

Notes: "+" = meets criteria; "-" = does not meet criteria

- Antennae Farm. suitable size, topography and other positives but ownership is in question; potential impacts to threatened and endangered species; distance from substation is a negative; close proximity to residential properties
- Flight Line Primary Approach. Potential mission impacts with O&M efforts and well within the secured perimeter.
- Base Landfill. Insufficient acreage within the timeframe needed.
- Trailer Park Site. Insufficient contiguous acreage, moderate impacts to threatened and endangered species; could not be permitted within the timeframe needed.
- Area north of water wells. Not in proximity to power transmission system; other access and infrastructure issues; previously undisturbed site has numerous trees on-site and potential impacts to biological resources, including Threatened and Endangered species; could not be permitted within the timeframe needed.
- Old Vandenberg Tracking Site. Excessive slope, inadequate acreage, undisturbed with high potential for

impacts to biological resources, including threatened and endangered species; could not be permitted within the timeframe needed.

2.6 Preferred Alternative

Alternative A is the preferred alternative because it is the only alternative that fulfills the project purpose and need while avoiding and minimizing environmental impacts. The No- Action Alternative would not meet the project purpose and need and has the potential to result in impacts similar to or greater than Alternative A.

Chapter 3. Affected Environment

3.1 Air Quality

Ambient air quality refers to the atmospheric concentration of a specific compound (i.e., amount of pollutants in a specified volume of air) that occurs in a particular geographic location. Ambient air quality levels at a particular location are determined by the interaction of emissions (e.g., type and amount of pollutant emitted into the atmosphere), meteorology (e.g., weather patterns affecting pollutant emissions), and chemistry (e.g., chemical reactions that transform emissions into other substances). Air quality in a given location is defined by pollutant concentrations in the atmosphere which are generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$).

One aspect of significance is a pollutant's concentration in comparison to a national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The national standards for seven major pollutants of concern (i.e., criteria pollutants), established by the U.S. Environmental Protection Agency (USEPA), are termed the National Ambient Air Quality Standards (NAAQS). Areas that violate a federal air quality standard are designated as non-attainment areas.

California standards, established by CARB, are termed the California Ambient Air Quality Standards (CAAQS). CAAQS are at least as restrictive as the NAAQS and include pollutants for which national standards do not exist. In addition to the federal criteria pollutants, California has identified four other pollutants for ambient air quality standards. Areas within California that have ambient air concentrations of a pollutant higher than a federal and/or state standard are designated as non-attainment areas for that pollutant. Table 3.1-1 summarizes the federal and state ambient air quality standards for regulated pollutants (Santa Barbara Air Pollution Control District 2013).

Toxic air contaminants include air pollutants that can cause serious illnesses or increased mortality, even in low concentrations. Toxic air contaminants are compounds that generally have no established ambient standards, but are known or suspected to cause short-term (acute) and/or long-term (chronic non-carcinogenic or carcinogenic) adverse health effects. The CARB designates diesel particulate matter from the combustion of diesel fuel as a toxic air contaminant.

The main pollutants of concern considered in this air quality analysis include volatile organic compounds (VOCs), ozone (O_3), carbon monoxide (CO), nitrogen oxides (NO_X), particulate matter less than 10 microns in diameter (PM_{10}), and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). Although VOCs or NO_X (other than nitrogen dioxide) have no established ambient standards, they are important as precursors to O_3 and $PM_{2.5}$ formation.

3.1.1 Regional Setting

The climate of the project area is Mediterranean, characterized by warm, dry summers and mild, relatively damp winters. The major influence of the regional climate is the Pacific Ocean and the Eastern Pacific High, a strong persistent atmospheric high-pressure system. Over 90 percent of the total annual precipitation in the project area occurs from polar storm systems that frequent the area during the months of November through April. The average annual precipitation is approximately 14 inches (National Oceanic and Atmospheric Administration 2011).

Due to the proximity of the project site to the coastline, marine air from the Pacific Ocean has a strong moderating effect on air

Table 3.1-1. Santa Barbara County
Attainment/Nonattainment Classification Summary 2013

Pollutant	Averaging Time	California Standards		National Standards	
		Concentration	Attainment Status	Concentration	Attainment Status
Ozone	8 hour	0.070 ppm	N	0.075 ppm*	U/A
	1 hour	0.09 ppm (180 µg/m$^{3)}$	--	--	--
Carbon Monoxide	8 hour	9.0 ppm (10 mg/m$^{3)}$	A	9.0 ppm (10 m/m$^{3)}$	A
	1 hour	20.0 ppm (23 mg/m$^{3)}$	A	35.0 ppm (40 µg/m$^{3)}$	A
Nitrogen Dioxide**	annual average	0.030 ppm(56 µg/m^3)	A	53 ppb	U/A
	1 hour	0.18 ppm(338 µg/m^3)	A	100 ppb	U/A
Sulfur Dioxide	annual average	--	--	Revoked	--
	24 hour	0.04 ppm (105 µg/m^3)	A	Revoked	--
	1 hour	0.25 ppm (655 µg/m^3)	A	75 ppb	***
Particulate Matter (PM_{10})	annual arithmetic mean	20 µg/m^3	N	revoked	A
	24 hour	50 µg/m^3	N	150 µg/m^3	A
Particulate Matter - Fine ($PM_{2.5}$)****	annual arithmetic mean	12 µg/m^3	U	12.0 µg/m^3	U/A
	24 hour	--	--	35 µg/m^{3**}	U/A
Sulfates	24 hour	25 µg/m^3	A		
Lead	calendar quarter	--	--	1.5 µg/m^3	A
	30 day average	1.5 µg/m^3	A	--	--
	Rolling 3-month Average	--	--	0.15 µg/m^3	U
Hydrogen Sulfide	1 hour	0.03 ppm (42 µg/m^3)	A	--	--
Vinyl Chloride (chloroethene)	24 hour	0.010 ppm (26 µg/m^3)		--	--
Visibility Reducing Particles	8 hour (1000 to 1800 PST)		A	--	--

A=Attainment **N=Nonattainment** **U=Unclassified**
U/A=Unclassifiable/Attainment **mg/m^3=milligrams per cubic meter** **ppm=parts per million**
µg/m^3=micrograms per cubic meter

NOTES:
* USEPA strengthened the 8 hour ozone standard from the 1997 level of .08 ppm to .075 ppm on May 27, 2008, but delayed implementation of the standard. Designations for the 2008 standard were finalized on April 30, 2012. For more information, see USEPA's website.
** The state Nitrogen Dioxide ambient air quality standard was amended on February 22, 2007, to lower the 1-hour standard to 0.18 ppm and establish a new annual standard of 0.030 ppm. On January 22, 2010, USEPA set a new 1-hour NO_2 standard of 100 ppb. They also retained the annual NO_2 standard of 53 ppb.
*** USEPA strengthened the 24-hour fine particle standard from the 1997 level of 65 µg/m^3 to 35 µg/m^3 on September 21, 2006. The annual standard was strengthened from 15 to 12.0 µg/m^3 on January 15, 2013.
**** USEPA has not yet made final designations on attainment status. For more information, see USEPA's website.

temperatures at this location. The high and low temperatures during the summer months average in the low 80s (degrees Fahrenheit) and low 50s, respectively. The high and low temperatures during the winter months average in the mid 60s and high 30s.

VAFB is located within Santa Barbara County, which is within the South Central Coast Air Basin (SCCAB). The SCCAB is composed of the counties of San Luis Obispo, Santa Barbara, and Ventura. The Santa Barbara County Air Pollution Control District (SBCAPCD) is responsible for regulating stationary sources of air emissions in Santa Barbara County.

Presently, Santa Barbara County is in attainment/unclassified of all NAAQS for all criteria pollutants. Additionally, Santa Barbara County is in attainment/unclassified of all CAAQS except those for O_3 and PM_{10} (CARB 2013). Table 3.1-1 summarizes the county's attainment status.

The CARB and SBCAPCD operate a network of ambient air monitoring stations in Santa Barbara County. The purpose of the monitoring stations is to measure ambient concentrations of air pollutants and determine whether air quality meets the CAAQS and the NAAQS. The nearest air monitoring station to the project site, the South H Street station in Lompoc measures all criteria pollutants and began monitoring $PM_{2.5}$ in 2007. A summary of the maximum air pollutant concentrations measured within the project region from 2010 through 2012 are presented in Table 3.1-2. Data from 2013 is not readily available.

Table 3.1-2. Ambient Air Quality at VAFB

Pollutant	Averaging Time	2010	2011	2012	CAAQS (ppm)	NAAQS (ppm)	Monitoring Station
Ozone	8 hour	0.069	0.060	0.064	0.070	0.075	Lompoc[1]
PM_{10}	Annual Arithmetic Mean	20.2 µg/m^3	21.4 µg/m^3	20.7 µg/m^3	20 µg/m^3	-	Lompoc[1]
	24 hour	55.1 µg/m^3	71.1 µg/m^3	54.5 µg/m^3	50 µg/m^3	150 µg/m^3	Lompoc[1]
$PM_{2.5}$	Annual Arithmetic Mean	6.5 µg/m^3	7.4 µg/m^3	No Data	12 µg/m^3	15 µg/m^3	Lompoc1
	24 hour	19.1 µg/m^3	18.8 µg/m^3	18.1 µg/m^3	-	35 µg/m^3	Lompoc1
NO_2	1 hour	31	31	33	0.18	-	Lompoc[1]
CO	8 hour	0.5	0.8	0.7	9.0	9	Lompoc[1]
	1 hour	1.5	1.5	1.5	20	35	Lompoc[1]
SO_2	1 hour	0.003	0.005	0.003	0.25	-	Lompoc[1]

Sources:
www.arb.ca.gov/adam (for annual O_3, PM_{10}, and $PM_{2.5}$).
www.epa.gov/air/data/monvals.html (CO 1-hour, 8-hour, NO_2 1-hour, SO_2 1-hour).
http://www.sbcapcd.org Annual Air Quality Reports
Note:
1 Lompoc South "H" Street

These data show that from 2010 through 2012, the region exceeded the: (1) state annual PM_{10} standard in 2010, 2011, and 2012; and (2) state 24-hour PM_{10} standard in 2010, 2011, and 2012. The region attained all other air pollutant standards during this period.

3.1.2 Climate Change and Greenhouse Gases

Climate change poses a serious threat to economic well-being, public health, natural resources and the environment. Global warming is projected to have detrimental effects on industries, including agriculture and tourism, increase the strain on electricity supplies and contribute to unhealthy air. National and international

actions are necessary to fully address the issue of global warming. Action taken by the federal government and California will have important effects by reducing emissions of greenhouse gases (GHG).

GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride, hydrofluorocarbons and perfluorocarbons. GHGs are typically reported as Carbon dioxide equivalent" or "CO_2 equivalent" or "CO_2e".

On 30 October 2009, USEPA issued the Mandatory Reporting of Greenhouse Gases Rule (EPA Mandatory Reporting Rule [MRR]). The USEPA MRR applies to direct GHG emitters, fossil fuel suppliers and industrial gas suppliers with an annual reporting threshold of 25,000 metric tons (MT) or more of CO_2e. The purpose of this rule is to collect accurate and timely GHG data to inform future policy decisions.

On 18 February 2010, the CEQ released draft guidance on addressing climate change in NEPA documents. The draft guidance proposes that federal agencies can use an annual threshold of 25,000 metric tons of CO_2e emissions as a useful reference point, not an absolute standard of significance, to evaluate project-specific GHG emissions and disclose potential impacts.

In response to the USEPA MRR, VAFB has reported its total GHG emissions for 2012 (VAFB 2013). During 2012 the Base as a whole emitted 19,370 metric tons CO_2e.

3.2 Biological Resources

This section describes the existing biological conditions within the Project site, which is based on data obtained from the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CDFW 2013) and a biological survey that was conducted for this project on November 4 and 5, 2014. The Biological Survey Report for this project is presented as Appendix B (URS 2013). The study area for the Biological Survey was approximately 345 acres, which includes the 182-acre Project site (Figure 3.2-1).

3.2.1 Vegetation

Due to past residential land uses on the Project site, the majority of the vegetation present does not represent natural conditions. However, several plant communities (vegetation types) occur on the site (Figure 3.2-1), and are comprised of ornamental vegetation installed for aesthetic/windrow purposes, non-native and ruderal vegetation that became established following demolition of the prior residential uses, and natural vegetation in areas that were avoided during construction of the residential uses. A total of eight plant communities were mapped within the Project site, and are described below. Acreages of each mapped community are summarized in Table 3.2-1.

Most of the project site is highly disturbed. These are areas that were previously developed as a residential neighborhood.

Table 3.2-1. Vegetation

Community	Study Area (Acres)	Project Site (Acres)
Burton Mesa Chaparral*	75	5.0
Arroyo Willow Thickets*	2.6	0.1
Coyote Brush Scrub	4	0
Coast Live Oak Woodland	4	0
Creeping Rye Grass Turf*	0.4	0
Subtotal Natural Vegetation	**86**	**5.1**
Disturbed	188	146.7
Ruderal	35	14.5
Eucalyptus Windrows	25	16.0
TOTAL	**345**	**182.3**

* CDFW Sensitive Natural Community

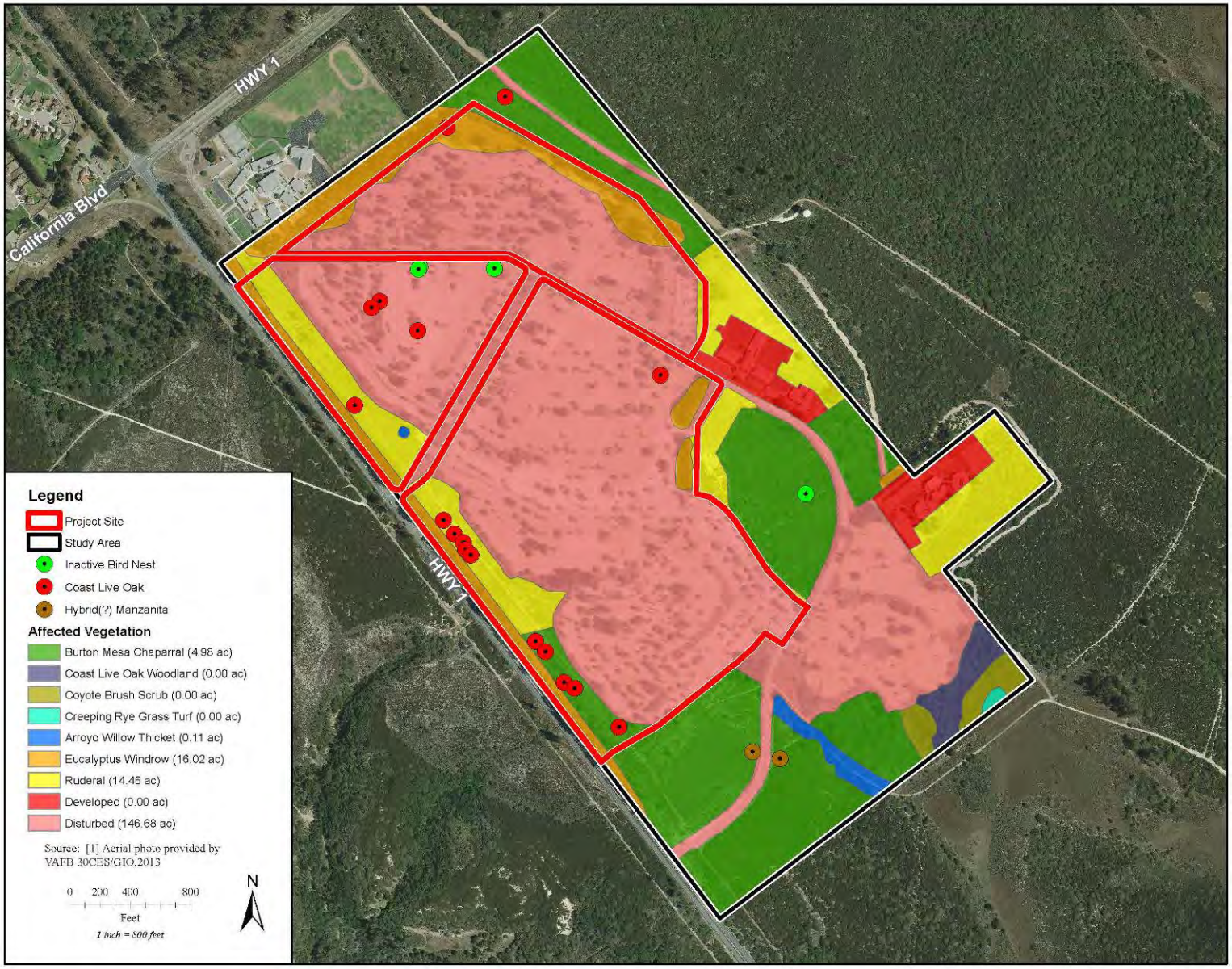

Figure 3.2-1. Biological Resources in the Study Area

The neighborhood has been demolished, and now, all that remains is an extensive amount of non-native exotic invasive plants of great concern such as Sahara mustard (*Brassica tournifortii*), filaree (*Erodium cicutarium*), Italian thistle (*Carduus pycnocephalus*), shortpod mustard (*Hirschfeldia incana*), plus others, ornamental trees, and some native trees that were part of the landscape of the neighborhood.

Burton Mesa Chaparral

Burton Mesa chaparral (*Arctostaphylos purissima*, *rudis* Shrubland Special Stands) is a rare native plant community that is endemic to old stabilized dune sands near the coast of northern Santa Barbara County at elevations between 25 and 150 meters. Shrubs are less than 5 meters in height (Gevirtz *et al*. 2007, Sawyer *et al*. 2009). The CDFW (2010) identifies Burton Mesa chaparral as a sensitive natural community.

This community encompasses approximately 75 acres within the study area, including 4.98 acres within the project site (Figure 3.2-1). Within the study area as a whole, Burton Mesa chaparral is dominated by La Purisima manzanita and Santa Barbara ceanothus. Shagbark manzanita and Lompoc ceanothus also occur in the study area. Associated shrubs include coffee berry, chamise, black sage, coyote bush, mock heather, coastal sage brush, and bush monkey flower. Coast live oak trees (many of them multi-trunked) are a common component of this community. Openings in the chaparral appear to be suitable for Vandenberg monkeyflower (proposed Endangered). Because it is an annual that flowers in the spring, it would not have been visible during the November 2013 surveys. However, the 4.2 acre portion of chaparral that is within the project site is degraded, and is of a lower quality than most of the chaparral within the rest of the study area such that it is not believed to be suitable habitat for Vandenberg monkeyflower. This was confirmed by a recent field survey (Gevirtz, 2014). Invasive weeds in this community include iceplant, pampas grass, Saharan mustard, and veldt grass.

Regarding Burton Mesa chaparral, the VAFB Natural Resources Management Plan states: “Be sure that construction or development would avoid intact stands of Burton Mesa chaparral as much as possible”; [and] use existing roads, fuel breaks, and natural barriers as firebreaks for controlled burning to reduce the potential for soil erosion and disturbance to the natural chaparral community.” (United States Air Force 2011). The piece of Burton Mesa chaparral located in the south/southwest corner of the project site is not considered an intact stand of Burton Mesa chaparral.

Eucalyptus Windrows

Eucalyptus windrows are comprised of trees less than 50 meters tall, with a canopy that is intermittent to continuous and a depauperate understory (Sawyer *et al*. 2009). Within the study area these windrows are planted in monotypic long rows (or parallel rows) of blue gum, comprising approximately 25 acres, including 16.02 acres within the project site (Figure 3.2-1). They are planted: (1) along and parallel to SR-1; (2) along the northwesterly and northeasterly study area boundaries; and, (3) in the middle of the project site.

Ruderal

Approximately 35 acres of ruderal vegetation occurs within the study area, including 14.46 acres within the project site (Figure 3.2-1). These areas are comprised of mostly non-native weeds, including iceplant, and non-native grasses such as veldt grass, ripgut grass, oat, and others. In addition, the vegetated recreation areas on the active and inactive school sites are also ruderal.

Arroyo Willow Thickets

Arroyo willow thickets (*Salix lasiolepis* Shrubland Alliance) typically grow along stream banks and benches that are seasonally or intermittently flooded. They sometimes also grow where water is near the ground surface. They are characterized by dominant or co-dominant arroyo willows in the shrub or tree canopy. The plants are less than 10 meters tall (Sawyer *et al*. 2009). The U.S. Army Corps of Engineers (Lichvar 2013) recognizes arroyo willow as a facultative wetland plant. The CDFW (2010) identifies arroyo willow thickets as a sensitive natural community.

Arroyo willow thickets encompass approximately 2.6 acres in the study area, including 0.11 acre within the northwest portion of the project site (Figure 3.2-1). Associated species include Pacific wax myrtle and others such as basket rush or salt grass. The largest area is associated with an unnamed drainage in the southeastern portion of the study area, outside the project site. There is extensive pampas grass in this area along the roadsides. Arroyo willow thicket is not present in or along the storm drain that runs parallel to SR-1 within the project site.

Coyote Brush Scrub

Coyote brush scrub (*Baccharis pilularis* Shrubland Alliance) is a community made up of shrubs less than three meters in height, dominated by coyote brush, with associated species including coastal sage brush, Menzie's goldenbush, black sage, deerweed and others(Sawyer *et al*. 2009). Approximately four acres of coyote brush scrub dominated by coyote brush and coastal sage brush are located in the southeastern portion of the study area. This community does not occur within the project site (Figure 3.2-1).

Coast Live Oak Woodland

Coast live oak woodland (*Quercus agrifolia* Woodland Alliance) is dominated by coast live oak trees that grow to 25 meters in height. Coast live oak is a drought-resistant evergreen tree. Seedlings survive best under large nurse plants (Sawyer, Keeler-Wolf, and Evens 2009). The understory comprises poison oak and others. California Spanish moss grows on some of the trees. Coast live oaks support a wide variety of animals, as they are used for food, shelter, perching, and nesting. There may be 100 or more oak trees within the study area; most of these are not on the project site. The diameter at breast height of most of these trees ranges from 6 to 24 inches.

Approximately four acres of coast live oak woodland occurs at the southeast end of the study area. None occurs within the project site (Figure 3.2-1).

In addition to the coast live oaks that are part of the Burton Mesa chaparral and coast live oak woodland, there are at least 16 isolated coast live oaks within the Project site (Figure 3.2-1). Many of these are multi-trunked, an unusual feature of live oaks in Burton Mesa chaparral. Some of these trees are very large. For example, one tree near the northwest corner of the project site has a canopy estimated to be 100 feet in diameter.

Creeping Rye Grass Turf

Creeping rye grass turf (*Leymus triticoides* Herbaceous Alliance, previously called "wet meadow") is an herbaceous community less than one meter in height. It occurs on poorly drained floodplains, as well as drainage and valley bottoms, and marsh margins (Sawyer *et al.* 2009). The creeping rye grass turf is vegetated by hydrophytic vegetation including beardless wild rye, common rush, and a sedge. The CDFW (2010) identifies creeping rye grass turf as a sensitive natural community. Approximately 0.4 acre of creeping rye grass turf located in the study area is outside of the project site (Figure 3.2-1).

3.2.2 Botanical Resources

A total of 73 species of plants, one lichen species, and several unidentified ornamental landscape species were observed within the Project site during surveys in November 2013. Although the survey was conducted during the fall season, the species detected included a representative mix of native and exotic plants known to occur in the region. Of particular note was the presence of four rare plants that are endemic to the region and associated with intact Burton Mesa chaparral vegetation, including La Purisima manzanita, shagbark manzanita, Lompoc ceanothus, and Santa Barbara ceanothus. Of great concern is exotic Sahara mustard primarily found in deserts, desert dunes, and coastal scrub, including the San Joaquin Valley, Sonoran and Mojave Deserts, and southwestern region of California that is rated "high" by California Invasive Plant Council with severe ecological impacts on physical processes, plant and animal communities, and vegetation structure.

Three of these species have been assigned sensitivity designations by the California Native Plant Society (CNPS), a non-governmental organization dedicated to the appreciation and conservation of California native plants (see Table 3.2-2). No federally- or state-listed threatened or endangered plants were detected within the Project site. A complete list of plant and lichen taxa observed within the Project site is presented in the project's Biological Survey Report (URS 2013; see Appendix B,). Subsequent to the initial biological survey, a supplemental survey was conducted in May 2014. Annual exotic invasive plants observed in May 2014 after the late spring rains. An updated list of species observed is provided in Appendix B.
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Table 3.2-2. Special Status Plant Species Observed within the Study Area

Common Name	Latin Name	Status
La Purisima manzanita	*Arctostaphylos purissima*	CNPS Rank 1B.1; Endemic
Shagbark manzanita	*Arctostaphylos rudis*	CNPS Rank 1B.2; Endemic
Lompoc ceanothus	*Ceanothus cuneatus* var. *fascicularis*	CNPS Rank 4.2; Endemic
Santa Barbara ceanothus	*Ceanothus impressus*	Endemic

CNPS Rank 1B.1 – Rare throughout its range. Seriously threatened.
CNPS Rank 1B.2 – Rare throughout its range. Moderately threatened.
CNPS Rank **4.2** – Uncommon, and Limited Distribution.
Source: California Native Plant Society 2013.

3.2.3 Wildlife Resources

A total of 35 animal species or their sign were observed during biological surveys of the Project site in November 2013, including one amphibian, one reptile, 27 birds, and six mammals. Because the surveys were conducted during the fall/winter season and were limited to pedestrian observations, it is likely that additional wildlife, possibly including fossorial, cryptic, nocturnal, or migratory species, may utilize the site but may have avoided detection during the survey. However, the timing of the survey did allow for the detection of wintering birds, some of which would not have been detectable during a breeding-season survey. A total of three sensitive birds were detected during the surveys, including the Nuttall's woodpecker, loggerhead shrike, and oak titmouse (see Table 3.2-3). All three of these species occur in the region year-round. In addition to these three sensitive taxa, a total of 22 common birds that receive federal protection under the Migratory Bird Treaty Act (16 U.S.C. 703-712) were detected on-site during surveys. A complete list of wildlife observed during surveys is presented in the Biological Survey Report for the Project (URS 2013; see Appendix B). A follow up bird survey was conducted during the summer of 2014. An additional 15 MBTA-protected birds were observed within the project site. The results

Table 3.2-3. Special Status Wildlife Observed within the Study Area

Common Name	Latin Name	Status
Nuttall's Woodpecker	*Picoides nuttallii*	Bird of Conservation Concern
Loggerhead Shrike	*Lanius ludovicianus*	Bird of Conservation Concern State Species of Special Concern
Oak Titmouse	*Baeolophus inornatus*	Bird of Conservation Concern

of this supplemental survey are included in Appendix B. No federally or state-listed threatened or endangered wildlife, or their sign, were detected within the Project site. Because the survey was conducted during the winter months, care was taken to explore on-site habitat features that may have been suitable for sensitive species at other times of year (trees suitable for nesting raptors, or areas that may accumulate ponded water during rains, for example).

3.2.4 Special Status Species Documented in the Project Vicinity

Ten special status species are recorded within a 1-mile radius of the site (CDFW 2013). These are: shagbark ("sand mesa") manzanita, La Purisima manzanita, pale-yellow layia, seaside bird's beak, Gambel's watercress, Vandenberg monkey flower, monarch butterfly, hoary bat, Yuma myotis, and Western red bat.

Shagbark manzanita and La Purisima manzanita occur on the site. Both species are endemic and listed by the California Native Plant Society as Rank 1B species (rare throughout their ranges) (Table 3.2-2).

Lompoc ceanothus and Santa Barbara ceanothus are endemic species that occur on the site but are not mapped as occurring within one mile of the site by the CDFW (2013). Lompoc ceanothus is also listed as a Rank 4.2 species by the California Native Plant Society (Table 3.2-2).

Pale-yellow layia is an annual flowering plant, and if it occurs on-site, would occur in Burton Mesa chaparral. It would not have been likely to have been in flower and observed during the November surveys.

Seaside bird's beak is typically evident even after it has flowered. However, it was not observed, and therefore is believed not to occur on the site.

Gambel's watercress (Endangered) occurs in freshwater marsh habitat, and this type of habitat does not occur on the site. (The creeping rye grass turf is not suitable habitat for this species.) Therefore this species is unlikely to occur on the site.

Vandenberg monkeyflower (Proposed Endangered) occurs in sandy openings in Burton Mesa chaparral. This species does not occur within the proposed solar site.

Monarch butterfly has no formal sensitivity designation, but is tracked by the California Department of Fish and Wildlife as a "Special Animal." This migratory butterfly forms autumnal and wintering aggregations, commonly in Eucalyptus groves near the coast. The Eucalyptus windrows on the site are in rows, rather than in groves that would provide shelter from wind and low temperatures; therefore, it is unlikely that aggregation sites occur on the site. Monarch butterflies were not observed in or near the Eucalyptus windrows, and they were not observed elsewhere on the site, even though the surveys were conducted during the optimal season, time, and weather conditions when they are typically observed.

Hoary bat, Yuma myotis, and western red bat. Surveys for bats were not conducted.

Hoary bat habitat for roosting and bearing young includes woodlands with medium to large-size trees and dense foliage (Harris, J. 1990). Suitable roosting habitat for this species occurs in the study area, but not on the project site.

Yuma myotis' optimal habitats are open forests and woodlands with sources of water over which to feed. This species roosts in buildings, mines, caves, or crevices, and sometimes in abandoned swallow nests and under bridges (Harris, J. 1990). Optimal habitat for this species is neither in the study area, nor on the project site, but this species might forage over the site.

Western red bat feeds over a wide variety of habitats including grasslands, shrublands, open woodlands, and croplands. This species roosts primarily in trees, and less often in shrubs. Roost sites often are in edge habitats adjacent to streams, fields, or urban areas. Preferred roost sites are protected from above, open below, and located above dark ground-cover (Harris, J. 1990). This species may forage over the site, and may roost in the study area, but is unlikely to roost on the site.

California Red-legged Frog (Threatened). The CDFW (2013) does not indicate the presence of California red-legged frog within one mile of the study area. GIS data obtained from VAFB includes three mapped locations identified as potential habitat for this species, but biologists visited all three sites and determined that none contain suitable habitat.

Nuttall's woodpecker, loggerhead shrike, and oak titmouse. Three additional sensitive animal species occur on the site: Nuttall's woodpecker, loggerhead shrike, and oak titmouse (Table 3.2-3).

3.2.5 Wetlands

Wetland delineations were conducted in the storm drain along SR-1 both south and north of Timber Lane and in the willow thicket north of Timber Lane. Although hydrophytic vegetation was present, neither hydrology nor hydric soils were present. No wetlands or waters of the U.S. are present on the project site (see Appendix B).

3.2.6 Bird Nests

Four inactive large bird nests were observed (Figure 3.2-1). Some of these were in non-native trees. It is not known how many of these would be used during the nesting season.

3.3 Cultural Resources

Cultural resources are districts, buildings, sites, structures, areas of traditional use, or objects with historical, architectural, archeological, cultural, or of scientific importance. They include archeological resources (both prehistoric and historic), historic architectural resources (physical properties, structures, or built items), and traditional cultural properties (those important to living Native Americans for religious, spiritual, ancestral, or traditional reasons).

The NHPA establishes national policy for protecting significant cultural resources that are defined as "historic properties." The term "historic property" refers to any "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the NRHP" (36 CFR Part 800.16).

3.3.1 Area of Potential Effects

The Area of Potential Effects (APE) of an undertaking is defined at 36 CFR 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist." The APE for the Proposed Action was defined as the 182-acre EHA site, a highly disturbed area, and two nearby archaeological resources.

3.3.2 Cultural Resources within the Project Area

An archaeological site record and literature search for the proposed solar energy facility on VAFB was completed on December 12, 2013, at the Central Coast Information

Center (CCIC), part of the California Historic Resources Information System (CHRIS) housed at the University of California at Santa Barbara. Background research included a review of archaeological literature, archaeological site and survey maps, and cultural resource records. Previous archaeological studies and archaeological resources within 0.25 mile of the proposed APE were identified during the record search. Two archaeological sites are sufficiently close to the footprint of ground-disturbing project activities to merit inclusion in the APE.

CA-SBA-3270 lies north of the Manzanita Public Charter School. Recorded in 1995, it is a sparse lithic scatter consisting of three Monterey chert flakes, one mudstone flake, over 10 Monterey chert nodules, and several small pieces of scatter. Site CA-SBA-3487 Is located south of the Manzanita Public Charter School, south of Mountain View Boulevard. This site consists of low density of lithic artifacts and a small amount of marine shell. These sites were addressed as part of the archaeological survey of the VAFB cantonment survey (Lebow and Peterson 2008).

The Draft Final EA indicated CA-SBA-3270 had not been evaluated for eligibility for listing on the National Register of Historic Places (NRHP) and indicated it will be assumed eligible for the purposes of this project only and protected with temporary exclusionary fencing. Subsequently, it was determined both CA-SBA-3270 and CA-SBA-3487 have been determined ineligible for listing in the National Register of Historic Places by consensus determination between VAFB and the State Historic Preservation Officer (OHP reference number USAF060717C). See Appendix C.

3.4 Geology and Earth Resources

VAFB is situated along the coastline in the Santa Maria basin. VAFB is a geologically complex area that includes the transition zone between the Southern Coast Range (on the northeast) and Western Transverse Range (on the south) geomorphic provinces. Extensive geological activity in the VAFB region has created four structural regions: the Santa Ynez Range; the Lompoc lowland; the Los Alamos syncline; and the San Rafael Mountain uplift. VAFB is characterized by generally northwest trending ridges and valleys. Major geologic features within VAFB include the Santa Ynez Mountains, Casmalia Hills, Purisima Hills, Santa Ynez Valley Dune Complex, Sudden Flats, beaches, and rocky headlands. The Santa Ynez River and San Antonio Creek are the two major drainages that traverse VAFB.

The near-surface geology in the project area is composed of the Orcutt formation which consists of middle to upper Pleistocene eolian nonmarine sand and gravel underlain by the Paso Robles and older formations. The Orcutt formation ranges from less than a foot to 150 feet in thickness. Sand in the Orcutt formation is described as loose, medium-grained, massive and light-buff in color. The basal portion of the Orcutt formation consists of well-rounded pebbles of quartzite, igneous rocks and Monterey chert and shale (Dibblee 1950).

3.4.1 Soils

Soils within VAFB are characterized by coastal sand dunes and alluvium (i.e., sediment deposited by flowing water). VAFB is underlain predominately by marine sedimentary rocks (e.g., shales and limestone) of Late Mesozoic period (140 to 70 million years before the present) and Cenozoic period (70 million years to the present). Basement rocks underlying VAFB is the Franciscan Formation, which consists of a series of sedimentary and volcanic rocks (Dibblee 1950).

The project site is underlain by Tangair sand and is located on nearly level terrain. Tangair sand is generally characterized by rapid permeability and poorly drained sand (USDA 1972).

3.4.2 Faulting and Seismicity

The California Geological Survey (CGS), formerly known as the California Division of Mines and Geology (CDMG), classifies faults as either active or potentially active, according to the Alquist-Priolo Special Studies Zone Act of 1972. The CGS has established Alquist-Priolo Special Study Zones around faults identified by the State Geologist as being active. The Alquist-Priolo Special Studies Zone Act limits development along the surface trace of active faults to reduce the potential for structural damage and/or injury due to fault rupture. The CGS also suggests that active faults, located within a 60 mile (96 km) radius of a project site, be evaluated with respect to regional seismicity (CDMG 1999, 1994).

Santa Barbara County is a seismically active region with a major earthquake occurring in the region about every 15 to 20 years (USAF 1987; Alterman et al. 1994). The project site is not underlain by any potentially active faults, active faults, or Alquist-Priolo Special Study Zones (CDMG 1999, 1994). However, three active fault zones that could cause ground motion or produce secondary effects traverse VAFB: the Santa Ynez-Pacifico Fault Zone; the Lompoc-Solvang (Santa Ynez River)-Honda Fault Zone; the Lions Head-Los Alamos-Baseline Fault Zones, and their potential offshore extensions (Alterman et al. 1994; Jennings 1994).

3.4.3 Geologic Hazards

Active faults do not traverse the project site; therefore, the potential for surface fault rupture is low. The primary geologic hazard at the project site is strong seismically induced ground shaking and collapsible soils. There are no known areas within the project area where liquefaction has occurred. The areas most prone to liquefaction on VAFB are near San Antonio Creek and the Santa Ynez River. The potential for liquefaction on VAFB, despite these areas, is considered low (USAF 1987).

3.5 Land Use and Coastal Zone Resources

Situated within an unincorporated area of the county, VAFB is located northwest of the City of Sana Barbara and south of the City of San Luis Obispo. Although the project site is located within Santa Barbara County, the local government generally does not have any jurisdictional authority over land use on VAFB because it is a federal military facility with federal military activities. However, private entities that engage in private activities on VAFB, e.g., long-term leases, may be subject to Santa Barbara County jurisdictional authority. General land uses at VAFB include administrative, Air Education and Training Command (AETC) campus for space and missile training, agriculture/grazing, airfield, community (commercial and service), housing, industrial, launch operations, medical, open space, outdoor recreation, and water/coastal (VAFB 2011).

The proposed solar facility is located on a highly disturbed site known as the EHA located near the VAFB main gate and the intersection of SR-1 and California Boulevard. EHA is the site of a former military housing subdivision that was demolished between 2006 and 2012. The project site is primarily surrounded by undeveloped open space to the east, south, and west. Vandenberg Middle School is located adjacent to the site to the north and Manzanita Public Charter School is located adjacent to the site to the southeast. The main gate to VAFB is located to the northwest of the site. SR-1 runs to the north and west of the site and is federally designated as a Strategic Highway Network (STRAHNET) connector, linking the Base to other roadways considered vital to defense policy (VAFB General Plan 2011).

The VAFB General Plan (2011) is a comprehensive planning document for the

installation, and guides future growth and development. The General Plan identifies a number of trends, influences and opportunities that will affect land use and installation planning, two of which are particularly relevant to the proposed project:

- **East Housing Area demolition.** Demolition of the EHA left water, gas, sewer, and electrical lines intact, making this an "excellent location for a business park" (VAFB 2011: 43).
- **Sustainability/energy management.** As the cost of energy continues to rise, the Base will need to examine ways to improve its energy management. Sustainability standards and green building practices will be required for future construction and renovation projects (VAFB 2011: 44).

The General Plan Future Land Use Map (Figure 3.5-1) identifies the proposed solar site for Community (Commercial) uses.

The project site is located approximately 6 miles or more from the state coastal zone and further separated from the coastal zone by SR-1. No coastal uses or resources are present at the project site.

3.6 Noise

Noise is part of the human environment and is typically evaluated under NEPA. The Noise Control Act (42 U.S.C. 4901 *et seq*.) limits the exposure and disturbance that individuals and communities experience from noise. It focuses on surface transportation and construction sources, particularly near airport environments. The Noise Control Act also specifies that performance standards for transportation equipment be established with the assistance of the Department of Transportation. In addition, the 1987 Quiet Community amendment gives state and local authorities greater involvement in controlling noise.

3.6.1 Noise Characteristics

Noise is commonly defined as unwanted sound. Sound is defined as pressure variations in air that the human ear can detect. The nature of sound can be characterized by its pitch or its loudness. Pitch is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. Loudness is the amplitude of sound waves combined with the reception characteristics of the ear. Technical acoustical terms commonly used in this section are defined in Table 3.6-1.

Table 3.6-1. Definitions of Acoustical Terms

Term	Definition
Decibel (dB)	A dB is a unit describing the amplitude of sound, equal to 20 times the logarithm to the Base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for sound in air is 20 micro Pascals.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sounds are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level (L_{eq})	The average A-weighted noise level during the measurement period. The hourly L_{eq} used for this report is denoted as dBA $L_{eq[h]}$.
Ambient Noise Level	The ambient noise level is the composite of noise from all sources near and far, and represents the normal or existing level of environmental noise at a given location.

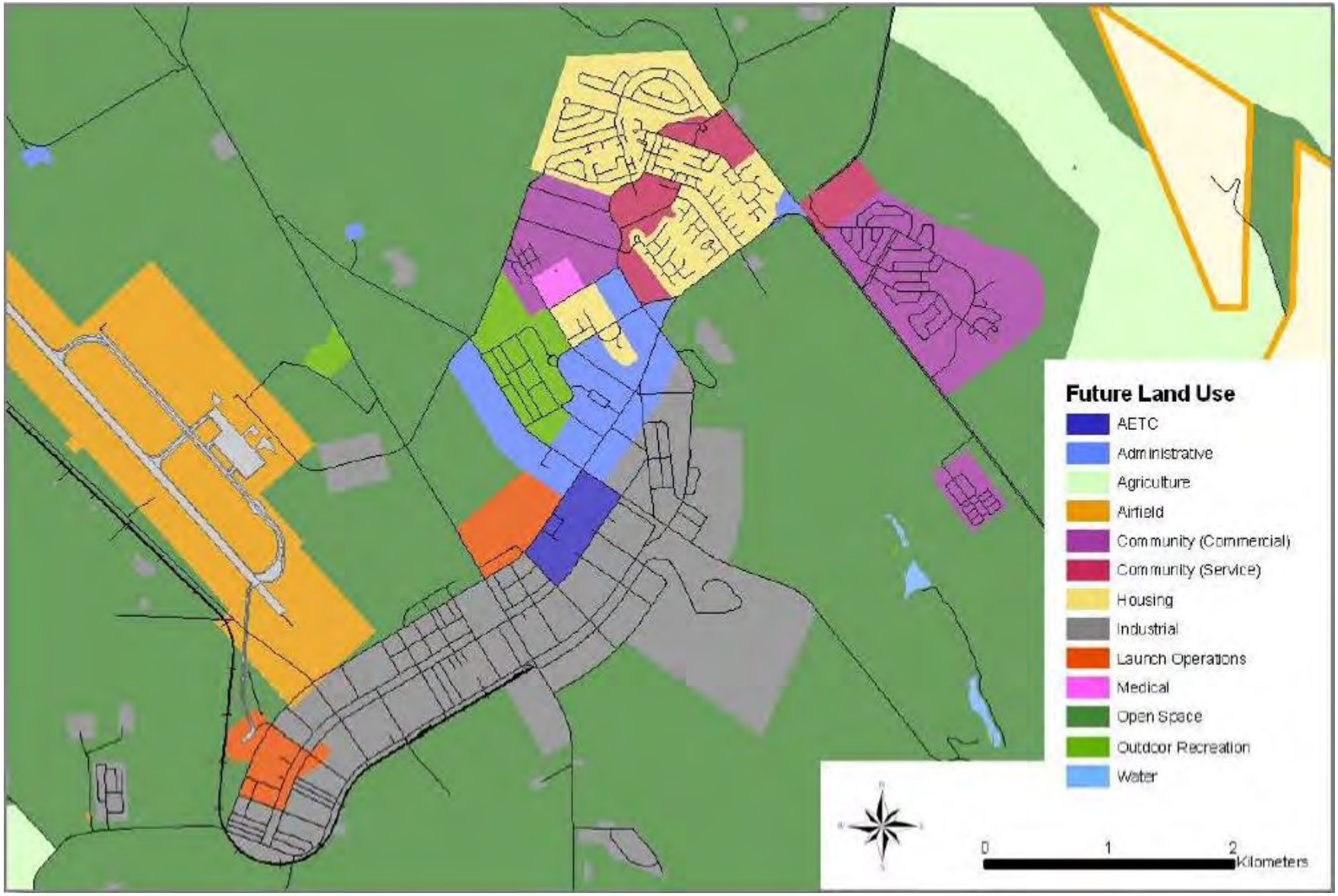

Figure 3.5-1. Future Land Use Map in the Cantonment Area, Vandenberg AFB

3.6.2 Sound Level and Frequency

Several noise measurement scales are used to describe noise. The decibel (dB) is a unit of measurement that indicates the relative amplitude of a sound. Zero on the decibel scale is based on the lowest sound pressure that a healthy, unimpaired human ear can detect. Sound levels in dBs are calculated on a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense. There is a relationship between the subjective noisiness or loudness of a sound and its level. Each 10-dB increase in sound level is perceived as approximately a doubling of loudness over a wide range of amplitudes. Since dB is a logarithmic unit, sound pressure levels are not added arithmetically. When two sounds of equal sound pressure level are added, the result is a sound pressure level that is 3 dB higher. For example, if the sound level were 70 dB when 100 cars pass by in a certain time period, then it would be 73 dB if 200 cars pass the observer during the same period. Doubling the amount of energy would result in a 3 dB increase to the sound level.

Frequency relates to the number of pressure oscillations per second, or Hertz (Hz). The range of sound frequencies that can be heard by healthy human ears is from about 20 Hz at the low end of the frequency spectrum to 20,000 Hz at the high end.

There are several methods for characterizing sound. The most common is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. The A-weighted level is closely correlated with annoyance caused by noise sources such as traffic and construction activity. Table 3.6-2 shows typical A-weighted noise levels that occur in various indoor and outdoor environments.

Table 3.6-2. Typical Noise Levels in the Environment

Common Outdoor Noise Source	Noise Level (dBA)	Common Indoor Noise Source
Jet fly-over at 1,000 ft.	120	
	110	Rock concert
Pile driver at 100 ft.	100	
Large truck passing by at 50 ft.	90	Night club with live music
Gas lawn mower at 50 ft.	80	Noisy restaurant
	70	Vacuum cleaner at 10 ft.
Commercial/Urban area daytime		Normal speech at 3 ft.
Suburban daytime	60	Active office environment
Urban area nighttime	50	Quiet office environment
Suburban nighttime	40	
Quiet rural areas		
	30	Library
		Quiet bedroom at night
Wilderness area	20	
	10	Quiet recording studio
Threshold of human hearing	0	Threshold of human hearing

Source: Adapted from Caltrans 2008 in Noise Study Report Format Guidance Document.

3.6.3 Noise Descriptors

Because sound levels can vary over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations is utilized. Most commonly, environmental sounds are described in terms of an

average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The hourly L_{eq} used for this report is denoted as dBA $L_{eq[h]}$.

3.6.4 Human Response to Noise

It is widely accepted that sound pressure level changes of 3 dBA are considered just noticeable to most people. A change of 5 dBA is readily perceptible. An increase in sound pressure level of 10 dBA is perceived as being twice as loud, while a decrease of 10 dBA is perceived as being half as loud.

3.6.5 Noise Sensitive Receptors

Two schools are located adjacent to the proposed solar site along Mountain View Boulevard, including Manzanita Public Charter School (K-6) and Vandenberg Middle School (see Figure 2-2). Vandenberg Middle School is operated by the Lompoc Unified School District. Office hours currently begin at 7:30 AM at both schools and end at 4:00 PM (Vandenberg) and 5:00 PM (Manzanita). Class hours range from 8:10 AM to 3:10 PM at Manzanita and from 8:40 AM to 3:15 PM at Vandenberg. The schools are closed between mid-June and mid-August.

3.6.6 Existing Noise Sources

Noise in the vicinity of VAFB results from vehicular transportation, industrial facility operations, construction activities, and railroad operations (e.g., Union Pacific and AMTRAK). In addition, periodic mission support activities (e.g., rocket launches and aircraft operations) create sporadic noise as dictated by the activity. In general, ambient Leq[H] measurements on VAFB range from around 35 to 60 dB (Thorson et al. 2001).

Using an estimation technique described in the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment* (FTA 2006) guidance document, and assuming traffic noise from the Cabrillo Highway (SR-1) is the dominant source of continuous sound, estimated existing outdoor ambient daytime sound levels in the vicinity of Vandenberg Middle School and Manzanita Public Charter School would be approximately 55 dBA and 50 dBA, respectively. These are within the aforementioned measurement range and do not include sound from intermittent, impulsive or short-term duration activities or events on base that may cause Leq[H] to be temporarily higher. Such activities could include: Space Launch Complex (SLC) operations and associated mission support activities; Vandenberg Airfield operations; and distant, periodic railroad activities on the Union Pacific tracks located along the coastline between the north and south launch facilities.

3.7 Public Health and Safety

A hazardous material or waste is a substance that due to its quantity, concentration, or chemical/physical characteristics, may present substantial risk to public health and welfare, workers, or the environment. Hazardous materials and wastes are those substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act (42 U.S.C. 9601-9675), Toxic Substances Control Act (15 U.S.C. 2601-2671), the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (42 U.S.C. 6901-6992), and as defined in state laws and regulations. VAFB is subject to all federal, state, and local hazardous materials regulations, including inspection by federal, state and local regulatory agencies.

Federal and state OSHA regulations govern protection of personnel in the workplace. All construction activities, facility operation, and maintenance on VAFB are subject to federal OSHA regulations. In addition, California OSHA has jurisdiction over non-federal

operations south of Honda Ridge Road on South VAFB.

VAFB is a secure, federal military installation. Access to VAFB, including the project site, is controlled by the Air Force and restricted to military personnel and authorized contractors and visitors.

3.7.1 Hazardous Materials Management

Approximately 5,000 hazardous materials are used at VAFB to support mission activities. To ensure compliance with applicable regulations for the transport, handling, storage, use, and disposal of hazardous materials, all Air Force personnel and contractors that handle hazardous materials are required to comply with California Business Plan requirements. In addition, management of hazardous materials used on VAFB follows procedures stipulated in the 30th Space Wing Plan (SWP) 32-7086, Hazardous Materials Management Plan. The Vandenberg Hazardous Materials Pharmacy (HazMart) maintains inventories of hazardous materials purchased by the Air Force and its contractors. Before releasing hazardous materials to the user, HazMart staff ensures a copy of the Material Safety Data Sheet is available and verifies that the material is suitable for use on VAFB. By providing handling and use information, VAFB controls the potential misuse of hazardous materials, maintains an accounting of the types of hazardous materials used on the Base, and prepares usage and emissions reports as required by federal, state and local regulations. Additionally, VAFB has established health and safety requirements, including industrial hygiene and ground safety, to minimize potential risk to the general public and personnel.

Hazardous materials potentially used during construction include gasoline, diesel fuel, oils, lubricants, solvents, detergents, degreasers, paints, ethylene glycol, and welding materials/supplies (e.g., pressurized gasses). Hazardous materials potentially used during operation of the proposed project include fuel, lubricants, solvents, janitorial supplies, paint, degreasers, herbicides, pesticides, and transformer insulating oil.

3.7.2 Hazardous Waste Management

Hazardous waste management at VAFB complies with the Resource Conservation and Recovery Act Subtitle C (40 CFR Part 240-299) and with California Hazardous Waste Control Laws as administered by CalEPA, Department of Toxic Substances Control, under Title 22, and Division 4.5 of the California Code of Regulations (CCR). These regulations require that hazardous wastes be handled, stored, transported, disposed of, or recycled according to defined procedures. The Vandenberg AFB *Hazardous Waste Management Plan* (30 SWP 32-7043A) outlines hazardous waste management procedures.

Hazardous wastes resulting from the construction and operation activities generally include small amounts of waste oil, hydraulic fluids, oil rags, solvents, adhesives, paint and batteries.

3.7.3 Installation Restoration Program

The federal Installation Restoration Program (IRP) was implemented at DoD facilities to identify, characterize, and restore hazardous substance release sites. There are currently 136 IRP sites throughout VAFB grouped into six Operable Units based on similarity of their characteristics.

In addition to IRP sites, there are identified Areas of Concern (AOCs), where potential hazardous material releases are suspected; and Areas of Interest (AOIs), defined as areas with the potential for use and/or presence of a hazardous substance. Various contaminants could be present at these sites including trichloroethylene, Polychlorinated Biphenyls (PCBs), VOCs, total petroleum hydrocarbons (TPH),

asbestos, and other hazardous contaminants.

No IRP, AOI or AOC issues were identified in the area of the Proposed Action.

3.7.4 Unexploded Ordnance

Several areas on VAFB were used as training ranges and have the potential to contain unexploded ordnance (UXO). The Proposed Action area is adjacent to Munitions Response Site 805D. In 2010, the Military Munitions Response Program investigated the Proposed Action area and determined that no further investigation was indicated for Munitions and Explosives of Concern, or Munitions Debris.

3.8 Transportation

The proposed solar site is located both south and east of Sr-1 across from the Vandenberg AFB Main Gate. SR-1 is a north-south route that exists throughout the majority of coastal California and runs adjacent to the western boundary of the proposed project site. SR-1 provides local access between VAFB and Lompoc to the south and Santa Maria to the north. Regional access to major metropolitan areas including Los Angeles to the south and San Francisco to the north is provided by U.S. Highway 101, which has local connections to SR-1 via SR-246 and SR-135. The regional transportation network is illustrated on Figure 3.8-1.

Local roadways within and adjacent to the project area include Casmalia-Lompoc Road, Mountain View Boulevard and Timber Lane (see Figure 3.8-2). Although the latter two roadways traverse portions of the proposed solar site, they will remain in service both during and after construction.

Roadway conditions are evaluated based on capacity and traffic volume. The capacity reflects the ability of the network to meet the demand of a roadway; it is dependent on width, number of lanes, intersection control and other physical factors. A roadway's ability to accommodate diverse volumes of traffic is conveyed by Level of Service (LOS). The LOS scales range from A to F, and each LOS scale is identified by the roadway density- or the level of traffic volume to roadway capacity. LOS A, B and C are considered to be operating at conditions with minimal to no delays for motorists. LOS D represents below average conditions, and LOS E represents a roadway at its maximum capacity. LOS F signals severe traffic congestion and significant delays.

In the Project site vicinity, SR-1 has four-lanes, two in each direction, separated by a short modular barrier known as a K-rail. Existing LOS for portions of SR-1 along the Project site vicinity vary between LOS A and B, depending on the direction and time of day.

3.8.1 Roadway Operation

Regional access to the project site is provided by U.S. Highway 101 to SR-1 via either SR-246 or SR-135 (Figure 3.8-1). From SR-1 there are three local intersections that provide direct access into the site (see Figure 3.8-2). From south to north, these three include:

- Mountain View Boulevard/SR-1 (southern-most intersection). This intersection allows north-bound travelers to make right-hand turns into and out of the site. The K-rail barrier at this intersection prevents south-bound travelers from making left-hand turns into or out of the site.
- Timber Lane/SR-1. This intersection provides access to the site for both north-bound and south-bound traffic. A stoplight with left-hand turning arrow controls left-turning through-traffic coming from the north.
- Mountain View Boulevard/SR-1 (northern-most intersection). This intersection includes a left-turn

Figure 3.8-1. Regional Transportation Map

Figure 3.8-2. Local Transportation Map

pocket but the intersection is not signalized. Additionally, this entrance onto Mountain View Boulevard is intermittently blocked off by a gate that is likely used to control traffic at Vandenberg Middle School.

Construction traffic associated with delivery of solar panels, racking systems and other specialized equipment and material would likely arrive from the south on U.S. Highway 101 and would likely access the site by taking SR-246 or SR-135 to SR-1, then into the site using the southern entrance of Mountain View Boulevard and/or the signalized intersection at Timber Lane (see Figure 3.8-2).

3.9 Visual Resources

Visual resources are generally defined as the natural and built features of the landscape visible from public views that contribute to an area's visual quality. This section describes the existing visual environment to characterize the aesthetic conditions of the project site, including on-site structures and facilities.

The evaluation of visual resources in the context of environmental analysis typically addresses the contrast between visible landscape elements. Collectively, these elements comprise the aesthetic environment, or landscape character. The landscape character is compared to the Proposed Action's visual qualities to determine the compatibility or contrast resulting from the buildout of the Proposed Action.

Views are defined as visual access to, or visibility of, a natural or built landscape feature from an observer viewpoint. Views may be focal (restricted in scope to a particular object) or panoramic (encompassing a large geographic area with a wide or deep [i.e., distant] field of view). Focal views can be from a number of observer viewpoints compared to the object being viewed, such as from a lower elevation, at the same level, or from an elevated vantage point. Panoramic views are usually associated with an elevated observer viewpoint. Scenic views or vistas are panoramic public views that include natural features including views of the ocean, unusual topographic features, or unique urban or historic structures.

Views are characterized by their distance from the viewer, including foreground, middleground, or background. Foreground views are those immediately perceived by the viewer and include objects at close range that tend to dominate the view. Middleground views occupy the center of the view and generally include objects that are the center of a viewer's attention if they are sufficiently large or visually contrasting with adjacent visual features. Background views include distant objects and other objects that form the horizon. Objects perceived in the background view eventually diminish in their importance with increasing distance. In the context of the background, the skyline can be an important visual context because objects above this point are highlighted against the typically blue background during daylight hours.

A viewshed, or visible area, is the total range of views experienced from an observer's viewpoint. A viewshed is defined by landscape features that define or obstruct sightlines, or the line of sight between an observer and a viewed object. Views may be partially or entirely obstructed by topography, buildings and structures, and/or vegetation.

The closer an intervening obstruction is to the observer, the more it will potentially obstruct the viewshed. Accordingly, a small physical obstruction in the foreground of a view will potentially have a more substantial effect on the viewshed compared to a relatively large obstruction perceived in the middle or background.

Glare, an indirectly caused phenomenon of lighting or reflection off building materials,

can cause a negative impact during the day or night. Daytime glare is caused by the reflection of sunlight from highly reflective surfaces. Reflective surfaces are generally associated with buildings constructed with broad expanses of highly polished or smooth surfaces (e.g., glass or metal) or broad, light-colored paving surfaces such as concrete. Nighttime glare can include direct, intense, focused light, as well as reflected light. Glare can be caused by mobile, transitory sources such as automobiles, or from intense stationary sources including security lighting.

3.9.1 Visual Quality

VAFB is located on the south-central coast of California. The Base is located along 42 miles of undeveloped coastline and is situated between the Pacific Ocean to the west, the Casmalia Hills to the north, and the Santa Ynez Mountains and Sudden Flats to the south. The Base is characterized by rolling hills, canyons, creeks, sand dunes, and beaches. VAFB includes several military and industrial facilities, including an airfield, launch pads, military support facilities, infrastructure, and ancillary facilities. The appearance of Base facilities is functional in nature, characterized by exposed infrastructure, open storage, and launch areas.

The project site is a component of the industrial Base complex and the importance of on-site visual resources is low. The project site was originally developed as a residential neighborhood that has since been demolished. As such, the site is highly disturbed and does not contain unique visual features, although several large trees on-site do provide some visual interest. The project site is briefly visible to motorists traveling on SR-1 north and west of the site. From SR-1, the site is largely screened by long rows of eucalyptus. While portions of SR-1 in California are designated as a state scenic highway, the segment near the project site is not.

3.9.2 Glare

The absence of development throughout the project site results in a relatively low degree of nighttime lighting and glare. General sources of light and glare in the vicinity of the project site include security lighting from the nearby schools and from the VAFB main gate area.

3.10 Water Resources

The federal Clean Water Act (CWA) provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. The CWA and implementing USEPA regulations provide the authority and framework for state regulations. The California Porter-Cologne Water Quality Act provides a framework for establishing beneficial uses of water resources and the development of local water quality objectives to protect these beneficial uses. The Central Coast Water Quality Control Plan (Basin Plan) assigns beneficial uses to water bodies and provides local water quality objectives to protect these beneficial uses.

Section 303(d) of the federal CWA requires states to identify surface water bodies that are polluted (water quality limited segments). These surface water bodies do not meet water quality standards even after discharges of wastes from point sources have been treated by the minimum required levels of pollution control technology. The project is located within the Santa Ynez River watershed, which is included in the 303(d) list of impaired water bodies for several pollutants.

In California, the State Water Resources Control Board (SWRCB) and the Central Coast Regional Water Quality Control Board (RWQCB) administer the NPDES Program for municipalities and construction activities through General Permits. The RWQCB is the state agency responsible for the VAFB area.

The NPDES Municipal General Permit prohibits discharges of material other than stormwater to waters of the U.S. and requires implementation of BMPs to reduce pollutants in stormwater to the maximum extent practicable.

The NPDES Construction General Permit regulates construction sites of one or more acre and regulates the discharge of pollutants in stormwater to waters of the U.S.

On VAFB, the 30th Civil Engineer Squadron, Environmental Compliance (30 CES/CEIEC), Water Resources Section reviews all requests for discharges of wastewater to grade (Discharge to Grade Program) to protect groundwater quality and comply with state water quality regulations. Wastewater that contains contaminants above certain levels may not be discharged to grade.

3.10.1 Surface Water

The major freshwater resources of the VAFB region include six streams comprising two major and four minor drainages. The major drainages are San Antonio Creek and the Santa Ynez River. The minor drainages include Shuman Creek, Bear Creek, Cañada Honda Creek, and Jalama Creek (VAFB 2010).

Monthly stream flow on VAFB generally corresponds to trends in precipitation, although minor increases in precipitation are not always reflected in the flows. Generally, peak rainfall occurs between November and April. Average annual precipitation is approximately 14 inches per year (National Oceanic and Atmospheric Administration 2011).Storm waters flow into two storm drains along SR-1 (see Figure 3.10-1). Both storm drains are classified as “dry” in that they almost never contain water and then only as a result of local storms. The northernmost storm drain connects to a natural drainage southeast of the site via a culvert under SR-1 and empties into Lake Canyon and Santa Lucia Canyon that ultimately connects with the Santa Ynez River approximately 4.5 miles to the south. The southern-most storm drain also empties into canyons that connect to the Santa Ynez River.

The project site is not located within a Federal Emergency Management Agency designated 100-year floodplain.

3.10.2 Groundwater

VAFB includes parts of two major groundwater basins (Santa Ynez River Valley and San Antonio Creek Valley). The project’s surface water is tributary to the Santa Ynez River Valley groundwater basin.

Figure 3.10-1. Project Site Drainage Features

Chapter 4. Environmental Consequences

The following analysis of environmental consequences is based on the potential direct, indirect, short-term and long-term, and cumulative effects of the Proposed Action. A list of factors to be considered in determining whether impacts are significant, for purposes of NEPA, are provided in each subsection, but the decision as to whether to prepare an Environmental Impact Statement (EIS) is based on the impacts of the action as a whole considering context and intensity of the potential impacts.

4.1 Air Quality

Factors considered in determining whether implementing an alternative would have adverse impacts on air quality include the extent or degree to which implementation of an alternative would:

- Expose people to localized (as opposed to regional) air pollutant concentrations that potentially violate federal or state ambient air quality standards; and/or
- Exceed caps (limits) as imposed by federal and state GHG regulations. These regulations are in the draft stage, but would likely be in place during project execution.

On 18 February 2010, the CEQ released draft guidance on addressing climate change in NEPA documents. The draft guidance, which has been issued for public review and comment, recommends quantification of GHG emissions, and proposes a threshold of 25,000 metric tons of CO_2e emissions. The guidance indicates that use of 25,000 metric tons of CO_2e emissions as a reference point would provide federal agencies with a useful indicator, rather than an absolute standard of significance, to provide action-specific evaluation of GHG emissions and disclosure of potential impacts.

4.1.1 Alternative A: Proposed Action

The Proposed Action will involve construction and operation of a 20–30 MW solar facility that will be constructed in 8-12 months and remain operational for 20-30 years. Air quality emissions from activities due to the construction of a solar PV facility would occur from (1) combustive emissions due to the use of fossil fuel-powered equipment and (2) fugitive dust emissions (PM_{10}/$PM_{2.5}$) due to the operation of equipment on exposed soil. Construction activity data were used to estimate proposed combustive and fugitive dust emissions.

Factors needed to derive construction source emission rates were obtained from California Emissions Estimator Model (CalEEMod). Appendix A includes data and assumptions used to calculate construction emissions based on a 30 MW project.

Table 4.1-1 summarizes the uncontrolled emissions estimated for construction emissions under Alternative A. Table 4.1-2 summarizes the uncontrolled emissions estimated for operational emissions under Alternative A. These data show that emissions from a 30-MW solar project would not be substantial for any criteria pollutant. As a result, proposed activities from Alternative A would produce less than significant air quality impacts.

Greenhouse Gases and Global Climate Change

Emissions of GHGs are considered to have a potential cumulative impact on global climate. As detailed in Tables 4.1-1 and 4.1-2, Alternative A would incrementally increase emissions of CO_2 and other GHGs.

Tables 4.1-1 and 4.1-2 indicate that the annual CO_2e emissions estimated for the Proposed Action (20 or 30 MW) would be far below the annual threshold of 25,000 metric tons of CO_2e. Also, the total

Table 4.1-1 Emissions Estimates for Construction Emissions under Alternative A

	ROG	NO_X	CO	SO_2	Fugitive PM_{10}	Exhaust PM_{10}	PM_{10} Total	Fugitive $PM_{2.5}$	Exhaust $PM_{2.5}$	$PM_{2.5}$ Total	Bio-CO_2	NBio-CO_2	Total CO_2	CH_4	N_2O	CO_2e
Category	**tons/yr**											**MT/yr**				
30 MW Total	**1.03**	**10.34**	**6.85**	**0.01**	**0.75**	**0.52**	**1.27**	**0.32**	**0.48**	**0.80**	**0.00**	**1,137.42**	**1,137.42**	**0.25**	**0.00**	**1,142.76**
20 MW Total	**0.69**	**6.89**	**4.57**	**0.01**	**0.50**	**0.35**	**0.85**	**0.21**	**0.32**	**0.53**	**0.00**	**758.28**	**758.28**	**0.17**	**0.00**	**761.84**

Table 4.1-2 Annual Emissions estimates for Operational Emissions under Alternative A

	ROG	NO_X	CO	SO_2	Fugitive PM_{10}	Exhaust PM_{10}	PM_{10} Total	Fugitive $PM_{2.5}$	Exhaust $PM_{2.5}$	$PM_{2.5}$ Total	Bio-CO_2	NBio-CO_2	Total CO_2	CH_4	N_2O	CO_2e
Category	**tons/yr**											**MT/yr**				
30 MW Total	**0.001**	**0.008**	**0.013**	**0.000**	**0.180**	**0.000**	**0.180**	**0.020**	**0.000**	**0.020**	**0.000**	**2.420**	**2.420**	**0.000**	**0.000**	**2.430**
20 MW Total	**0.001**	**0.005**	**0.009**	**0.000**	**0.120**	**0.000**	**0.120**	**0.013**	**0.000**	**0.014**	**0.000**	**1.613**	**1.613**	**0.000**	**0.000**	**1.620**

projected emissions over a 20-30 year operational period would also remain below the CO_2e emissions threshold for either a 20 or 30 MW facilities.

Moreover, operational emissions of the Proposed Action would have a beneficial effect on air quality and global climate change; compared to traditional fossil-fueled facilities, a 30 MW solar energy facility on the Base could offset approximately 728,510 metric tons of CO_2e over its projected service life (URS 2014).

Conformity

Under the federal Clean Air Act (CAA), federal agencies are required to conduct a conformity review to demonstrate their actions conform with the approved State Implementation Plan (SIP) for nonattainment or maintenance areas prior to initiating such actions.

However, in accordance with Section 176 of the CAA, a conformity analysis for the Proposed Action is not needed because VAFB is located in an attainment zone for federal NAAQS.

Environmental Protection Measures

The following are considered integral elements of the project description and would be fully implemented to ensure air quality impacts would be avoided and minimized in accordance with SBCAPCD requirements.

Construction

The following minimization measures are required for construction of a new facility:

- Obtaining an ATC permit and a PTO permit from the SBCAPCD for affected equipment, if applicable.
- Asphalt paving activities shall comply with APCD Rule 329, *Cutback and Emulsified Asphalt Paving Materials*.

Since Santa Barbara County is in non-attainment of the state standard for PM_{10}, dust mitigation measures are required for all discretionary construction activities based on the policies in the 1979 Air Quality Attainment Plan. Construction activities must comply with:

- SBCAPCD Rule 345, *Control of Fugitive Dust from Construction and Demolition Activities*. Under Rule 345, construction, demolition, and/or earthmoving activities are prohibited from causing discharge of visible dust outside the property line, and must utilize standard BMPs to minimize dust from truck hauling, track-out/carry-out from active construction sites, and demolition activities.

Standard dust mitigations are required per APCD Rule 345 for all construction and/or grading activities. The following dust control measures are required to be implemented during land preparation, excavation and/or demolition:

- All soil excavated or graded should be sufficiently watered to prevent excessive dust. Watering should occur as needed with complete coverage of disturbed soil areas. Watering should be a minimum of twice daily on unpaved/untreated roads and on disturbed soil areas with active operations.
- All clearing, grading, earth moving and excavation activities should cease during periods of winds greater than 20 miles per hour (mph) (averaged over one hour), if disturbed material is easily windblown, or when dust plumes of 20% or greater opacity impact public roads, occupied structures, or neighboring property.
- All fine material transported off-site should be either sufficiently watered

or securely covered to prevent excessive dust.

- All haul trucks should be required to exit the site via an access point where a gravel pad or grizzly has been installed.
- Stockpiles of soil or other fine loose material shall be stabilized by watering or other appropriate method to prevent wind-blown fugitive dust.
- Once initial leveling has ceased, all inactive soil areas within the construction site should either be seeded and watered until plant growth is evident, treated with a dust palliative, or watered twice daily until soil has sufficiently crusted to prevent fugitive dust emission.
- On-site vehicle speed should be limited to 15 mph.
- All areas with vehicle traffic should be paved, treated with dust palliatives or watered a minimum of twice daily.
- No off-road vehicles or engines will idle for more than 5 consecutive minutes. Idling of a vehicle that is owned by a rental company will be the responsibility of the renter or lessee, and the rental agreement shall so indicate. The idling limit does not apply to:
    - Idling when queuing,
    - Idling to verify that the vehicle is in safe operating condition,
    - Idling for testing, servicing, repairing or diagnostic purposes,
    - Idling necessary to accomplish work for which the vehicle was designed (such as operating a crane),
    - Idling required to bring the machine system to operating temperature, and
    - Idling necessary to ensure safe operation of the vehicle.

Fine particulate emissions from diesel equipment exhaust are classified as carcinogenic by the State of California. Therefore compliance with all state diesel air toxic control measures is required. The following measures should be implemented to control construction vehicle/equipment tailpipe emissions:

- Properly maintain and tune all internal combustion engine powered equipment;
- Require employees and subcontractors to comply with the ARB idling restrictions for compression ignition engines; and
- Use California ultra-low sulfur diesel fuel.

Operations

The following minimization measures are required for operation of a new facility:

- The project shall comply with all applicable SBCAPCD Rules and Regulations including:
    - Complying with all applicable requirements specified in SBCAPCD Regulation VIII, New Source Review, and
    - Obtaining an ATC permit and a PTO permit from the SBCAPCD for affected equipment, if applicable.
- The project shall comply with all Air Toxic “Hot Spots” Information and Assessment Act requirements, including revision of existing emissions inventory plans and/or health risk assessments.

- The project shall comply with all applicable requirements as identified in AFI 32-7040, *Air Quality Compliance*.
- Air quality operational permits are required for all portable construction equipment containing more than 50 brake horsepower, if such equipment remains on base for more than 12 months.

Based on anticipated impacts and environmental protection measures described above, the Proposed Action will result in unavoidable vehicular emissions during construction. However, these emissions are not anticipated to result in any exceedance of NAAQS or CAAQS resulting in VAFB or adjacent areas violating any state or federal air quality standards. Emissions during operations will be negligible and operation of the solar facility will reduce emissions compared to a traditional fossil-fuel burning electrical generating facility, a beneficial impact. No further analysis of air quality impacts is warranted as adverse impacts remain within acceptable levels. These conclusions apply regardless of project size (e.g., 20 MW, 30 MW).

4.1.2 Alternative B: No-Action Alternative

Under the No-Action Alternative, the solar facility would not be built at the site. However, based on the VAFB General Plan, the No-Action Alternative might result in the EHA being developed as a business park or other commercial uses and result in air quality impacts potentially greater than the Proposed Action. If no solar or other renewable energy project is built at the Base, electricity would continue to be procured from existing sources, most of which are traditional fossil fuel facilities that generate greater emissions of criteria pollutants and GHGs. Under this scenario, the No-Action Alternative would have greater air quality impacts than the Proposed Action. Preliminary estimates indicate a 30 MW renewable energy project at the base could offset more than 700,000 CO_2e over a 30-year period. Such benefits would not occur under this No-Action scenario.

Under the No-Action Alternative the Base could develop renewable energy sources at other sites, in which case air quality impacts might be similar or greater than the Proposed Action, depending on location. For example, sites that require additional grading or are located farther from critical infrastructure would require greater construction activity and greater emissions. However, air quality emissions associated with any No-Action developments would be subject to standard environmental protection measures identified above.

4.2 Biological Resources

Factors considered in determining whether implementing an alternative would have adverse impacts on biological resources include the extent or degree to which implementation of an alternative would result in:

- Unmitigable loss of important quantities of declining vegetation communities that are considered rare;
- Impacts to endangered, threatened, or protected species; and/or
- Alteration of regionally- and locally-important wildlife corridors that would severely and permanently limit their use.

4.2.1 Alternative A: Proposed Action

Effects on Vegetation

If the site were completely developed, the project would affect a total of approximately 182 acres of land, including approximately 146.7 acres of highly disturbed ground, 14.5 acres of ruderal habitat, 16 acres of

Eucalyptus windrow, 5 acres of (degraded) Burton Mesa chaparral, and 0.11 acre of arroyo willow thicket within the project site. It should be noted, however, that at this time it is not certain whether the oaks tress and/or eucalyptus trees need to be removed in whole or in part.

Adjacent areas within the larger study area, as discussed in Section 3.2, are characterized by undisturbed native vegetation communities have been avoided by project design and would not be directly affected (see Figure 3.2-1 and Table 4.2-1).

Table 4.2-1. Effects on Vegetation

Type	Acres to be Removed in the Project Site (acres)	Acres to be Avoided in the Study Area (acres)
Burton Mesa Chaparral	5.0	70.78
Arroyo Willow Thicket	0.1	2.49
Coast Live Oak Woodland	0	4
Coyote Brush Scrub	0	4
Creeping Rye Grass Turf	0	0.4
Eucalyptus Windrow	16.0	25
Ruderal	14.5	35
Disturbed	146.7	43.43
Total	**182.3**	**185.1**

Environmental protection measures described at the end of this section would protect sensitive habitats located adjacent to the Proposed Action from indirect effects such as illumination, fugitive dust, construction noise, and spread of invasive species.

The Proposed Action could result in the introduction and/or propagation of invasive species that could be deleterious to Burton Mesa chaparral and other sensitive habitats in the study area. Per Executive Order 13112, the Proposed Action includes an environmental protection measure to ensure the project is managed and monitored to prevent the spread of invasive species.

As many as 16 native coast live oak trees would be removed (although possibly fewer or none), thus removing foraging, nesting, and shade habitat for Nuttall's woodpecker and oak titmouse, and other common native animal species. Removal of the native oak trees would be an adverse effect, which could be reduced by avoiding and setting back from as many native oak trees as is practicable. Oaks would be protected and/or avoided if possible; however, some oaks may need to be removed depending on the actual location of the solar array panels. VAFB's 30 CES/CEIE would review and approve any request for oak tree removal per the VAFB INRMP and considering the Santa Barbara County Planning and Development *Planner's Guide to Conditions of Approval and Mitigation Measures*. At a minimum, for every 6-inch diameter or greater coast live oak tree to be removed or significantly disturbed, the tree would be replaced with a 5 gallon size *Quercus agrifolia* (coast live oak) tree obtained from locally occurring saplings or seed stock of 10 acorns.

The INRMP states the following Management practices:

- Encourage habitat enhancement measures, particularly regeneration of oak trees in woodlands outside of construction zones.
- Restore altered oak woodlands to their pre-disturbance condition. Employ measures specific to oak woodlands, such as replanting oaks at the optimal replacement rate, protecting seedlings with cylinders of wire mesh, and using snow fencing to protect root zones, or other equally effective methods.

- Replace oak woodland plant species removed during construction with local native plants.
- Avoid development and construction in oak woodlands to minimize disturbances to oak trees.

Effects on Common Wildlife/Flora

Implementation of the Proposed Action would result in the permanent loss of approximately 5.0 acres of Burton Mesa chaparral, 0.1 acre of riparian habitat, 16.0 acres of Eucalyptus windrow, 14.5 acres of ruderal habitat, 146.7 acres of disturbed ground, 200–300 non-native trees, and at least 16 native oak trees (Figure 3.2-1). Both the native and non-native trees provide habitat for common wildlife species, particularly birds. Affected animals would likely permanently relocate into similar habitats in the region. This might result in increased competition for resources in the short-term. However, regional populations of common wildlife species are not expected to be measurably reduced.

Construction could leave the surrounding habitats vulnerable to deposition of sediment as a result of rain hitting the solar panels, running off onto bare ground, and then transporting sediment into riparian and chaparral areas. Consequently, this could facilitate invasion of non-native weeds in off-site habitats and result in a long-term reduction in the amount of habitat available for native animals. This would be an adverse impact that would be avoided or minimized because the EISA requires that pre-development hydrology be maintained (see Section 4.10.1). In addition, erosion control and other BMPs required under the NPDES program will be implemented as part of the project's Stormwater Pollution Protection Plan (SWPPP). Measures to manage on-site spread of invasive species are addressed later in this section.

Prior to the demolition of EHA, streetlights were present and illuminated the roadways during the night. Night lighting of the facility could have a long-term adverse impact on nocturnal animals in the surrounding native habitat areas by disrupting their foraging patterns. This would be an adverse impact that would be minimized by designing the project so that all of the night lighting is the minimum required for security and safety, shielded so that it points downward, and is directed toward the interior of the site.

Effects on Birds

Because PV solar installations can possess reflective properties that are somewhat similar to those of a pond or lake, potential exists for waterfowl such as grebes, ducks, herons, rails, and others to confuse the facility for an aquatic habitat and attempt to land on the panels at high speed. This phenomenon has been documented at solar PV facilities elsewhere in California, and has resulted in avian mortality (Clarke 2013). It is not known how to minimize this effect. One possible solution is to frame the solar panels in a color that breaks up the visual appearance of the panel array so that it does not look like a body of water. This, and other techniques (if developed) that minimize this effect, should be incorporated into the project to ensure impacts to birds are avoided and/or minimized to the extent possible in accordance with the Migratory Bird Treaty Act. In addition, the construction at the project site would involve the removal of trees and shrubs. To minimize impacts to birds, these activities would either occur outside the bird nesting season or a qualified biologist will visit sites and assess prior to removal.

Wildlife Movement

The project is not expected to substantially alter movement patterns for small to large mammals (badger, deer, coyote, bobcat, mountain lion). The project site is located within a previously disturbed area is bounded by State Route 1 to the west and north (see Figure 3.2-1). Any mammals that presently use the site may be displaced into the adjacent and generally undisturbed habitat. Since the project site has

undergone demolition in the recent past, the habitat value of this area is considered low.

Temporary effects to wildlife species may occur to animals and their habitat from dust and noise generated during construction. This would be an adverse impact in the short-term. In the long-term, however, common wildlife are expected to continue to use the adjacent areas and are not expected to be adversely affected by operation of the unmanned PV solar facility.

Effects on Special Status Species

Vandenberg monkeyflower (Proposed Endangered)

Vandenberg monkeyflower would not be affected by the Proposed Action. The degraded Burton Mesa chaparral in the south/southwest corner of the project site, as shown in Figure 3.2-1, is not considered suitable habitat for this species and absence of the species in the project site was confirmed by a biological survey on May 20, 2014 (Gevirtz, 2014).

La Purisima manzanita, shagbark manzanita, Lompoc ceanothus, and Santa Barbara ceanothus

Impacts to La Purisima manzanita, shagbark manzanita, Lompoc ceanothus, and Santa Barbara ceanothus are not anticipated from the Proposed Action. Suitable habitat for these species is limited to Burton Mesa chaparral, which is located outside of the project site.

California red-legged frog (Threatened)

California red-legged frogs (CRLF) will not be affected by the Proposed Action. Best-available CRLF data indicates that no CRLFs have been documented within 2500 meters of the project site and suitable habitat is not present on the project site, nor is upland dispersal by CRLF through the previously disturbed, former housing area likely.

Nuttall's woodpecker, loggerhead shrike, and oak titmouse

Although some habitat used by these species would be removed, valuable Burton Mesa chaparral habitat for Nuttall's woodpecker and oak titmouse would be protected southeast of Mountain View Boulevard, thus lessening the effect on these species. Loggerhead shrike will lose foraging opportunities, but it is likely to find suitable foraging habitat nearby.

El Segundo blue butterfly (Endangered)

The host plant for El Segundo blue butterfly (seacliff buckwheat) was not observed on the site and is not anticipated to occur on the site. Therefore, El Segundo blue butterfly is not expected to be affected by the project.

Hoary Bat, Yuma Myotis and Western Red Bat.

The Hoary Bat, the Yuma Myotis and the Western Red Bat have been documented within 1-mile of the project site (CDFW 2013). Removal of the Eucalyptus and Coast Live Oak trees within the project site could have the impact of reducing roosting habitat for the Hoary Bat and the Western Red Bat. However, this is considered low quality habitat for roosting because it is not adjacent to a water source (Harris J. 1990). There is no suitable roosting habitat for the Yuma Myotis within the project area. The removal of vegetation from the project site would reduce the area of foraging habitat for bats but it is not expected to have any impact on bats because there is abundant foraging habitat of a higher quality surrounding the project site.

Non-native Invasive Plants

Construction and operation of the facility may lead to the spread, establishment, and propagation of invasive species that could adversely affect the Burton Mesa chaparral and riparian areas located outside of the project site by invading these habitats and displacing native plants, including protected species. This would be an adverse effect

that would be avoided, to the extent possible, by managing and monitoring the project site to prevent and/or eradicate invasive species. This is a required environmental protection measure that shall be implemented as part of the Proposed Action. All required environmental protection measures are described at the end of this section.

Waters of the U.S. and Wetlands

Wetlands and non-wetland waters of the U.S. do not occur on the site. The riparian areas located off-site would not be affected by the Proposed Action because necessary BMPs required under the NPDES program will be implemented as part of the project's Stormwater Pollution Protection Plan (SWPPP) to avoid and minimize erosion/runoff during construction and operations.

Environmental Protection Measures

The following measures are required actions that would be fully implemented as part of the Proposed Action. They are required to avoid a significant impact to protected biological species.

- If the eucalyptus trees south of Timber Lane along SR-1 are removed, the area will be replanted with lower-growing native shrubs to help screen the facility.
- Removal of trees should be scheduled to occur after August 15 and before February 15 to avoid the bird breeding season. If tree removal is scheduled during the bird breeding season, surveys for nesting birds should be conducted prior to disturbance of the trees. If active nests are located, they should be avoided until the young of the year have left the nest(s).
- The project site shall be managed and monitored to prevent and eradicate invasive plant species. Prior to project site transport, all vehicles shall be cleaned of weed seeds. During on-site entry and exit periods, all equipment vehicles traversing the unpaved areas shall be cleaned of weed seeds to prevent the spread of Sahara mustard especially, plus other exotic invasive plant seeds. At a minimum, both manual removal of soil and debris followed by a wash system will be accomplished with containment. Vehicles will be high pressure spray washed at least 6 minutes especially on the undercarriage, wheel wells, and bumper areas by a well trained wash crew. Any skid plates shall be removed for cleaning or removed and cleaned prior to project site transport. Exotic weed seeds and other cleaning waste products will be properly disposed.
- Any night-lighting on the site shall be the minimum required for security and safety, shielded, and directed downward and toward the interior of the site rather than toward the adjacent habitat areas in order to avoid adverse effects to nocturnal animals.
- If landscaping will be installed on the project, a preliminary species list shall be reviewed and approved by a qualified botanist familiar with native plants of the Burton Mesa and invasive non-native species. A botanist will work with the contractor to review the sources of seeds and propagation material, and will be on-site during landscape installation to ensure that no non-native invasive plants are planted. The botanist and contractor shall coordinate with 30 CES/CEIEA.
- Any above ground electrical lines shall be designed and constructed to reduce the likelihood of electrocution of large birds, such as raptors, per Avian Protection Plan Guidelines

developed by the Avian Power Line Interaction Committee and the USFWS (APLIC 2005). Any modification to existing power lines shall also incorporate avian protection measures.

- Coast live oak trees will be avoided and/or protected during construction, if possible. As recommended, consideration will be given to establishing a setback along SR 1 where many oaks are located and/or implementing an appropriate buffer zone (i.e. six-foot) with restrictions (i.e., no grading) around each tree. However, in the event of Coast live oak tree removal, for every 6-inch diameter or greater coast live oak tree to be removed or significantly disturbed, the tree would be replaced with a 5 gallon size *Quercus agrifolia* (coast live oak) tree obtained from locally occurring saplings or seed stock of 10 acorns.

- For the protection of migratory birds, the contractor will consider selecting solar panel frames that are lighter in color (e.g., silver) to keep the facility from looking like a water body; this design feature should avoid or minimize bird collisions and/or attract birds to the site.

Based on anticipated impacts and environmental protection measures that would be implemented, the Proposed Action will not result in loss of important quantities of declining vegetation communities that are considered rare; it will not result in impacts to endangered, threatened, or protected species; and it will not alter regionally- and locally- important wildlife corridors. These conclusions apply regardless of project size (e.g., 20 MW, 30 MW) because either sized facility would be constructed within the same project site footprint evaluated under this EA.

4.2.2 Alternative B: No-Action Alternative

Based on the VAFB General Plan, the No-Action Alternative might result in the EHA being developed as a business park or other commercial uses. Such a development can be expected to have environmental impacts similar to or greater than the Proposed Action. If the site is left undeveloped, the portion of the site that is highly disturbed bare ground could be colonized by invasive non-native species that could lead to or exacerbate existing invasive weed problems on VAFB and on other natural lands in the area. The EHA site is also suitable for and could be used as a mitigation site to offset losses of seacliff buckwheat elsewhere on the Base for the benefit of the El Segundo Blue Butterfly.

The Base may also develop renewable energy sources at other sites, in which case biological resource impacts can be expected to be similar to or greater than the Proposed Action, depending on location.

4.3 Cultural Resources

Factors considered in determining whether implementing an alternative would have adverse impacts on cultural resources include the extent or degree to which implementation of an alternative would:

- Result in the permanent loss of a significant cultural resource or the loss of a value or characteristic that qualify a historic resource for listing on the NRHP; and/or

- Substantially alter the natural environment or access to it in such a way that traditional cultural or religious activities were restricted.

4.3.1 Alternative A: Proposed Action

The proposed solar site has been completely surveyed and two cultural resources are present within the APE, as described in Section 3.3.1. CA-SBA-3487

was determined ineligible for the NRHP by consensus determination. The Draft Final EA indicated that CA-SBA-3270 had not been evaluated and would be assumed eligible for the purposes of this project only and will be protected with temporary exclusionary fencing. Subsequent to the Public Draft EA, the SHPO provided documentation that both sites have been determined ineligible and suggested the proposed project would have no effect to historic properties. At this time no changes to the environmental protection measures listed below have been made; however, future discussion with the SHPO and consulting tribes may result in modification to those measures if determined to be unnecessary.

Environmental Protection Measures

The following measures are required and shall be implemented as part of the Proposed Action to ensure no adverse impacts to historic properties occur:

- Temporary exclusionary fencing will be installed around the southwestern portion of CA-SBA-3270 to prevent vehicles and equipment from inadvertently entering site boundaries.
- In the event that previously undocumented cultural resources are discovered during construction activities, work will stop and the procedures established in 36 CFR 800.13 and the VAFB Integrated Cultural Resources Management Plan shall be followed.

Based on anticipated impacts and implementation of the EPM noted above, the Proposed Action is not expected to result in impacts to cultural resources. These conclusions apply regardless of project size (e.g., 20 MW, 30 MW).

4.3.2 Alternative B: No-Action Alternative

Based on the Vandenberg AFB General Plan, the No-Action Alternative might result in the East Housing Area being developed as a business park or other commercial uses. Impacts resulting from such development on cultural resources listed in or eligible for listing in the NRHP would be evaluated based on the details of the specific development plan. The Base may also develop renewable energy sources at other sites, in which case impacts could occur if cultural resources are present.

4.4 Geology and Earth Resources

Factors considered in determining whether implementing an alternative would have adverse impacts on geology and earth resources include the extent or degree to which implementation of an alternative would:

- Result in substantial soil erosion or the loss of topsoil; and/or
- Expose people or structures to potential substantial adverse effects, involving rupture of a known earthquake fault, strong seismic ground shaking, and/or liquefaction.

4.4.1 Alternative A: Proposed Action

Soils and Erosion

Site development would result in removal of vegetation and associated soil disturbance; thus, temporarily exacerbating the potential for erosion-induced sedimentation of adjacent areas.

The Proposed Action will include the construction, operation and maintenance (O&M) of a solar photovoltaic (PV) energy facility to provide electricity to Vandenberg Air Force Base (AFB). The construction contractor would prepare an SWPPP before project implementation, which would include

standard erosion control BMPs to stabilize disturbed soil areas and sediment control BMPs (see Environmental Protection Measures in Section 4.10.1 Water Resources).

Due to implementation of a SWPPP and associated BMPs, adverse impacts on geology and earth resources are not expected.

Seismicity

The project site is not underlain by any mapped active faults. Although active faults located within the region could result in strong seismically induced ground shaking, the potential for surface fault rupture and liquefaction on VAFB would be minimal. Therefore, adverse impacts associated with seismically induced ground shaking should not occur.

The Proposed Action is not expected to result in substantial soil erosion or the loss of topsoil or expose people or structures to potential substantial adverse effects from rupture of a known earthquake fault, strong seismic ground shaking, and/or liquefaction. These conclusions apply regardless of project size (e.g., 20 MW, 30 MW).

4.4.2 Alternative B: No-Action Alternative

Based on the VAFB General Plan, the No-Action Alternative might result in the EHA being developed as a business park or other commercial uses. Such a development can be expected to have environmental impacts similar to the Proposed Action and would be subject to similar Environmental Protection Measures. The Base may also develop renewable energy sources at other sites, in which case geological impacts can be expected to be similar to or greater than the Proposed Action, depending on location. However, engineering solutions and standard Environmental Protection Measures can be expected to avoid adverse impacts.

4.5 Land Use and Coastal Zone Resources

Factors considered in determining whether implementing an alternative would have adverse impacts on land use and coastal zone resources include the extent or degree to which implementation of an alternative would:

- Result in land uses on the project site that are incompatible with, or would have a substantial adverse impact on, the existing character of adjacent land uses; and/or
- Conflict with substantive requirements of land use plans or the enforceable policies of the California Coastal Act.

4.5.1 Alternative A: Proposed Action

The General Plan specifically notes that demolition of the EHA provides an opportunity for future commercial development to support the military community (VAFB 2011).

Development of the EHA site as a solar facility to serve the Base's power needs is considered an allowable use consistent with the General Plan (Sassenberg 2014). As a result, the Proposed Action would not have an adverse effect on land use.

The Proposed Action would not affect the coastal zone or coastal resources. The project site is located more than 6 miles from the coast, is separated from the main area of the Base and the coastline by SR-1, and does not contain perennial watercourses that would convey runoff to the coast.

Therefore, the development of the solar facility would not conflict with any land use policies or requirements or affect the coastal zone or any coastal resource. This conclusion applies regardless of project size (e.g., 20 MW, 30 MW).

4.5.2 Alternative B: No-Action Alternative

Under the No-Action Alternative, a solar facility would not be constructed at this location. As per the General Plan, the site might be developed as a business park or other commercial uses that would support the military community. Such developments would be consistent with the General Plan and compatible with adjacent land uses (Commercial/Services). Therefore, like the Proposed Action, the No-Action Alternative would have no impacts on land use at the EHA.

The Base may also develop renewable energy sources at other sites, in which case land use impacts can be expected to be similar to or greater than the Proposed Action, depending upon location.

4.6 Noise

Factors considered in determining whether implementing an alternative would have adverse noise impacts include the extent or degree to which implementation of an alternative would:

- Expose people to noise levels in excess of applicable standards or at levels that may be harmful.

4.6.1 Alternative A: Proposed Action

As there are two schools (Vandenberg Middle School and Manzanita Public Charter) adjacent to the project site, the assessment of anticipated noise impacts is based on predictions of project noise due to construction, operation and maintenance activities as they compare with acceptable interior noise level ranges suggested for classrooms as indicated in the Air Force adopted technical manual on noise and vibration control (AFJMAN 1995). Construction activities at the Project site would include vegetation clearing, grubbing, grading, trenching for buried cables, installation of pile-driven pier foundations, erection of the solar panels, installation of inverters and other equipment on small concrete pads, construction of the perimeter and interior access roads, and fencing, among others. The activities would use conventional construction equipment over an approximate 8-month period. Pile-driving activity is also anticipated, as the PV solar panel array support structures require driven post foundations. Typical noise levels of conventional construction equipment and pile-drivers planned for the project are presented in Table 4.6-1 along with typical acoustical usage factors per FHWA Roadway Construction Noise Model User's Guide (FHWA 2006) data.

Table 4.6-1: Typical Construction Equipment Noise Levels

Equipment Description	Typical Acoustical Usage Factor (%)	Maximum Sound Pressure (L_{max}, dBA) at 50 feet
Grader	40	85
Excavator	40	81
Dozer	40	82
Compactor	20	83
Skidsteer	40	66
Backhoe	40	78
Front End Loader	40	79
Pile Driver	20	101
Rough Terrain Forklift	20	72
Crawler Trencher	40	80
Hydraulic Mobile Crane	16	81
Pick Up Truck	40	75
Line Truck	40	74
Water Truck	20	74
Concrete Truck	40	79
ATV / Mule	40	74

Sources:
FHWA 2006.

Manzanita Public Charter School (K-6) and Vandenberg Middle School are located adjacent to the Proposed Action. For noise-sensitive receiver locations corresponding with the closest building facades of the two schools, hourly average L_{eq} noise levels were predicted due to construction activity associated with the Proposed Action based on the types and numbers of equipment anticipated to be on-site during construction each month. These predictions were performed for two analysis cases: (1) the anticipated two loudest pieces of conventional construction equipment are operating simultaneously at a geographical central point within the project boundary; and (2) the two loudest pieces, plus the addition of pile driving activity, are operating simultaneously at a geographical central point within the project boundary. This two-source technique is compatible with the FTA general assessment methodology for construction noise. Predicted exterior noise levels in excess of 65 dBA would be considered potentially impactful, since the corresponding interior noise level (e.g., within an occupied classroom) would be 45 dBA (which can be considered comparable to NC-35, per Engineering Noise Control [Bies and Hansen 1996]). Federal Highway Administration (FHWA) guidance (FHWA 2010) concurs with this apparent 20 dBA exterior-to-interior noise level difference by describing the following building noise reduction factors (for all building types) as follows: window open, 10 dBA; ordinary sash (closed), 20 dBA.

Table 4.6-2 indicates that the first four months of construction activity could result in high noise impacts when pile driving occurs. To avoid noise impacts to students, pile driving activity should occur after regular school hours on weekdays, or during weekends, school holidays or other periods of the year (e.g., summer months) when the school buildings are not occupied by students (i.e., the sensitive receivers under consideration). If pile driving activity does occur during time periods when students are present, some form of equipment noise control or sound path abatement would need to be considered and implemented. In addition, any construction activity occurring at a distance of less than 300 feet from either of the nearest school structures should be scheduled when students are not present.

Table 4.6-2. Predicted Construction Noise Levels at Two Nearest Noise-Sensitive Receivers

	Central Construction Point with Pile Driving (PD)		Central Construction Point without PD	
Construction Month	Predicted Leq[H] at Vandenberg Middle School	Predicted Leq[H] at Manzanita Public Charter School	Predicted Leq[H] at Vandenberg Middle School	Predicted Leq[H] at Manzanita Public Charter School
1	70	75	54	59
2	70	75	54	59
3	70	75	54	59
4	70	75	51	56
5	51 (no PD this month)	56 (no PD this month)	51	56
6	51 (no PD this month)	56 (no PD this month)	51	56
7	44 (no PD this month)	49 (no PD this month)	44	49
8	44 (no PD this month)	49 (no PD this month)	44	49

Sources:
FHWA 2006.

Project facility operation noise would be generated predominantly by small electrical devices (inverters) that convert direct current (DC) from the solar panels to alternating current (AC) so the electricity can be used to power commercial appliances. Inverters generate minimal noise and operational noise levels at the school property lines would be considerably less than the estimated daytime existing outdoor ambient sound levels and far below the 65 dBA interior noise levels that would be considered potentially impactful.

Routine maintenance activities (e.g., PV solar panel washing and service) during

operations would likely involve a truck-mounted pressure washer. Because the noise from high-pressure water release (or impact on the PV panel surfaces) and the moving or idling vehicle may be as close to the schools as the project property line, and might under such conditions create a noise impact.

Environmental Protection Measures

The following measures are required and shall be implemented as part of the Proposed Action to avoid excessive construction noise to nearby schools and potential health and safety effects on children consistent with EO 13045:

- Pile-driving of posts for the PV solar panel structural support assemblies shall either be (1) conducted with equipment noise controls/abatements or (2) scheduled to occur during weekday (e.g., after-school hours), weekend, holiday, summer or other periods when classes at Vandenberg Middle School and the Manzanita Public Charter School are not in session.
- Site grading and other construction activities that are expected to take place at a distance of less than 300 feet from the nearest school buildings shall be scheduled to occur during weekday (e.g., after-school hours), weekend, holiday, summer or other periods when classes are not in session.
- PV panel washing and other project facility maintenance activities involving mechanized equipment and/or vehicles that are expected to take place at a distance of less than 300 feet from the nearest school buildings shall be scheduled to occur during weekday (e.g., after-school hours), weekend, holiday, summer or other periods when school is not in session.

Based on anticipated impacts and environmental protection measures that would be implemented, the Proposed Action is expected to exceed ambient noise levels temporarily but would not exceed interior noise levels within the nearby schools during construction and operations. This conclusion applies regardless of project size (e.g., 20 MW, 30 MW).

4.6.2 Alternative B: No-Action Alternative

Under the No-Action Alternative, the site might be developed as a business park or other commercial uses, which would attract more workers and/or consumers and can be expected to have greater noise impacts to the nearby schools than will the Proposed Action.

The Base may also develop renewable energy sources at other sites, in which case noise impacts at those locations can be expected to be similar to or greater than the Proposed Action, depending on the location of sensitive receptors.

4.7 Public Health and Safety

Factors considered in determining whether implementing an alternative would have adverse impacts on public health and safety include the extent or degree to which implementation of an alternative would result in:

- Non-compliance with applicable regulatory requirements; and/or
- Human exposure to hazardous materials and wastes, or environmental release above permitted limits.

4.7.1 Alternative A: Proposed Action

Hazardous Materials and Waste

Proposed construction activities would require the use of hazardous materials similar to those currently used and managed on VAFB. The Proposed Action would not create significant increase in the amounts of hazardous materials present on Base. Construction activities would comply with federal and state EPA and OSHA

regulations, the VAFB *Hazardous Material Management Plan* (30 SWP 32-7086/30 SWP 32-7043A), and applicable hazardous waste regulations. Therefore, impacts to public health and safety from hazardous materials and waste management should not be adverse.

Potential adverse effects could result from accidental releases of hazardous materials from vehicles or equipment. All hazardous wastes would be properly managed and disposed of in accordance with applicable federal, state, and local hazardous waste regulations, including the VAFB *Hazardous Waste Management Plan* (30 SWP 32-7043A). All hazardous wastes would be managed during release response and clean-up, and adverse impacts are not expected.

Installation Restoration Sites

As described in Section 3.7.3, No IRP, AOI or AOC issues were identified in the area of the Proposed Action. Therefore, there would be no impacts.

Unexploded Ordnance

The Proposed Action area is adjacent to Munitions Response Site 805D. In 2010, the Military Munitions Response Program investigated the Proposed Action area and determined that no further investigation was indicated for Munitions and Explosives of Concern, or Munitions Debris. Given the prior removal of the EHA residential complex, potential impacts are considered unlikely. All ground disturbing activities would be coordinated with the 30 SW/SEW.

Federal Health and Safety Requirements

All applicable OSHA requirements and Air Force regulations would be specified in construction contracts and implemented with standard BMPs associated with the Proposed Action. As discussed in the following subsection Environmental Protection Measures, a health and safety plan would be implemented and a formally trained individual would be the safety officer and the main point of contact for all job site safety issues. Therefore, adverse impacts associated with environmental health and safety risks should not occur.

Environmental Protection Measures

The following measures are required and shall be implemented as part of the Proposed Action.

- Proper disposal of hazardous waste would be accomplished through identification, characterization, sampling, and analysis of wastes generated.
- All hazardous materials would be properly identified and used per manufacturer's specifications to avoid accidental exposure to or release of hazardous materials required to operate and maintain construction equipment.
- All equipment would be properly maintained and free of leaks during construction and maintenance activities. All necessary equipment maintenance and repairs would be performed in pre-designated controlled, paved areas to minimize risks from accidental spillage or release. Prior to construction, a Spill Prevention Plan would be submitted to 30th Civil Engineer Squadron, Environmental Flight (30 CES/CEIE) for approval.
- Hazardous materials would be procured through or approved by the HazMart. Monthly usage of hazardous materials would be reported to the HazMart to meet legal reporting requirements.
- The Air Force would ensure compliance with applicable OSHA requirements during construction, operations and maintenance activities.
- A Health and Safety Plan would be developed and implemented. In addition, the Air Force would coordinate with the 30th Space Wing Safety-Weapon Safety (30 SW/SEW) prior to implementing the Proposed Action to

ensure no adverse effects would occur from UXO issues.

- Awareness training would be incorporated into the worker health and safety protocol to minimize potential adverse impacts from biological hazards (e.g., snakes and poison oak) and physical hazards (e.g., rocky and unstable terrain).

Based on anticipated impacts and environmental protection measures that would be implemented, the Proposed Action is not expected to result in adverse effects to public health and safety from hazardous materials and wastes, exposure to unexploded ordnance, or other factors. This conclusion applies regardless of project size (e.g., 20 MW, 30 MW).

4.7.2 Alternative B: No-Action Alternative

Under the No-Action Alternative, a business park or other commercial uses may be developed on the site. The Base may also develop renewable energy sources at other sites. Such developments would be required to comply with all applicable federal regulations and implement BMPs and other environmental protection measures similar to those required of the Proposed Action. Impacts of the No-Action Alternative therefore can be expected to be similar to the Proposed Action.

4.8 Transportation

Factors considered in determining whether implementing an alternative would have adverse impacts on transportation include the extent or degree to which implementation of an alternative would:

- Result in a primary roadway no longer being able to service existing traffic demands; and/or
- Result in traffic to shift to a roadway that was incompatible with those traffic increases (e.g., inadequate pavement structure or design capacity), or could cause potential safety problems.

4.8.1 Alternative A: Proposed Action

Most construction materials (solar panels, racking system) are expected to be trucked to the site from the Los Angeles area via US Highway 101, SR-246 and SR-1 (see Figures 3.8-1 and 3.8-2). Implementation of the Proposed Action would temporarily affect the local roadway network (SR-1, Mountain View Boulevard and Timber Lane), through the delivery of materials and personnel during site construction. However, since increases in traffic volumes associated with construction activities would be temporary, no long-term impacts to the local or regional transportation network would occur.

Heavy construction vehicles would be kept on-site for the duration of their use. Thus, increases in traffic volumes would mainly result from construction workers traveling to and from the project site and trucks delivering materials to and removing material from the project site.

Traffic impacts during construction are anticipated to be minimal with implementation of environmental protection measures (see below). Anticipated traffic volumes during construction would be within the capacity of surrounding roadways, including SR-1 and the Lompoc/Casmalia Road. During peak months of construction, there would be approximately 80 workers on-site and approximately 20 truck deliveries per day. Since the facility would be unmanned, traffic during operations would be limited to periodic visits by a few people during operations and maintenance. There would be no long-term impacts on traffic or circulation.

Environmental Protection Measures

The following measures are required and shall be implemented as part of the

Proposed Action to avoid and minimize potential traffic impacts.

- No commuters or construction trucks shall be allowed to enter the site at the northern intersection of SR-1 and Mountain View Boulevard while Vandenberg Middle School is in session.
- Truck deliveries shall be scheduled to avoid conflicts with school buses and, when practicable, to avoid peak traffic hours.
- The construction contractor shall prepare a construction traffic control plan in coordination with Caltrans.
- Warning signs, cones, and flaggers shall be provided if necessary to warn roadway users of truck crossings on SR-1 and to control traffic flow.
- Construction equipment shall not be parked off-site.
- Construction workers shall be encouraged to carpool and eat lunch on the site.

Based on anticipated impacts and environmental protection measures that would be implemented, the Proposed Action is not expected to result in adverse effects to the Level of Service of regional or local roads regardless of project size (e.g., 20 MW, 30 MW).

4.8.2 Alternative B: No-Action Alternative

Under the No-Action Alternative, the EHA site might be developed as a business park or commercial development per the VAFB General Plan. Such commercial developments can be expected to have greater transportation impacts than the Proposed Action, although the local road network is likely to continue to operate at acceptable LOS.

The Base may also develop renewable energy sources at other sites, in which case transportation impacts can be expected to be similar to the Proposed Action.

4.9 Visual Resources

Factors considered in determining whether implementing an alternative would have adverse impacts on visual resources include the extent or degree to which implementation of an alternative would:

- Substantially degrade the existing visual character or quality of important visual resources or designated scenic views; and/or
- Create a new source of substantial light or glare that would adversely affect day or night views in the area or that would substantially impact other people or properties.

4.9.1 Alternative A: Proposed Action

The Proposed Action would include the construction and operation of a photovoltaic solar generating facility that would include the following major components: non-reflective PV solar module arrays mounted on a fixed tilt racking system, inverters and transformers on small concrete pad pads, buried collector lines, and electrical equipment. The solar power generation facility would also include a small, unmanned communications enclosure that would contain metering and supervisory data acquisition and control equipment. A chain link security fence will be installed around the facility. The solar panels are expected to be approximately 10 feet high.

Construction activities would be visible to individuals traveling on local roadways, including SR-1, Mountain View Boulevard and Timber Lane. Students, faculty and visitors at Vandenberg Middle School and Manzanita Public Charter School would have views in close proximity of project construction activities and equipment.

However, project construction activities would be short term and temporary.

A viewshed analysis indicates the proposed facility would not be visible from most areas within a 2-mile perimeter of the project site (see Figure 4.9-1). Since viewers within close proximity to the project site are most likely to be impacted, a close up of the viewshed analysis is provided as Figure 4.9.-2.

Existing trees to the north of the site between Vandenberg Middle School and along the northeastern boundary would remain. Although considered unlikely, eucalyptus trees south of Timber Lane along SR-1 may be removed to reduce shading and improve exposure to sunlight (see Figure 4.9-2). If so, this would result in increased visibility along part of the project site boundary, although the trees could be replaced with native shrubs to help screen the facility.

Sensitive viewers within the vicinity of the project site include students, faculty, and visitors of Vandenberg Middle School and Manzanita Public Charter School and travelers along nearby roads including SR-1, Timber Lane, and Mountain View Boulevard.

While the Proposed Action would result in a visual change from its undeveloped state, the site is highly disturbed from previous development and contains no unique visual features. Nonetheless, some viewers at the school sites and some travelers on nearby roadways may view the visual change as adverse since the project will remove mature trees from the interior of the site and introduce industrial elements.

Students, faculty and visitors to Vandenberg Middle School and Manzanita Public Charter School would have close views of the project from some school locations and along Mountain View Boulevard and Timber Lane. From some locations, these individuals would have permanent views of the facility fence and solar panels.

However, as identified in Figure 4.9.-2, significant portions of the school sites would not have views of the panels. Views of the panels would primarily be from the play fields at Vandenberg Middle School and portions of other school facilities. At Manzanita Public School the panels would primarily be visible from the facilities nearest to the project site.

The portion of SR-1 located adjacent to the project is not designated as a scenic highway or byway and travelers would have only brief views of the project site at select locations so long as the eucalyptus trees remain or if replaced with shrubs (see Figure 4.9-2). In addition, SR-1 to the west would largely be screened by dense rows of tall eucalyptus trees north of Timber Lane. These motorists are unlikely to perceive a substantial change in visual quality or character during construction and operations unless trees along SR-1 are removed. If so, they could be replaced with native shrubs that would help screen the project. Students, faculty and visitors to Vandenberg Middle School and Manzanita Public Charter School would have close and permanent views of the project from some school locations and along Mountain View Boulevard and Timber Lane. From some locations, these individuals would have permanent views of the facility fence and solar panels. As views of important visual resources would not be substantially altered, substantial adverse impacts to visual resources would not occur.

All Project lighting will be designed to provide the minimum illumination needed to achieve safety and security objectives. Lighting will be directed downward and shielded to focus illumination on desired areas. The Proposed Action includes non-reflective PV solar module arrays. The Air Force has internally conducted a glare analysis and found that no glare is anticipated to affect operations at the airfield on base (Fillman 2014). Therefore, no substantial changes in light and glare would result.

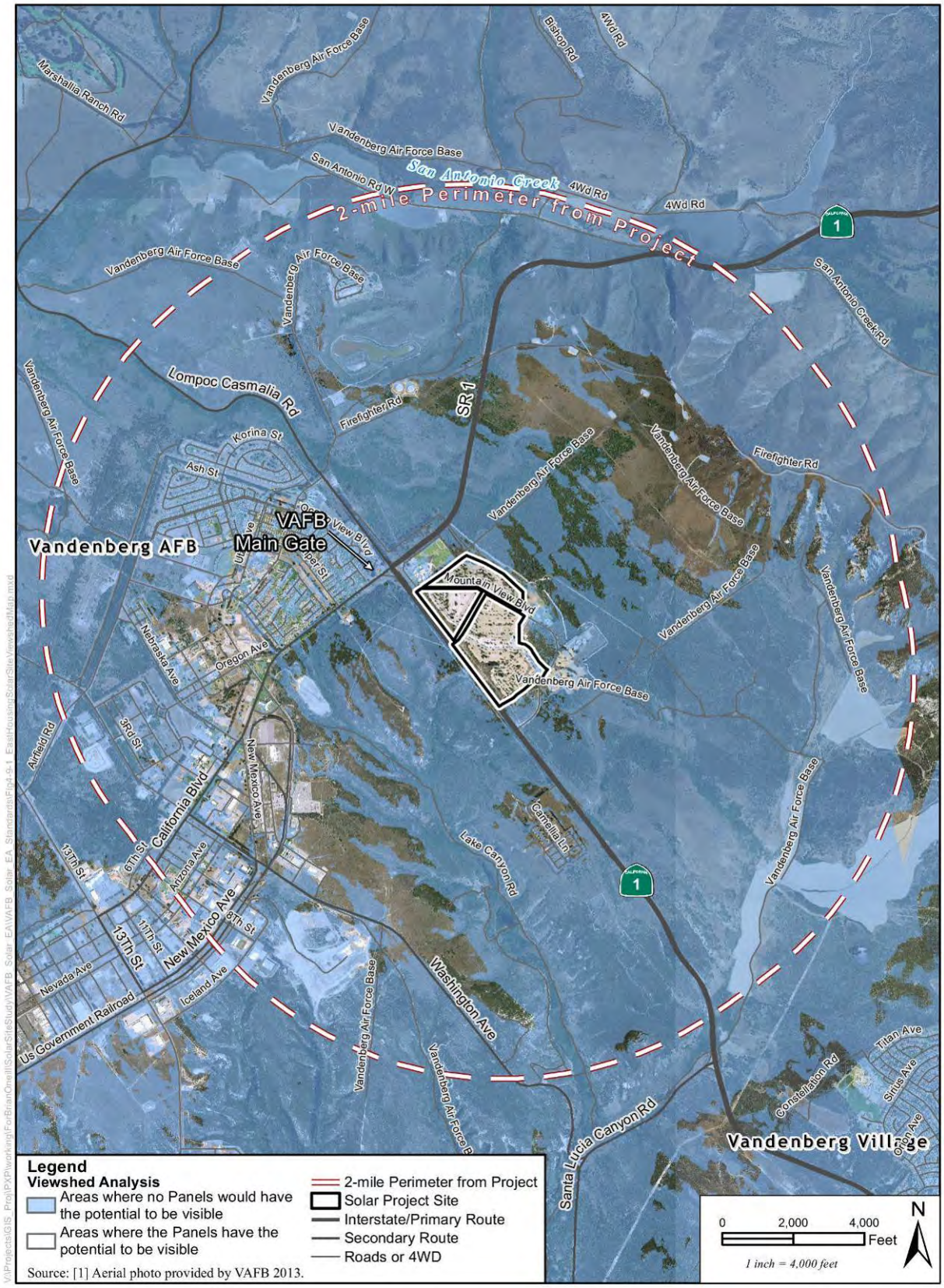

Figure 4.9-1. Project Viewshed Map

Figure 4.9-2. Project Viewshed Map Detail

Environmental Protection Measures

The following measure is required and shall be implemented as part of the Proposed Action to avoid and minimize potential visual resource impacts:

- Lighting will be directed downward and shielded to focus illumination on desired areas.
- If the eucalyptus trees south of Timber Lane along SR-1 are removed, they will be replanted with lower-growing native shrubs to help screen the facility.

Based on anticipated impacts and environmental protection measures that would be implemented, the Proposed Action would result in a visual change but is not expected to substantially degrade the existing visual character or quality of important visual resources or designated scenic views and would not create a new source of substantial light or glare. Some viewers at the school sites and some travelers on nearby roadways may view the visual change as adverse since the project will remove mature trees from the interior of the site and possibly along SR-1 and would introduce industrial elements. These conclusions apply regardless of project size (e.g., 20 MW, 30 MW).

4.9.2 Alternative B: No-Action Alternative

Under the No-Action Alternative, a solar facility would not be constructed at the site. Based on the VAFB General Plan, under the No-Action Alternative the site might be developed as a business park or a “town center” characterized by a diversity of commercial buildings and structures. In terms of mass, height and lighting, such commercial developments can be expected to be more noticeable than the proposed solar site. However, such developments would not affect scenic resources.

Under the No-Action Alternative, the Base may also develop renewable energy sources at other sites, in which case impacts can be expected to be similar to or greater than the Proposed Action, depending on location.

4.10 Water Resources

Factors considered in determining whether implementing an alternative would have adverse impacts on water resources include the extent or degree to which implementation of an alternative would:

- Cause substantial flooding or erosion;
- Reduce surface water quality to creeks, rivers, streams, lakes, or the ocean; and/or
- Reduce surface or groundwater quality or quantity.

4.10.1 Alternative A: Proposed Action

The Proposed Action site is relatively flat and contains no wetlands, Waters of the U.S. or other water bodies. Stormwater is drained by a man-made storm drain that runs along SR-1 (see Figure 3.10-1) and eventually drains into the Santa Ynez River. This storm drain is dry except for storm events. The Proposed Action is not anticipated to have an adverse effect on water resources.

The construction of new access roads and of facility infrastructure may result in an increase in impermeable surfaces, potentially increasing storm water runoff from the project site. Per federal requirements as outlined in Section 438 of the Energy Independence and Security Act (EISA), post-development hydrology shall “maintain or restore, to the Maximum Extent Technically Feasible, the pre-development hydrology of the property with regard to the temperature, rate, volume, and duration of flow.” Additionally, under the NPDES Municipal General Permit, VAFB has

developed post-construction stormwater runoff standards. The project shall meet the EISA Option 2 standard using continuous simulation modeling to determine the site's predevelopment hydrology. The design would identify how post-development hydrology would match predevelopment hydrology and through site design and low-impact development practices.

The Proposed Action would require coverage under the NPDES Construction General Permit because the total disturbed area would be greater than one acre. A SWPPP would be developed and implemented to maintain compliance with the NPDES Construction General Permit. During site preparation and construction activities, BMPs would be implemented to prevent sediment, chemicals, non-stormwater or debris from entering into storm water. BMPs include erosion and sediment controls, non-stormwater (wastewater) management, tracking controls, vehicle and equipment fueling and maintenance, spill prevention and control, solid waste management, liquid waste management, stockpile management and septic waste management. . Areas with exposed disturbed soil would be stabilized per the NPDES Construction General Permit.

Erosion

The site is relatively flat and mostly bare but construction activities could result in localized erosion as a result of vegetation clearing, grubbing, grading, trenching for buried cables and installation of pile-driven pier foundations, soil compaction by heavy equipment, and off-site transport of soils in vehicle tires. Removal of vegetation along the storm drain (see Figure 3.10-1) would be avoided or minimized and disturbed soils would be stabilized and revegetated as needed to prevent erosion. Internal access roads would be constructed of gravel or other pervious materials that would reduce the potential for erosion during operations and maintenance.

As discussed below in the Environmental Protection Measures subsection, the Proposed Action would be designed to match predevelopment hydrology and comply with NPDES permits that include implementation of a Stormwater Pollution Prevention Plan and BMPs to prevent or minimize potential effects to water resources from erosion and sedimentation.

Refer to Section 4.4, Geology and Earth Resources, for additional information pertaining to erosion.

Water Quality

Surface water quality impacts, although unlikely, could potentially occur as a result of inadvertent dispersion of contaminants during construction, and subsequent maintenance. No project activities would occur within or nearby any water body and the amount of material potential would be minimal (such as an oil leak from a vehicle); therefore, any accidental spills would remain localized and small. Nonetheless, construction activities would require the use of vehicles and equipment powered by diesel fuel/gasoline and lubricated with oil and other mechanical fluids, which are considered hazardous substances. Accidental releases of such substances (e.g., spills arising from leakage of fuel, motor oil, or hydraulic fluid during operation and/or equipment maintenance) also could occur.

All hazardous wastes would be properly managed and disposed of under applicable federal, state, and local hazardous waste regulations, including the VAFB Hazardous Waste Management Plan (30 SWP 32-7043A). The contractor would follow a spill prevention and response plan, have spill kits, and clean-up spills immediately. Any resulting hazardous waste would be properly disposed of per VAFB procedures. Therefore, no adverse impacts on water quality would occur.

Periodic panel washing will be conducted with water from existing on-site fire hydrants

without the addition of chemicals in a manner that water run-off will infiltrate prior to reaching the storm drain system along SR-1. A discharge-to-grade form for panel washing will be submitted for approval to 30 CES/CEIEC.

Flooding

An all-weather perimeter road would be constructed for the project. Internal access roads would likely be gravel or some other pervious material. Additional site facilities would also cause minor localized increases in imperviousness with resulting increases in storm water runoff volume. The existing storm drains along SR-1 (see Figure 3.10-1) would not be adversely affected by the Proposed Action and potential flooding would be controlled through the design of a drainage system that would result in surface water runoff rates and volumes that match existing conditions. Therefore, the Proposed Action is not anticipated to cause adverse flooding impacts to the surface drainages in the vicinity of the site.

Through implementation of the SWPPP, associated BMPs, and incorporation of drainage features into project design, the Proposed Action would not result in adverse impacts to water resources during construction, and/or maintenance activities.

Environmental Protection Measures

The following measures are required and shall be implemented as part of the Proposed Action to avoid and minimize potential impacts to water resources.

- A SWPPP prepared per the California Construction General Permit and approved by 30th Civil Engineer Squadron (30 CES)/CEIEEC, shall be developed prior to initiation of any activities under the Proposed Action. The SWPPP shall be implemented, including but not limited to Best Management Practices, inspections, reporting and Sampling and Analysis requirements.
- The project would be designed to match predevelopment hydrology per federal and state post-construction storm water requirements. An EISA Option 2 Site-Specific Hydrological Analysis and a Maximum Extent Technically Feasible Determination shall be developed during design and reviewed by the 30 CES/CEIEC Water Resources .
- A discharge-to-grade form for panel washing will be submitted for approval to 30 CES/CEIEC Water Resources.
- Construction contractors and operations and maintenance (O&M) personnel shall obtain stormwater pollution prevention training.
- The construction contractor shall adhere to accepted California BMP Manuals such as the California Stormwater Quality Association Manual.

Based on anticipated impacts and environmental protection measures that would be implemented, the Proposed Action should not result in substantial flooding or erosion; reduced surface water quality to creeks, rivers, streams, lakes, or the ocean; or reduced surface or groundwater quality or quantity. This conclusion applies regardless of project size (e.g., 20 MW, 30 MW).

4.10.2 Alternative B: No-Action Alternative

Under the No-Action Alternative, a solar facility would not be constructed at the site. Based on the VAFB General Plan, the site might be developed as a business park or other developments characterized by a diversity of commercial buildings and structures. Given the absence of water bodies and implementation of standard environmental protection measures, BMPs, and other design features, such

developments are not expected to have adverse impacts to water resources.

The Base may also develop renewable energy sources at other sites, in which case impacts to water resources can be expected to be similar to or greater than the Proposed Action, depending on location. Standard environmental protection measures, BMPs and design standards would be expected to avoid and minimize impacts.

4.11 Cumulative Impacts

CEQ regulations implementing NEPA require that the cumulative impacts of a Proposed Action be assessed (40 CFR Parts 1500-1508). A cumulative impact is defined as the following:

> *"the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future 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)*

CEQ's guidance for considering cumulative effects states that NEPA documents "should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant" (CEQ 1997). The first step in assessing cumulative effects, therefore, involves identifying and defining the scope of other actions and their interrelationship with the Proposed Action or alternatives. The scope must consider other projects that coincide with the location and timing of the Proposed Action and other actions, and the duration of potential effects on the environment.

4.11.1 Projects Considered in the Cumulative Analysis

The effects of the Proposed Action in combination with the effects of other relevant past, present, and reasonably foreseeable future projects have been evaluated in this cumulative effects analysis. A list of relevant past, present, and reasonably foreseeable projects that have been/would be constructed on VAFB is provided in Table 4.11-1. The foregoing analysis is based on the same resource thresholds as discussed in Sections 4.1 to 4.10.

Table 4.11-1. Federal Projects

Project Title	Project Status
Entry Control Facilities Security and Safety Upgrades	NEPA analyzed EHA site; construction underway.
East Housing Area Infrastructure Demolition	Demolition completed in 2012
Reactivation of SLC-4E (SpaceX)	Approved project.
Borrow Pits Expansion and Reactivation Project	Approved project; continuing action
13th Street Bridge	Current major project; NEPA underway
Narlon Bridge Replacement	Current major project; NEPA underway
Repairs and Replacement of Overhead Electrical Line, Feeders K1 and K7	Approved project; construction initiated.
Repairs and Replacement of Overhead Electrical Line, Feeders N1 and N6	NEPA underway

In addition, the City of Lompoc has more than 30 approved and pending projects that would add approximately 600 residential units, 290,000 square feet of commercial space and 130,000 square feet of institutional space and Lompoc has assessed cumulative impacts of these projects (City of Lompoc 2013). Lompoc also has indicated it will prepare an EIR for a new 38-acre business park (Lompoc 2014) but no environmental analysis has been conducted. These cumulative projects

are scattered throughout the city and are located approximately 6 to 9 miles south of the Proposed Action site.

4.11.2 Alternative A: Proposed Action

Air Quality

Air quality impacts from the Proposed Action are primarily construction-related and temporary. The SBCAPCD (2011) defines cumulative impacts to air quality as long-term project emissions. The Proposed Action is an unmanned facility that would have negligible operational emissions.

The Proposed Action in combination with all of the projects listed in Table 4.11-1 in addition to approved and pending projects in the City of Lompoc would not exceed thresholds in Santa Barbara County. Since all projects are required to comply with SBCAPCD's standard requirements pertaining to fugitive dust and because VAFB projects that would cause an exceedance of an ambient air quality standard would be postponed, until the following calendar year, the Proposed Action should not produce any significant adverse cumulative air quality impacts.

Compared to emissions from a traditional fossil-fuel electrical generating facility, the Proposed Action should have a beneficial air quality impact and climate change during operations.

Biological Resources

Present and reasonably foreseeable projects at VAFB (Entry Control Facility; SLC-4e; two bridge projects; expansion of borrow pits and two overhead electrical line feeders) involve ground disturbing activities such as grading, paving, landscaping, construction of roads and buildings, and related noise and traffic impacts could result in temporary and localized effects to biological resources that would be individually comparable to or greater than those associated with the Proposed Action. In particular, the bridge projects, borrow pit projects and overhead facility projects involve potential impacts to biological resources found in the vicinity of the Proposed Action (e.g. California red-legged frog). However, the Proposed Action has been sited to avoid impacts to protected species and sensitive habitats. The Base routinely implements projects and specific measures and procedures set forth in the Integrated Natural Resources Management Plan, which would tend to ensure project-specific and cumulative adverse effects to biological resources are avoided and minimized. As a result, the Proposed Action, in combination with other past and planned activities, should not result in significant adverse cumulative impacts on biological resources, although other projects may in themselves result in greater impacts to biological resources than anticipated under the Proposed Action.

Cultural Resources

Archaeological sites are a limited resource and, therefore, any impact on an archaeological site that qualifies as a historic property may contribute to a cumulative impact. However, the Proposed Action is located in a previously demolished military housing area, has been thoroughly disturbed and would not affect any known cultural resource. The Proposed Action and other construction projects on the Base include implementation of standard environmental protection measures and the *Vandenberg AFB Integrated Cultural Resources Management Plan* in the event that previously undocumented cultural resources are discovered during construction. Therefore, Alternative A would not combine with other projects and should not result in significant adverse cumulative impacts to cultural resources.

Geology and Earth Resources

Cumulative projects at VAFB involving grading, excavations, and construction/demolition could result in erosion-induced sedimentation of adjacent drainages and water bodies. None of the cumulative project sites listed in Table 4.11-

1 or in the City of Lompoc involve grading and construction that would result in significant cumulative erosional impacts in combination with Proposed Action. All of these projects (Entry Control Facility; SLC-4e; two bridge projects; expansion of borrow pits and two overhead electrical line feeders) would require implementation of BMPs, compliance with established plans and policies, and incorporation of standard erosion control measures into project design. Similarly, Lompoc projects would be subject to soils and geotechnical engineering studies and existing regulations such as the Uniform Building Code and California Building Code. Therefore, cumulative impacts are not expected.

All projects located in the region are subject to seismically induced ground shaking due to an earthquake on a local or regional fault. By incorporating modern construction engineering and safety standards, all adverse seismic-related impacts at the project site, as well as the projects in the region should be avoided.

Therefore, Alternative A would not combine with other projects to result in significant adverse cumulative impacts to geology and earth resources.

Land Use and Coastal Zone Resources

Alternative A is consistent with the VAFB General Plan and the Proposed Action is outside the coastal zone and would not affect any coastal resources. Therefore, implementation of Alternative A, in conjunction with development of reasonably foreseeable projects presented in Table 4.11-1, is not expected to result in any significant adverse cumulative impacts to land use and coastal zone resources.

Noise

With the exception of the Entry Control Facility, the cumulative projects listed in Table 4.11-1 and in Lompoc are not located in the vicinity of the Proposed Action and thus would not combine with it to produce a cumulative noise impact either in the long-term or short-term. The only Noise impact generated from the Entry Control Facility is caused by ongoing maintenance of the Facility. However, that noise is attenuated based on the distance between the project site and the Entry Control Facility. Noise generated by project operation or annual maintenance activities would not substantially affect the existing noise environment within the project vicinity, which is currently dominated by traffic noise along SR-1 and by periodic traffic along Mountain View Boulevard and Timber Lane. Therefore, the contribution of the Proposed Action to cumulative operational noise impacts should not be considered significantly adverse.

Public Health and Safety

Potential health and safety impacts of the Proposed Action would be avoided and minimized by standard environmental protection measures. Similarly, construction and operational activities of Alternative A and all other projects on the cumulative list (Entry Control Facility; SLC-4e; two bridge projects; expansion of borrow pits and two overhead electrical line feeders) would be required to comply with all applicable federal and state regulations, including applicable hazardous waste regulations such as the Vandenberg AFB Hazardous Material Management Plan (30 SWP 32-7086). Therefore, significant adverse cumulative impacts to public health and safety are not expected.

Transportation

Construction of the Proposed Action and the cumulative projects (e.g., Entry Control Facility; SLC-4e; two bridge projects; expansion of borrow pits and two overhead electrical line feeders) would result in additional traffic volumes within the region. A cumulative traffic analysis assuming full buildout of Lompoc projects forecasts that in 2015 the LOS during peak hours at the SR-1/Purisima Road/Harris Grade intersection will decline from an acceptable LOS C to an unacceptable LOS D (City of Lompoc 2013).

Although the assumption of full buildout by 2015 is unlikely, truck trips associated with construction of the Proposed Action could temporarily increase traffic at this intersection and could contribute to an adverse traffic impact. However, environmental protection measures that would be implemented as part of the Proposed Action include preparation of a construction traffic management plan in consultation with Caltrans, avoidance of peak hour deliveries where feasible, and encouragement of worker car-pooling and other related measures to avoid and reduce construction-related traffic impacts. The solar facility will be unmanned and periodic O&M activities would not substantially increase traffic entering the project site. Given the short-term increases in traffic, and the traffic-related environmental protection measures identified in this EA, the Proposed Action, in combination with other cumulative projects, should not result in significant adverse cumulative impacts on transportation.

Visual Resources

Alternative A is not co-located with other cumulative projects and its visual changes would not combine with other cumulative projects. The nearest related project in Table 4.11-1 is the Entry Control Facility, but that project was deemed to have no impacts to visual resources. Therefore, the Proposed Action would not result in significant adverse cumulative impacts on visual resources.

Water Resources

All of the cumulative and related projects listed in Table 4.11-1 (Entry Control Facility; SLC-4e; two bridge projects; expansion of borrow pits and two overhead electrical line feeders) and most Lompoc projects would result in temporary soil disturbance and potential discharge of construction- and operation-related waste materials that could affect the quality of surface water or shallow groundwater downstream from the project site. Most cumulative projects would result in some increase in impermeable surfaces that can alter drainage patterns, increase peak flows and risk of flooding and degrade water quality. Some of these projects (e.g., 13th street Bridge, Narlon Bridge, and some Lompoc projects) could result in impacts to water resources such as the Santa Ynez River.

However, VAFB would comply with the Energy Independence and Security Act (EISA) requirements to maintain or restore, to the maximum extent technically feasible, the pre-development hydrology of the property, would adhere to stormwater runoff standards under its NPDES Municipal General Permit, and would conduct other environmental protection measures such as implementation of a SWPPP, BMPs, and incorporation of drainage features into project design. All similar projects on the Base can be expected to comply with similar environmental protection measures. Similarly, the City of Lompoc avoids and minimizes cumulative impacts to water resources by implementing NPDES BMPs and its own guidelines on a case-by-case basis (City of Lompoc 2013). Therefore, the Proposed Action is not expected to result in cumulative impacts to water resources.

In summary, VAFB includes environmental contract specifications and environmental protection measures into all projects listed in Table 4.11-1 (Entry Control Facility; SLC-4e; two bridge projects; expansion of borrow pits and two overhead electrical line feeders) to ensure that no substantial adverse cumulative impacts result from its development projects. Projects are reviewed and modified, as necessary, during the NEPA planning process to ensure adverse impacts are avoided or minimized to the extent feasible. As all VAFB projects are designed and implemented in compliance with applicable statutes and regulations and environmental protection measures are developed in coordination with the appropriate regulatory agencies, impacts associated with the Proposed Action, when added to the impacts from other related and

cumulative projects should not result in significant adverse cumulative impacts.

4.11.3 Alternative B: No-Action Alternative

The No-Action Alternative coupled with cumulative project developments, particularly with residential and commercial projects planned in the City of Lompoc, could result in an increase in air quality and traffic impacts. However, no substantial cumulative impact is anticipated for the Lompoc projects (City of Lompoc 2013) and, as all VAFB projects are designed and implemented in compliance with applicable statutes and regulations and environmental protection measures are developed in coordination with the appropriate regulatory agencies, impacts associated with the No-Action Alternative, when added to the impacts from other related and cumulative projects is not expected to result in significant cumulative impacts. More discussion follows.

Under the No-Action Alternative, one possible scenario is that the proposed renewable energy facility would not be built and the Base would continue to rely on electricity from PG&E, most of which is derived from fossil-fuel burning sources. Under this scenario, the Base would continue to be exposed to unanticipated future increases in the cost of electricity and there would be no long-term benefits to air quality and climate change from use of a renewable energy source. This scenario would continue existing conditions and trends that will contribute to cumulative impacts to air quality and climate change.

Under the No-Action Alternative, the Base could develop renewable energy sources at another site, in which case cumulative environmental impacts might be similar to or greater than the Proposed Action, depending on location.

Under the No-Action Alternative, based on the VAFB General Plan, the EHA might be developed as a business park or other commercial uses. Environmental impacts would be similar to or greater than the Proposed Action, depending on specific developments, but could result in greater traffic along SR-1 and greater vehicle emissions. Cumulative projects in the City of Lompoc include residential and commercial developments that are anticipated to adversely affect operations of the SR-1/Purisima Road/Harris Grade intersection absent traffic improvements (City of Lompoc 2013). Development of the EHA as a business park or other commercial use could generate additional transportation impacts and greater operational emissions of criteria pollutants and GHGs, although VAFB would implement standard environmental protection measures and comply with all applicable rules, regulations, and permit requirements to ensure that project-specific and cumulative impacts would not be significant.

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Chapter 7. References

Alterman, I.B., R.B. McMullen, L.S. Cluff, and D.B. Slemmons (eds). 1994. Seismotectonics of Central California Coast Ranges. Geological Society of America Special Paper 292.

Avian Power Line Interaction Committee (APLIC). 2005. Avian Protection Plan (APP) Guidelines. Website: http://www.aplic.org/uploads/files/2634/APPguidelines_final-draft_Aprl2005.pdf.

Arnold, Jeanne E. 1992. Complex Hunter-Gatherer-Fishers of Prehistoric California: Chiefs, Specialists, and Maritime Adaptations of the Channel Islands. *American Antiquity* 57:60–84.

Bies, David A., and C. H. Hansen. 1996. Engineering Noise Control. 2nd ed. E&FN Spon.

California Department of Fish and Wildlife (CDFW). 2013. California Natural Diversity Database. Special status species occurrences within 1-mile radius of the project site. Biogeographic Data Branch. Sacramento, CA.

2010. List of California Terrestrial Natural Communities. September, 2010. Available online at http://www.dfg.ca.gov/biogeodata/ vegcamp/pdfs/natcomlist.pdf. Visited through January 2014.

California Department of Transportation (Caltrans). Caltrans Earth accessed January 2014 at: http://earth.dot.ca.gov/

2008. Noise Study Report Format Guidance Document. February.

California Environmental Protection Agency (EPA). 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislatur*e. March. Website: http://www.climatechange.ca. gov/research/2008_assessment/index.html.

California Air Resources Board (CARB). 2011. iADAM Air Quality Data Statistics. Website: http://www.arb.ca.gov/adam.

2010a. *Ambient Air Quality Standards (AAQS).* Website: http://www.arb.ca.gov/ research/aaqs/aaqs.htm.

2010b. *Area Designations Maps/State and National*. Website: http://www.arb.ca.gov/ desig/adm/adm.htm.

2006a. Off-Road Emissions Inventory Program. OFFROAD2007. Website: http://www .arb.ca.gov/msei/offroad/offroad.htm.

2006b. EMFAC2007 Release. Website: http://www.arb.ca.gov/msei/onroad/latest _version.htm.

California Division of Mines and Geology (CDMG). 1999. *Fault Rupture Hazard Zones in California*. Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zone Maps. Special Publication 42. Sacramento, CA.

1994. Fault Activity Map of California and Adjacent Areas, with Locations and Ages of Recent Volcanic Eruptions, compiled by C.W. Jennings.

City of Lompoc. 2013. Summit View Homes Project Final Environmental Impact Report Comments and Responses.

Clarke, Chris. 2013. Water Birds Turning Up Dead at Solar Projects in the Desert. Rewire. KCET. July 17.

Dibblee, T.W. 1950. Geology of Southwestern Santa Barbara County, California: Point Arguello, Lompoc, Point Conception, Los Olivos, and Gaviota Quadrangles. California Division of Mines Bulletin 150. California Department of Natural Resources, San Francisco.

Erlandson, Jon M. 1994. Early Hunter-Gatherers of the California Coast. Plenum, New York.

Erlandson, Jon M., and Kevin Bartoy. 1996. Protohistoric California: Paradise or Pandemic? Proceedings of the Society for California Archaeology 9:304–309.

1995. Cabrillo, the Chumash, and Old World Diseases. Journal of California and Great Basin Anthropology 17:153–173.

Federal Highway Administration (FHWA). 2010. Highway Traffic Noise: Analysis and Abatement Guidance. Washington, D.C.

2006. Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. U.S. Department of Transportation. January.

Fillman, Richard, 2014. Email communication with Linda Serret, 30 CES/CEIE/Center for Environmental Management of Military Lands (CEMML), dated April 10, 2014.

Federal Transit Administration (FTA). 2006. Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. U.S. Department of Transportation. May.

Gevirtz, Elihu, 2014. Email communication with Craig Woodman dated 20 May, 2014.

Glassow, Michael A. 1996. *Purisimeño Chumash Prehistory: Maritime Adaptations along the Southern California Coast.* Case Studies in Archaeology. Jeffrey Quilter, series editor. Harcourt Brace College Publishers, San Diego.

1990. *Archaeological Investigations on Vandenberg Air Force Base in Connection with the Development of Space Transportation System Facilities*, with contributions by Jeanne E. Arnold, G. A. Batchelder, Richard T. Fitzgerald, Brian K. Glenn, D. A. Guthrie, Donald L. Johnson, and Phillip L. Walker. Department of Anthropology, University of California, Santa Barbara. Submitted to U.S. Department of the Interior, National Park Service, Western Region Interagency Archeological Services Branch, San Francisco, Contract No. CX-8099-2-0004.

Greenwood, Roberta S. 1978. Obispeño and Purisimeño Chumash. In California, edited by Robert F. Heizer, pp. 520–523. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

1972. 9000 Years of Prehistory at Diablo Canyon, San Luis Obispo County, California. San Luis Obispo County Archaeological Society Occasional Paper No. 7.

Harris, J. 1990. *in:* Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Department of Fish and Game, Sacramento, California.

Intergovernmental Panel on Climate Change. 2007. *Climate Change 2007 – Synthesis Report*. IPCC Fourth Assessment Report.

Jennings, C.W. 1994. Fault map of California and adjacent areas. California Division of Mines and Geology. California Geological Data Map Series, Map No. 6, Scale 1:750,000.

Joint Departments of the Army and Air Force. 1995. Noise and Vibration Control. TM 5-8054/AFJMAN 32-1090. Washington, DC. May.

Kaufmann, K. 2013. What to do about bird deaths at solar and wind farms. Desert Sun. November 22.

King, Brad. 2014. Email communication with Craig Woodman, dated 21, January, 2014.

King, Chester D. 1990. Evolution of Chumash Society: A Comparative Study of Artifacts Used for Social System Maintenance in the Santa Barbara Channel Region before A.D. 1804. The Evolution of North American Indians, edited by David Hurst Thomas. Garland, New York.

1984. *Ethnohistoric Background. In Archaeological Investigations on the San Antonio Terrace, Vandenberg Air Force Base, California, in Connection with MX Facilities Construction, pp. I-1–I-54*. Chambers Consultants and Planners, Stanton, California. Submitted to U.S. Army Corps of Engineers, Los Angeles District, Contract No. DAC09-81-C-0048.

1981. *The Evolution of Chumash Society: A Comparative Study of Artifacts Used in Social System Maintenance in the Santa Barbara Channel Region before A.D. 1804*. Ph.D. dissertation, Department of Anthropology, University of California, Davis.

Landberg, Leif. 1965. The Chumash Indians of Southern California. Southwest Museum Papers No. 19. Los Angeles.

Lebow, Clayton G. 2001. *Archaeological Studies for the Encapsulated Payload Transfer Route, Vandenberg Air Force Base, Santa Barbara County, California*. Applied EarthWorks, Inc., Lompoc, California. Submitted to 30 CES/CEVPC, Vandenberg Air Force Base, California.

Lebow, Clayton G., Rebecca L. McKim, Douglas R. Harro, and Ann M. Munns. 2006. *Prehistoric Land Use in the Casmalia Hills throughout the Holocence: Archaeological Investigations along Combar Road, Vandenberg Air Force Base, California. 2 vols*. Applied EarthWorks, Inc., Lompoc, California. Submitted to 30th Civil Engineer Squadron, Environmental Flight (30 CES/CEVNC), Vandenberg Air Force Base, California.

Lebow, Clayton G. and Robert R. Peterson, Jr. 2008. *Archaeological Survey for the Vandenberg Air Force Base Cantonment General Plan, Santa Barbara County, California.* Submitted to 30th Civil Engineer Squadron, Environmental Flight (30 CES/CEVNC), Vandenberg Air Force Base, California.

Lebow, Clayton G., Rebecca L. McKim, Douglas R. Harro, Ann M. Munns, and Carole Denardo. 2007. *Littoral Adaptations throughout the Holocene: Archaeological Investigations at the Honda Beach Site (CA-SBA-530), Vandenberg Air Force Base, Santa Barbara County, California. 2 vols*. Applied EarthWorks, Inc., Lompoc, California. Submitted to 30th Civil Engineer Squadron, Environmental Flight (30 CES/CEVNC), Vandenberg Air Force Base, California.

Lichvar, R.W. 2013. The National Wetland Plant List: 2013 wetland ratings. Phytoneuron 2013-49: 1–241. Published 17 July 2013. ISSN 2153 733X.

Lompoc Unified School District (LUSD), 2010. Vandenberg Middle School, 2008-09 School Accountability Report Card School Accountability Report Card, available at: http://www.lusd.org/domain/635 (last accessed April 10, 2014).

Manzanita Public Charter School (MPCS), 2014. Manzanita Public Charter School, 2012-13 School Accountability Report Card, available at: http://www.manzanitacharterschool.com/SARC.htm (last accessed April 10, 2014).

McKim, Rebecca L., and Barry A. Price. 1997. *NRHP Eligibility Testing at CA-SBA-3487 (CA-SBA-ISO-608), Military Housing Project, Vandenberg Air Force Base, California.* Applied Earthworks, Inc., Fresno, California, for Tetra Tech, Inc., Santa Barbara, California. Submitted to 30CES/
CEVPC Vandenberg Air Force Base, California, USAF Contract No. F04684-95-C-0045.

Moratto, Michael J. 1984. California Archaeology. Academic Press, New York and London.

National Oceanic and Atmospheric Administration. 2011. Period of Record Monthly Climate Summary – Lompoc, California (045064). Period of Record: July 1, 1950 to December 31, 2005. Website: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?calomp+sca.

Nowlan, Patrick, Sheila Ellsworth, Roy McCullough, Mira Metzinger, Jim Gorski, and Andy Bonhert. 1996. *Cold War Properties Evaluation—Phase I, Inventory and Evaluation of Launch Complexes and Related Facilities at Vandenberg Air Force Base, California, for the United States Air Force*. Tri-Services Cultural Resources Research Center, U.S. Army Construction Engineering Research Laboratories, Champaign, Illinois. Prepared for U.S. Department of Defense Legacy Resource Management Program, Washington, D.C.

Palmer, Kevin (Lex). 1999. *Central Coast Continuum—From Ranchos to Rockets: A Contextual Historic Overview of Vandenberg Air Force Base, Santa Barbara County, California*. Prepared by Palmer Archaeology and Architecture Associates, Santa Barbara.

Preston, William. 1996. Serpent in Eden: Dispersal of Foreign Diseases into Pre-Mission California. Journal of California and Great Basin Anthropology 18:2–37.

Santa Barbara County Air Pollution Control District (SBCAPCD). 2011. 2009 Annual Air Quality Report. Website: http://www.sbcapcd.org/sbc/2009aqrpt.htm.

Sassenberg, Paul W. (30 CES/CENPL). 2014. Email communication between Craig Woodman (URS) and Linda Serrett (30 CES/CEIE). January 3.

Sawyer, J., Keeler-Wolf, T. Evens. J. 2009. A Manual of California Vegetation. Second Edition. California Native Plant Society In collaboration with the California Department of Fish and Game. Sacramento, California.

Thorson, P.H., J.K. Francine, E.A. Berg, L.E. Fillmore, and D.A. Eidson. 2001. Acoustic Measurement of the 21 September 2000 Titan II G-13 Launch and Quantitative Analysis of Behavioral Responses for Selected Pinnipeds on Vandenberg Air Force Base, CA. SRS Technologies technical report submitted to USAF and NMFS. 29pp.

United States Air Force. 2011. 30th Space Wing, Asset Management Flight. Vandenberg Air Force Base, California. INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR VANDENBERG AIR FORCE BASE, CALIFORNIA. PLAN PERIOD 2011–2015. Prepared by: 30 CES/CEA; Mantech SRS Technologies, Inc., Tetra Tech, Inc., SAGE Associates, 30 CES/CEOEC, 30 CES/CEFH. In cooperation with: California Department of Fish and Game NOAA – National Marine Fisheries Service U.S. Fish and Wildlife Service. May.

2003. JFMAN 32-1090. Noise and Vibration Control.

1987. Mineral resource management plan: Potential exploration, development, and production of oil and gas resources, Vandenberg Air Force Base.

U.S. Environmental Protection Agency (USEPA). 2010. Region 9 Air Programs – Air Quality Maps. Website: http://www.epa.gov/region09/air/maps.

United States General Services Administration. 1999. Executive Order 13112: Invasive Species. February 3.

URS. 2014. Preliminary results of PVsyst modeling of a generic 30 MW solar project. Preliminary calculations on file at URS Corporation, 130 Robin Hill Road, Santa Barbara, CA.

URS. 2013. Biological Survey Report for the Solar Photovoltaic Project. Former East Housing Area, Vandenberg Air Force Base. XUMU302290. Prepared for Vandenberg Air Force Base 30 CES/CEIEA. Vandenberg AFB, California.

Vandenberg Air Force Base (VAFB). 2013. Final 2012 GHG Emissions Report. Prepared for Vandenberg Air Force Base 30 CES/CEANQ and U.S. Army Corps of Engineers, CESAM-EN-GE. Prepared by AECOM Technical Services, Inc.

2011. Integrated Natural Resources Management Plan: 2010–2014.

2010. Biological Assessment: Potential Effects to Beach layia, California red-legged frog, El Segundo blue butterfly and Gaviota tarplant. Repair/Replace Overhead Distribution Lines N1/N3/N6 of Electrical Infrastructure at Vandenberg Air Force Base, Santa Barbara County, California. Prepared by 30th Space Wing Asset Management Flight, 30 CES/CEAN. November.

2010. Vandenberg Air Force Base General Plan. Section 7 (Land Use and Transportation). 54pp.

Vandenberg Air Force Base General Plan. November 2011. 46 pp.

Integrated Natural Resources Management Plan, Plan Period 2011–2015. May 2011.

Appendix A
Air Quality Emissions Calculations

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VAFB 30 MW

Santa Barbara-North of Santa Ynez County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	170.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.1	**Precipitation Freq (Days)**	37
Climate Zone	4			**Operational Year**	2016
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 30 MW Solar Facility at Vandenberg Airforce Base

Land Use - unit size = 1 site

Construction Phase - construction period 12 months

Off-road Equipment - - other construciton equipment = pile drivers
offhighway trucks = pickups, water truck, atv

Off-road Equipment - off highway trucks pickups line trucks atvs

Off-road Equipment - off highway trucks pickups, line truck, atvs

Off-road Equipment - off-highway = pickups , atvs

Off-road Equipment - Other Construction Equipment = Pile Driver 2 @ 50 hp
Off- Highway Trucks 4 pickups 150 hp
1 water truck 220 hp
4 atvs 24 hp

Off-road Equipment - other construction equipment = pile driver 4 50 hp

Off highway trucks 6 pickup trucks 150 hp, 1 water truck 220 hp, 1 concrete truck 250hp, 4 atvs 24 hp

Off-road Equipment - Other construction equipment = pile drivers 50 hp
off highway trucks = 6 pickup trucks
1 water truck 220 hp
1 concrete truck @ 250 , 4 atvs 24 hp

Off-road Equipment - other construction equipment = 4 pile drivers 50 hp
off highway trucks = 6 pickups 150 hp 1 water truck 220 hp, 1 concrete truck 250 hp, 4 atvs 24 hp

Off-road Equipment - other construction equpment = 2 pile drivers 50 hp
off highway trucks = 6 pickups 150 hp
1 water truck 220 hp
1 concrete truck 250 hp
4 atv/ mules 24 hp

Off-road Equipment - off highway trucks pickups 150 hp water truck 220 hp atvs 24 hp

Off-road Equipment - off highway trucks = pickups water truck and atvs

Off-road Equipment - off highway trucks pickups, line truck, water truck, atvs

Trips and VMT - -

Grading - disturbed acres = area graded

Vehicle Trips - -

Road Dust - 80% paved travel to site

Energy Use -

Operational Off-Road Equipment - forklift

Water And Wastewater - outdoor

Table Name	Column Name	Default Value	New Value
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tblConstructionPhase	NumDays	3,100.00	27.00
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tblGrading	AcresOfGrading	27.00	60.00
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tblOffRoadEquipment	HorsePower	100.00	120.00
tblOffRoadEquipment	HorsePower	100.00	120.00
tblOffRoadEquipment	HorsePower	100.00	120.00
tblOffRoadEquipment	HorsePower	100.00	120.00
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tblOffRoadEquipment	HorsePower	100.00	120.00
tblOffRoadEquipment	HorsePower	100.00	120.00
tblOffRoadEquipment	HorsePower	64.00	56.00
tblOffRoadEquipment	HorsePower	64.00	56.00
tblOffRoadEquipment	HorsePower	64.00	56.00
tblOffRoadEquipment	HorsePower	64.00	56.00

tblOffRoadEquipment	HorsePower	64.00	56.00
tblOffRoadEquipment	HorsePower	64.00	56.00
tblOffRoadEquipment	HorsePower	64.00	56.00
tblOffRoadEquipment	HorsePower	64.00	56.00
tblOffRoadEquipment	HorsePower	64.00	56.00
tblOffRoadEquipment	HorsePower	80.00	175.00
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tblOffRoadEquipment	HorsePower	80.00	175.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	UsageHours	7.00	5.00
tblOffRoadEquipment	UsageHours	7.00	5.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	7.00	6.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	4.00
tblOperationalOffRoadEquipment	OperHorsePower	100.00	120.00

tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblRoadDust	RoadPercentPave	100	80
tblTripsAndVMT	HaulingTripLength	20.00	155.00
tblTripsAndVMT	HaulingTripLength	20.00	155.00
tblTripsAndVMT	HaulingTripLength	20.00	155.00
tblTripsAndVMT	HaulingTripLength	20.00	155.00
tblTripsAndVMT	HaulingTripLength	20.00	155.00
tblTripsAndVMT	HaulingTripLength	20.00	155.00
tblTripsAndVMT	HaulingTripLength	20.00	155.00
tblTripsAndVMT	HaulingTripLength	20.00	155.00
tblTripsAndVMT	HaulingTripLength	20.00	155.00
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tblTripsAndVMT	HaulingTripLength	20.00	155.00
tblTripsAndVMT	HaulingTripLength	20.00	155.00
tblTripsAndVMT	HaulingTripNumber	0.00	26.00
tblTripsAndVMT	HaulingTripNumber	0.00	52.00
tblTripsAndVMT	HaulingTripNumber	0.00	26.00
tblTripsAndVMT	HaulingTripNumber	0.00	100.00
tblTripsAndVMT	HaulingTripNumber	0.00	108.00
tblTripsAndVMT	HaulingTripNumber	0.00	104.00
tblTripsAndVMT	HaulingTripNumber	0.00	104.00
tblTripsAndVMT	HaulingTripNumber	0.00	104.00
tblTripsAndVMT	HaulingTripNumber	0.00	104.00
tblTripsAndVMT	HaulingTripNumber	0.00	27.00
tblTripsAndVMT	HaulingTripNumber	0.00	52.00
tblTripsAndVMT	VendorTripLength	4.60	13.00
tblTripsAndVMT	VendorTripLength	4.60	13.00

tblTripsAndVMT	VendorTripLength	4.60	13.00
tblTripsAndVMT	VendorTripLength	4.60	13.00
tblTripsAndVMT	VendorTripLength	4.60	13.00
tblTripsAndVMT	VendorTripLength	4.60	13.00
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tblTripsAndVMT	VendorTripLength	4.60	13.00
tblTripsAndVMT	VendorTripNumber	0.00	3.00
tblTripsAndVMT	VendorTripNumber	0.00	3.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	WorkerTripLength	12.30	20.00
tblTripsAndVMT	WorkerTripLength	12.30	20.00
tblTripsAndVMT	WorkerTripLength	12.30	20.00
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tblTripsAndVMT	WorkerTripLength	12.30	20.00
tblTripsAndVMT	WorkerTripLength	12.30	20.00
tblTripsAndVMT	WorkerTripLength	12.30	20.00
tblTripsAndVMT	WorkerTripLength	12.30	20.00
tblTripsAndVMT	WorkerTripLength	12.30	20.00
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tblTripsAndVMT	WorkerTripLength	12.30	20.00
tblTripsAndVMT	WorkerTripNumber	58.00	30.00
tblTripsAndVMT	WorkerTripNumber	0.00	40.00
tblTripsAndVMT	WorkerTripNumber	0.00	34.00

tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	75.00	50.00
tblTripsAndVMT	WorkerTripNumber	78.00	50.00
tblTripsAndVMT	WorkerTripNumber	0.00	80.00
tblTripsAndVMT	WorkerTripNumber	0.00	80.00
tblTripsAndVMT	WorkerTripNumber	0.00	80.00
tblTripsAndVMT	WorkerTripNumber	0.00	80.00
tblTripsAndVMT	WorkerTripNumber	0.00	54.00
tblTripsAndVMT	WorkerTripNumber	0.00	60.00
tblVehicleTrips	CC_TL	4.60	5.00
tblVehicleTrips	CC_TTP	0.00	37.00
tblVehicleTrips	CNW_TL	4.60	77.00
tblVehicleTrips	CNW_TTP	0.00	2.00
tblVehicleTrips	CW_TL	8.80	10.00
tblVehicleTrips	CW_TTP	0.00	61.00
tblVehicleTrips	HW_TL	0.00	10.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	WD_TR	0.00	1.00
tblWater	OutdoorWaterUseRate	0.00	651,702.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	1.0286	10.3375	6.8472	0.0124	0.7491	0.5234	1.2725	0.3179	0.4815	0.7994	0.0000	1,137.4155	1,137.4155	0.2543	0.0000	1,142.7565
Total	**1.0286**	**10.3375**	**6.8472**	**0.0124**	**0.7491**	**0.5234**	**1.2725**	**0.3179**	**0.4815**	**0.7994**	**0.0000**	**1,137.4155**	**1,137.4155**	**0.2543**	**0.0000**	**1,142.7565**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	1.0286	10.3375	6.8472	0.0124	0.7491	0.5234	1.2725	0.3179	0.4815	0.7994	0.0000	1,137.4145	1,137.4145	0.2543	0.0000	1,142.7556
Total	**1.0286**	**10.3375**	**6.8472**	**0.0124**	**0.7491**	**0.5234**	**1.2725**	**0.3179**	**0.4815**	**0.7994**	**0.0000**	**1,137.4145**	**1,137.4145**	**0.2543**	**0.0000**	**1,142.7556**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	6.1000e-004	1.6900e-003	7.3400e-003	1.0000e-005	0.1844	2.0000e-005	0.1845	0.0185	2.0000e-005	0.0185	0.0000	0.9830	0.9830	5.0000e-005	0.0000	0.9840
Offroad	5.1000e-004	6.5000e-003	5.6600e-003	1.0000e-005		3.6000e-004	3.6000e-004		3.3000e-004	3.3000e-004	0.0000	0.7789	0.7789	2.3000e-004	0.0000	0.7838
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.6636	0.6636	3.0000e-005	1.0000e-005	0.6661
Total	**1.1200e-003**	**8.1900e-003**	**0.0130**	**2.0000e-005**	**0.1844**	**3.8000e-004**	**0.1848**	**0.0185**	**3.5000e-004**	**0.0188**	**0.0000**	**2.4254**	**2.4254**	**3.1000e-004**	**1.0000e-005**	**2.4339**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	6.1000e-004	1.6900e-003	7.3400e-003	1.0000e-005	0.1844	2.0000e-005	0.1845	0.0185	2.0000e-005	0.0185	0.0000	0.9830	0.9830	5.0000e-005	0.0000	0.9840
Offroad	5.1000e-004	6.5000e-003	5.6600e-003	1.0000e-005		3.6000e-004	3.6000e-004		3.3000e-004	3.3000e-004	0.0000	0.7789	0.7789	2.3000e-004	0.0000	0.7838
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.6636	0.6636	3.0000e-005	1.0000e-005	0.6661
Total	**1.1200e-003**	**8.1900e-003**	**0.0130**	**2.0000e-005**	**0.1844**	**3.8000e-004**	**0.1848**	**0.0185**	**3.5000e-004**	**0.0188**	**0.0000**	**2.4254**	**2.4254**	**3.1000e-004**	**1.0000e-005**	**2.4339**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**45.54**	**79.37**	**43.50**	**50.00**	**0.00**	**94.74**	**0.19**	**0.00**	**94.29**	**1.75**	**0.00**	**32.11**	**32.11**	**74.19**	**0.00**	**32.20**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	1 Mobilization	Grading	1/1/2016	1/30/2016	6	26	
2	2 Civil	Grading	2/1/2016	2/29/2016	6	25	
3	3 Civil	Grading	3/1/2016	3/31/2016	6	27	
4	4 Mechanical	Building Construction	4/1/2016	4/30/2016	6	26	
5	5 Mechanical	Building Construction	5/1/2016	5/31/2016	6	26	
6	6 Mechanical	Building Construction	6/1/2016	6/30/2016	6	26	
7	7 Electrical	Building Construction	7/1/2016	7/31/2016	6	26	
8	8 Electrical	Building Construction	8/1/2016	8/31/2016	6	27	
9	9 Electrical	Building Construction	9/1/2016	9/30/2016	6	26	
10	10 Electrical	Building Construction	10/1/2016	10/31/2016	6	26	
11	11 Commissioning	Building Construction	11/1/2016	11/30/2016	6	26	
12	12 Demobilization	Building Construction	12/1/2016	12/30/2016	6	26	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
1 Mobilization	Cranes	0	5.00	120	0.29
1 Mobilization	Excavators	2	4.00	175	0.38
1 Mobilization	Graders	2	8.00	175	0.41
1 Mobilization	Off-Highway Trucks	4	2.00	150	0.38
1 Mobilization	Off-Highway Trucks	0	8.00	310	0.38
1 Mobilization	Off-Highway Trucks	1	8.00	220	0.38

1 Mobilization	Off-Highway Trucks	0	5.00	250	0.38
1 Mobilization	Off-Highway Trucks	4	8.00	24	0.38
1 Mobilization	Other Construction Equipment	2	8.00	50	0.42
1 Mobilization	Rollers	2	8.00	120	0.38
1 Mobilization	Rough Terrain Forklifts	0	8.00	120	0.40
1 Mobilization	Rubber Tired Dozers	2	8.00	250	0.40
1 Mobilization	Skid Steer Loaders	2	8.00	56	0.37
1 Mobilization	Tractors/Loaders/Backhoes	2	6.00	120	0.37
1 Mobilization	Trenchers	0	8.00	175	0.50
2 Civil	Excavators	2	4.00	175	0.38
2 Civil	Graders	2	8.00	175	0.41
2 Civil	Off-Highway Trucks	6	2.00	150	0.38
2 Civil	Off-Highway Trucks	1	8.00	220	0.38
2 Civil	Off-Highway Trucks	4	8.00	24	0.38
2 Civil	Off-Highway Trucks	1	5.00	250	0.38
2 Civil	Other Construction Equipment	4	8.00	50	0.42
2 Civil	Rollers	2	8.00	120	0.38
2 Civil	Rough Terrain Forklifts	2	8.00	120	0.40
2 Civil	Rubber Tired Dozers	2	8.00	250	0.40
2 Civil	Skid Steer Loaders	2	8.00	56	0.37
2 Civil	Tractors/Loaders/Backhoes	2	6.00	120	0.37
3 Civil	Excavators	2	4.00	175	0.38
3 Civil	Graders	2	8.00	175	0.41
3 Civil	Off-Highway Trucks	6	2.00	150	0.38
3 Civil	Off-Highway Trucks	1	8.00	220	0.38
3 Civil	Off-Highway Trucks	1	5.00	250	0.38
3 Civil	Off-Highway Trucks	4	8.00	24	0.38
3 Civil	Other Construction Equipment	4	8.00	50	0.42

3 Civil	Rollers	2	8.00	120	0.38
3 Civil	Rough Terrain Forklifts	3	8.00	120	0.40
3 Civil	Rubber Tired Dozers	2	8.00	250	0.40
3 Civil	Skid Steer Loaders	2	8.00	56	0.37
3 Civil	Tractors/Loaders/Backhoes	2	6.00	120	0.37
4 Mechanical	Off-Highway Trucks	6	2.00	150	0.38
4 Mechanical	Off-Highway Trucks	1	8.00	220	0.38
4 Mechanical	Off-Highway Trucks	1	5.00	250	0.38
4 Mechanical	Off-Highway Trucks	4	8.00	24	0.38
4 Mechanical	Other Construction Equipment	4	8.00	50	0.42
4 Mechanical	Rollers	2	8.00	120	0.38
4 Mechanical	Rough Terrain Forklifts	3	8.00	120	0.40
4 Mechanical	Skid Steer Loaders	1	8.00	56	0.37
4 Mechanical	Tractors/Loaders/Backhoes	2	6.00	120	0.37
5 Mechanical	Off-Highway Trucks	6	2.00	150	0.38
5 Mechanical	Off-Highway Trucks	1	8.00	220	0.38
5 Mechanical	Off-Highway Trucks	1	5.00	250	0.38
5 Mechanical	Off-Highway Trucks	4	8.00	24	0.38
5 Mechanical	Other Construction Equipment	4	8.00	50	0.42
5 Mechanical	Rollers	1	8.00	120	0.38
5 Mechanical	Rough Terrain Forklifts	3	8.00	120	0.40
5 Mechanical	Skid Steer Loaders	1	8.00	56	0.37
6 Mechanical	Off-Highway Trucks	6	2.00	150	0.38
6 Mechanical	Off-Highway Trucks	1	8.00	220	0.38
6 Mechanical	Off-Highway Trucks	1	5.00	250	0.38
6 Mechanical	Off-Highway Trucks	4	8.00	24	0.38
6 Mechanical	Other Construction Equipment	2	8.00	50	0.42
6 Mechanical	Rollers	1	8.00	120	0.38

6 Mechanical	Rough Terrain Forklifts	3	8.00	120	0.40
6 Mechanical	Skid Steer Loaders	1	8.00	56	0.37
6 Mechanical	Trenchers	2	8.00	175	0.50
7 Electrical	Off-Highway Trucks	4	2.00	150	0.38
7 Electrical	Off-Highway Trucks	1	8.00	220	0.38
7 Electrical	Off-Highway Trucks	4	8.00	24	0.38
7 Electrical	Rollers	1	8.00	120	0.38
7 Electrical	Rough Terrain Forklifts	3	8.00	120	0.40
7 Electrical	Skid Steer Loaders	1	8.00	56	0.37
7 Electrical	Trenchers	2	8.00	175	0.50
8 Electrical	Off-Highway Trucks	6	2.00	150	0.38
8 Electrical	Off-Highway Trucks	1	8.00	220	0.38
8 Electrical	Off-Highway Trucks	2	8.00	24	0.38
8 Electrical	Rollers	1	8.00	120	0.38
8 Electrical	Rough Terrain Forklifts	2	8.00	120	0.40
8 Electrical	Skid Steer Loaders	1	8.00	56	0.37
8 Electrical	Trenchers	2	8.00	175	0.50
9 Electrical	Cranes	1	5.00	120	0.29
9 Electrical	Off-Highway Trucks	8	2.00	150	0.38
9 Electrical	Off-Highway Trucks	4	8.00	310	0.38
9 Electrical	Off-Highway Trucks	1	8.00	220	0.38
9 Electrical	Off-Highway Trucks	2	8.00	24	0.38
9 Electrical	Rollers	1	8.00	120	0.38
9 Electrical	Rough Terrain Forklifts	2	8.00	120	0.40
9 Electrical	Skid Steer Loaders	1	8.00	56	0.37
9 Electrical	Trenchers	2	8.00	175	0.50
10 Electrical	Cranes	1	5.00	120	0.29
10 Electrical	Off-Highway Trucks	8	2.00	150	0.38

10 Electrical	Off-Highway Trucks	4	8.00	310	0.38
10 Electrical	Off-Highway Trucks	2	8.00	24	0.38
10 Electrical	Rough Terrain Forklifts	1	8.00	120	0.40
11 Commissioning	Off-Highway Trucks	6	2.00	150	0.38
11 Commissioning	Off-Highway Trucks	1	8.00	310	0.38
11 Commissioning	Off-Highway Trucks	2	8.00	24	0.38
11 Commissioning	Rough Terrain Forklifts	1	8.00	120	0.40
12 Demobilization	Off-Highway Trucks	2	2.00	150	0.38
12 Demobilization	Off-Highway Trucks	2	8.00	24	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
1 Mobilization	23	30.00	3.00	26.00	20.00	13.00	155.00	LD_Mix	HDT_Mix	HHDT
2 Civil	30	50.00	3.00	100.00	20.00	13.00	155.00	LD_Mix	HDT_Mix	HHDT
3 Civil	31	50.00	16.00	108.00	20.00	13.00	155.00	LD_Mix	HDT_Mix	HHDT
4 Mechanical	24	80.00	0.00	104.00	20.00	13.00	155.00	LD_Mix	HDT_Mix	HHDT
5 Mechanical	21	80.00	0.00	104.00	20.00	13.00	155.00	LD_Mix	HDT_Mix	HHDT
6 Mechanical	21	80.00	0.00	104.00	20.00	13.00	155.00	LD_Mix	HDT_Mix	HHDT
7 Electrical	16	80.00	0.00	104.00	20.00	13.00	155.00	LD_Mix	HDT_Mix	HHDT
8 Electrical	15	54.00	0.00	27.00	20.00	13.00	155.00	LD_Mix	HDT_Mix	HHDT
9 Electrical	22	60.00	0.00	52.00	20.00	13.00	155.00	LD_Mix	HDT_Mix	HHDT
10 Electrical	16	40.00	0.00	52.00	20.00	13.00	155.00	LD_Mix	HDT_Mix	HHDT
11 Commissioning	10	34.00	0.00	26.00	20.00	13.00	155.00	LD_Mix	HDT_Mix	HHDT
12 Demobilization	4	20.00	0.00	0.00	20.00	13.00	155.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 1 Mobilization - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1884	0.0000	0.1884	0.0895	0.0000	0.0895	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1168	1.1400	0.6053	8.9000e-004		0.0654	0.0654		0.0602	0.0602	0.0000	84.3535	84.3535	0.0254	0.0000	84.8878
Total	**0.1168**	**1.1400**	**0.6053**	**8.9000e-004**	**0.1884**	**0.0654**	**0.2538**	**0.0895**	**0.0602**	**0.1497**	**0.0000**	**84.3535**	**84.3535**	**0.0254**	**0.0000**	**84.8878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3500e-003	0.0303	0.0146	7.0000e-005	1.7100e-003	3.9000e-004	2.1000e-003	4.7000e-004	3.6000e-004	8.3000e-004	0.0000	6.6243	6.6243	4.0000e-005	0.0000	6.6252
Vendor	6.3000e-004	6.7800e-003	7.7000e-003	2.0000e-005	4.5000e-004	1.0000e-004	5.5000e-004	1.3000e-004	1.0000e-004	2.2000e-004	0.0000	1.4225	1.4225	1.0000e-005	0.0000	1.4227
Worker	2.0900e-003	4.4400e-003	0.0370	6.0000e-005	5.8000e-003	4.0000e-005	5.8400e-003	1.5400e-003	4.0000e-005	1.5800e-003	0.0000	4.7144	4.7144	2.9000e-004	0.0000	4.7205
Total	**4.0700e-003**	**0.0415**	**0.0592**	**1.5000e-004**	**7.9600e-003**	**5.3000e-004**	**8.4900e-003**	**2.1400e-003**	**5.0000e-004**	**2.6300e-003**	**0.0000**	**12.7613**	**12.7613**	**3.4000e-004**	**0.0000**	**12.7684**

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Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1884	0.0000	0.1884	0.0895	0.0000	0.0895	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1168	1.1400	0.6053	8.9000e-004		0.0654	0.0654		0.0602	0.0602	0.0000	84.3534	84.3534	0.0254	0.0000	84.8877
Total	**0.1168**	**1.1400**	**0.6053**	**8.9000e-004**	**0.1884**	**0.0654**	**0.2538**	**0.0895**	**0.0602**	**0.1497**	**0.0000**	**84.3534**	**84.3534**	**0.0254**	**0.0000**	**84.8877**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3500e-003	0.0303	0.0146	7.0000e-005	1.7100e-003	3.9000e-004	2.1000e-003	4.7000e-004	3.6000e-004	8.3000e-004	0.0000	6.6243	6.6243	4.0000e-005	0.0000	6.6252
Vendor	6.3000e-004	6.7800e-003	7.7000e-003	2.0000e-005	4.5000e-004	1.0000e-004	5.5000e-004	1.3000e-004	1.0000e-004	2.2000e-004	0.0000	1.4225	1.4225	1.0000e-005	0.0000	1.4227
Worker	2.0900e-003	4.4400e-003	0.0370	6.0000e-005	5.8000e-003	4.0000e-005	5.8400e-003	1.5400e-003	4.0000e-005	1.5800e-003	0.0000	4.7144	4.7144	2.9000e-004	0.0000	4.7205
Total	**4.0700e-003**	**0.0415**	**0.0592**	**1.5000e-004**	**7.9600e-003**	**5.3000e-004**	**8.4900e-003**	**2.1400e-003**	**5.0000e-004**	**2.6300e-003**	**0.0000**	**12.7613**	**12.7613**	**3.4000e-004**	**0.0000**	**12.7684**

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Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1824	0.0000	0.1824	0.0862	0.0000	0.0862	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1394	1.3207	0.7510	1.1100e-003		0.0763	0.0763		0.0702	0.0702	0.0000	104.4445	104.4445	0.0315	0.0000	105.1061
Total	**0.1394**	**1.3207**	**0.7510**	**1.1100e-003**	**0.1824**	**0.0763**	**0.2586**	**0.0862**	**0.0702**	**0.1564**	**0.0000**	**104.4445**	**104.4445**	**0.0315**	**0.0000**	**105.1061**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.2000e-003	0.1164	0.0561	2.8000e-004	6.5700e-003	1.5000e-003	8.0700e-003	1.8000e-003	1.3800e-003	3.1800e-003	0.0000	25.4781	25.4781	1.7000e-004	0.0000	25.4816
Vendor	6.0000e-004	6.5200e-003	7.4000e-003	2.0000e-005	4.3000e-004	1.0000e-004	5.3000e-004	1.2000e-004	9.0000e-005	2.2000e-004	0.0000	1.3678	1.3678	1.0000e-005	0.0000	1.3680
Worker	3.3500e-003	7.1200e-003	0.0592	1.0000e-004	9.2900e-003	7.0000e-005	9.3600e-003	2.4700e-003	6.0000e-005	2.5300e-003	0.0000	7.5552	7.5552	4.6000e-004	0.0000	7.5649
Total	**9.1500e-003**	**0.1301**	**0.1227**	**4.0000e-004**	**0.0163**	**1.6700e-003**	**0.0180**	**4.3900e-003**	**1.5300e-003**	**5.9300e-003**	**0.0000**	**34.4011**	**34.4011**	**6.4000e-004**	**0.0000**	**34.4145**

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Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1824	0.0000	0.1824	0.0862	0.0000	0.0862	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1394	1.3207	0.7509	1.1100e-003		0.0763	0.0763		0.0702	0.0702	0.0000	104.4444	104.4444	0.0315	0.0000	105.1060
Total	**0.1394**	**1.3207**	**0.7509**	**1.1100e-003**	**0.1824**	**0.0763**	**0.2586**	**0.0862**	**0.0702**	**0.1564**	**0.0000**	**104.4444**	**104.4444**	**0.0315**	**0.0000**	**105.1060**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.2000e-003	0.1164	0.0561	2.8000e-004	6.5700e-003	1.5000e-003	8.0700e-003	1.8000e-003	1.3800e-003	3.1800e-003	0.0000	25.4781	25.4781	1.7000e-004	0.0000	25.4816
Vendor	6.0000e-004	6.5200e-003	7.4000e-003	2.0000e-005	4.3000e-004	1.0000e-004	5.3000e-004	1.2000e-004	9.0000e-005	2.2000e-004	0.0000	1.3678	1.3678	1.0000e-005	0.0000	1.3680
Worker	3.3500e-003	7.1200e-003	0.0592	1.0000e-004	9.2900e-003	7.0000e-005	9.3600e-003	2.4700e-003	6.0000e-005	2.5300e-003	0.0000	7.5552	7.5552	4.6000e-004	0.0000	7.5649
Total	**9.1500e-003**	**0.1301**	**0.1227**	**4.0000e-004**	**0.0163**	**1.6700e-003**	**0.0180**	**4.3900e-003**	**1.5300e-003**	**5.9300e-003**	**0.0000**	**34.4011**	**34.4011**	**6.4000e-004**	**0.0000**	**34.4145**

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Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1944	0.0000	0.1944	0.0928	0.0000	0.0928	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1540	1.4703	0.8492	1.2500e-003		0.0848	0.0848		0.0780	0.0780	0.0000	118.0573	118.0573	0.0356	0.0000	118.8051
Total	**0.1540**	**1.4703**	**0.8492**	**1.2500e-003**	**0.1944**	**0.0848**	**0.2792**	**0.0928**	**0.0780**	**0.1708**	**0.0000**	**118.0573**	**118.0573**	**0.0356**	**0.0000**	**118.8051**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.6200e-003	0.1258	0.0605	3.0000e-004	7.0900e-003	1.6200e-003	8.7100e-003	1.9400e-003	1.4900e-003	3.4300e-003	0.0000	27.5164	27.5164	1.8000e-004	0.0000	27.5202
Vendor	3.4800e-003	0.0376	0.0426	9.0000e-005	2.4800e-003	5.8000e-004	3.0600e-003	7.1000e-004	5.3000e-004	1.2400e-003	0.0000	7.8786	7.8786	6.0000e-005	0.0000	7.8798
Worker	3.6200e-003	7.6900e-003	0.0640	1.1000e-004	0.0100	7.0000e-005	0.0101	2.6700e-003	7.0000e-005	2.7300e-003	0.0000	8.1596	8.1596	5.0000e-004	0.0000	8.1701
Total	**0.0127**	**0.1710**	**0.1672**	**5.0000e-004**	**0.0196**	**2.2700e-003**	**0.0219**	**5.3200e-003**	**2.0900e-003**	**7.4000e-003**	**0.0000**	**43.5545**	**43.5545**	**7.4000e-004**	**0.0000**	**43.5700**

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Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1944	0.0000	0.1944	0.0928	0.0000	0.0928	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1540	1.4703	0.8492	1.2500e-003		0.0848	0.0848		0.0780	0.0780	0.0000	118.0572	118.0572	0.0356	0.0000	118.8050
Total	**0.1540**	**1.4703**	**0.8492**	**1.2500e-003**	**0.1944**	**0.0848**	**0.2792**	**0.0928**	**0.0780**	**0.1708**	**0.0000**	**118.0572**	**118.0572**	**0.0356**	**0.0000**	**118.8050**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.6200e-003	0.1258	0.0605	3.0000e-004	7.0900e-003	1.6200e-003	8.7100e-003	1.9400e-003	1.4900e-003	3.4300e-003	0.0000	27.5164	27.5164	1.8000e-004	0.0000	27.5202
Vendor	3.4800e-003	0.0376	0.0426	9.0000e-005	2.4800e-003	5.8000e-004	3.0600e-003	7.1000e-004	5.3000e-004	1.2400e-003	0.0000	7.8786	7.8786	6.0000e-005	0.0000	7.8798
Worker	3.6200e-003	7.6900e-003	0.0640	1.1000e-004	0.0100	7.0000e-005	0.0101	2.6700e-003	7.0000e-005	2.7300e-003	0.0000	8.1596	8.1596	5.0000e-004	0.0000	8.1701
Total	**0.0127**	**0.1710**	**0.1672**	**5.0000e-004**	**0.0196**	**2.2700e-003**	**0.0219**	**5.3200e-003**	**2.0900e-003**	**7.4000e-003**	**0.0000**	**43.5545**	**43.5545**	**7.4000e-004**	**0.0000**	**43.5700**

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Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0812	0.6987	0.4998	7.2000e-004		0.0443	0.0443		0.0408	0.0408	0.0000	67.8979	67.8979	0.0205	0.0000	68.3280
Total	**0.0812**	**0.6987**	**0.4998**	**7.2000e-004**		**0.0443**	**0.0443**		**0.0408**	**0.0408**	**0.0000**	**67.8979**	**67.8979**	**0.0205**	**0.0000**	**68.3280**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.4100e-003	0.1211	0.0583	2.9000e-004	6.8300e-003	1.5600e-003	8.3900e-003	1.8700e-003	1.4400e-003	3.3100e-003	0.0000	26.4972	26.4972	1.7000e-004	0.0000	26.5009
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5700e-003	0.0119	0.0986	1.7000e-004	0.0155	1.1000e-004	0.0156	4.1100e-003	1.0000e-004	4.2100e-003	0.0000	12.5718	12.5718	7.7000e-004	0.0000	12.5880
Total	**0.0110**	**0.1330**	**0.1569**	**4.6000e-004**	**0.0223**	**1.6700e-003**	**0.0240**	**5.9800e-003**	**1.5400e-003**	**7.5200e-003**	**0.0000**	**39.0690**	**39.0690**	**9.4000e-004**	**0.0000**	**39.0889**

3.5 4 Mechanical - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0812	0.6987	0.4998	7.2000e-004		0.0443	0.0443		0.0408	0.0408	0.0000	67.8978	67.8978	0.0205	0.0000	68.3279
Total	**0.0812**	**0.6987**	**0.4998**	**7.2000e-004**		**0.0443**	**0.0443**		**0.0408**	**0.0408**	**0.0000**	**67.8978**	**67.8978**	**0.0205**	**0.0000**	**68.3279**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.4100e-003	0.1211	0.0583	2.9000e-004	6.8300e-003	1.5600e-003	8.3900e-003	1.8700e-003	1.4400e-003	3.3100e-003	0.0000	26.4972	26.4972	1.7000e-004	0.0000	26.5009
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5700e-003	0.0119	0.0986	1.7000e-004	0.0155	1.1000e-004	0.0156	4.1100e-003	1.0000e-004	4.2100e-003	0.0000	12.5718	12.5718	7.7000e-004	0.0000	12.5880
Total	**0.0110**	**0.1330**	**0.1569**	**4.6000e-004**	**0.0223**	**1.6700e-003**	**0.0240**	**5.9800e-003**	**1.5400e-003**	**7.5200e-003**	**0.0000**	**39.0690**	**39.0690**	**9.4000e-004**	**0.0000**	**39.0889**

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Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0664	0.5595	0.4023	5.9000e-004		0.0338	0.0338		0.0311	0.0311	0.0000	55.9942	55.9942	0.0169	0.0000	56.3489
Total	**0.0664**	**0.5595**	**0.4023**	**5.9000e-004**		**0.0338**	**0.0338**		**0.0311**	**0.0311**	**0.0000**	**55.9942**	**55.9942**	**0.0169**	**0.0000**	**56.3489**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.4100e-003	0.1211	0.0583	2.9000e-004	6.8300e-003	1.5600e-003	8.3900e-003	1.8700e-003	1.4400e-003	3.3100e-003	0.0000	26.4972	26.4972	1.7000e-004	0.0000	26.5009
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5700e-003	0.0119	0.0986	1.7000e-004	0.0155	1.1000e-004	0.0156	4.1100e-003	1.0000e-004	4.2100e-003	0.0000	12.5718	12.5718	7.7000e-004	0.0000	12.5880
Total	**0.0110**	**0.1330**	**0.1569**	**4.6000e-004**	**0.0223**	**1.6700e-003**	**0.0240**	**5.9800e-003**	**1.5400e-003**	**7.5200e-003**	**0.0000**	**39.0690**	**39.0690**	**9.4000e-004**	**0.0000**	**39.0889**

3.6 5 Mechanical - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0664	0.5595	0.4023	5.9000e-004		0.0338	0.0338		0.0311	0.0311	0.0000	55.9941	55.9941	0.0169	0.0000	56.3488
Total	**0.0664**	**0.5595**	**0.4023**	**5.9000e-004**		**0.0338**	**0.0338**		**0.0311**	**0.0311**	**0.0000**	**55.9941**	**55.9941**	**0.0169**	**0.0000**	**56.3488**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.4100e-003	0.1211	0.0583	2.9000e-004	6.8300e-003	1.5600e-003	8.3900e-003	1.8700e-003	1.4400e-003	3.3100e-003	0.0000	26.4972	26.4972	1.7000e-004	0.0000	26.5009
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5700e-003	0.0119	0.0986	1.7000e-004	0.0155	1.1000e-004	0.0156	4.1100e-003	1.0000e-004	4.2100e-003	0.0000	12.5718	12.5718	7.7000e-004	0.0000	12.5880
Total	**0.0110**	**0.1330**	**0.1569**	**4.6000e-004**	**0.0223**	**1.6700e-003**	**0.0240**	**5.9800e-003**	**1.5400e-003**	**7.5200e-003**	**0.0000**	**39.0690**	**39.0690**	**9.4000e-004**	**0.0000**	**39.0889**

3.7 6 Mechanical - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0774	0.7675	0.4884	7.3000e-004		0.0422	0.0422		0.0388	0.0388	0.0000	69.3059	69.3059	0.0209	0.0000	69.7449
Total	**0.0774**	**0.7675**	**0.4884**	**7.3000e-004**		**0.0422**	**0.0422**		**0.0388**	**0.0388**	**0.0000**	**69.3059**	**69.3059**	**0.0209**	**0.0000**	**69.7449**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.4100e-003	0.1211	0.0583	2.9000e-004	6.8300e-003	1.5600e-003	8.3900e-003	1.8700e-003	1.4400e-003	3.3100e-003	0.0000	26.4972	26.4972	1.7000e-004	0.0000	26.5009
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5700e-003	0.0119	0.0986	1.7000e-004	0.0155	1.1000e-004	0.0156	4.1100e-003	1.0000e-004	4.2100e-003	0.0000	12.5718	12.5718	7.7000e-004	0.0000	12.5880
Total	**0.0110**	**0.1330**	**0.1569**	**4.6000e-004**	**0.0223**	**1.6700e-003**	**0.0240**	**5.9800e-003**	**1.5400e-003**	**7.5200e-003**	**0.0000**	**39.0690**	**39.0690**	**9.4000e-004**	**0.0000**	**39.0889**

3.7 6 Mechanical - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0774	0.7675	0.4884	7.3000e-004		0.0422	0.0422		0.0388	0.0388	0.0000	69.3058	69.3058	0.0209	0.0000	69.7448
Total	**0.0774**	**0.7675**	**0.4884**	**7.3000e-004**		**0.0422**	**0.0422**		**0.0388**	**0.0388**	**0.0000**	**69.3058**	**69.3058**	**0.0209**	**0.0000**	**69.7448**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.4100e-003	0.1211	0.0583	2.9000e-004	6.8300e-003	1.5600e-003	8.3900e-003	1.8700e-003	1.4400e-003	3.3100e-003	0.0000	26.4972	26.4972	1.7000e-004	0.0000	26.5009
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5700e-003	0.0119	0.0986	1.7000e-004	0.0155	1.1000e-004	0.0156	4.1100e-003	1.0000e-004	4.2100e-003	0.0000	12.5718	12.5718	7.7000e-004	0.0000	12.5880
Total	**0.0110**	**0.1330**	**0.1569**	**4.6000e-004**	**0.0223**	**1.6700e-003**	**0.0240**	**5.9800e-003**	**1.5400e-003**	**7.5200e-003**	**0.0000**	**39.0690**	**39.0690**	**9.4000e-004**	**0.0000**	**39.0889**

3.8 7 Electrical - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0559	0.6185	0.3863	5.9000e-004		0.0329	0.0329		0.0303	0.0303	0.0000	55.1622	55.1622	0.0166	0.0000	55.5116
Total	**0.0559**	**0.6185**	**0.3863**	**5.9000e-004**		**0.0329**	**0.0329**		**0.0303**	**0.0303**	**0.0000**	**55.1622**	**55.1622**	**0.0166**	**0.0000**	**55.5116**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.4100e-003	0.1211	0.0583	2.9000e-004	6.8300e-003	1.5600e-003	8.3900e-003	1.8700e-003	1.4400e-003	3.3100e-003	0.0000	26.4972	26.4972	1.7000e-004	0.0000	26.5009
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5700e-003	0.0119	0.0986	1.7000e-004	0.0155	1.1000e-004	0.0156	4.1100e-003	1.0000e-004	4.2100e-003	0.0000	12.5718	12.5718	7.7000e-004	0.0000	12.5880
Total	**0.0110**	**0.1330**	**0.1569**	**4.6000e-004**	**0.0223**	**1.6700e-003**	**0.0240**	**5.9800e-003**	**1.5400e-003**	**7.5200e-003**	**0.0000**	**39.0690**	**39.0690**	**9.4000e-004**	**0.0000**	**39.0889**

3.8 7 Electrical - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0559	0.6185	0.3863	5.9000e-004		0.0329	0.0329		0.0303	0.0303	0.0000	55.1621	55.1621	0.0166	0.0000	55.5115
Total	**0.0559**	**0.6185**	**0.3863**	**5.9000e-004**		**0.0329**	**0.0329**		**0.0303**	**0.0303**	**0.0000**	**55.1621**	**55.1621**	**0.0166**	**0.0000**	**55.5115**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.4100e-003	0.1211	0.0583	2.9000e-004	6.8300e-003	1.5600e-003	8.3900e-003	1.8700e-003	1.4400e-003	3.3100e-003	0.0000	26.4972	26.4972	1.7000e-004	0.0000	26.5009
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5700e-003	0.0119	0.0986	1.7000e-004	0.0155	1.1000e-004	0.0156	4.1100e-003	1.0000e-004	4.2100e-003	0.0000	12.5718	12.5718	7.7000e-004	0.0000	12.5880
Total	**0.0110**	**0.1330**	**0.1569**	**4.6000e-004**	**0.0223**	**1.6700e-003**	**0.0240**	**5.9800e-003**	**1.5400e-003**	**7.5200e-003**	**0.0000**	**39.0690**	**39.0690**	**9.4000e-004**	**0.0000**	**39.0889**

3.9 8 Electrical - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0578	0.6299	0.3864	5.8000e-004		0.0335	0.0335		0.0308	0.0308	0.0000	55.1264	55.1264	0.0166	0.0000	55.4756
Total	**0.0578**	**0.6299**	**0.3864**	**5.8000e-004**		**0.0335**	**0.0335**		**0.0308**	**0.0308**	**0.0000**	**55.1264**	**55.1264**	**0.0166**	**0.0000**	**55.4756**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4000e-003	0.0314	0.0151	8.0000e-005	1.7700e-003	4.1000e-004	2.1800e-003	4.9000e-004	3.7000e-004	8.6000e-004	0.0000	6.8791	6.8791	5.0000e-005	0.0000	6.8800
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.9100e-003	8.3100e-003	0.0691	1.2000e-004	0.0108	8.0000e-005	0.0109	2.8800e-003	7.0000e-005	2.9500e-003	0.0000	8.8124	8.8124	5.4000e-004	0.0000	8.8237
Total	**5.3100e-003**	**0.0398**	**0.0842**	**2.0000e-004**	**0.0126**	**4.9000e-004**	**0.0131**	**3.3700e-003**	**4.4000e-004**	**3.8100e-003**	**0.0000**	**15.6914**	**15.6914**	**5.9000e-004**	**0.0000**	**15.7037**

3.9 8 Electrical - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0578	0.6299	0.3864	5.8000e-004		0.0335	0.0335		0.0308	0.0308	0.0000	55.1263	55.1263	0.0166	0.0000	55.4755
Total	**0.0578**	**0.6299**	**0.3864**	**5.8000e-004**		**0.0335**	**0.0335**		**0.0308**	**0.0308**	**0.0000**	**55.1263**	**55.1263**	**0.0166**	**0.0000**	**55.4755**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4000e-003	0.0314	0.0151	8.0000e-005	1.7700e-003	4.1000e-004	2.1800e-003	4.9000e-004	3.7000e-004	8.6000e-004	0.0000	6.8791	6.8791	5.0000e-005	0.0000	6.8800
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.9100e-003	8.3100e-003	0.0691	1.2000e-004	0.0108	8.0000e-005	0.0109	2.8800e-003	7.0000e-005	2.9500e-003	0.0000	8.8124	8.8124	5.4000e-004	0.0000	8.8237
Total	**5.3100e-003**	**0.0398**	**0.0842**	**2.0000e-004**	**0.0126**	**4.9000e-004**	**0.0131**	**3.3700e-003**	**4.4000e-004**	**3.8100e-003**	**0.0000**	**15.6914**	**15.6914**	**5.9000e-004**	**0.0000**	**15.7037**

3.10 9 Electrical - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1025	1.1222	0.6223	1.1500e-003		0.0540	0.0540		0.0497	0.0497	0.0000	108.3192	108.3192	0.0327	0.0000	109.0053
Total	**0.1025**	**1.1222**	**0.6223**	**1.1500e-003**		**0.0540**	**0.0540**		**0.0497**	**0.0497**	**0.0000**	**108.3192**	**108.3192**	**0.0327**	**0.0000**	**109.0053**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7000e-003	0.0606	0.0291	1.4000e-004	3.4200e-003	7.8000e-004	4.2000e-003	9.4000e-004	7.2000e-004	1.6500e-003	0.0000	13.2486	13.2486	9.0000e-005	0.0000	13.2504
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1800e-003	8.8900e-003	0.0739	1.2000e-004	0.0116	9.0000e-005	0.0117	3.0800e-003	8.0000e-005	3.1600e-003	0.0000	9.4289	9.4289	5.8000e-004	0.0000	9.4410
Total	**6.8800e-003**	**0.0694**	**0.1031**	**2.6000e-004**	**0.0150**	**8.7000e-004**	**0.0159**	**4.0200e-003**	**8.0000e-004**	**4.8100e-003**	**0.0000**	**22.6775**	**22.6775**	**6.7000e-004**	**0.0000**	**22.6914**

3.10 9 Electrical - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1025	1.1222	0.6223	1.1500e-003		0.0540	0.0540		0.0497	0.0497	0.0000	108.3191	108.3191	0.0327	0.0000	109.0052
Total	**0.1025**	**1.1222**	**0.6223**	**1.1500e-003**		**0.0540**	**0.0540**		**0.0497**	**0.0497**	**0.0000**	**108.3191**	**108.3191**	**0.0327**	**0.0000**	**109.0052**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7000e-003	0.0606	0.0291	1.4000e-004	3.4200e-003	7.8000e-004	4.2000e-003	9.4000e-004	7.2000e-004	1.6500e-003	0.0000	13.2486	13.2486	9.0000e-005	0.0000	13.2504
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1800e-003	8.8900e-003	0.0739	1.2000e-004	0.0116	9.0000e-005	0.0117	3.0800e-003	8.0000e-005	3.1600e-003	0.0000	9.4289	9.4289	5.8000e-004	0.0000	9.4410
Total	**6.8800e-003**	**0.0694**	**0.1031**	**2.6000e-004**	**0.0150**	**8.7000e-004**	**0.0159**	**4.0200e-003**	**8.0000e-004**	**4.8100e-003**	**0.0000**	**22.6775**	**22.6775**	**6.7000e-004**	**0.0000**	**22.6914**

3.11 10 Electrical - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0594	0.6490	0.3548	7.3000e-004		0.0291	0.0291		0.0268	0.0268	0.0000	69.2523	69.2523	0.0209	0.0000	69.6909
Total	**0.0594**	**0.6490**	**0.3548**	**7.3000e-004**		**0.0291**	**0.0291**		**0.0268**	**0.0268**	**0.0000**	**69.2523**	**69.2523**	**0.0209**	**0.0000**	**69.6909**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7000e-003	0.0606	0.0291	1.4000e-004	3.4200e-003	7.8000e-004	4.2000e-003	9.4000e-004	7.2000e-004	1.6500e-003	0.0000	13.2486	13.2486	9.0000e-005	0.0000	13.2504
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7900e-003	5.9300e-003	0.0493	8.0000e-005	7.7300e-003	6.0000e-005	7.7900e-003	2.0500e-003	5.0000e-005	2.1100e-003	0.0000	6.2859	6.2859	3.8000e-004	0.0000	6.2940
Total	**5.4900e-003**	**0.0665**	**0.0784**	**2.2000e-004**	**0.0112**	**8.4000e-004**	**0.0120**	**2.9900e-003**	**7.7000e-004**	**3.7600e-003**	**0.0000**	**19.5345**	**19.5345**	**4.7000e-004**	**0.0000**	**19.5444**

3.11 10 Electrical - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0594	0.6490	0.3548	7.3000e-004		0.0291	0.0291		0.0268	0.0268	0.0000	69.2522	69.2522	0.0209	0.0000	69.6908
Total	**0.0594**	**0.6490**	**0.3548**	**7.3000e-004**		**0.0291**	**0.0291**		**0.0268**	**0.0268**	**0.0000**	**69.2522**	**69.2522**	**0.0209**	**0.0000**	**69.6908**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7000e-003	0.0606	0.0291	1.4000e-004	3.4200e-003	7.8000e-004	4.2000e-003	9.4000e-004	7.2000e-004	1.6500e-003	0.0000	13.2486	13.2486	9.0000e-005	0.0000	13.2504
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7900e-003	5.9300e-003	0.0493	8.0000e-005	7.7300e-003	6.0000e-005	7.7900e-003	2.0500e-003	5.0000e-005	2.1100e-003	0.0000	6.2859	6.2859	3.8000e-004	0.0000	6.2940
Total	**5.4900e-003**	**0.0665**	**0.0784**	**2.2000e-004**	**0.0112**	**8.4000e-004**	**0.0120**	**2.9900e-003**	**7.7000e-004**	**3.7600e-003**	**0.0000**	**19.5345**	**19.5345**	**4.7000e-004**	**0.0000**	**19.5444**

3.12 11 Commissioning - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0221	0.2427	0.1555	2.8000e-004		0.0115	0.0115		0.0106	0.0106	0.0000	26.5105	26.5105	8.0000e-003	0.0000	26.6784
Total	**0.0221**	**0.2427**	**0.1555**	**2.8000e-004**		**0.0115**	**0.0115**		**0.0106**	**0.0106**	**0.0000**	**26.5105**	**26.5105**	**8.0000e-003**	**0.0000**	**26.6784**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3500e-003	0.0303	0.0146	7.0000e-005	1.7100e-003	3.9000e-004	2.1000e-003	4.7000e-004	3.6000e-004	8.3000e-004	0.0000	6.6243	6.6243	4.0000e-005	0.0000	6.6252
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3700e-003	5.0400e-003	0.0419	7.0000e-005	6.5700e-003	5.0000e-005	6.6200e-003	1.7500e-003	4.0000e-005	1.7900e-003	0.0000	5.3430	5.3430	3.3000e-004	0.0000	5.3499
Total	**3.7200e-003**	**0.0353**	**0.0565**	**1.4000e-004**	**8.2800e-003**	**4.4000e-004**	**8.7200e-003**	**2.2200e-003**	**4.0000e-004**	**2.6200e-003**	**0.0000**	**11.9673**	**11.9673**	**3.7000e-004**	**0.0000**	**11.9751**

3.12 11 Commissioning - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0221	0.2427	0.1555	2.8000e-004		0.0115	0.0115		0.0106	0.0106	0.0000	26.5105	26.5105	8.0000e-003	0.0000	26.6784
Total	**0.0221**	**0.2427**	**0.1555**	**2.8000e-004**		**0.0115**	**0.0115**		**0.0106**	**0.0106**	**0.0000**	**26.5105**	**26.5105**	**8.0000e-003**	**0.0000**	**26.6784**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3500e-003	0.0303	0.0146	7.0000e-005	1.7100e-003	3.9000e-004	2.1000e-003	4.7000e-004	3.6000e-004	8.3000e-004	0.0000	6.6243	6.6243	4.0000e-005	0.0000	6.6252
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3700e-003	5.0400e-003	0.0419	7.0000e-005	6.5700e-003	5.0000e-005	6.6200e-003	1.7500e-003	4.0000e-005	1.7900e-003	0.0000	5.3430	5.3430	3.3000e-004	0.0000	5.3499
Total	**3.7200e-003**	**0.0353**	**0.0565**	**1.4000e-004**	**8.2800e-003**	**4.4000e-004**	**8.7200e-003**	**2.2200e-003**	**4.0000e-004**	**2.6200e-003**	**0.0000**	**11.9673**	**11.9673**	**3.7000e-004**	**0.0000**	**11.9751**

3.13 12 Demobilization - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.0900e-003	0.0304	0.0226	3.0000e-005		1.6800e-003	1.6800e-003		1.5500e-003	1.5500e-003	0.0000	2.9851	2.9851	9.0000e-004	0.0000	3.0040
Total	**3.0900e-003**	**0.0304**	**0.0226**	**3.0000e-005**		**1.6800e-003**	**1.6800e-003**		**1.5500e-003**	**1.5500e-003**	**0.0000**	**2.9851**	**2.9851**	**9.0000e-004**	**0.0000**	**3.0040**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3900e-003	2.9600e-003	0.0246	4.0000e-005	3.8700e-003	3.0000e-005	3.8900e-003	1.0300e-003	3.0000e-005	1.0500e-003	0.0000	3.1430	3.1430	1.9000e-004	0.0000	3.1470
Total	**1.3900e-003**	**2.9600e-003**	**0.0246**	**4.0000e-005**	**3.8700e-003**	**3.0000e-005**	**3.8900e-003**	**1.0300e-003**	**3.0000e-005**	**1.0500e-003**	**0.0000**	**3.1430**	**3.1430**	**1.9000e-004**	**0.0000**	**3.1470**

3.13 12 Demobilization - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.0900e-003	0.0304	0.0226	3.0000e-005		1.6800e-003	1.6800e-003		1.5500e-003	1.5500e-003	0.0000	2.9851	2.9851	9.0000e-004	0.0000	3.0040
Total	**3.0900e-003**	**0.0304**	**0.0226**	**3.0000e-005**		**1.6800e-003**	**1.6800e-003**		**1.5500e-003**	**1.5500e-003**	**0.0000**	**2.9851**	**2.9851**	**9.0000e-004**	**0.0000**	**3.0040**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3900e-003	2.9600e-003	0.0246	4.0000e-005	3.8700e-003	3.0000e-005	3.8900e-003	1.0300e-003	3.0000e-005	1.0500e-003	0.0000	3.1430	3.1430	1.9000e-004	0.0000	3.1470
Total	**1.3900e-003**	**2.9600e-003**	**0.0246**	**4.0000e-005**	**3.8700e-003**	**3.0000e-005**	**3.8900e-003**	**1.0300e-003**	**3.0000e-005**	**1.0500e-003**	**0.0000**	**3.1430**	**3.1430**	**1.9000e-004**	**0.0000**	**3.1470**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	6.1000e-004	1.6900e-003	7.3400e-003	1.0000e-005	0.1844	2.0000e-005	0.1845	0.0185	2.0000e-005	0.0185	0.0000	0.9830	0.9830	5.0000e-005	0.0000	0.9840
Unmitigated	6.1000e-004	1.6900e-003	7.3400e-003	1.0000e-005	0.1844	2.0000e-005	0.1845	0.0185	2.0000e-005	0.0185	0.0000	0.9830	0.9830	5.0000e-005	0.0000	0.9840

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	1.00	0.00	0.00	2,467	2,467
Total	1.00	0.00	0.00	2,467	2,467

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	10.00	5.00	77.00	61.00	37.00	2.00	100	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.488644	0.036147	0.211789	0.155303	0.049980	0.007496	0.019734	0.013964	0.001908	0.002194	0.008100	0.001610	0.003131

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.6636	3.0000e-005	1.0000e-005	0.6661
Unmitigated	0.6636	3.0000e-005	1.0000e-005	0.6661

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0.651702	0.6636	3.0000e-005	1.0000e-005	0.6661
Total		**0.6636**	**3.0000e-005**	**1.0000e-005**	**0.6661**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0.651702	0.6636	3.0000e-005	1.0000e-005	0.6661
Total		**0.6636**	**3.0000e-005**	**1.0000e-005**	**0.6661**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Rough Terrain Forklifts	1	8.00	4	120	0.40	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Rough Terrain Forklifts	5.1000e-004	6.5000e-003	5.6600e-003	1.0000e-005		3.6000e-004	3.6000e-004		3.3000e-004	3.3000e-004	0.0000	0.7789	0.7789	2.3000e-004	0.0000	0.7838
Total	**5.1000e-004**	**6.5000e-003**	**5.6600e-003**	**1.0000e-005**		**3.6000e-004**	**3.6000e-004**		**3.3000e-004**	**3.3000e-004**	**0.0000**	**0.7789**	**0.7789**	**2.3000e-004**	**0.0000**	**0.7838**

10.0 Vegetation

Appendix B
Biological Survey Report for the Solar Photovoltaic Project at East Housing Area, Vandenberg Air Force Base (including Wetland Delineation forms)

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BIOLOGICAL SURVEY REPORT

FOR THE
SOLAR PHOTOVOLTAIC PROJECT

FORMER EAST HOUSING AREA
VANDENBERG AIR FORCE BASE
XUMU302290

Prepared for:

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URS Project Number 28910227

April 2014

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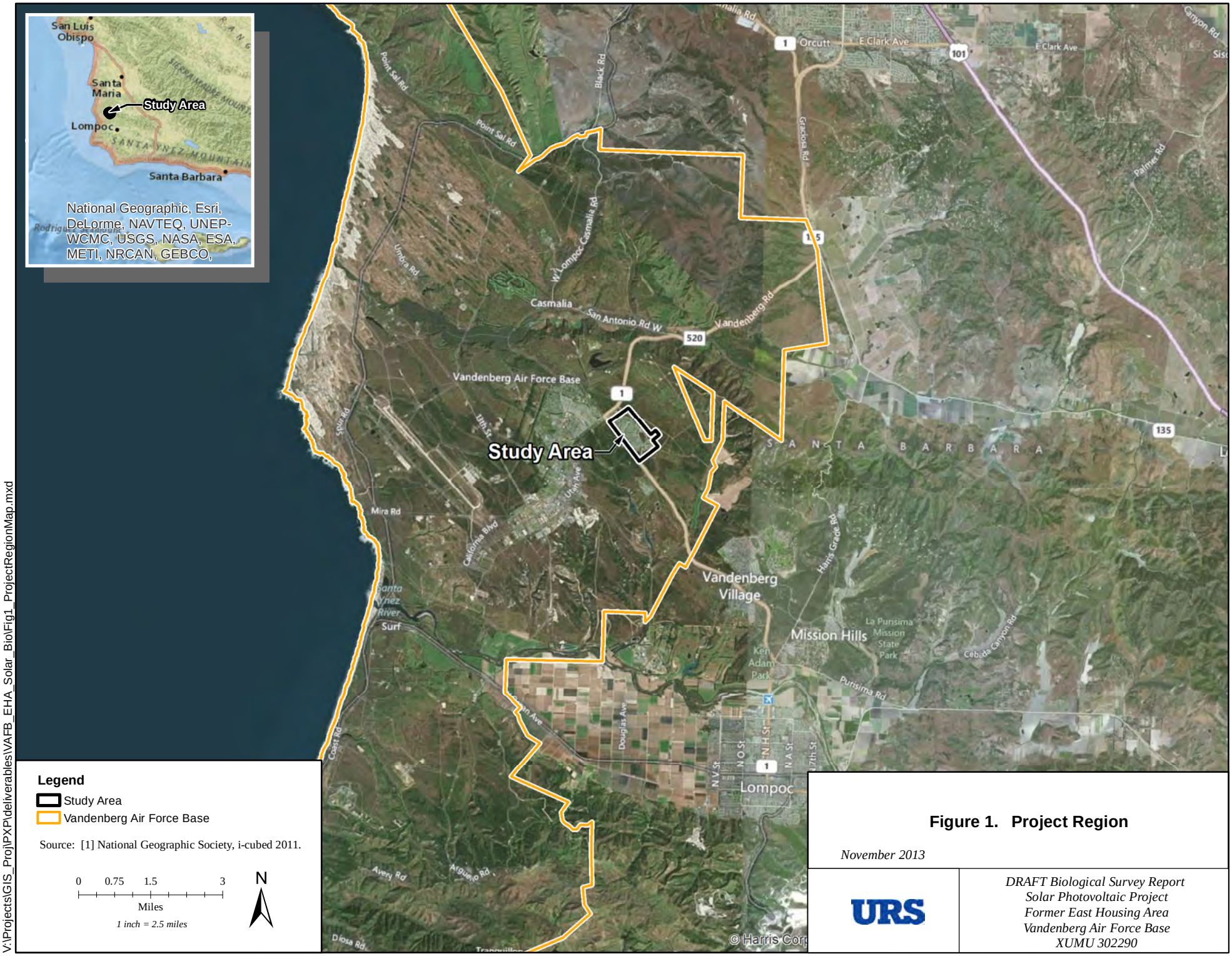
SECTION 1.0
INTRODUCTION

Vandenberg Air Force Base (AFB) proposes construction of a solar photovoltaic facility capable of producing 10 to 30 megawatts of electrical power. The electricity that is generated will be used by the Base to augment its existing demand.

The facility is proposed to be located on a study area known as the East Housing Area, which is a 300-acre study area located near the Santa Maria gate to the Base at the intersection of U.S. Highway 1 and California Boulevard in northern Santa Barbara County, California. It is located on the U.S. Geological Survey (USGS) Surf and Casmalia 7.5 minute topographic quadrangles (Figures 1 and 2). The coordinates at the center of the project are N 34.746628° W - 120.511118° (NAD83).

The 345-acre study area was developed as a residential neighborhood in the 1950s, and included several hundred homes, utilities, roads, and schools. Approximately 145 acres were left undeveloped and remain undeveloped today (Figure 3). Demolition of the neighborhood was completed in 2012. All that remains are some of the asphalt-paved streets and ornamental and native trees. Most of the study area has been recently tilled, and is unvegetated bare ground. Photographs of the study area are provided in Appendix A.

Vandenberg AFB intends to protect and buffer significant biological resources. The purpose of the Biological Survey Report is to identify and describe the biological resources of the study area.



Legend

- Study Area
- Vandenberg Air Force Base

Source: [1] National Geographic Society, i-cubed 2011.

0 0.75 1.5 3
Miles
1 inch = 2.5 miles

N

Figure 1. Project Region

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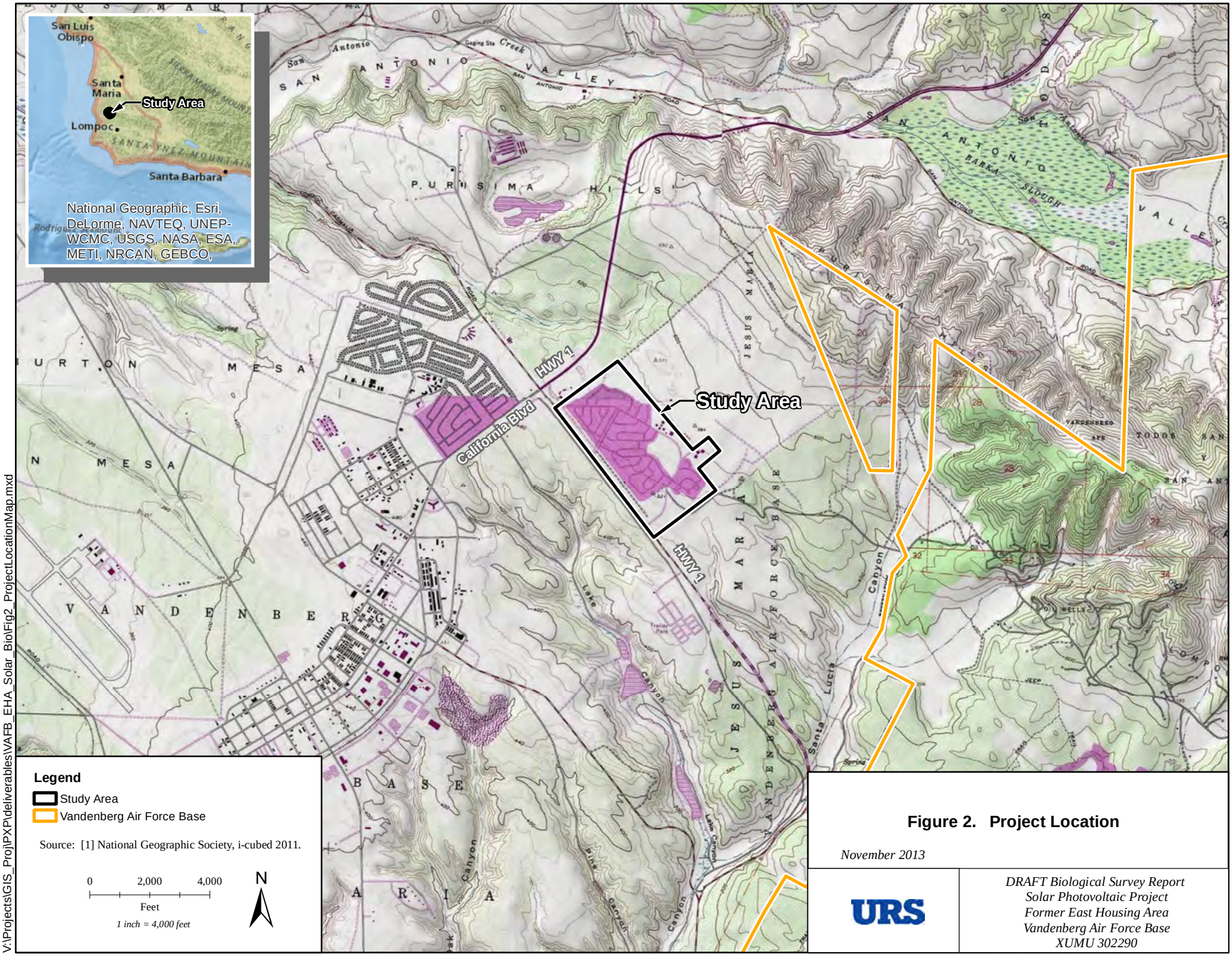

Figure 2. Project Location

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Figure 3. East Housing Area Pre-Demolition

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SECTION 2.0
PROJECT DESCRIPTION

2.1 STUDY AREA

The Study Area is located on the former East Housing Area on Vandenberg Air Force Base (AFB), northwest of the City of Lompoc, California (Figures 1 and 2). The coordinates at the approximate center of the project are N 34.746628° W - 120.511118° (NAD83). The exact boundaries of the project have not yet been determined, as the Base will use the findings of this report to design the project to avoid significant biological resources.

2.2 PROJECT DESCRIPTION DETAILS

The project consists of construction of a ground-mounted photovoltaic solar power generating facility capable of producing 10 to 30 megawatts. The power will be used by the Base to augment its existing electrical power supply. The facility is expected to encompass a maximum of 230 acres out of the 345-acre study area.

SECTION 3.0
METHODS

Existing biological resources data within the study area and nearby vicinity provided by Vandenberg AFB, and data obtained from the California Department of Fish and Wildlife (CDFW) Natural Diversity Database (CDFW 2013), were searched within the Study Area and a 1-mile radius for the presence of threatened and endangered species, as well as sensitive species and communities (Appendix B).

URS biologist Elihu Gevirtz surveyed a portion of the study area shown on Figure 4 on November 4, 2013 from 9:45 a.m. to 5:30 p.m., and URS biologists Elihu Gevirtz and Johanna Kisner surveyed the remainder of the Study Area on November 5, 2013 from 9:45 a.m. to 5:10 p.m. The survey was conducted by walking meandering transects through or adjacent to all vegetated areas. Some areas could only be viewed from the perimeter due to the density of the shrubs and/or trees. Plant and lichen species were identified by examining them in the field. Animal species were identified by sight, sound, tracks, and scat, using 10x power binoculars when necessary. Areas identified by Vandenberg AFB as potential California red-legged frog (Threatened) breeding habitats were inspected and evaluated to determine breeding suitability. All species observations were recorded in the field. Vegetation communities were mapped by hand marking on an aerial photograph. Relevant biological features including oak trees, inactive bird nests, drainages, and wetland vegetation were photographed and the locations were recorded with a hand-held GPS unit (Garmin GPSmap 60CSx). Results of the surveys are both preliminary and limited due to the season in which they were conducted, as November is outside of the flowering season for annual plant species, and it is outside of the breeding bird season.

Vegetation communities are classified using *A Manual of California Vegetation* (Sawyer *et al.* 2009), which establishes systematic classifications and definitions of vegetation communities. The vegetation mapping is based on observations within the study area, and analysis of aerial photography conducted in the office. The vegetation map is preliminary and can be refined further with additional field work. The taxonomy used in this report uses Baldwin 2012, Crother 2008, The American Ornithologist's Union 2013, and Baker et *al*. 2003. This report was prepared by URS biologist Elihu Gevirtz.

SECTION 4.0
RESULTS

4.1 WEATHER

The weather ranged from 55 to 70 degrees Fahrenheit (°F), sunny, blue skies, with excellent visibility and wind speeds ranging from 0 to 15 miles per hour.

4.2 BOTANICAL RESOURCES

A total of 73 species of plants and one (1) lichen species were observed (Table 1). Several ornamental landscape species were not identified and therefore not included in the list. It is very likely that surveys in spring and summer would add additional plant species to the species list. Therefore, this inventory should be considered preliminary.

4.3 VEGETATION

4.3.1 Disturbed/Ruderal

Most of the study area (approximately 188 acres) is highly disturbed. These are areas that were previously developed as a residential neighborhood. The neighborhood has been demolished, and now, all that remains is bare ground and no vegetation other than ornamental trees and some native trees that were part of the landscape of the neighborhood. An additional 35 acres is ruderal. Photographs are provided in Appendix A.

4.3.2 Burton Mesa Chaparral

Burton Mesa chaparral (*Arctostaphylos* [*purissima, rudis*] Shrubland Special Stands) is a rare native plant community that is endemic to old stabilized dune sands near the coast of northern Santa Barbara County between 25 and 150 meters in elevation. Shrubs are less than 5 meters in height (Gevirtz *et al.* 2007, Sawyer *et al.* 2009).

Within the study area, this community encompasses approximately 75 acres (Figure 4). Here, Burton Mesa chaparral is dominated by La Purisima manzanita (*Arctostophylos purissima*) and Santa Barbara ceanothus (*Ceanothus impressus*). Shagbark manzanita (*Arctostaphylos rudis*) and Lompoc ceanothus (*Ceanothus cuneatus* var. *fascicularis*), and possibly a hybrid manzanita (*Arctostaphylos purissima x Arctostaphylos rudis*) also occur in the community. Other associated shrubs include coffee berry (*Rhamnus californica*), chamise (*Adenostoma fasciculatum*), black sage (*Salvia mellifera*), coyote bush (*Baccaris pilularis* subsp. *consanguinea*), mock heather (*Ericameria ericoides*), coastal sage brush (*Artemisia californica*), and bush monkey flower (*Mimulus aurantiacus*). Coast live oak trees (*Quercus agrifolia* var. *agrifolia*) (many of them multi-trunked) are a common component of this

TABLE 1
PLANT AND LICHEN SPECIES OBSERVED
NOVEMBER 4 AND 5, 2013
VANDENBERG AIR FORCE BASE EAST HOUSING AREA

Family	Latin Name	Common Name	Status*	Native or Exotic	Invasive
Aceraceae	*Acer* sp.	Maple		E	
Aizoaceae	*Carpobrotus edulis*	Ice plant		E	x
Anacardiaceae	*Schinus molle*	Pepper tree		E	
Anacardiaceae	*Toxicodendron diversilobum*	Poison oak		N	
Asteraceae	*Ambrosia psilostachya*	Ragweed		N	
Asteraceae	*Artemisia californica*	Coastal sage brush		N	
Asteraceae	*Baccharis pilularis* subsp. *consanguinea*	Coyote bush		N	
Asteraceae	*Carduus pycnocephalus*	Italian thistle		E	x
Asteraceae	*Cirsium vulgare*	Bull thistle		E	x
Asteraceae	*Corethrogyne filaginifolia*	Common sand aster			
Asteraceae	*Ericameria ericoides*	Mock heather		N	
Asteraceae	*Heterotheca grandiflora*	Telegraph weed		N	
Asteraceae	*Isocoma menziessi*	Menzie's goldenbush		N	
Betulaceae	*Betula* sp.	Birch tree		E	
Boraginaceae	*Heliotropium curassavicum*	Salt heliotrope		N	
Brassicaceae	*Brassica rapa*	Field mustard		E	x
Brassicaceae	*Lobularia maritime*	Sweet alyssum		E	
Cactaceae	*Opuntia littoralis*	Coastal prickly pear		N	
Chenopodiaceae	*Atriplex semibaccata*	Australian saltbush		E	
Cistaceae	*Helianthemum scoparium*	Common sun rose		N	

TABLE 1 (CONTINUED)
PLANT AND LICHEN SPECIES OBSERVED
NOVEMBER 4 AND 5, 2013
VANDENBERG AIR FORCE BASE EAST HOUSING AREA

Family	Latin Name	Common Name	Status*	Native or Exotic	Invasive
Cupressaceae	*Cupressus macrocarpa*	Monterey cypress		E	
Ericaceae	*Arctostaphylos purissima*	La Purisima manzanita	Endemic 1B.1	N	
Ericaceae	*Arctostaphylos rudis*	Shagbark manzanita	Endemic 1B.2	N	
Ericaceae	*Arctostaphylos rudis* x *purissima* (?)	Hybrid (?) manzanita	Endemic	N	
Euphorbiaceae	*Croton californicus*	California croton		N	
Fabaceae	*Acmispon glaber*	Deerweed		N	
Fagaceae	*Quercus agrifolia* var. *agrifolia*	Coast live oak		N	
Fagaceae	*Quercus agrifolia* x *parvula* (?)	Live oak hybrid (?)		N	
Fagaceae	*Quercus* sp.	Oak		E	
Geraniaceae	*Erodium cicutarium*	Redstem filaree		E	
Geraniaceae	*Geranium* sp.				
Juncaceae	*Juncus patens* (?)	Common rush (?)		N	
Juncaceae	*Juncus textilis*	Basket rush		N	
Lamiaceae	*Marrubium vulgare*	Horehound		E	
Lamiaceae	*Rosmarinus officinalis*	Rosemary		E	
Lamiaceae	*Salvia mellifera*	Black sage		N	
Liliaceae	*Agave* spp.			E	
Malvaceae	*Malva parviflora*	Cheeseweed		E	
Myricaceae	*Myrica californica*	Pacific wax myrtle		N	
Myrtaceae	*Callistemon* sp.	Bottlebrush tree		E	

TABLE 1 (CONTINUED)
PLANT AND LICHEN SPECIES OBSERVED
NOVEMBER 4 AND 5, 2013
VANDENBERG AIR FORCE BASE EAST HOUSING AREA

Family	Latin Name	Common Name	Status*	Native or Exotic	Invasive
Myrtaceae	*Eucalyptus globulus*	Blue gum		E	x
Myrtaceae	*Eucalyptus sideroxylon*	Red iron bark		E	
Myrtaceae	*Eucalyptus* sp.	Eucalyptus		E	x
Oleaceae	*Olea europea*	Olive		E	
Oxalidaceae	*Oxalis corniculata*	Creeping wood sorrel			
Phrymaceae	*Mimulus aurantiacus*	Bush monkey flower		N	
Pinaceae	*Pinus radiate*	Monterey pine		E	x
Pinaceae	*Pinus* spp.	Pine		E	x
Plantaginaceae	*Plantago coronopus*	Cut-leaved plantain		E	
Plantaginaceae	*Plantago lanceolata*	English plantain		E	
Platanaceae	*Platanus racemosa*	Western sycamore		N	
Platanaceae	*Platanus* x *acerifolia*	London plane tree		E	
Poaceae	*Avena barbata*	Slender oat		E	x
Poaceae	*Bromus diandrus*	Ripgut grass		E	x
Poaceae	*Bromus hordeaceus*	Soft chess		E	
Poaceae	*Cortaderia jubata*	Pampas grass		E	x
Poaceae	*Cynodon dactylon*	Bermuda grass		E	x
Poaceae	*Distichlis spicata*	Salt grass		N	
Poaceae	*Ehrharta calycina*	Veldt grass		E	x
Poaceae	*Elymus condensatus*	Giant wild rye		N	

TABLE 1 (CONTINUED)
PLANT AND LICHEN SPECIES OBSERVED
NOVEMBER 4 AND 5, 2013
VANDENBERG AIR FORCE BASE EAST HOUSING AREA

Family	Latin Name	Common Name	Status*	Native or Exotic	Invasive
Poaceae	*Elymus triticoides*	Beardless wild rye		N	
Poaceae	*Pennisetum clandestinum*	Kikiyu grass		E	x
Polygonaceae	*Rumex* sp.	Dock			
Ramalinaceae	*Ramalina menziesii*	California Spanish moss		N	
Rhamnaceae	*Ceanothus cuneatus var. fascicularis*	Lompoc ceanothus	Endemic 4.2	N	
Rhamnaceae	*Ceanothus impressus*	Santa Barbara ceanothus	Endemic CBR	N	
Rhamnaceae	*Ceanothus* sp. (?)	Ceanothus			
Rhamnaceae	*Rhamnus californica*	Coffee berry		N	
Rosaceae	*Adenostoma fasciculatum*	Chamise		N	
Rosaceae	*Horkelia cuneata subsp. Cuneata*	Wedge leaved horkelia		N	
Rubiaceae	*Galium* sp.				
Salicaceae	*Salix lasiolepis*	Arroyo willow		N	
Typhaceae	*Typha* (*domingensis*?)	(Southern?) cattail		N	
Unknown		Fan palm		E	x

Taxonomy follows:
Baldwin, B. G., D. H. Holdman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken, editors. 2012.
1B.1 – Rare throughout its range. Seriously threatened.
1B.2 – Rare throughout its range. Moderately threatened.
4.2 – Uncommon, and Limited Distribution.
CBR
* Source: California Native Plant Society 2013.

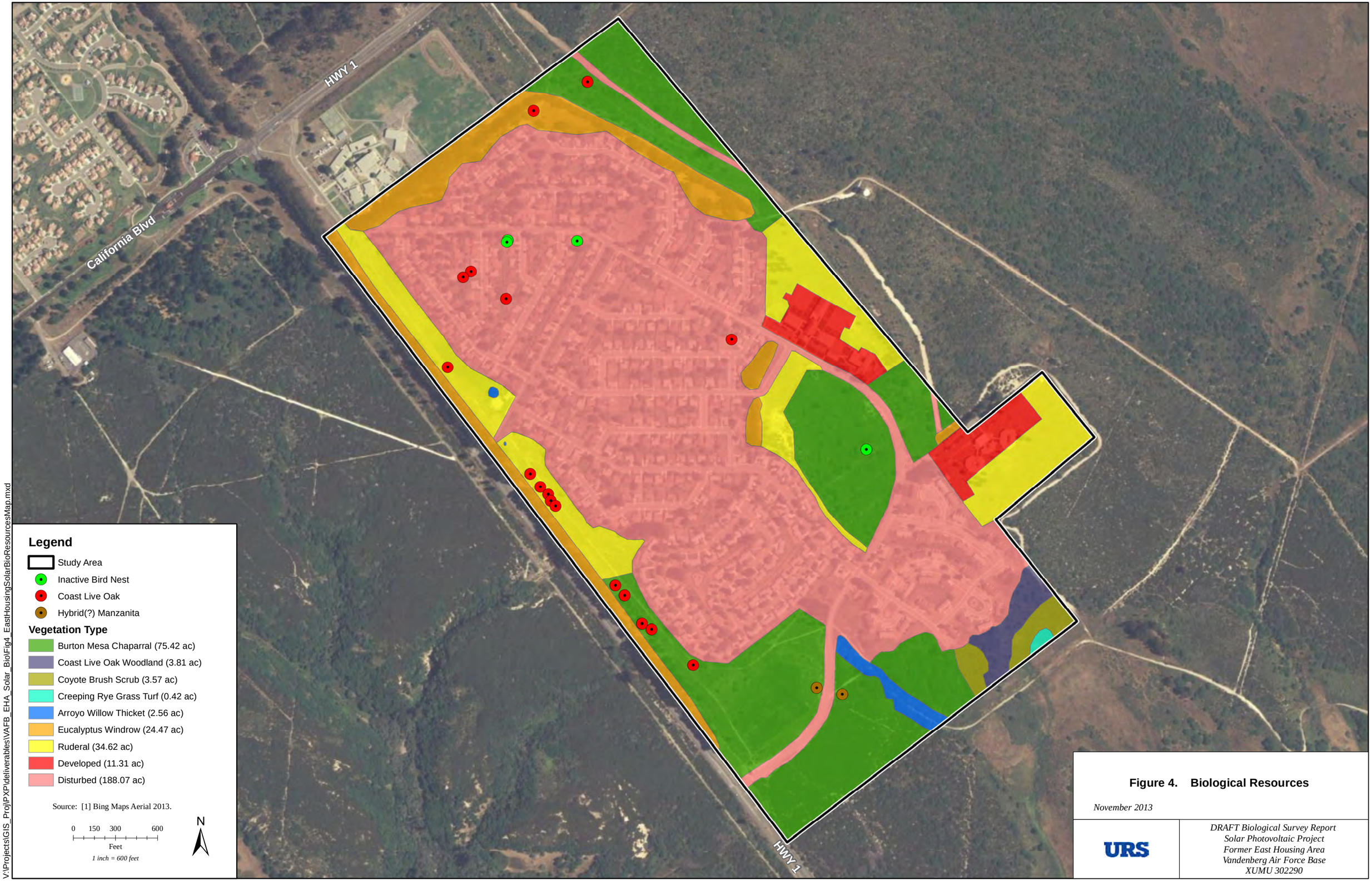

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Figure 4. Biological Resources

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community. Openings in this community appear to be suitable for Vandenberg monkeyflower (*Diplacus vandenbergensis*) (proposed Endangered). Because it is an annual that flowers in the spring, it would not have been visible during the November surveys. Invasive weeds in this community include iceplant (*Carpobrotus edulis*), pampas grass (*Cortaderia jubata*), and veldt grass (*Ehrharta calycina*). Photographs are provided in Appendix A.

The shrubs on the north side of Mountain View Boulevard within roughly 150 feet of the road are stunted and are generally less than three (3) feet tall; whereas across the street, shrubs of the same species are generally greater than six (6) feet tall. The stunted individuals may be the result of a shallow hard pan beneath the soil surface.

4.3.3 Eucalyptus Windrows

Eucalyptus windrows (*Eucalyptus* [*globulus, camaldulensis*] Semi-Natural Wodland Stands) are comprised of trees less than 50 meters tall, with a canopy that is intermittent to continuous. Understories in groves are usually depauperate. They are native to Australia, and once planted, often become naturalized (Sawyer *et al.* 2009). Within the study area these windrows are planted in monotypic long rows (or parallel rows) of blue gum (*Eucalyptus globulus*). (See photographs in Appendix A.) They comprise approximately 25 acres, and are planted: 1) along and parallel to U.S. Highway 1, 2) along the northwesterly study area boundary, 3) along the northeasterly boundary, and 4) in the middle of the study area (Figure 4).

4.3.4 Ruderal

Approximately 35 acres of ruderal vegetation occurs within the study area (Figure 4). These areas are comprised of mostly non-native weeds, including iceplant, and non-native grasses such as veldt grass, ripgut grass (*Bromus diandrus*), oat (*Avena* sp.), and others. In addition, the vegetated recreation areas on the active and inactive school study areas within the study area are also mapped as ruderal.

4.3.5 Arroyo Willow Thickets

Arroyo willow thickets (*Salix lasiolepis* shrubland alliance) grow along stream banks and benches that are seasonally or intermittently flooded. They occur throughout much of California between 0 and 2,170 meters in elevation. They are characterized by dominant or co-dominant arroyo willows in the shrub or tree canopy. The plants are less than 10 meters tall (Sawyer *et al.* 2009). The U.S Fish and Wildlife Service (USFWS) Wetland Inventory (1996 national list) recognizes *Salix lasiolepis* as a facultative wetland (FACW) plant (USFWS 1996). Within the study area, arroyo willow thickets encompass approximately 2.6 acres. Associated species include Pacific wax myrtle (*Myrica californica*) and others such as basket rush (*Juncus textilis*) or salt grass (*Distichlis spicata*). The largest area is associated

with an unnamed drainage in the southeastern portion of the study area. There is extensive pampas grass in this area, particularly along the roadsides. There is also an isolated thicket in the northwestern area of the study area (Figure 4).

4.3.6 Coyote Brush Scrub

Coyote brush scrub or "coastal sage scrub" (*Baccharis pilularis* Shrubland Alliance) is a community made up of shrubs less than three (3) meters in height. Stands can be both transitory or persist for a long time. Coyote brush invades grasslands, forming stands in the absence of fire (Sawyer *et al.* 2009). Within the study area, approximately four (4) acres of coyote brush scrub dominated by coyote brush and coastal sage brush (*Artemisia californica*) are located in the southeastern portion of the study area (Figure 4).

4.3.7 Coast Live Oak Woodland

Coast live oak woodland (*Quercus agrifolia* Woodland Alliance) is dominated by coast live oak trees that grow to 25 meters in height (Sawyer *et al.* 2009).Within the study area, approximately four (4) acres of coast live oak woodland occurs at the southeast end of the study area.

4.3.8 Creeping Rye Grass Turf

Creeping rye grass turf (previously called "wet meadow") (*Leymus triticoides* Herbaceous Alliance) is an herbaceous community less than one (1) meter in height. It occurs in poorly drained floodplains, drainage and valley bottoms, mesic flat to sloping topography, and marsh margins (Sawyer *et al.* 2009). Approximately 0.4 acre of creeping rye grass turf is located in the southeast corner of the study area on the edge of a grassland that is offsite (Figure 4). The meadow is vegetated by beardless wild rye (*Elymus triticoides*), common rush (*Juncus patens*?), and a sedge (*Carex* sp.?).

4.4 WILDLIFE RESOURCES

A total of 35 animal species or their sign were observed during biological surveys of the Project site in November 2013, including one amphibian, one reptile, 27 birds, and six mammals. Because the surveys were conducted during the fall/winter season and were limited to pedestrian observations, it is likely that additional wildlife, possibly including fossorial, cryptic, nocturnal, or migratory species, may utilize the site but may have avoided detection during the survey. However, the winter timing of the survey did allow for the detection of wintering birds, some of which would not have been detectable during a breeding-season survey.

A total of three sensitive birds were detected during the surveys, including the Nuttall's woodpecker, loggerhead shrike, and oak titmouse. All three of these species occur in the

region year-round. In addition to these three sensitive taxa, a total of 22 common migratory birds that receive federal protection under the Migratory Bird Treaty Act (16 U.S.C. 703-712) were detected on-site during surveys. A complete list of wildlife observed during surveys is presented in the Biological Survey Report for the Project (URS 2013; see Appendix B).

No federally- or state-listed threatened or endangered wildlife, or their sign, were detected within the Project site. Because the survey was conducted during the winter months, care was taken to explore on-site habitat features that may have been suitable for sensitive species at other times of year (trees suitable for nesting raptors, or areas that may accumulate ponded water during rains, for example).

TABLE 2
ANIMAL SPECIES OBSERVED
NOVEMBER 4 AND 5, 2013
VANDENBERG AIR FORCE BASE EAST HOUSING AREA

Order	Family	Species	Common Name
Amphibians			
Anura	Ranidae	*Pseudacris hypochondriaca hypochondriaca*	Northern Baja California treefrog
Reptiles			
Squamata	Iguanidae	*Uta stansburiana*	Common side-blotched lizard
Birds			
Galliformes	Odontophoridae	*Callipepla californica*	California quail
Accipitriformes	Cathartidae	*Cathartes aura*	Turkey vulture
Accipitriformes	Accipitridae	*Buteo jamaicensis*	Red-tailed hawk
Columbiformes	Columbidae	*Zenaida macroura*	Mourning dove
Strigiformes	Strigidae	*Bubo virginianus*	Great horned owl
Apodiformes	Trochilidae	*Calypte anna*	Anna's hummingbird
Piciformes	Picidae	*Sphyrapicus ruber*	Red-breasted sapsucker
Piciformes	Picidae	*Picoides nuttallii*	Nuttall's woodpecker
Piciformes	Picidae	*Colaptes auratus*	Northern flicker
Falconiformes	Falconidae	*Falco sparverius*	American kestrel
Passeriformes	Tyrannidae	*Sayornis nigricans*	Black phoebe
Passeriformes	Tyrannidae	*Tyrannus verticalis*	Western kingbird
Passeriformes	Laniidae	*Lanius ludovicianus*	Loggerhead shrike
Passeriformes	Corvidae	*Aphelocoma californica*	Western scrub-jay
Passeriformes	Corvidae	*Corvus brachyrhynchos*	American crow

TABLE 2 (CONTINUED)
ANIMAL SPECIES OBSERVED
NOVEMBER 4 AND 5, 2013
VANDENBERG AIR FORCE BASE EAST HOUSING AREA

Order	Family	Species	Common Name
Passeriformes	Paridae	*Baeolophus inornatus*	Oak titmouse
Passeriformes	Regulidae	*Regulus calendula*	Ruby-crowned kinglet
Passeriformes	Sylviidae	*Chamaea fasciata*	Wrentit
Passeriformes	Turdidae	*Sialia Mexicana*	Western bluebird
Passeriformes	Sturnidae	*Sturnus vulgaris*	European starling
Passeriformes	Parulidae	*Setophaga petechial*	Yellow warbler
Passeriformes	Parulidae	*Setophaga coronate*	Yellow-rumped warbler
Passeriformes	Emberizidae	*Pipilo maculatus*	Spotted towhee
Passeriformes	Emberizidae	*Melozone crissalis*	California towhee
Passeriformes	Emberizidae	*Zonotrichia leucophrys*	White-crowned sparrow
Passeriformes	Emberizidae	*Junco hyemalis*	Dark-eyed junco
Passeriformes	Fringillidae	*Haemorhous mexicanus*	House finch
Mammals			
Lagomorpha	Leporidae	*Sylvilagus bachmani*	Brush rabbit
Rodentia	Geomyidae	*Thomomys bottae*	Botta's pocket gopher
Rodentia	Muridae	*Neotoma fuscipes*	Dusky-footed woodrat
Carnivora	Canidae	*Canas latrans*	Coyote
Artiodactyla	Suidae	*Sus scrofa*	Feral pig
Artiodactyla	Cervidae	*Odocoileus hemionus*	Mule deer

Taxonomy follows:
Crother, B. I. (ed.). 2008.
The American Ornithologist's Union 2013.
Baker, R.J., Bradley, L.C., Bradley, R.D., Dragoo, J.W., Engstrom, M.D., Hoffmann, R.S., Jones, C.A., Reid, F., Rice, D.W., and Jones, C. 2003.

SECTION 5.0
THREATENED AND ENDANGERED SPECIES AND SPECIAL-STATUS SPECIES

5.1 THREATENED AND ENDANGERED SPECIES

No federal threatened or endangered species were observed.

5.1.1 Vandenberg Monkeyflower (*Diplacus vandenbergensis*) (Proposed Endangered)

Suitable habitat for Vandenberg monkeyflower exists within openings between the shrubs of the Burton Mesa chaparral. This species is an annual that flowers in the spring, and would not be expected to be present at the time of the November surveys.

5.1.2 California Red-legged Frog (*Rana draytonii*) (Threatened)

The California Natural Diversity Database does not indicate the presence of California red-legged frog within one (1) mile of the study area (Appendix B). GIS data obtained from Vandenberg AFB includes three (3) mapped locations identified as potential habitat for this species. The biologists visited all three (3) locations, although access to the willow thicket was limited due to the density of the vegetation. If moisture is present, these areas may serve as transitory or summer refuge sites, but none of these areas appear to contain suitable breeding habitat, based on suspected insufficient duration of ponding. It is recommended that habitat suitability surveys be conducted during the rainy season after it has rained to determine the level and duration of ponding in these areas and the type of habitat they would provide for California red-legged frog.

5.2 SPECIAL STATUS SPECIES

Four (4) endemic plant species are on the study area (Table 3). Two (2) of these have been assigned sensitivity designations by the California Native Plant Society Rank 1 (rare throughout the range), and one (1) is Rank 4 (uncommon and limited distribution). Three (3) sensitive animal species occur within the study area (Table 4).

TABLE 3
SPECIAL STATUS PLANT SPECIES

Common Name	Latin Name	Status
La Purisima manzanita	*Arctostaphylos purissima*	1B.1; Endemic
Shagbark manzanita	*Arctostaphylos rudis*	1B.2; Endemic
Lompoc ceanothus	*Ceanothus cuneatus* var. *fascicularis*	4.2; Endemic
Santa Barbara ceanothus	*Ceanothus impressus*	Endemic

TABLE 4
SPECIAL STATUS ANIMAL SPECIES

Common Name	Latin Name	Status
Nuttall's Woodpecker	*Picoides nuttallii*	Bird of Conservation Concern State Species of Special Concern Santa Barbara Audubon Watch List
Loggerhead Shrike	*Lanius ludovicianus*	Bird of Conservation Concern State Species of Special Concern
Oak Titmouse	*Baeolophus inornatus*	Bird of Conservation Concern Santa Barbara Audubon Watch List

SECTION 6.0
MIGRATORY BIRD TREATY ACT

Twenty-five bird species observed on this study area are protected by the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703–712) (Table 5). Additional species are likely to occur on the study area, and most of these would be protected by the MBTA.

TABLE 5
BIRDS PROTECTED BY THE
MIGRATORY BIRD TREATY ACT

Species	Common Name
Cathartes aura	Turkey Vulture
Buteo jamaicensis	Red-tailed Hawk
Zenaida macroura	Mourning Dove
Bubo virginianus	Great Horned Owl
Calypte anna	Anna's Hummingbird
Sphyrapicus ruber	Red-breasted Sapsucker
Picoides nuttallii	Nuttall's Woodpecker
Colaptes auratus	Northern Flicker
Falco sparverius	American Kestrel
Sayornis nigricans	Black Phoebe
Tyrannus verticalis	Western Kingbird
Lanius ludovicianus	Loggerhead Shrike
Aphelocoma californica	Western Scrub-Jay
Corvus brachyrhynchos	American Crow
Baeolophus inornatus	Oak Titmouse
Regulus calendula	Ruby-crowned Kinglet
Chamaea fasciata	Wrentit
Sialia mexicana	Western Bluebird
Setophaga petechia	Yellow Warbler
Setophaga coronata	Yellow-rumped Warbler
Pipilo maculatus	Spotted Towhee
Melozone crissalis	California Towhee
Zonotrichia leucophrys	White-crowned Sparrow
Junco hyemalis	Dark-eyed Junco
Haemorhous mexicanus	House Finch

SECTION 7.0
WETLANDS

Wetland delineations were conducted in the storm drain along SR-1 both south and north of Timber Lane on January 28, 2014. Wetland delineation also was conducted in the willow thicket north of Timber Lane on April 17, 2014 (see data forms in Appendix C). Although hydrophytic species were present, neither hydrology nor hydric soils were present. No wetlands or waters of the U.S. are present on the project site.

SECTION 8.0
OTHER FEATURES

8.1 OAK TREES

In addition to the coast live oaks that are part of the Burton Mesa chaparral and coast live oak woodland, there are at least 10 isolated coast live oaks within the areas mapped as "disturbed" and "ruderal", and one in a Eucalyptus windrow, as shown in Figure 4. Additional coast live oaks may be present in these areas. Many of these are multi-trunked, an unusual feature of live oaks in Burton Mesa chaparral. One (1) tree near the northwest corner of the study area is particularly large, with a canopy estimated to be 100 feet in diameter. (See photo in Appendix A.)

8.2 BIRD NESTS

Four (4) large, inactive bird nests were observed. Some of these were in non-native trees. It is not known how many of these would be used during the nesting season.

SECTION 9.0
SUMMARY AND RECOMMENDATIONS

9.1 SUMMARY

The study area supports several significant biological communities including Burton Mesa chaparral (75 acres), arroyo willow thickets (2.6 acres), coyote brush scrub (4 acres), coast live oak woodland (4 acres), and creeping rye grass turf (0.4 acre). The remainder of the study area consists of Eucalyptus windrows (25 acres), disturbed (188 acres), ruderal 35 acres), and developed (11 acres). In summary, 248 acres have low biological resource value, 11 acres are developed with schools (one in use and one not in use), and there are 86 acres of native vegetation.

The study area supports at least 73 species of plants, one (1) lichen species, and at least 35 species of animals. There is suitable habitat for Vandenberg monkeyflower (proposed endangered) and potential habitat for California red-legged frog (threatened).

9.2 RECOMMENDATIONS

Most of the study area is highly suitable for development given that 188 acres were previously developed with a residential neighborhood, and an additional 60 acres are comprised of Eucalyptus windrow, ruderal vegetation, and developed land. Nevertheless, the following recommendations are provided to minimize impacts to significant biological resources:

1. All construction personnel shall be required to attend a mandatory educational program about listed species and sensitive habitat in the project area.
2. Removal of trees should be scheduled to occur after August 15 and before February 15 to avoid the bird breeding season. If tree removal is scheduled during the bird breeding season, surveys for nesting birds should be conducted prior to disturbance of the trees. If active nests are located, they should be avoided until the young of the year have left the nest(s).
3. Any night-lighting on the site shall be the minimum required for security and safety, shielded, and directed downward and toward the interior of the site rather than toward the adjacent habitat areas in order to avoid adverse effects to nocturnal animals.
4. The project site shall be managed and monitored to prevent and eradicate invasive plant species. Requirements will be determined by 30 CES/CEIEA.
5. If landscaping will be installed on the project, a preliminary species list shall be reviewed and approved by a qualified botanist familiar with native plants of the Burton Mesa and invasive non-native species. A botanist will work with the contractor to review the

sources of seeds and propagation material, and will be on-site during landscape installation to ensure that no non-native invasive plants are planted. The botanist and contractor shall coordinate with 30 CES/CEIEA.

6. Any above ground electrical lines shall be designed and constructed to reduce the likelihood of electrocution of large birds, such as raptors, per Avian Protection Plan Guidelines developed by the Avian Power Line Interaction Committee and the USFWS (APLIC 2005). Any modification to existing power lines shall also incorporate avian protection measures.
7. Coast live oak trees and a six-foot buffer zone around each tree should be protected to the extent practical. No grading should be allowed within the buffer zone.
8. Consider selecting solar panel frames that are lighter in color (e.g., silver) to keep the facility from looking like a water body; this design feature should avoid or minimize bird collisions at the site.

SECTION 10.0
REFERENCES

The American Ornithologist's Union 2013. The AOU Check-list of North American Birds, 7th Edition, 54th Supplement.

Baker, R.J., Bradley, L.C., Bradley, R.D., Dragoo, J.W., Engstrom, M.D., Hoffmann, R.S., Jones, C.A., Reid, F., Rice, D.W., and Jones, C. 2003. Revised Checklist of North American Mammals North of Mexico, 2003. Occasional Papers Number 229. Museum of Texas Tech University. December 01.

Baldwin, B. G., D. H. Holdman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken, editors. 2012. The Jepson Manual: Vascular Plants of California. Second Edition. University of California Press, Berkeley.

California Department of Fish and Wildlife 2013. California Natural Diversity Database.

California Native Plant Society 2013. The Online CNPS Inventory of Rare and Endangered Plants (8th Edition).

Crother, B. I. (ed.). 2008. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, pp. 1–84. SSAR Herpetological Circular 37.

Gevirtz, E., M. Carroll, K. Burton, P. Collins, M. Holmgren, L. Spanne, and A. Nelson 2007. Final Land Management Plan Burton Mesa Ecological Reserve. Condor Environmental Planning Services, Inc. Prepared for State of California, The Resources Agency, Department of Fish and Game.

Sawyer, J., Keeler-Wolf, T. Evens, J. 2009. A Manual of California Vegetation. Second Edition. California Native Plant Society In collaboration with California Department of Fish and Game. Sacramento, California.

United States Fish and Wildlife Service 1996. National List of Vascular Plant Species That Occur in Wetlands: 1996 National Summary. Ecology Section. National Wetlands Inventory, Washington, DC.

APPENDIX A
PHOTOS

APPENDIX A
PHOTOS

DATE:	**NOVEMBER 4–5, 2013**
PROJECT:	**VANDENBERG SOLAR PV, BIOLOGICAL SURVEY**
CLIENT:	**VANDENBERG AIR FORCE BASE**
REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO # 2662
FACING: North
DESCRIPTION: Ditch in northwest corner of study area conveys water runoff from school. The ditch is vegetated by non-native species. Iceplant is seen here on the banks in the foreground.

APPENDIX A
PHOTOS

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URS REFERENCE NUMBER:	**28910227**

PHOTO #	2663
FACING:	South
DESCRIPTION:	Same ditch as in Photo 2662. The ditch is largely unvegetated from this point south.

APPENDIX A
PHOTOS

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REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2664
FACING: South
CAPTION: Unvegetated swale on east side of blue gum eucalyptus windrow parallel to U.S. Hwy 1.

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PHOTOS

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REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2665
FACING: Southeast
DESCRIPTION: Ruderal vegetation including iceplant and non-native grasses near westerly power line.

APPENDIX A
PHOTOS

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PROJECT:	**VANDENBERG SOLAR PV, BIOLOGICAL SURVEY**
CLIENT:	**VANDENBERG AIR FORCE BASE**
REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO: 2666
FACING: West
DESCRIPTION: Blue gum eucalyptus windrow. U.S. Hwy 1 in background.

APPENDIX A
PHOTOS

DATE:	**NOVEMBER 4–5, 2013**
PROJECT:	**VANDENBERG SOLAR PV, BIOLOGICAL SURVEY**
CLIENT:	**VANDENBERG AIR FORCE BASE**
REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2688
FACING: Southeast
CAPTION: Ruderal vegetation including iceplant, elms, eucalyptus, pine, and other non-natives.

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DATE:	**NOVEMBER 4–5, 2013**
PROJECT:	**VANDENBERG SOLAR PV, BIOLOGICAL SURVEY**
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REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO # 2669
FACING: West
DESCRIPTION: Isolated wetland vegetation. Arroyo willow thicket with pacific wax myrtle and salt grass. Later in the morning a loggerhead shrike perched on top of the willows.

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PROJECT:	**VANDENBERG SOLAR PV, BIOLOGICAL SURVEY**
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REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #	2670
LOOKING:	Southwest
DESCRIPTION:	Very large multi-trunked coast live oak with 100-foot +/- diameter canopy.

APPENDIX A
PHOTOS

DATE:	**NOVEMBER 4–5, 2013**
PROJECT:	**VANDENBERG SOLAR PV, BIOLOGICAL SURVEY**
CLIENT:	**VANDENBERG AIR FORCE BASE**
REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2671
FACING: Northwest
DESCRIPTION: Disturbed. Vegetation is absent with the exception of trees that were part of the landscape of the residential neighborhood. Most of the study area looks like this.

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PHOTOS

DATE:	**NOVEMBER 4–5, 2013**
PROJECT:	**VANDENBERG SOLAR PV, BIOLOGICAL SURVEY**
CLIENT:	**VANDENBERG AIR FORCE BASE**
REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2673
LOOKING: South
DESCRIPTION: Ruderal vegetation consisting of iceplant and non-native trees.

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PHOTOS

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REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2674
LOOKING: Northeast
DESCRIPTION: Burton Mesa chaparral in northeast corner of study area including La Purisima manzanita and Santa Barbara ceanothus.

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URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2675
FACING: Southeast
DESCRIPTION: Disturbed ground near northeast corner of study area.

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URS REFERENCE NUMBER:	**28910227**

PHOTO #: Photo 2677

LOOKING: N/A

DESCRIPTION: Burton Mesa chaparral dominated by La Purisima manzanita near southeast corner of study area.

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REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2678

LOOKING: Northwest

DESCRIPTION: Burton Mesa chaparral near southeastern corner of study area dominated by Santa Barbara ceanothus (gray) in the foreground and background, with La Purisima manzanita (green) in the middle of the photo.

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REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2682
LOOKING: West
DESCRIPTION: Ruderal vegetation including veldt grass and iceplant in and along sandy dirt road near southwest corner of the study area.

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REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2684
LOOKING: East
DESCRIPTION: Investigator standing at edge between wet meadow and non-native grassland at south end of study area.

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REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2685
DIRECTION: West
DESCRIPTION: Edge of arroyo willow thicket. Ruderal vegetated dominated by iceplant is in the foreground under the canopy of a eucalyptus tree.

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REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2686
LOOKING: West
DESCRIPTION: Dirt road through arroyo willow thicket dominated by arroyo willow with Pacific wax myrtle. Pampas grass present along the road margins.

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REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO#:	2687
LOOKING	Northwest
DESCRIPTION:	Ruderal vegetation including non-native grasses, iceplant and pine tree at abandoned school adjacent to Carob Street.

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REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2688
LOOKING: South
DESCRIPTION: Drainage ditch at Timber Lane and U.S. Highway 1 beneath canopy of blue gum eucalyptus windrow. Non-native vegetation in ditch.

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DATE:	**NOVEMBER 4–5, 2013**
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REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #	2689
LOOKING:	North
DESCRIPTON:	Ditch parallel to U.S. Highway 1 south of Timber Lane. The ditch is largely unvegetated.

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CLIENT:	**VANDENBERG AIR FORCE BASE**
REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2690
LOOKING: South
DESCRIPTION: Ditch parallel to U.S. Highway 1 south of Timber Lane.

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PHOTOS

DATE:	**NOVEMBER 4–5, 2013**
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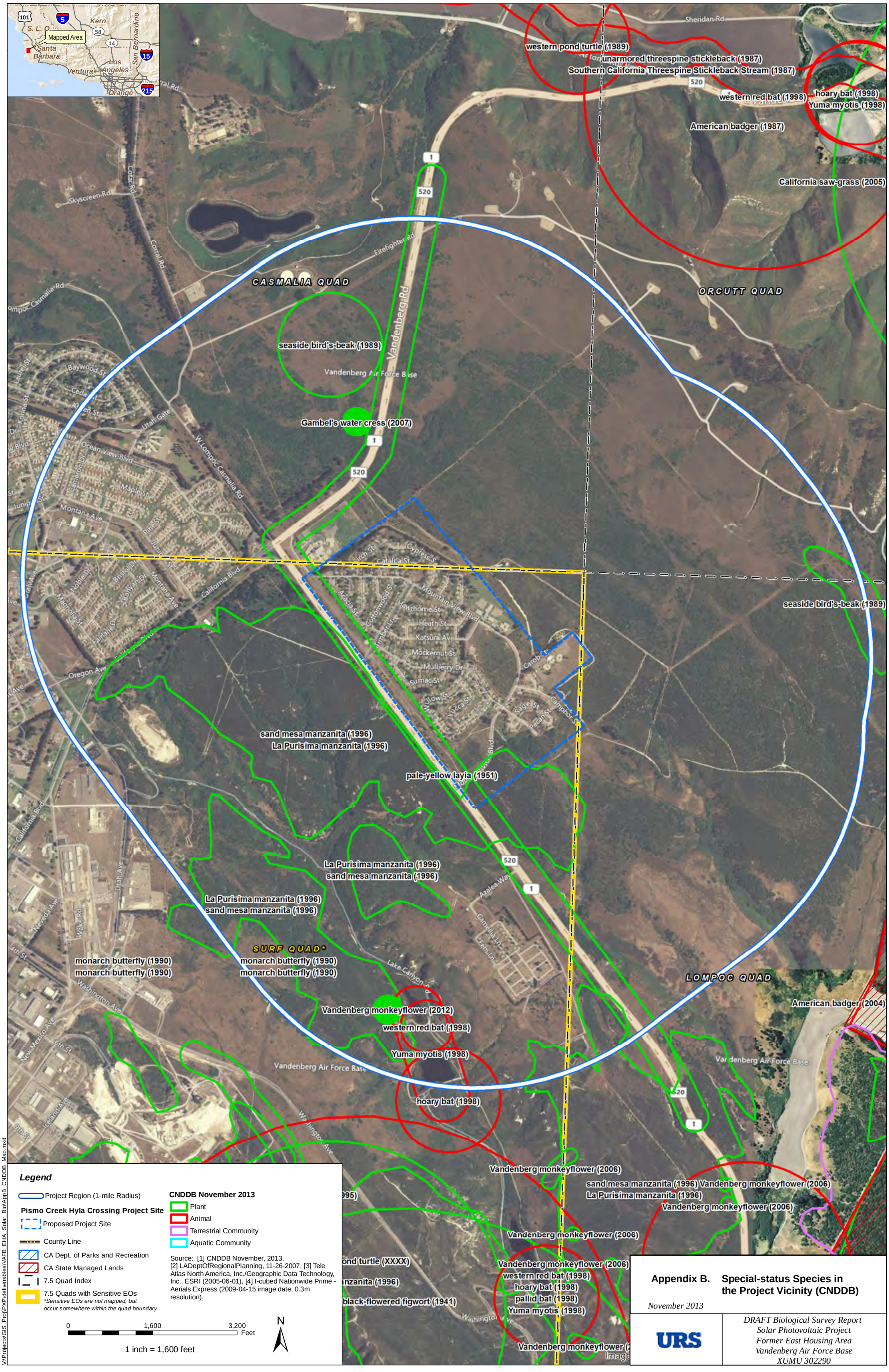
CLIENT:	**VANDENBERG AIR FORCE BASE**
REFERENCE NUMBER:	**XUMU302290**
URS REFERENCE NUMBER:	**28910227**

PHOTO #: 2691
LOOKING: Southeast
DESCRIPTION: Burton Mesa chaparral with infestations of veldt grass (foreground) and pampas grass (background) at southwestern edge of study area.

APPENDIX B
CALIFORNIA NATURAL DIVERSITY DATABASE SEARCH RESULTS



Appendix B. Special-status Species in the Project Vicinity (CNDDB)

November 2013

URS

DRAFT Biological Survey Report
Solar Photovoltaic Project
Former East Housing Area
Vandenberg Air Force Base
XUMU 302290

Appendix B: Special Status Species Occurrences Within 1-Mile Radius of VAFB East Housing Area
SOURCE: California Natural Diversity Database (November 2013)

SNAME	CNAME	ACCURACY	FEDLIST	CALLIST	RPLANTRANK	LOCATION	LOCDETAILS	ECOLOGICAL	GENERAL
Danaus plexippus	monarch butterfly	1/5 mile	None	None				19 SMALL AND 3 LARGE CLUSTERS OBSERVED.	
Danaus plexippus	monarch butterfly	1 mile	None	None				APPROXIMATELY 46 CLUSTERS LOCATED AT THE NORTH MARGIN OF THE GROVE; SMALL DRAINAGES RUN THROUGH NW TO SE, WITH MODERATE PROTECTION FROM THE SOUTH.	
Danaus plexippus	monarch butterfly	1/5 mile	None	None				GOOD PROTECTION PROVIDED FROM THE WEST; POOR, FROM THE SOUTH.	
Danaus plexippus	monarch butterfly	1/5 mile	None	None				APPROXIMATELY 75 SMALL CLUSTERS OBSERVED.	
Arctostaphylos rudis	sand mesa manzanita	nonspecific area	None	None	1B.2	3.0-5.5 MILES N OF LOMPOC, FROM THE VICINITY OF MISSION LA PURISIMA, W TO VANDENBERG AFB (NEAR SPRR), N TO BURTON MESA.	MAPPED AS SEVERAL NON-SPECIFIC POLYGONS ON THE LOMPOC, SURF, AND CASMALIA QUADS.	BURTON MESA MARITIME CHAPARRAL, ON ORCUTT SAND. W/ARCTOSTAPHYLOS PURISSIMA, ERICAMERIA ERICOIDES, ARTEMISIA CALIFORNICA, ADENOSTOMA FASCICULATUM, Q. AGRIFOLIA, SALVIA MELLIFERA, CORETHROGYNE FILAGINIFOLIA, HORKELIA CUNEATA, LOTUS SCOPARIUS.	AT LEAST 58000 PLANTS ESTIMATED BETWEEN 1988 AND 1989. INCLUDES FORMER OCCURRENCES 2, 3, 12, 13, 14, 21, & 23.
Arctostaphylos purissima	La Purisima manzanita	nonspecific area	None	None	1B.1	3.0-5.5 MILES N OF LOMPOC, FROM THE VICINITY OF MISSION LA PURISIMA, W TO VANDENBERG AFB (NEAR SPRR), N TO BURTON MESA.	MAPPED TOGETHER WITH ARCTOSTAPHYLOS RUDIS AS SEVERAL NON-SPECIFIC POLYGONS ON THE LOMPOC, SURF, AND CASMALIA QUADS.	BURTON MESA MARITIME CHAPARRAL, ON ORCUTT SAND. WITH ARCTOSTAPHYLOS RUDIS, ERICAMERIA ERICOIDES, ARTEMISIA CALIFORNICA, ADENOSTOMA FASCICULATUM, Q. AGRIFOLIA, SALVIA MELLIFERA, CORETHROGYNE FILAGINIFOLIA, HORKELIA CUNEATA, LOTUS SCOPARIUS.	MAPPED BASED ON ASSOCIATION OF THIS SPECIES W/PREVIOUSLY IDENTIFIED STANDS OF ARCTOSTAPHYLOS RUDIS &CENTRAL MARITIME CHAPARRAL. ACTUAL EXTENT OF A. PURISSIMA IN THIS AREA IS UNKNOWN. 10 PLANTS N OF MISSION STATE HISTORICAL MONUMENT IN 1996.
Layia heterotricha	pale-yellow layia	nonspecific area	None	None	1B.1	HIGHWAY 1, BURTON MESA, NORTH OF LOMPOC.	EXACT LOCATION UNKNOWN. MAPPED AS BEST GUESS BY CNDDB ALONG HIGHWAY 1 IN VICINITY OF BURTON MESA.	OPEN SPOTS.	ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1951 COLLECTION BY KAPPLER. NEEDS FIELDWORK.
Lasiurus cinereus	hoary bat	1/5 mile	None	None		VANDENBERG AIR FORCE BASE, LAKE CANYON, ABOUT 1.3 MILES ESE OF INTERSECTION OF WASHINGTON AVE AND NEW MEXICO AVE.			RECORD(S) COLLECTED DURING SURVEY BETWEEN 1997-1998.
Cordylanthus rigidus ssp. littoralis	seaside bird's-beak	1/5 mile	None	Endangered	1B.1	0.8 MI N OF VANDENBERG AFB MAIN GATE; ABOUT 1000 FT W OF HWY 1.		RECENT BURN SITE (WITHIN 5 YEARS). OPEN BURTON MESA CHAPARRAL/OAK WOODLAND DOMINATED BY ADENOSTOMA AND RHAMNUS CALIFORNICA. IN SANDY SOIL ALONG OLD FIREBREAK.	OVER 100 PLANTS IN 1989.
Myotis yumanensis	Yuma myotis	nonspecific area	None	None		VANDENBERG AIR FORCE BASE, LAKE CANYON, ABOUT 1.2 MILES EAST OF INTERSECTION OF WASHINGTON AND NEW MEXICO AVENUES.			DAY ROOST DETECTED DURING SURVEY BETWEEN 1997-1998.
Cordylanthus rigidus ssp. littoralis	seaside bird's-beak	specific area	None	Endangered	1B.1	W SIDE OF SANTA LUCIA CANYON, BASE OF PURISIMA HILLS, NEAR EASTERN BORDER OF VANDENBERG AFB.		IN SANDY SOIL IN OPEN CHAPARRAL WITH SALVIA MELLIFERA, PTERIDIUM AQUILINUM, ARCTOSTAPHYLOS RUDIS. ALSO FURTHER DOWNSLOPE IN DISTURBED SCRUB/GRASSLAND ON OLD FIREBREAK W/BACCHARIS PILULARIS & BROMUS DIANDRUS.	THOUSANDS OF PLANTS IN 1989.
Lasiurus blossevillii	western red bat	1/10 mile	None	None		VANDENBERG AIR FORCE BASE, LAKE CANYON, ABOUT 1.2 MILES EAST OF INTERSECTION OF WASHINGTON AND NEW MEXICO AVENUES.			RECORD(S) COLLECTED DURING SURVEY BETWEEN 1997-1998.
Nasturtium gambelii	Gambel's water cress	80 meters	Endangered	Threatened	1B.1	VANDENBERG AFB; 0.5 MI NNE OF MAIN GATE, JUST W OF HWY 1 (VANDENBERG RD) AT "LOMPOC LEFT LANE" SIGN.	PLANTS PRIMARILY FOUND AT W END OF PEAT RICH MARSH AT ECOTONE WITH RIPARIAN (WILLOW) WOODLAND.	FRESHWATER MARSH WITH FLOATING MAT SURROUNDED BY WILLOW WOODLAND. BORDERED BY COASTAL DUNE SCRUB & COASTAL LIVE OAK WOODLAND. ASSOCIATES INCLUDE: TYPHA LATIFOLIA, SCIRPUS MICROCARPUS, S. ACUTUS, SPARGANIUM, SALIX LASIOLEPIS, & MYRICA CAL.	FEWER THAN 100 PLANTS IN 1996. SEEN IN 1998 & 1999. <100 IN 2005 & 2007. A 2008 PRINCE REPORT SHOWS THAT 2 DNA SAMPLES FROM THIS SITE MAY BE HYBRIDS WITH N. OFFICINALE. THIS SITE MAY BE THE ONLY REMAINING SITE WITH PURE N. GAMBELII.
Mimulus fremontii var. vandenbergensis	Vandenberg monkeyflower	80 meters	Proposed Endangered	None	1B.1	JUST NORTH OF CAMPGROUND IN LAKE CANYON, VANDENBERG AIR FORCE BASE.	MAPPED ACCORDING TO 2012 CHESNUT COORDINATES; DATUM UNKNOWN, MAPPED TO ENCOMPASS NAD7 AND NAD83 POINTS. INCLUDES A 2011 COLLECTION FROM "ABANDONED TRAIL ~100M N OF CAMPGROUND IN LAKE CYN, AT END OF LAKE CYN RD."	CLEARINGS WITH WHITE SAND DERIVED FROM DIATOMACEOUS MARINE SHALE. EDGE OF CHAPARRAL/OAK WOODLAND.	OCCURRENCE IS BASED ON A 2011 COLLECTION BY WILKEN AND A 2012 PHOTO BY CHESNUT IN CALPHOTOS.

APPENDIX C
WETLAND DETERMINATION FORMS

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site:	Vandenberg AFB East Housing Area	City/County:	Lompoc/Santa Barb Sampling Date: 1/28/2014
Applicant/Owner:	Vandenberg AFB	State: CA	Sampling Point: 1
Investigator(s):	Tiffany Whitsitt, Elihu Gevirtz	Section, Township, Range:	S: 25, T: 08N, R: 35W
Landform (hillslope, terrace, etc.):	Man-made ditch	Local Relief (concave, convex, none): Concave	Slope (%): 0
Subregion (LRR):	C-Mediterranean Lat: 34°44'42.30"N	Long: 120°30'51.21"W	Datum: NAD83
Soil Map Unit Name:	Tangair Sand	NWI Classification: N/A	

Are climatic/hydrological conditions on the site typical for this time of the year? ☑ Yes ☐ No

Are Vegetation, ☐ Soil, ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, ☐ Soil, ☑ or Hydrology ☐ naturally problematic? (If needed, explain answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes	☑ No	**Is the Sampled Area within a Wetland?** ☐ Yes ☑ No
Hydric Soil Present?	☐ Yes	☑ No	
Wetland Hydrology Present?	☐ Yes	☑ No	

Remarks:
Man-made ditch. Pit is 15' from culvert outlet. Drought year. Even in normal years, weather can be dry in January. Ditch receives water from rainfall & runoff from former neighborhood. Homes and most streets were removed recently. Less runoff received now. Typha might be relict of greater runoff.

VEGETATION

Tree Stratum	Plot size: 60 x 5 ft. (linear)	Absolute % Cover	Dominant Species?	Indicator Status
1. Eucalyptus globulus		2	Yes	UPL
2. unknown non-native		0.01	No	
3.				
4.				
	Total Cover:	2.01		
Sapling/Shrub Stratum	**Plot size: 40 x 5 ft. (linear)**			
1. Eucalyptus globulus		0.01	Yes	UPL
2.				
3.				
4.				
5.				
	Total Cover:	0.01		
Herb Stratum	**Plot size: 20 x 5 ft. (linear)**			
1. Typha sp.		70	Yes	OBL
2. Carpobrotus edulis		0.1	No	UPL
3. unknown		5	No	
4. Toxicodendron diversilobum		0.01	No	UPL
5. Cynodon dactylon		0.01	No	FACU
6.				
7.				
8.				
	Total Cover:	75.12		
Woody Vine Stratum	**Plot size: 20 x 5 ft. (linear)**			
1. None				
2.				
	Total Cover:			

% Bare Ground in Herb Stratum: 25 % Cover of Biotic Crust: 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiplied by:	
OBL species	70	x1 =	70
FACW species	0	x2 =	0
FAC species	0	x3 =	0
FACU species	0.01	x4 =	0.04
UPL species	2.12	x5 =	10.6
Column Totals:	72.13 (A)		80.64 (B)

Prevalence Index = B/A = 1.117981422

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%

☑ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐ Yes ☑ No

Remarks:
Although Typha could not be identified to species due to lack of adequate material, all Typha species are obligate. Typha (angustifolia, domingensis, latifolia)

Herbaceous Alliance (cattail marshes)

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 5/1	100					SaLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☑ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type: _____
Depth (inches): _____

Hydric Soil Present? ☐ Yes ☑ No

Remarks:
Naturally problematic sandy soil. Shovel refusal at 12" due to rock. No hydric soil indicators observed in field.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizopheres along Living Roots (C3)
- ☐ Presence Of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth (inches): _____
Water Table Present?	☐ Yes	☑ No	Depth (inches): _____
Saturation Present? (Includes capillary fringe)	☐ Yes	☑ No	Depth (inches): _____

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No wetland hydrology indicators observed in the field. Man-made ditch.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site:	Vandenberg AFB East Housing Area	City/County:	Lompoc/Santa Barb Sampling Date: 1/28/2014
Applicant/Owner:	Vandenberg AFB	State: CA	Sampling Point: 2
Investigator(s):	Tiffany Whitsitt, Elihu Gevirtz	Section, Township, Range:	S: 25, T: 08N, R: 35W
Landform (hillslope, terrace, etc.):	Man-made ditch	Local Relief (concave, convex, none): Concave	Slope (%): 0
Subregion (LRR):	C-Mediterranean Lat: 34°44'54.88"N	Long: 120°31'3.05"W	Datum: NAD83
Soil Map Unit Name:	Tangair Sand	NWI Classification: N/A	

Are climatic/hydrological conditions on the site typical for this time of the year? ☑ Yes ☐ No

Are Vegetation, ☐ Soil, ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" Present? ☑ Yes ☐ No

Are Vegetation, ☐ Soil, ☑ or Hydrology ☐ naturally problematic? (If needed, explain answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes	☑ No	**Is the Sampled Area within a Wetland?** ☐ Yes ☑ No
Hydric Soil Present?	☐ Yes	☑ No	
Wetland Hydrology Present?	☐ Yes	☑ No	

Remarks:
Man-made ditch. Pit is 35' from culvert outlet. Receives runoff water from school and from what used to be a residential neighborhood. Homes and most roads have been removed, thus runoff has probably been reduced. Drought year, but even in normal years, weather can be dry in January.

VEGETATION

Tree Stratum	Plot size: 30' x 15' (linear)	Absolute % Cover	Dominant Species?	Indicator Status
1. None				
2.				
3.				
4.				
	Total Cover:	0		
Sapling/Shrub Stratum	**Plot size: 30' x 15' (linear)**			
1. Eucalyptus globulus		0.1	Yes	UPL
2.				
3.				
4.				
5.				
	Total Cover:	0.1		
Herb Stratum	**Plot size: 10' x 15' (linear)**			
1. Carpobrotus edulis		30	Yes	UPL
2. Avena sp.		1	No	UPL
3. Plantago lanceolata		2	No	FAC
4. Festuca myuros		13	Yes	FACU
5. Bromus rubens		1	No	UPL
6. Plantago coronopus		1	No	FACW
7. Melilotus sp.		1	No	UPL
8. Spergularia (bocconii?)		1	No	FACW
	Total Cover:	50		
Woody Vine Stratum	**Plot size: 10' x 15' (linear)**			
1. None				
2.				
	Total Cover:			

% Bare Ground in Herb Stratum: 45 % Cover of Biotic Crust: 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiplied by:	
OBL species	0	x1 =	0
FACW species	2	x2 =	4
FAC species	2	x3 =	6
FACU species	13	x4 =	52
UPL species	33.1	x5 =	165.5
Column Totals:	50.1 (A)		227.5 (B)

Prevalence Index = B/A = 4.540918164

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐ Yes ☑ No

Remarks:
Roots in pit. Ruderal vegetation. Other species: Cynodon dactylon (FACU), Rumex crispus (FAC), Bromus diandrus (UPL), Heterotheca grandfolia (UPL), Ehrharta calycina (UPL), Malva parviflora (UPL)

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/1	100					SaLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☑ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type: _____
Depth (inches): _____

Hydric Soil Present? ☐ Yes ☑ No

Remarks:
Naturally problematic sandy soils. Roots in pit. No hydric soil indicators observed in field.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizopheres along Living Roots (C3)
- ☐ Presence Of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth (inches): _____
Water Table Present?	☐ Yes	☑ No	Depth (inches): _____
Saturation Present? (Includes capillary fringe)	☐ Yes	☑ No	Depth (inches): _____

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Man-made ditch. No wetland hydrology indicators observed in the field.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site:	Vandenberg AFB East Housing Area	City/County:	Lompoc/Santa Barb Sampling Date: 4/17/2014
Applicant/Owner:	Vandenberg AFB	State: CA	Sampling Point: 3
Investigator(s):	Luanne Lum, Lisa Michl, Ben Wagner, Linda Serret	Section, Township, Range:	S: 25, T: 08N, R: 35W
Landform (hillslope, terrace, etc.):	bottom of hill slope	Local Relief (concave, convex, none): flat	Slope (%): 0
Subregion (LRR):	C-Mediterranear Lat: 34°44' 45.734"	Long: 120°30'52.408"	Datum: NAD 1983
Soil Map Unit Name:	Tangair Sand	NWI Classification: N/A	

Are climatic/hydrological conditions on the site typical for this time of the year? ☐ Yes ☑ No

Are Vegetation, ☑ Soil, ☑ or Hydrology ☑ significantly disturbed? Are "Normal Circumstances" Present? ☐ Yes ☑ No

Are Vegetation, ☐ Soil, ☐ or Hydrology ☐ naturally problematic? (If needed, explain answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes	☑ No	**Is the Sampled Area within a Wetland?** ☐ Yes ☑ No
Hydric Soil Present?	☐ Yes	☑ No	
Wetland Hydrology Present?	☐ Yes	☑ No	

Remarks:
Previosuly developed and disturbed area; drought year, however, normal for current month; arroyo vegetation may be a result of prior drainage patterns or leaks from past housing development or utilities; entire area around this parth of arroyo is disturbed and pipes laying/stacked inside the patch of arroyo.

VEGETATION

Tree Stratum (Plot size: 5 ft (radius))	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	97	Yes	FACW
2. Morella Californica	7	N	FACW
3.			
4.			
Total Cover:	104		
Sapling/Shrub Stratum (Plot size: 5 ft (radius))			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum (Plot size: 5 ft (radius))			
1. Meliotus indica	1	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	1		
Woody Vine Stratum (Plot size: 5x5 ft (radius))			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum: 90 % Cover of Biotic Crust: 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1 (A)
Total Number of Dominant Species Across All Strata:	2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiplied by:	
OBL species	0	x1 =	0
FACW species	104	x2 =	208
FAC species	0	x3 =	0
FACU species	1	x4 =	4
UPL species	0	x5 =	0
Column Totals:	105 (A)		212 (B)

Prevalence Index = B/A = 2.019047619

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☑ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? ☐ Yes ☑ No

Remarks:
Salix patch approximately 30 meters in diameter in the middle of a heavily disturbed (previously developed) area. Area surrounding the Salix thicket is greatly disturbed due to past activities with non-native plants being dominant.

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/3	100	7.5YR 5/8	1	C	PL	Sandy Loam	
			7.5YR 5/8	2	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type: _____
Depth (inches): _____

Hydric Soil Present? ☐ Yes ☑ No

Remarks:
Shovel refusal at 6" due to root mass.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizopheres along Living Roots (C3)
- ☐ Presence Of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth (inches): _____
Water Table Present?	☐ Yes	☑ No	Depth (inches): _____
Saturation Present? (Includes capillary fringe)	☐ Yes	☑ No	Depth (inches): _____

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Hydrologic features not detectable due to previous development at the site.

PLANT AND LICHEN SPECIES OBSERVED
NOV. 4 and 5, 2013 and May 20, 2014
VANDENBERG AIR FORCE BASE EAST HOUSING AREA

Family	Latin Name	Common Name	Status*	Native or	Invasive
Aceraceae	*Acer sp.*	Maple		E	
Aizoaceae	*Carpobrotus edulis*	Ice plant		E	x
Anacardiaceae	*Schinus molle*	Pepper tree		E	
Anacardiaceae	*Toxicodendron diversilobum*	Poison oak		N	
Asteraceae	*Ambrosia psilostachya*	Ragweed		N	
Asteraceae	*Artemisia californica*	Coastal sage brush		N	
Asteraceae	*Baccharis pilularissubsp. consanguinea*	Coyote bush		N	
Asteraceae	*Carduus pycnocephalus*	Italian thistle		E	x
Asteraceae	*Cirsium vulgare*	Bull thistle		E	x
Asteraceae	*Ericameria ericoides*	Mock heather		N	
Asteraceae	*Heterotheca grandiflora*	Telegraph weed		N	
Asteraceae	*Isocoma menziessi*	Menzie's goldenbush		N	
Betulaceae	*Betula* sp.	Birch tree		E	
Boraginaceae	*Heliotropium curassavicum*	Salt heliotrope		N	
Brassicaceae	*Brassica rapa*	Field mustard		E	x
Brassicaceae	*Brassica tournefortii*	Saharan mustard		E	x
Brassicaceae	*Lobularia maritima*	Sweet alyssum		E	
Cactaceae	*Opuntia littoralis*	Coastal prickly pear		N	
Chenopodiaceae	*Atriplex semibaccata*	Australian saltbush		E	
Cistaceae	*Helianthemum scoparium*	Common sun rose		N	
Cupressaceae	*Cupressus macrocarpa*	Monterey cypress		E	
Ericaceae	*Arctostaphylos purissima*	La Purisima manzanita	Endemic 1B.1	N	
Ericaceae	*Arctostaphylos rudis*	Shagbark manzanita	Endemic 1B.2	N	
Ericaceae	*Arctostaphylos rudis* x *purissima(?)*	Hybrid(?) manzanita	Endemic	N	
Euphorbiaceae	*Croton californicus*	California croton		N	
Fabaceae	*Acmispon glaber*	Deerweed		N	
Fagaceae	*Quercus agrifolia* var. *agrifolia*	Coast live oak		N	
Fagaceae	*Quercus agrifolia* x *parvula(?)*	Live oak hybrid(?)		N	
Fagaceae	*Quercus* sp.	Oak		E	
Geraniaceae	*Erodium cicutarium*	Redstem filaree		E	
Geraniaceae	*Geranium* sp.				
Juncaceae	*Juncus patens(?)*	Common rush (?)		N	
Juncaceae	*Juncus textilis*	Basket rush		N	
Lamiaceae	*Marrubium vulgare*	Horehound		E	
Lamiaceae	*Rosmarinus officinalis*	Rosemary		E	
Lamiaceae	*Salvia mellifera*	Black sage		N	
Liliaceae	*Agave* spp.			E	
Malvaceae	*Malva parviflora*	Cheeseweed		E	
Myricaceae	*Myrica californica*	Pacific wax myrtle		N	
Myrtaceae	*Callistemon* sp.	Bottlebrush tree		E	
Myrtaceae	*Eucalyptus globulus*	Blue gum		E	x
Myrtaceae	*Eucalyptus sideroxylon*	Red iron bark		E	
Myrtaceae	*Eucalyptus* sp.	Eucalyptus		E	x
Oleaceae	*Olea europea*	Olive		E	
Oxalidaceae	*Oxalis corniculata*	Creeping wood sorrel			
Phrymaceae	*Mimulus aurantiacus*	Bush monkey flower		N	

PLANT AND LICHEN SPECIES OBSERVED
NOV. 4 and 5, 2013 and May 20, 2014
VANDENBERG AIR FORCE BASE EAST HOUSING AREA

Family	Latin Name	Common Name	Status*	Native or	Invasive
Pinaceae	*Pinus radiata*	Monterey pine		E	x
Pinaceae	*Pinus* spp.	Pine		E	x
Plantaginaceae	*Plantago coronopus*	Cut-leaved plantain		E	
Plantaginaceae	*Plantago lanceolata*	English plantain		E	
Platanaceae	*Platanus racemosa*	Western sycamore		N	
Platanaceae	*Platanus* x *acerifolia*	London plane tree		E	
Poaceae	*Avena barbata*	Slender oat		E	x
Poaceae	*Bromus diandrus*	Ripgut grass		E	x
Poaceae	*Bromus hordeaceus*	Soft chess		E	
Poaceae	*Cortaderia jubata*	Pampas grass		E	x
Poaceae	*Cynodon dactylon*	Bermuda grass		E	x
Poaceae	*Distichlis spicata*	Salt grass		N	
Poaceae	*Ehrharta calycina*	Veldt grass		E	x
Poaceae	*Elymus condensatus*	Giant wild rye		N	
Poaceae	*Elymus triticoides*	Beardless wild rye		N	
Poaceae	*Pennisetum clandestinum*	Kikiyu grass		E	x
Polygonaceae	*Rumex* sp.	Dock			
Ramalinaceae	*Ramalina menziesii*	California Spanish moss		N	
Rhamnaceae	*Ceanothus cuneatus var. fascicularis*	Lompoc ceanothus	Endemic 4.2	N	
Rhamnaceae	*Ceanothus impressus*	Santa Barbara ceanothus	Endemic CBR	N	
Rhamnaceae	*Ceanothus* sp.(?)	Ceanothus			
Rhamnaceae	*Rhamnus californica*	Coffee berry		N	
Rosaceae	*Adenostoma fasciculatum*	Chamise		N	
Rosaceae	*Horkelia cuneata subsp. cuneata*	Wedge leaved horkelia		N	
Roasaceae	*Prunus fasciculata* var. *punctata*	Sand Almond	4.3	N	
Rubiaceae	*Galium* sp.				
Salicaceae	*Salix lasiolepis*	Arroyo willow		N	
Unknown		Fan palm		E	x
Asteraceae	*Corethrogyne filaginifolia*	Common sand aster			

Baldwin, B. G., D. H. Holdman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken, editors. 2012. The Jepson Manual: Vascula

1B.1 Rare throughout its range. Seriously threatened.

1B.2 Rare throughout its range. Moderately threatned.

4.2 Uncommon, and Limited Distribution.

CBR

*** Source: California Native Plant Society 2013**

Center for Environmental Management
MILITARY LANDS
Colorado State University

Avian Biodiversity Follow-up Survey (June 2014)
East Housing Solar Energy Project

In November 2013, the URS Corporation conducted a biological survey of the animal species found in and around the Vandenberg Air Force Base (VAFB) East Housing site designated for a future solar energy project. Part of the URS survey included the bird species present and because avian biodiversity can change throughout the year, a similar survey was conducted in the early summer months of 2014 to augment the data. The following table contains the collective avian species found during a two-week monitoring period in June 2014 (monitoring times of day were random throughout the day to get a representative sample). Additionally, 6-10 large nests (Great Horned Owl seen near one nest) were present in various trees throughout the site as well as nesting Western Bluebirds, Black Phoebes and Western Scrub Jays. Other animal species that were also observed while surveying include mule deer (*Odocoileus hemionus*), gray fox (*Urocyon cinereoargenteus)*, bobcat (*Lynx* rufus) and monarch butterflies (*Danaus plexippus*).

Species	**Common Name**
Cathartes aura	Turkey Vulture
Circus cyaneus	Northern Harrier
Streptopelia decaocto	Eurasian Collared Dove
Bubo virginianus	Great Horned Owl
Calypte anna	Anna's Hummingbird
Archilochus alexandri	Black-chinned Hummingbird
Selasphorous sasin	Allen's Hummingbird
Calypte costae	Costa's Hummingbird
Piciodes nuttallii	Nuttall's Woodpecker
Piciodes villosus	Downy Woodpecker
Colaptes auratus	Northern Flicker
Contopus sordidulus	Western Wood Pewee
Sayornis saya	Say's Phoebe
Myiarchus cinerascens	Ash-throated Flycatcher
Tyrannus verticalis	Western Kingbird
Aphelocoma californica	Western Scrub Jay
Corvus brachyrhynchos	American Crow
Petrochelidon pyrrhonota	Cliff Swallow
Baeolophus inornatus	Oak Titmouse
Sialia Mexicana	Western Bluebird
Turdus migratorius	American Robin
Mimus polyglottos	Northern Mockingbird
Sturnus vulgaris	European Starling
Pipilo maculatus	Spotted Towhee
Junco hyemalis	Dark-eyed Junco
Carpodacus mexicanus	House Finch
Carpodacus purpureus	Purple Finch
Icterus cucullatus	Hooded Oriole
Callipepla californica	California Quail
Carduelis tristis	American Goldfinch
Buteo jamaicensis	Red-tailed Hawk
Sayornis saya	Black Phoebe
Zenaida macroura	Mourning Dove
Vireo huttoni	Hutton's Vireo
Thyromanes bewickii	Bewick's Wren
Pheucticus melanocephalus	Black-headed Grosbeak
Psaltriparus minimus	Bushtit

Surveyed by: Lindsay Jacobs, 30 CES/CEIEC/CEMML, June 2014

Appendix C
Consultations

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DEPARTMENT OF THE AIR FORCE
30TH SPACE WING (AFSPC)

MAY 2 2 2014

Lieutenant Colonel Deron L. Frailie
Commander, 30th Civil Engineer Squadron
1172 Iceland Ave
Vandenberg AFB CA 93437-6012

Dr. Carol Roland-Nawi
State Historic Preservation Officer
Department of Parks and Recreation
Office of Historic Preservation
P.O. Box 942896
Sacramento CA 94296-0001

Dear Dr. Roland-Nawi

The 30th Space Wing of the United States Air Force, Vandenberg Air Force Base (VAFB), proposes to construct and operate a 10-megawatt solar photo-voltaic system on North VAFB within the former East Military Family Housing Area (now entirely demolished). VAFB determined the *East Housing Area Solar Energy Project* constitutes an undertaking subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and will comply with Section 106 using the implementing regulations [36 CFR Part 800]. With this letter and attachment, VAFB is initiating consultation with you.

VAFB cultural resources and project management personnel delineated the area of potential effects (APE). Prehistoric archaeological sites CA-SBA-3270 and CA-SBA-3487 are within the APE. CA-SBA-3270 was not evaluated for eligibility for listing on the National Register of Historic Places (NRHP); it will be assumed eligible for the purposes of this project only and protected using temporary exclusionary fencing. CA-SBA-3487 was determined ineligible for the NRHP in 2006 [OHP file reference # USAF060717C]. VAFB applied the criteria of adverse effect and found the proposed project would not alter, directly or indirectly, any of the characteristics of the historic property within the APE that qualify the property for inclusion on the NRHP. VAFB requests concurrence from you that:

a. The APE for constructing and operating the *East Housing Area Solar Energy Project* is adequately delineated, and

b. CA-SBA-3270 would not be adversely affected by the project.

Pending your concurrence on the above determinations, VAFB's federal agency Section 106 finding for the *East Housing Area Solar Energy Project* is no adverse effect

to historic properties. If there is no objection to this finding by the State Historic Preservation Officer (SHPO), VAFB has fulfilled its Section 106 responsibilities for the undertaking and no further consultation is required. If the SHPO objects to any of these findings, we understand that further consultation will be needed. Additionally, if project implementation results in a discovery during construction, VAFB will reopen Section 106 consultation.

If you have any questions or require additional information, please contact Christopher Ryan at (805) 605-0748 or via e-mail at christopher.ryan.7@us.af.mil. Thank you for your assistance with this undertaking.

Sincerely

DERON L. FRAILIE, Lt Col, USAF
Commander

Attachment:
Section 106 Report, East Housing Area Solar Energy Project

STATE OF CALIFORNIA – THE NATURAL RESOURCES AGENCY

EDMUND G. BROWN, JR., *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov

June 19, 2014

Reply in Reference To: USAF_2014_0530_002

Lieutenant Colonel Deron L. Frailie
Commander, 30th Civil Engineer Squadron
1172 Iceland Ave.
Vandenberg AFB, CA 93437-6012

Dear Lieutenant Colonel Frailie:

Re: Requesting Consultation from the State Historic Preservation Officer (SHPO) on the East Housing Area Solar Energy Undertaking on North Vandenberg Air Force Base

Thank you for your May 22, 2014 letter initiating SHPO consultation for the East Housing Area Solar Energy undertaking on North Vandenberg Air Force Base within the former East Military Family Housing Area (now entirely demolished). The 30th Space Wing of the United States Air Force Vandenberg Air Force Base (VAFB) is consulting with the SHPO to comply with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f), as amended, and its implementing regulations 36 CFR 800. Your letter requests SHPO concurrence on the VAFB's determination and documentation of the area of potential effects (APE) (36 CFR §800.4(a)) and finding of no adverse effect (36 CFR §800.5(c)) as a result of this undertaking.

The proposed undertaking includes non-reflective photo-voltaic solar module arrays mounted on a fixed tilt racking system, buried collector lines, electrical equipment on small concrete pads, and a small, unmanned communications enclosure that would contain supervisory control and data acquisition equipment. Provisions for vehicular travel would include existing paved roads, a perimeter road, and graveled interior roads providing access for maintenance of the module arrays. A chain link security fence would surround the facility. Facility lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives. No new power pole relocations are expected.

Supporting documentation (36 CFR §800.11(a)) submitted with your letter includes the *Identification of Historic Properties East Housing Area Solar Energy Project Vandenberg Air Force Base Santa Barbara County, California* report (Ryan 2014).

The VAFB has determined and documented the APE (36 CFR §800.4(a)(1)) as a 182-acre area and has identified the footprint for all foreseeable project-related ground-disturbing activities for this undertaking as the area of direct impacts (ADI). The APE was established to encompass the entirety of the ADI. In areas where the ADI encroaches upon or is very near to a cultural resource boundary, the APE was expanded to include the entire resource boundary.

The VAFB's efforts to identify historic properties within the APE (36 CFR §800.4(b)(1)) included a record and literature search, including a 0.25 mile buffer around the APE.

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JUN 24 2014
BY

Results from the record and literature search identified that four previous archaeological investigations occurred within and in the vicinity of the APE. The results of these investigations indicated that no cultural resources exist within the ADI. However, two prehistoric archaeological sites, CA-SBA-3270 and CA-SBA-3478 are located adjacent to the ADI and have therefore been included within the APE. Both sites were resurveyed as part of the VAFB's identification efforts and their current condition is the same as when originally recorded and no new archaeological material was observed.

The VAFB initiated consultation with the Santa Ynez Band of Chumash Indians as part of their gathering of information from any Indian tribe or organization identified pursuant to 36 CFR §800.3(f) to assist in identifying properties which may be of religious and cultural significance to them and may be eligible for listing in the NRHP (36 CFR §§800.4(a)(4) and 800.4(b)). Native American consultation included sending project information and a transmittal letter via email along with a site visit with Freddie Romero, Elders Council Representative for the tribe. The tribe has not expressed issues or concerns regarding this undertaking.

The VAFB did not evaluate CA-SBA-3270 for eligibility for listing on the National Register of Historic Places (NRHP) and is being assumed eligible for this undertaking. The site is located outside and adjacent to the ADI, and a temporary exclusionary fence will be installed around the southwest end of the site's boundary in an effort to prevent vehicles and equipment from inadvertently entering the site boundary. CA-SBA-3487 was found ineligible during a prior Section 106 review for an undertaking, and SHPO concurred on this determination in 2006 (USAF060717C). I have reviewed this prior SHPO letter of concurrence, dated August 2, 2006, and have found that the SHPO also concurred with the VAFB's determination of CA-SBA-3270's ineligibility for listing on the NRHP. I have enclosed a copy of this letter for your reference.

Based on my assessment of your letter and supporting documentation, I find the VAFB's documentation and identification of the APE (36 CFR §800.4(a)) sufficient. However, given that both CA-SBA-3270 and CA-SBA-3487 were previously determined ineligible by the SHPO I suggest a finding of no historic properties affected (36 CFR §800.4(c)(1)) as a result of this undertaking and that no protection measures of CA-SBA-3270 is warranted.

Thank you for seeking my comments and considering historic properties as part of your undertaking. Please be advised that under certain circumstances, such as post-review discoveries or a change in the undertaking description, you may have future responsibilities for this undertaking under 36 CFR Part 800. If you require further information, please contact Alicia Perez of my staff at 916-445-7020 or at Alicia.Perez@parks.ca.gov.

Sincerely,

Carol Roland-Nawi, Ph.D.

Carol Roland-Nawi, Ph.D.
State Historic Preservation Officer

Enclosure: SHPO, letter, August 2, 2006

CHRON.

STATE OF CALIFORNIA – THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov
www.ohp.parks.ca.gov

August 2, 2006

In reply refer to: USAF060717C

Lt Col Darren R. Daniels
Commander
US Department of the Air Force
30th Space Wing (AFSPC)
30 CES/CC
1172 Iceland Avenue
Vandenberg AFB, CA 93437-6012

Re: Privatization of Military Family Housing, Vandenberg Air Force Base, Santa Barbara County, California

Dear Lt Col Daniels:

Thank you for your letter of 13 July 2006, requesting my comments with regards to the proposed privatization of military family housing at Vandenberg Air Force Base (VAFB), California. You are consulting with me, in order to comply with Section 106 of the National Historic Preservation Act (NHPA) and implementing regulations codified at 36 CFR § 800.

The proposed undertaking would include the demolition of 1,167 houses, construction of 684 new houses, renovation of 835 existing houses, and the management of all housing units under a lease agreement for 50 years. During the development period and throughout the lease period, VAFB will retain responsibility for compliance with applicable laws governing the management and treatment of cultural resources. The proposed Area of Potential Effect is defined as the lease boundary. I agree that the Air Force has properly determined and documented the APE per 36 CFR § 800.4 (a)(1).

Your efforts to identify historic properties, which I agree have been appropriate per 36 CFR § 800.4(b), found five archaeological sites (CA-SBA-3270, -3487, -3559H, -3741, and -3748) and one building greater than 50 years old (Sesto Auditorium) within the APE . The Air Force has determined that CA-SBA-3741 is eligible for inclusion in the National Register of Historic Places (NRHP) under criterion D for its potential to add to the understanding of prehistoric subsistence and settlement patterns within the coastal zone of Central California. The Air Force has further determined that CA-SBA-3270, -3487, -3559H, -3748, and the Sesto Auditorium are not eligible for inclusion in the NRHP. Based upon a review of the documentation you submitted with your letter, including the report *Archaeological Investigations Supporting Consultation with the State Historic Preservation Officer for the Privatization of Military Family Housing on Vandenburg Air Force Base, Santa Barbara County* (February 2006), I concur in your determinations.

The Air Force has applied the criteria of adverse effect per 36 CFR § 800.5(a) and has determined that the undertaking will not adversely affect the NRHP-eligible properties. Based on my review of the documents you submitted, I concur with this determination.

Thank you for seeking my comments and considering historic properties as part of your project planning. If you have any questions or concerns, please contact David Byrd, Project Review Unit historian, at (916) 653-9019 or at dbyrd@parks.ca.gov.

Sincerely,

Susan K Stratton for

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

MWD:db

DEPARTMENT OF THE AIR FORCE
30TH SPACE WING (AFSPC)

Christopher Ryan
30th Civil Engineer Squadron
1028 Iceland Avenue
Vandenberg AFB, CA 93437-6010

May 21, 2014

Mr. Sam Cohen
Mr. Freddie Romero
Santa Ynez Band of Chumash Indians
P.O. Box 517
Santa Ynez, CA 93460

Hello Sam, Hello Freddie:

The 30th Space Wing of the United States Air Force, Vandenberg Air Force Base (VAFB) proposes to construct and operate a 10 megawatt solar photo-voltaic system near the Main Gate within the former East Military Family Housing Area (now entirely demolished). VAFB determined the East Housing Area Solar Energy Project constitutes an undertaking subject to compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. With this letter and the accompanying report, VAFB is initiating consultation with the Santa Ynez Band of Chumash Indians regarding impacts to cultural resources of Tribal concern.

VAFB delineated the area of potential effects (APE) and carried out a reasonable and good faith effort to identify historic properties within the APE. Two previously recorded prehistoric archaeological sites were identified within the APE. The attached report describes the proposed project and its potential to affect the two archaeological sites. I would like to invite you to visit the project area at your convenience. Please call or e-mail me and we can set up a date and time. Additionally, I am requesting your written views regarding the project and its potential to affect the two sites; if I could receive your comments within 30 calendar days I would be grateful. If you have any questions, please contact me at 605-0748. Thank you for your assistance.

Sincerely

Christopher Ryan

CHRISTOPHER RYAN
Cultural Resources Manager

1 Attachment: Section 106 Consultation Package

May 27, 2014

Chris Ryan
VAFB Cultural Resource Management
1028 Iceland Ave. Bldg.11146
VAFB, Calif. 93437-6010

Re: EHA Solar Project

Chris,

Thanks again for the affording time to do a site visit for the EHA Solar Energy Project. It really helped to put this project into perspective.

After visiting the site on May 22, I can concur with the project mitigation measures. I agree with the placement of exclusionary fencing around CA-SBA-3270 to protect it during construction. I also agree that there will be no impact to the second site located within the APE CA-SBA-3487 and that there are no measures needed for this location, since it sits outside of any proposed work associated with the project.

However, should the contractor find it necessary to stage in the area of CA-SBA-3487, I would ask that they stage their equipment at the eastern end of the site location.

Should you have any questions, please do not hesitate to contact me.

Freddie Romero
Cultural Preservation Consultant
SYBCI Elders Council
805-688-7997

Appendix D
"Net Zero" Energy, Water, and Waste Policy

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DEPARTMENT OF THE AIR FORCE
OFFICE OF THE CHIEF OF STAFF
UNITED STATES AIR FORCE
WASHINGTON DC 20330

JUN 23 2012

MEMORANDUM FOR DISTRIBUTION C
ALMAJCOM-FOA-DRU/CC

SUBJECT: Air Force "Net Zero" Energy, Water, and Waste Policy

This policy memorandum establishes the Air Force policy and end-state goals to achieve an Air Force "Net Zero" posture for installation energy, water, and waste. This policy supports and builds upon the sustainability goals and objectives already established in Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," the 2012 National Defense Authorization Act (NDAA), the Air Force Energy Plan, the 2011 Air Force Implementation Plan for the DoD Strategic Sustainability Performance Plan, and the Air Force policy memorandum on Pollution Prevention, dated April 27, 2012.

Net Zero does not represent an unfunded mandate, but instead refocuses existing energy, water, and waste investments on finding cost savings/cost avoidance opportunities while achieving Net Zero goals. It is not the intent of this policy to create a new program, but to use, to the extent possible, existing energy, water, and waste-related staff, programs, metrics, and reporting capabilities to fulfill Air Force Net Zero goals and objectives. Moreover, any strategic investment decisions made to achieve the goals and expectations of this policy will be grounded in solid business case analysis, with primary payback targeted within the Future Years Defense Program and secondary consideration targeted for a ten-year payback.

For the purposes of this policy, a Net Zero Energy posture is defined as reducing energy demand, improving the assured availability of facility/process energy for mission-critical operations, and increasing generation of renewable energy to the greatest extent practicable in order to consume no more energy than is generated. A Net Zero Water posture is defined as reducing consumption of potable water to an amount no more than can be practicably captured and reused, repurposed, or aquifer-recharged. A Net Zero Waste posture is defined as reducing the disposal of waste in all its forms (e.g., non-hazardous solid waste, hazardous waste, and medical waste) through the application of the pollution prevention hierarchy to the greatest extent practicable (to include avoiding landfilling and maximizing recycling).

This memorandum also directs the establishment of a Tiger Team to build a strategic, economically-sensitive Air Force-wide approach to these end-state goals. This should include leveraging public-private partnerships and regional solutions wherever possible, such as when the economic viability of a Net Zero project depends upon conditions and contributions beyond the installation boundary (as could be the case with energy demand or waste). The Tiger Team shall build a streamlined plan, recommending specific objectives, targets, and appropriate baselines and measurement criteria that will most efficiently and effectively address the end-state goals. The plan should leverage and integrate efforts already underway, and find opportunities to meet these ambitious end-state goals, while improving energy security and driving down costs

for the collective benefit of the Air Force. The Tiger Team shall be co-chaired by SAF/IEE and AF/A7C, and will deliver, within 90 days from the date of this memorandum, a draft Air Force Net Zero Strategic Implementation Plan, that embraces the intent of this policy memo.

The Tiger Team will evaluate and make recommendations for environmentally sound and economically feasible waste management and/or waste-to-energy conversion projects to minimize waste sent to landfills as much as technically possible. To support the economic analysis for a decision to invest in a waste management and/or waste-to-energy project, the Tiger Team shall establish a monetary threshold reflecting the potential environmental liability associated with disposing of Air Force waste (hazardous, non-hazardous, and medical) into a regulated or unregulated landfill in the event that landfill would fail (i.e., what is the worst case scenario in terms of legal/technical/administrative effort, remediation liability, sampling and analysis, reporting, etc., that the Air Force could pay as a contributor to the landfill?), as well as the standard contracting costs, tipping fees, and transportation fees that are traditionally paid to dispose of such waste into a landfill.

This Net Zero policy reinforces the Air Force's commitment to support its operational mission by leading in energy and environmental management. The Air Force will do this by complying with legal requirements, reducing unacceptable risk to operations from energy-related considerations and environmental impacts, and balancing any necessary investments against unfunded operational requirements. By continuously improving energy and environmental management practices to be more effective and efficient, and carefully considering return on investment, the Air Force will ensure sustainable management of the resources that we need to adequately fly, fight and win into the future.

This policy is effective immediately. If you have any questions about this policy memorandum, please contact Mr. Michael McGhee, SAF/IEE, (703) 697-9297, michael.mcghee@pentagon.af.mil, for Net Zero Waste; or Ms. Carol Ann Beda, SAF/IEN, (703) 697-1207, carolann.beda@pentagon.af.mil, for Net Zero Energy and Net Zero Water.

TERRY A. YONKERS
Assistant Secretary
(Installations, Environment & Logistics)

PHILIP M. BREEDLOVE
General, USAF
Vice Chief of Staff

Attachment:
References

REFERENCES

a. Executive Order 13514: *Federal Leadership in Environmental, Energy, and Economic Performance* (http://www.gpo.gov/fdsys/pkg/FR-2009-10-08/pdf/E9-24518.pdf)

b. 2012 National Defense Authorization Act (NDAA) (http://www.govtrack.us/congress/bills/112/hr1540/text)

c. Air Force Energy Plan (http://www.safie.hq.af.mil/shared/media/document/AFD-091208-027.pdf)

d. DoD Strategic Sustainability Performance Plan (http://www.denix.osd.mil/sustainability/upload/DoD-SSPP-FY11-FINAL_Oct11.pdf)

e. 2011 Air Force Implementation Plan for the DoD Strategic Sustainability Performance Plan (http://www.safie.hq.af.mil/shared/media/document/AFD-120228-062.pdf)

f. Air Force Policy Memorandum on Pollution Prevention, 27 Apr 12 (https://eis.af.mil/cs/edash/Documents/Pollution%20Prevention%20(P2)/P2%20Policy%20Memo.pdf)

g. Air Force Instruction 32-7001, *Environmental Management* (http://www.e-publishing.af.mil/shared/media/epubs/afi32-7001.pdf)

Appendix E
Public Comment Process

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Lee Central Coast Newspapers

AFFIDAVIT

I, **Danyelle Chavez**, in my capacity as **Advertising Account Executive** of the newspaper
(Name) (Title)

Santa Maria Times in **Santa Maria, California** hereby certify that the ☒ ROP/❑ Inserts
(Newspaper Name) (City) (State)

For **URS Corporation, Environmental Assessment & Draft** IO #**31892** was inserted in the above
(Advertiser) (Ad Headline)

Newspaper on **June 1, 2014**
(Run Date)

Danyelle S — 6/18/14
Signature of Person Making Affidavit — *Date*

Subscribed and sworn to before me in the County of SANTA BARBARA (County) in the State of California (State), on this 18th (Date) day of June (Month), 2014 (Year).

Notary Public Seal: ESTHER M. MENDEZ Commission #1953248 Notary Public California SANTA BARBARA COUNTY My Commission Expires September 22, 2015

E M Mendez
Notary Public Signature

9/22/2015
Commission Expires

Witness — Date

Lee Central Coast Newspapers

AFFIDAVIT

I, **Danyelle Chavez**, in my capacity as **Advertising Account Executive** of the newspaper
(Name) (Title)

Santa Maria Times in **Santa Maria, California** hereby certify that the ☒ ROP/☐ Inserts
(Newspaper Name) (City) (State)

For **URS Corporation, Environmental Assessment & Draft** IO #**31892** was inserted in the above
(Advertiser) (Ad Headline)

Newspaper on **June 2, 2014**
(Run Date)

Danyelle 6/18/14
Signature of Person Making Affidavit *Date*

Subscribed and sworn to before me in the County of SANTA BARBARA (County) in the State of California (State), on this 18th (Date) day of June (Month), 2014 (Year).

Notary Public Seal:

ESTHER M. MENDEZ
Commission #1953248
Notary Public
California
SANTA BARBARA COUNTY
My Commission Expires September 22, 2015

Esther M Mendez
Notary Public Signature

9/22/2015
Commission Expires

Witness Date

Lee Central Coast Newspapers

AFFIDAVIT

I, **Danyelle Chavez**, in my capacity as **Advertising Account Executive** of the newspaper
(Name) (Title)

Santa Maria Times in **Santa Maria, California** hereby certify that the ☒ ROP/☐ Inserts
(Newspaper Name) (City) (State)

For **URS Corporation, Environmental Assessment & Draft** IO #**31892** was inserted in the above
(Advertiser) (Ad Headline)

Newspaper on **June 3, 2014**
(Run Date)

Danyelle C 6/18/14
Signature of Person Making Affidavit *Date*

Subscribed and sworn to before me in the County of Santa Barbara (County) in the State of California (State), on this 18th (Date) day of June (Month), 2014 (Year).

Notary Public Seal:

ESTHER M. MENDEZ
Commission #1953248
Notary Public
California
SANTA BARBARA COUNTY
My Commission Expires September 22, 2015

Esther M. Mendez
Notary Public Signature

9/22/2015
Commission Expires

Witness Date

Lee Central Coast Newspapers

AFFIDAVIT

I, **Danyelle Chavez,** in my capacity as **Advertising Account Executive** of the newspaper
(Name) (Title)

Lompoc Record in **Lompoc, California** hereby certify that the ☒ ROP/❑ Inserts
(Newspaper Name) (City) (State)

For **URS Corporation, Environmental Assessment & Draft** IO #**31892** was inserted in the above
(Advertiser) (Ad Headline)

Newspaper on **June 1, 2014**
(Run Date)

Danyelle S — 6/18/14
Signature of Person Making Affidavit *Date*

Subscribed and sworn to before me in the County of Santa Barbara (County) in the State of California (State), on this 18th (Date) day of June (Month), 2015 (Year).

Notary Public Seal:

ESTHER M. MENDEZ
Commission #1953248
Notary Public
California
SANTA BARBARA COUNTY
My Commission Expires September 22, 2015

Esther M. Mendez
Notary Public Signature

9/22/2015
Commission Expires

Witness Date

Lee Central Coast Newspapers

AFFIDAVIT

I, **Danyelle Chavez,** in my capacity as **Advertising Account Executive** of the newspaper
(Name) (Title)

Lompoc Record in **Lompoc, California** hereby certify that the ☒ ROP/❑ Inserts
(Newspaper Name) (City) (State)

For **URS Corporation, Environmental Assessment & Draft** IO #**31892** was inserted in the above
(Advertiser) (Ad Headline)

Newspaper on **June 3, 2014**
(Run Date)

Danyelle C. 6/18/14
Signature of Person Making Affidavit *Date*

Subscribed and sworn to before me in the County of Santa Barbara (County) in the State of California (State), on this 18th (Date) day of June (Month), 2014 (Year).

Notary Public Seal:

Esther M. Mendez
Notary Public Signature

9/22/2015
Commission Expires

ESTHER M. MENDEZ
Commission #1953248
Notary Public
California
SANTA BARBARA COUNTY
My Commission Expires September 22, 2015

Witness Date

Lee Central Coast Newspapers

AFFIDAVIT

I, **Danyelle Chavez,** in my capacity as **Advertising Account Executive** of the newspaper
(Name) (Title)

Lompoc Record in **Lompoc, California** hereby certify that the ☒ ROP/❑ Inserts
(Newspaper Name) (City) (State)

For **URS Corporation, Environmental Assessment & Draft** IO #**31892** was inserted in the above
(Advertiser) (Ad Headline)

Newspaper on **June 5, 2014**
(Run Date)

Danyelle C
Signature of Person Making Affidavit

6/18/14
Date

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Notary Public
California
SANTA BARBARA COUNTY
My Commission Expires September 22, 2015

Esther M. Mendez
Notary Public Signature

9/22/2015
Commission Expires

Witness

Date

May 23, 2014

Subject: Receipt of Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for East Housing Area Solar Energy Project, Vandenberg Air Force Base (VAFB), California.

Attn: Head Librarian/Library Manager:

This is to record that we have delivered to you a copy of the above referenced EA and Draft FONSI for public review/inspection per the terms of the associated Notice of Availability (NOA).

By signing below, you acknowledge that you have received a copy of the above referenced document; will make it available in the library and in an area where the public can readily review/inspect the document; and will leave the document out for the duration of the public comment period as stated on the NOA. Please contact VAFB if you need a replacement copy (Andrew Edwards: 805-606-2044; Linda Serret: 805-605-0503; or Lisa Michl: 805-605-8399).

Delivered by:

Craig T. Woodman 5/29/14

Library Signature:

5-29-14

City of Santa Barbara
Public Library

40 E. Anapamu Street
PO Box 1019
Santa Barbara, CA 93102
www.sbplibrary.org
www.SantaBarbaraCA.gov

Brent Field
Librarian

Tel: 805.564.5623
Fax: 805.564.5660
BField@SantaBarbaraCA.gov

SANTA MARIA LIBRARY

May 23, 2014

Subject: Receipt of Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for East Housing Area Solar Energy Project, Vandenberg Air Force Base (VAFB), California.

Attn: Head Librarian/Library Manager:

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Delivered by:

5/30/2014

Library Signature:

5/30/14

LOMPOC LIBRARY

May 30, 2014

Subject: Receipt of Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for East Housing Area Solar Energy Project, Vandenberg Air Force Base (VAFB), California.

Attn: Head Librarian/Library Manager:

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Delivered by:

30 May 2014

Library Signature:

5/30/14

Distribution Instructions: Please distribute NEPA documents, including the corresponding notice of availability (NOA), to the following points of contact (POCs) as indicated below. Distribute copies to the libraries via personal delivery. Please inform VAFB of any "return to sender" issues with any of the listed POCs. Please inform VAFB of any POC that would like to be removed from this list.

Federal

HQ AFSPC/A7I
Attn: Judith "Lynne" Newman
150 Vandenberg St, Suite 1105
Peterson AFB, CO 80914
Email: judith.neuman@us.af.mil
Electronic Copy

NOAA – Channel Islands National Marine Sanctuary
Attn: Chris Mobley
113 Harbor Way, Suite 150
Santa Barbara, CA 93109
NOA

NOAA - National Marine Fisheries Service
Southwest Regional Office
Attn: For Distribution
501 West Ocean Blvd
Long Beach, CA 90802-4213
NOA

National Park Service
Channel Islands National Park
Attn: Superintendent
1901 Spinnaker Drive
Ventura, CA 93001
NOA

U.S. Army Corps of Engineers
Attn: David A. Jorgenson, P.E.
1318 New Mexico Avenue, Building 9360
Vandenberg AFB, CA 93437
Email: David.A.Jorgenson@usace.army.mil
Electronic Copy

U.S. Coast Guard
Attn: For Distribution
111 Harbor Way
Santa Barbara, CA 93109
NOA

U.S. Department of Transportation
Federal Aviation Administration (FAA)
Attn: Planning and Environmental Division
800 Independence Avenue
Washington, DC 20591
NOA

U.S. Environmental Protection Agency, Region 9
Environmental Review Office
Attn: Carol Sachs
Mail Code - ENF-4-2
75 Hawthorne Street
San Francisco, CA 94105
NOA

U.S. Fish and Wildlife Service
Ventura Fish and Wildlife Office
Attn: Jeff Phillips
2493 Portola Road, Suite B
Ventura, CA 93003-7726
Email: jeff_phillips@fws.gov
Electronic Copy

State

California Coastal Commission - Energy, Ocean Resources and Federal Consistency Division
Attn: Larry Simon
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219
Email: lsimon@coastal.ca.gov
Electronic Copy

Central Coast Regional Water Quality Control Board
Attn: Sheila Soderberg
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401-7906
Email: Sheila.soderberg@waterboards.ca.gov
Electronic Copy

Central Coast Regional Water Quality Control Board - Central Coast Ambient Monitoring Program (CCAMP)
Attn: Mary Hamilton
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401
Email: Mary.Hamilton@waterboards.ca.gov
NOA

California Department of Fish & Wildlife
South Coast Region
Attn: Martin Potter
P.O. Box 1787
Ojai, CA 93024
NOA

California Department of Fish & Wildlife
South Coast Region
Attn: Mary Meyer
226 W. Ojai Avenue, Suite 101 PMB 501,
Ojai, CA 93024
NOA

California Environmental Protection Agency
Attn: For Distribution
1001 I Street
P.O. Box 2815
Sacramento, CA 95812-2815
NOA

California Office of Historic Preservation
Attn: Carol Roland-Nawi
1725 23rd Street, Suite 100
Sacramento, CA 95816
Email: carol.roland-nawi@parks.ca.gov
Hardcopy

Office of the Governor
Office of Planning and Research
Attn: State Clearinghouse
1400 l0th Street
Sacramento CA 95814
Hardcopy - 15 Copies + NOC (obtain from website)

Santa Barbara County Air Pollution Control District
Attn: Molly Pearson
260 N. San Antonio Road, Suite A
Santa Barbara, CA 93110-1315
Email: pearsonm@sbcapcd.org
Electronic Copy

Tribes

Santa Ynez Band of Chumash Indians
Elders Council
Attn: Sam Cohen & Freddie Romero
P.O. Box 517
Santa Ynez, CA 93460
Electronic Copy
Emails: FRomero@santaynezchumash.org
SCohen@santaynezchumash.org

Local

Santa Barbara County Board of Supervisors
C/O: Santa Barbara County Planning & Development
Attn: David Villalobos
123 E. Anapamu Street
Santa Barbara, CA 93101
Email: dvillalo@co.santa-barbara.ca.us
Electronic Copy

Santa Barbara County Planning & Development
Attn: Heather Allen
123 East Anapamu Street
Santa Barbara CA 93101-2058
Email: hallen@co.santa-barbara.ca.us
Electronic Copy

City of Lompoc
Economic & Community Development
Attn: Lucille Breese
100 Civic Center Plaza
Lompoc CA 93436
Email: l_breese@ci.lompoc.ca.us
Hardcopy

Libraries

Santa Barbara Public Library
40 East Anapamu Street
Santa Barbara, CA 93101-2000
Hardcopy

Lompoc Public Library
501 East North Avenue
Lompoc, CA 93436
Hardcopy

Santa Maria Public Library
421 S. McClelland Street
Santa Maria, CA 93454
Hardcopy

Requesting Entities

California Native Plant Society
Channel Islands Chapter
Attn: David Magney
P.O. Box 6
Ojai, CA 93024-006
Email: president@cnpsci.org
Electronic Copy

California Trout
Attn: Kurt Zimmerman
701 E. Santa Clara St.
Ventura, CA 93001
Email: kurtfz63@yahoo.com
NOA

Environmental Defense Center
Attn: Brian Trautwein
906 Garden Street
Santa Barbara, CA 93101
Email:
BTrautwein@EnvironmentalDefenseCenter.org
Electronic Copy

La Purisima Audubon Society
Attn: Tamarah Taaffe
24 Stanford Circle
Vandenberg Village, CA
93436-1113
Email: bima55@msn.com
Hardcopy

Santa Barbara Museum of Natural History
Attn: Luke J. Swetland
2559 Puesta del Sol
Santa Barbara, CA 93105
Email: lswetland@sbnature2.org
Electronic Copy

Sierra Club
Los Padres Chapter
Attn: Gerry Ching
P O Box 31241
Santa Barbara, CA 93130-1241
Email: gching@cox.net
Electronic Copy

County Of Santa Barbara

Mona Miyasato
County Executive Officer

105 East Anapamu Street, Room 406
Santa Barbara, California 93101
805-568-3400 • Fax 805-568-3414
www.countyofsb.org

Executive Office

June 30, 2014

Mr. Andrew Edwards
30th Civil Engineer Squadron
1028 Iceland Avenue
Vandenberg AFB, CA 93437

E-Mail: andrew.edwards@us.af.mil

Re: Draft Final Environmental Assessment for East Housing Solar Energy Project, Vandenberg Air Force Base

Dear Mr. Edwards:

Thank you for the opportunity to comment on the Draft Final Environmental Assessment for Vandenberg Air Force Base's East Housing Solar Energy Project. At this time, the County is submitting the attached letters from the Fire Department and the Planning and Development Department.

The County has no further comments on this project at this time and looks forward to hearing more about the project's progress. If you should have any further questions, please do not hesitate to contact my office directly, or David Lackie, Interim Deputy Director in the Office of Long Range Planning at (805) 568-2023.

Sincerely,

Mona Miyasoto
County Executive Officer

cc: David Lackie, Interim Deputy Director, Long Range Planning Division, Planning & Development Department
Rob Heckmen, Division Chief/Fire Marshal, Fire Department
Glenn Russell, PhD, Director, Planning & Development Department

Attachments: Fire Department Comment Letter, dated June 11, 2014
Planning and Development Comment Letter, dated June 27, 2014

Renée E. Bahl
Assistant County Executive Officer
rbahl@co.santa-barbara.ca.us

Terri Maus-Nisich
Assistant County Executive Officer
tmaus@countyofsb.org

Dennis Bozanich
Assistant to the County Executive Officer
dbozanich@co.santa-barbara.ca.us

Fire Department

"Serving the community since 1926"

HEADQUARTERS

4410 Cathedral Oaks Road
Santa Barbara, CA 93110-1042
(805) 681-5500 FAX: (805) 681-5563

Michael W.Dyer
Fire Chief
County Fire Warden

Eric Peterson
Deputy Fire Chief

June 11, 2014

Mr. Andrew Edwards
Vandenberg Air Force Base
United States Air Force AFSPC 30 CES/CEIEA

Dear Mr. Edwards:

SUBJECT: East Housing Area Solar Energy Project, Vandenberg Air Force Base

I have reviewed the above referenced project and have no comments on the project as presented at this time.

As always, if you have any questions or require further information, please call 681-5554 or 681-5523.

In the interest of life and fire safety,

Rob Heckman
Division Chief/Fire Marshal

DP: mkb

County of Santa Barbara
Planning and Development

Glenn S. Russell, Ph.D., Director
Dianne Black, Assistant Director

June 27, 2014

Mr. Andrew Edwards
Vandenberg Air Force Base
United States Air Force AFSPC 30 CES/CEIEA

RE: Comments on the Draft Final Environmental Assessment for East Housing Area Solar Energy Project Vandenberg Air Force Base, California, May 2014

Dear Mr. Edwards:

Thank you for the opportunity to comment on the Draft Final Environmental Assessment (EA) for the East Housing Area Solar Energy Project. We have the following comments regarding the proposed project and adequacy of the EA:

Response: We have reviewed the visual impacts analysis and confirmed that potential impacts are based on the scenario of removal of eucalyptus trees in the southern portion of the former EHA along SR 1 south of Timber Lane. We have revised the environmental protection measure (EPM) of native plantings to be a mandatory EPM, if trees are removed. Specifics about how this EPM will be implemented are not available at this time.

Potential Eucalyptus Windrow Removal

The existing eucalyptus windrow serves as a spatial and visual buffer between the highway and the proposed solar facility and should be retained. The proposed removal of the windrow will change the visual character of the area, resulting in potential short-term and mid-term visual impacts. The proposed mitigation measure of native plantings (which is missing necessary detail) could be effective, but only after years of careful monitoring. In addition, the mature windrow foliage provides an effective dust filter that could be beneficial for the proposed solar facility. If necessary, we recommend that the design of the facility be altered to avoid any shading of proposed solar panels from the windrow.

Responses: (1) There was a plant survey done in May 2014 during the blooming period of pale yellow layia (layia heterotricha). No pale yellow layia was observed during the May 2014 survey (see list in Appendix B). At this time, based on that survey, pale yellow layia does not appear to be in the project area. Protective measures will be implemented to control certain exotic invasive plants in the area and to prevent future invasions that threaten native plant species including pale yellow layia. (2) We have revised the EPM for Coast live oaks trees and have relocated this to the required EPM section.

Biological Resources

1. The EA clearly states that the botanical survey was performed at the wrong time of year (November) to determine the presence or absence of the Pale-yellow layia, which is a CNPS Rank 1B plant that has been previously collected in the area. A botanical survey during the flowering season of this plant should be performed before potential impacts to this species can be determined and disclosed.

2. The mitigation measure for impacts to oak trees is inadequate. The EA should specify the criteria by which individual native trees are slated to remain or be removed. In addition, measures should be taken to ensure that native trees to remain are fenced or otherwise protected from damage during construction. The EA should include a native oak replacement mitigation measure with a replacement ratio of 10:1 in order to ensure that the habitat value of the removed trees and understory recovers over time.

123 E. Anapamu Street, Santa Barbara, CA 93101 • Phone: (805) 568-2000 • FAX: (805) 568-2030
624 W. Foster Road, Santa Maria, CA 93455 • Phone: (805) 934-6250 • FAX: (805) 934-6258
www.sbcountyplanning.org

Response: A reference to the survey report has been added to the EA, but due to potentially sensitive location information, it has not been appended to the EA. Note that we have received SHPO concurence for the the Proposed Action based on the content of the EA and past investigations of the general area. Correspondence with the SHPO is provided in Appendix C.

Cultural Resources

The EA states that the proposed development area has been completely surveyed for cultural resources. However, there is no reference to a survey report that would corroborate this statement and provide details about the survey (when it was performed, by whom, site visibility, etc.). There should be a reference to the survey report included.

If you have any questions or comments regarding this letter, or would like to discuss these issues further, please call Brian A. Tetley (805) 884-6848.

Sincerely,

Diane M. Black

for Glenn S. Russell, Ph.D., Director

c: Chron File

Santa Barbara County
Air Pollution Control District

Response: We have confirmed that the Environmental Protection Measures (EPMs) presented in the EA addressed the issues/topics listed below. We have made minor additions consistent with the language procvided by the SBCAPCD. We have added the reference to Rule 329. We have not included the attachments provided because compliance with the specified Rule(s) and/or EPMs noted in the EA are deemed sufficient.

June 23, 2014

USAF AFSPC 30 CES/CEIEA
Attn: Andrew Edwards
1028 Iceland Avenue
Vandenberg Air Force Base, CA 93437

Re: APCD Response to Draft Final Environmental Assessment and Finding of No Significant Impact for East Housing Area Solar Energy Project, Vandenberg Air Force Base

Dear Mr. Edwards:

The Santa Barbara County Air Pollution Control District (APCD) appreciates the opportunity to provide comments on the Draft Final Environmental Assessment for East Housing Area Solar Energy Project at Vandenberg Air Force Base. Vandenberg Air Force Base proposes to enter into a Power Purchase Agreement with a private developer who would design, construct, operate and maintain an unmanned 20 MW PV solar energy facility at the former East Housing Area on VAFB. Construction of the facility would require grading in the amount of 20,000 to 35,000 cubic yards of cut and fill to balance on site.

Air Pollution Control District staff suggests that the following measures be applied to the project:

1. Standard dust mitigations (**Attachment A**) are recommended for all construction and/or grading activities. The name and telephone number of an on-site contact person must be provided to the APCD prior to issuance of land use clearance.

2. Fine particulate emissions from diesel equipment exhaust are classified as carcinogenic by the State of California. Therefore, during project grading, construction, and hauling, construction contracts must specify that contractors shall adhere to the requirements listed in **Attachment B** to reduce emissions of ozone precursors and fine particulate emissions from diesel exhaust.

3. Asphalt paving activities shall comply with APCD Rule 329, *Cutback and Emulsified Asphalt Paving Materials*.

Please contact me at 961-8838 or by e-mail at PearsonM@sbcapcd.org if you have questions.

Sincerely,

Molly Pearson

Molly Pearson, Planning and Grants Supervisor
Technology and Environmental Assessment Division

Attachments: Fugitive Dust Control Measures
Diesel Particulate and NO_x Emission Measures

cc: TEA Chron File

Santa Barbara County
Air Pollution Control District

ATTACHMENT A
FUGITIVE DUST CONTROL MEASURES

These measures are required for all projects involving earthmoving activities regardless of the project size or duration. Proper implementation of these measures is assumed to fully mitigate fugitive dust emissions.

- During construction, use water trucks or sprinkler systems to keep all areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, this should include wetting down such areas in the late morning and after work is completed for the day. Increased watering frequency should be required whenever the wind speed exceeds 15 mph. Reclaimed water should be used whenever possible. However, reclaimed water should not be used in or around crops for human consumption.

- Minimize amount of disturbed area and reduce on site vehicle speeds to 15 miles per hour or less.

- If importation, exportation and stockpiling of fill material is involved, soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation. Trucks transporting fill material to and from the site shall be tarped from the point of origin.

- Gravel pads shall be installed at all access points to prevent tracking of mud onto public roads.

- After clearing, grading, earth moving or excavation is completed, treat the disturbed area by watering, <u>or</u> revegetating, <u>or</u> by spreading soil binders until the area is paved or otherwise developed so that dust generation will not occur.

- The contractor or builder shall designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. Their duties shall include holiday and weekend periods when work may not be in progress. The name and telephone number of such persons shall be provided to the Air Pollution Control District prior to land use clearance for map recordation and land use clearance for finish grading of the structure.

  Plan Requirements: All requirements shall be shown on grading and building plans and as a note on a separate information sheet to be recorded with map. **Timing**: Requirements shall be shown on plans or maps prior to land use clearance or map recordation. Condition shall be adhered to throughout all grading and construction periods.

  <u>MONITORING</u>: Lead Agency shall ensure measures are on project plans and maps to be recorded. Lead Agency staff shall ensure compliance onsite. APCD inspectors will respond to nuisance complaints.

Santa Barbara County
Air Pollution Control District

ATTACHMENT B
DIESEL PARTICULATE AND NO_x EMISSION MEASURES

Particulate emissions from diesel exhaust are classified as carcinogenic by the state of California. The following is an updated list of regulatory requirements and control strategies that should be implemented to the maximum extent feasible.

The following measures are required by state law:

- All portable diesel-powered construction equipment shall be registered with the state's portable equipment registration program OR shall obtain an APCD permit.
- Fleet owners of mobile construction equipment are subject to the California Air Resource Board (CARB) Regulation for In-use Off-road Diesel Vehicles (Title 13 California Code of Regulations, Chapter 9, § 2449), the purpose of which is to reduce diesel particulate matter (PM) and criteria pollutant emissions from in-use (existing) off-road diesel-fueled vehicles. For more information, please refer to the CARB website at www.arb.ca.gov/msprog/ordiesel/ordiesel.htm.
- All commercial diesel vehicles are subject to Title 13, § 2485 of the California Code of Regulations, limiting engine idling time. Idling of heavy-duty diesel construction equipment and trucks during loading and unloading shall be limited to five minutes; electric auxiliary power units should be used whenever possible.

The following measures are recommended:

- Diesel construction equipment meeting the California Air Resources Board (CARB) Tier 1 emission standards for off-road heavy-duty diesel engines shall be used. Equipment meeting CARB Tier 2 or higher emission standards should be used to the maximum extent feasible.
- Diesel powered equipment should be replaced by electric equipment whenever feasible.
- If feasible, diesel construction equipment shall be equipped with selective catalytic reduction systems, diesel oxidation catalysts and diesel particulate filters as certified and/or verified by EPA or California.
- Catalytic converters shall be installed on gasoline-powered equipment, if feasible.
- All construction equipment shall be maintained in tune per the manufacturer's specifications.
- The engine size of construction equipment shall be the minimum practical size.
- The number of construction equipment operating simultaneously shall be minimized through efficient management practices to ensure that the smallest practical number is operating at any one time.
- Construction worker trips should be minimized by requiring carpooling and by providing for lunch onsite.

Plan Requirements: Measures shall be shown on grading and building plans. **Timing:** Measures shall be adhered to throughout grading, hauling and construction activities.

MONITORING: Lead Agency staff shall perform periodic site inspections to ensure compliance with approved plans. APCD inspectors shall respond to nuisance complaints.

La Purisima Audubon Society

Post Office Box 2045
Lompoc, CA 93438

Serving the Lompoc, Santa Maria, and Santa Ynez Valleys

Responses: (1) We have evaluated the potential project site so as to allow for flexibility in the future construction of the solar PV facility. It may be the case that the facility will not develop the entire 182 acres and/or remove the row of eucalyptus trees/Coast live oak trees. (2) We have incorporated your recommendation for the protection of the Coast live oak trees into our Environmental Protection Measure (EPM). A setback and/or buffer may be feasible depending on the location of the solar array panels within the project area. (3) Adjacent habitat is of higher quality than the project area if displacment ocurs. (4) We have revised the EPM for Coast live oaks trees and have relocated this to the required EPM section. (5) No significant impact is anticipated as to migratory birds, however, we have reclassified the EPM as mandatory, which requires the contractor to considers impacts to birds when selecting the solar panels.

Andrew Edwards, Civ, DAF
30 CES/CEIEA
NEPA Project Manager
VAFB, CA

June 30, 2014

I am writing as a representative of the La Purisima Chapter of the National Audubon Society regarding the Draft Final Environmental Assessment for the East Housing Area Solar Energy Project on Vandenberg Air Force Base.

We are happy to see that VAFB has a solar project in the works. Funding and credit opportunities are surely considerations which drive project size, output and feasibility and since there is a chance now to get a solar project to boost VAFB's environmental appeal we understand the desire to do so on a grand scale. However, we are surprised at the size of the project site and concerned about the effect of destroying hundreds and hundreds of trees to accommodate solar panels, and the effect this will have on people and wildlife.

Such a large mosaic of majestic trees being removed will create an unpleasant departure of greenery which we hope can be mitigated by creating a deeper setback to the project site from CA State Highway 1. This would include the Coast Live Oaks shown within Figure 4 Biological Resources Map along the western corridor and extend east to include a buffer 8 feet east from the Monterey Cypress that is across from the southwestern stand of Coast Live Oaks. Creating a buffer with existing Coast Live Oaks and some of the other existing trees is preferable to a fence or even the eucalyptus stand which leaves so much roadside detritus.

The project site is a habitat for many wildlife species and the large amount and variety of trees offer shelter to many birds. By removing so many trees and displacing wildlife corridors and shelters it will create territorial challenges so numerous that the adjacent areas may not be viable options for some species.

Appendix A 2670 shows a Coast Live Oak that we request be taken into special consideration with your project design. The other interior Coast Live Oaks should be preserved as well although one of them appears to be ivy-choked.

The number and variety of trees planned for destruction will have a major impact on the local avian population as well as non-shorebird migratory species using the Pacific Flyway.

La Purisima Audubon Society

Post Office Box 2045
Lompoc, CA 93438

Serving the Lompoc, Santa Maria, and Santa Ynez Valleys

We wish you success with your project as well as hoping that these considerations can be a part of its success in that it preserves the majority of the trees of special concern and a Monterey Cypress that offers its high canopy with no low branching impediments to interfere with your large solar project.

Yours sincerely,

Michael Taaffe, President
La Purisima Audubon Society

P.S. Please use the following as a return address:

24 Stanford Circle
Lompoc CA 93436-1113

Response: We have revised the EPM for Coast live oaks trees and have relocated this to the required EPM section. To the extent the degraded Burton Mesa chaparral is colocated with the Coast live oaks and/or eucalyptus trees that would not be removed, then it is possible some of the chaparral may be protected. VAFB recognizes the importance and scarcity of Burton Mesa chaparral. The extent of this habitat on and near the project area is highly compromised and degraded by past use. The management of this habitat is detailed, with extensive protection measures, in the base's Integrated Natural Resources Management Plan (section 3.6 and other areas). As to invasive species, VAFB conducts extensive invasive species management actions every year, including hundreds of acres of pampas grass treatments over a 5 year period. This EA has included a mandatory EPM to address invasive species.

Andrew Edwards, Civ, DAF
30 CES/CEIEA
NEPA Project Manager
VAFB, CA

June 25, 2014

Dear Andrew,

I am writing as a representative of the local Arguello Group of the Sierra Club regarding the Draft Final Environmental Assessment for the East Housing Area Solar Energy Project on Vandenberg Air Force Base.

Thank you for providing me with an electric and printed copy of your EA for this project.

The following concerns have been raised regarding the project:

- Several particularly large multi-trunked coast live oaks are located within the project boundaries; one, sited in Appendix A on Page 8 reportedly has a canopy that spans roughly 100 feet in diameter. Multi-trunked coast live oaks are a unique variant of coast live oaks; they are endemic and aside from being beautiful, providing homes to wildlife and being part of the Burton Mesa chaparral community, they are taking a beating from humans. We request that the coast live oaks identified in Figure 4 of the Biological Resources map be preserved with a six foot buffer zone around each tree and no grading allowed within the buffer zone.

- Approximately 4.2 acres of "degraded Burton Mesa chaparral" is considered to be within the project site. This plant community is unique, as far as it is known, to the world. Once consisting of 22,000 acres, by 2007 it had been whittled down to 8,645 acres. What remains is spread between VAFB and the Burton Mesa Ecological Reserve. It is all too easy, it seems, to write off this degraded section, but in reality, the plant community that remains is under the guardianship of those entrusted to care for it. To that end, if this acreage is indeed destined to become part of a solar energy project, we request that an equal amount of acreage of Burton Mesa chaparral (preferably upwind of pampas grass) in some other location on VAFB be thoroughly relieved of ruderals, including pampas grass, taking care not to destroy the vegetation that is sought to be protected, as a mitigation for the loss.

Sincerely,

Peg Beebe

Peg Beebe
Arguello Group/Sierra Club