Draft
Environmental Assessment for Periodic Operations of F-15E/EX Testing at Vandenberg Space Force Base Santa Barbara County, California

March 2025

Prepared for:
United States Space Force
30th Civil Engineer Squadron
CEQ Unique Identification Number: EAXX-007-57-USF-1740409464

PRIVACY ADVISORY

This Environmental Assessment (EA) has been provided for public comment in accordance with the National Environmental Policy Act (NEPA), as amended by the Fiscal Responsibility Act of 2023 (Public Law 118-5), and 32 *Code of Federal Regulations* Part 989, *Environmental Impact Analysis Process (EIAP)*, which provides an opportunity for public input on United States Department of the Air Force (DAF) decision-making, allows the public to offer input on alternative ways for DAF to accomplish what it is proposing, and solicits comments on DAF's analysis of environmental effects.

Public input allows DAF to make better-informed decisions. Letters or other written or verbal comments provided may be published in this EA. Providing personal information is voluntary. Private addresses will be compiled to develop a stakeholders inventory. However, only the names of the individuals making comments and specific comments will be disclosed. Personal information, home addresses, telephone numbers, and email addresses will not be published in this EA.

COMPLIANCE

This document has been certified that it does not exceed 75 pages, not including appendices. NEPA regulations define a "page" as 500 words, not including maps, diagrams, graphs, tables, and other means of graphically displaying quantitative or geospatial information.

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COVER SHEET

**Draft Environmental Assessment for
Periodic Operations of F-15E/EX Testing at Vandenberg Space Force Base,
Santa Barbara County, California**

a. *Responsible Agency: Department of the Air Force*

b. *Location: Vandenberg Space Force Base, Santa Barbara County, California*

c. *Designation: Draft Environmental Assessment*

d. *Point of Contact: Jennifer Vicich, United States Space Force, jennifer.vicich@spaceforce.mil*

Abstract:

This Environmental Assessment (EA) has been prepared pursuant to provisions of the *National Environmental Policy Act*, Title 42 *United States Code*, § 4321 et seq., as amended by the *Fiscal Responsibility Act of 2023* (Public Law 118-5), and 32 *Code of Federal Regulations* Part 989, *Environmental Impact Analysis Process (EIAP)*. Potentially affected environmental resources were identified in coordination with local, state, and federal agencies. Specific environmental resources with the potential for environmental consequences include land use; air quality (including greenhouse gas and climate change); earth, water, biological, and cultural resources; noise; coastal zone management, infrastructure (including transportation and utilities); hazardous materials and waste; safety; and socioeconomics.

The Department of the Air Force (DAF) prepared this EA to analyze potential impacts from the periodic operation of F-15E/EX aircraft at Vandenberg Space Force Base (SFB) for testing and training. The periodic operation would include a temporary deployment of up to 12 F-15E or F-15EX aircraft with test and training operations of approximately one week in duration occurring a maximum of two times per year the first year, then a maximum of once a year thereafter. The periodic operation would require construction of several facilities on Vandenberg SFB to support the flight operations.

The purpose of the Proposed Action is to provide a suitable location for testing and training for a homeland defense mission with the F-15E and F-15EX fighter jets that can be performed with minimal conflict with other ongoing Department of the Air Force (DAF) operations.

The DAF continues to develop new weapons to fulfill its mission to defend the United States. The Proposed Action is needed to test weapons systems and train personnel in the execution of the homeland defense mission. The testing of new weapon systems and training of personnel in the use of those systems are essential to establishing a homeland defense mission capability.

The analysis of the affected environment and environmental consequences concluded that implementing the Proposed Action would not have significant, adverse impacts on the resource areas analyze. Further, implementing environmental protection measures and best management practices, as applicable in accordance with 32 CFR §§ 989.22(c) and (d) and 32 CFR § 989.14(j)(4), would ensure that impacts from the Proposed Action would be below significant levels. Further, significant cumulative impacts would not be anticipated from activities associated with the Proposed Action when considered in combination with the effects of other past, present, and reasonably foreseeable future projects at Vandenberg SFB.

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FINDING OF NO SIGNIFICANT IMPACT (FONSI)

AND

FINDING OF NO PRACTICABLE ALTERNATIVE (FONPA)

PERIODIC OPERATIONS OF F-15E/EX TESTING AT VANDENBERG SPACE FORCE BASE, SANTA BARBARA COUNTY, CALIFORNIA

Pursuant to provisions of the *National Environmental Policy Act*, Title 42 *United States Code* (USC) § 4321 et seq. (NEPA), as amended by the *Fiscal Responsibility Act of 2023* (Public Law 118-5), and the United States (US) Department of the Air Force (DAF) NEPA regulations at 32 *Code of Federal Regulations* (CFR) Part 989, *Environmental Impact Analysis Process (EIAP)*, DAF prepared the attached Draft Environmental Assessment (EA) to address the potential environmental consequences associated with the periodic operations of F-15E/EX aircraft at Vandenberg Space Force Base (SFB) in California.

Purpose and Need

The purpose of the Proposed Action is to provide a suitable location for testing and training for a homeland defense mission with the F-15E and F-15EX fighter jets that can be performed with minimal conflict with other ongoing DAF operations. The DAF continues to develop new weapons to fulfill its mission to defend the US. The Proposed Action is needed to test weapons systems and train personnel in the execution of the homeland defense mission. The testing of new weapon systems and training of personnel in the use of those systems are essential to establishing a homeland defense mission capability.

The Air Force developed the following selection standards to identify reasonable alternative locations for the Proposed Action for analysis in this EA. The alternative locations

1. must be a DAF or SFB with a runway and airfield capable of supporting F-15E/F-15EX periodic operations. The runway must be at least 10,000 feet long by 150 feet wide;

2. must not have any foreign flightline presence or joint civil/military use to maintain integrity of the sovereign homeland defense mission;

3. must have an airfield ground temperature between 45 degrees Fahrenheit (ºF) and 95ºF. The higher the percentage of time an airfield meets this standard, the higher it was ranked. “Top tier” locations would meet this requirement more than 90 percent of the time, while “second tier” locations would meet the requirement between 75 and 89 percent of the time. The identified temperature criteria represent the best year-round conditions for operations when considering the assets being tested and loaded onto aircraft;

4. must be within 100 nautical miles of international waters; and

5. must be located on the west coast of the US to enable use of airspace over the Pacific Ocean, which requires less de-confliction than airspace off the east coast of the US.

Based on these criteria, Vandenberg SFB was the only site that met all the criteria and was selected as location for the Proposed Action.

Description of the Proposed Action and Alternatives

The EA evaluates two alternatives for the proposed action at Vandenberg SFB and the No Action Alternative. The two alternatives each contain the same construction projects, flight operations, and personnel basing. However, the two alternatives differ in the location of an access road to the complex of four munitions storage igloos (Project 5) and the location of the proposed aerospace ground equipment (AGE) storage and administration building (Project 2a or 2b) (Table 1). Alternative 1 in the EA is considered the preferred alternative because it disturbs less native vegetation, and the location of the AGE building would not conflict with the potential location of a new air traffic control tower for the Vandenberg SFB airfield.

No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E and/or F-15EX fighter jets at Vandenberg SFB to test and execute a homeland defense mission. No additional personnel would be stationed at Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 operations. Over time, the mission capabilities of weapons systems would diminish without additional testing to improve F-15 and F-15EX fighter capabilities along with the DAF's ability to fulfill its mission to defend the US.

Table 1
Construction Project Descriptions

Project #	Project	Project Description	New Impervious Surface (ft^2)
1	F-15 ramp space and tie-downs/grounding points and temporary aerospace ground equipment (AGE) storage pad	Demolish existing and install new ramp tie-downs/grounding points and mark F-15 parking space with new lines. Construct small (approximately 1,500 ft^2) AGE pad for use during flight operations.	1,500
2a	AGE storage/administration building – Hangar Building Alternative	Construct a new AGE storage/administration building to support F-15 operations southeast of the drive-through Hangar Building including a new all-weather access road from Airfield Road and from the AGE building to the F-15 ramp space with tie-in to the temporary AGE storage pad.	4,000
2b	AGE storage /administration building – Building 1754 Alternative	Demolish Building 1754 and replace with new AGE storage/administration building to support F-15 operations.	0
3	Aircraft arresting system	Install an aircraft arresting system on each end of the runway.	4,000
4	Live ordnance loading area (LOLA)	Construct new entry/exit ramps and apron to use as a LOLA with a capacity of four F-15 aircraft.	292,000
5	Complex of four earth-covered munitions storage igloos – Flightline Alternative	Construct four earth-covered 7-bar Navy Containerized Long Weapons Storage Magazine structures northeast of the flightline with an access road to the airfield and upgrade a gravel access road to a paved road for delivery of munitions and emergency access. Connect igloos to electrical and communications utilities.	251,576
6	Single earth-covered munitions storage igloo and access road	Construct a single earth-covered 7-bar Navy Containerized Long Weapons Storage Magazine structure near Building 980.	19,994

AGE = aerospace ground equipment; ft^2 = square feet; LOLA = live ordnance loading area

Summary of Findings

Potentially affected environmental resources were identified through communications with state and federal agencies, Vandenberg SFB staff, and review of past environmental documentation. Specific environmental resources with the potential for environmental consequences include land use; air quality; earth, water, biological, and cultural resources; noise; coastal zone management; infrastructure and utilities; hazardous materials and wastes; safety; and socioeconomics.

In the summary of findings, the term "Proposed Action Alternatives" is used to refer to Alternatives 1 and 2 when impacts are the same for both alternatives. Where differences occur, potential impacts are summarized by each alternative.

Land Use

No adverse impacts to land use would result from implementation of the Proposed Action Alternatives. The construction projects under the Proposed Action Alternatives would occur entirely within the existing boundaries of Vandenberg SFB. These projects would be implemented within planning districts consistent with their existing purpose. The construction of the munitions storage igloos (Projects 5 and 6) would have long-term but non-significant impacts on future land use in the area surrounding the igloos because of explosives safety zone restrictions. The land use restrictions would not affect the viability of existing land uses in the surrounding area and would not have a detrimental effect on the mission of Vandenberg SFB.

Earth Resources

With the use of best management practices and project-specific measures, adverse impacts to earth resources from soil disturbance during construction activities under the Proposed Action Alternatives would be short term and non-significant. Disturbed area would either be covered with hardscape (buildings or pavement) or seeded with vegetation to prevent soil erosion.

Air Quality

Air emissions from the construction projects are expected to be short term and are all significantly below Prevention of Significant Deterioration (PSD) thresholds of significance within the South Central Coast Intrastate Air Quality Control Region. Nitrogen oxide emissions are primarily from aircraft operations, which are short term and are also below the PSD threshold of significance.

Water Resources

Wetlands and Floodplains

None of the proposed project areas occur within the 100-year floodplains of San Antonio Creek or the Santa Ynez River. The Project 5 location carried forward in the EA for analysis was the only site that met the operational and safety requirements for the four munitions storage igloos. The location of Project 5 would require the access road from the storage igloos to the airfield to cross a linear swale area that contains palustrine emergent wetlands. Wetland delineation surveys determined that the wetlands in the swale area are all isolated wetlands that do not maintain a “continuous surface connection” to any other bodies of water that could definitively be considered waters of the US under the current rule, and therefore, are not considered jurisdictional wetlands.

Alternative 1: As described in the EA, the munitions storage igloos access road for Project 5 under Alternative 1 would follow an existing bladed unimproved powerline road and would cross a wetland area. The access road would follow an existing two-track road through the wetland crossing. The road grade within the wetland area would be raised to avoid flooding from seasonal collection of precipitation. Culverts would be installed to maintain a hydrologic connection between wetland areas on either side of the access road. Approximately 0.09 acre (3,920 ft^2) of non-jurisdictional wetland may be impacted. Alternative 1 would not have a significant impact on wetlands.

Alternative 2: As described in the EA, the munitions storage igloos access road for Project 5 under Alternative 2 would follow a former unimproved road that is now overgrown with chaparral vegetation. The access road would cross the wetland in the linear swale. The road grade would be raised to avoid seasonal flooding. Culverts would be installed to maintain a hydrologic connection between wetland areas on either side of the road. Approximately 0.02 acre (871 ft^2) of non-jurisdictional wetlands may be impacted. Alternative 2 would not have a significant impact on wetlands.

Water Quality

Construction and operational activities under the Proposed Action Alternatives would have no significant short- or long-term impacts to water quality. Erosion and sedimentation control measures would be fully implemented during construction to prevent and minimize soil- and pollutant-dispersion to surface waters. Any vegetated areas that are exposed during construction would be permanently stabilized with vegetation

to prevent erosion and meet the National Pollutant Discharge Elimination System (NPDES) Construction General Permit requirements. The access roads would be paved, which would prevent erosion.

For projects near the airfield, a Storm Water Control Plan would be prepared describing low impact development measures to maintain pre-development hydrology in accordance with Vandenberg SFB post-construction standards and Section 438 of the *Energy Independence and Security Act of 2007*. The F-15 flight operations would be added to the Vandenberg SFB Industrial stormwater pollution prevention plan for compliance with the NPDES Industrial General Permit.

Biological Resources

Vegetation

Alternative 1: The projects under Alternative 1 would disturb 11.08 acres of vegetation of which 6.62 acres are mown or maintained vegetation. Approximately 4.46 acres of native vegetation would be disturbed including 3.36 acres of the *Arctostaphylos* (*purissima, rudis*) Shrubland Special Stands (commonly known as Burton Mesa Chaparral community) and 1.06 acres of *Artemisia californica – Salvia mellifera* Shrubland Alliance (known as coastal sage). Impacts to vegetation would be anticipated to be long term but not significant under Alternative 1 because a relatively small area would be disturbed. In addition, future development would be restricted in areas surrounding the munitions storage igloos (Project 5 and 6) preventing future disturbance of vegetation in those areas.

Alternative 2: The projects under Alternative 2 would disturb 11.28 acres of vegetation of which 6.41 acres are mown or maintained vegetation. Approximately 4.87 acres of native vegetation would be disturbed including 3.78 acres of the *Arctostaphylos* (*purissima, rudis*) Shrubland Special Stands (commonly known as Burton Mesa Chaparral community) and 1.06 acres of *Artemisia californica – Salvia mellifera* Shrubland Alliance (known as coastal sage scrub). Impacts to vegetation would be anticipated to be long term but not significant under Alternative 2 because a relatively small area would be disturbed. In addition, future development would be restricted in areas surrounding the munitions storage igloos (Project 5 and 6) preventing future disturbance of vegetation in those areas.

Wildlife

Impacts to wildlife under the Proposed Action Alternatives could occur from aircraft activities (direct strike or noise impacts) and construction activities (loss of habitat, noise, crushing or physical harm to individuals). Construction of the project components would not remove a significant percentage of any habitat nor significantly alter the connectivity of the surrounding habitats for wildlife use. Construction areas would be relatively small compared to the overall amount of habitat on Vandenberg SFB, and any loss of wildlife individuals would have insignificant impacts on the status or viability of any population of wildlife species.

Threatened or Endangered Species and Other Protected Species

Noise modeling of proposed flight operations indicate that the periodic operation of F-15 aircraft at Vandenberg SFB would not increase the noise level above that of current aircraft operations. No threatened and endangered species were found in proposed project areas or within a 100-foot buffer zone surrounding the projects. Vandenberg SFB evaluated the potential impact of the Proposed Action on the California red-legged frog and concluded that the action may affect but would not likely adversely affect the species with concurrence from the US Fish and Wildlife Service. With implementation of environmental protection measures (EPMs), no significant effect on threatened or endangered species or other protected species (e.g., state listed species or migratory birds) would occur.

Cultural Resources

No cultural resources were found within project areas during field surveys. Based on evaluation of Vandenberg SFB archaeological records, sites located within the areas of direct impact, or the 200-meter buffer zone were determined to be not eligible for listing on the National Register of Historic Places. Noise analysis indicated that sound levels (120 dB contour lines and no sonic booms) created by flight operations would not affect any historic property. There would be no effect on cultural resources under the Proposed Action Alternatives.

Noise

Noise associated with construction and demolition projects under the Proposed Action Alternatives would not cause any significant direct or indirect impacts on noise-sensitive receptors. In addition, the Proposed Action Alternatives would not result in any operational increases in noise. The multiple noise metrics evaluated are described in the EA.

Coastal Zone Management

After review of the Proposed Action, the DAF has determined that the Proposed Action Alternatives are consistent with the Sections 30230, 30231, 30240, and 30244 of the *California Coastal Act of 1976* (see **Appendix E** of the EA).

Infrastructure (including Transportation and Utilities)

Transportation

Alternative 1 would not impact the transportation systems at Vandenberg SFB. Local and regional roadways are considered in good condition and would be able to readily absorb construction-related traffic. Therefore, impacts to transportation would be temporary and not significant under the Proposed Action Alternatives.

Communications

The existing communications system at Vandenberg SFB meets the current missions of Vandenberg SFB with some limitations, primarily on South Base. Under the Proposed Action Alternatives, Projects 2a or 2b, 5 and 6 would require the installation of new communications lines along existing roads or connections to the AGE building. These communications lines would tie into the existing communications system at Vandenberg SFB. With the installation of new communication lines, the communications systems would have the capacity to meet the demand. There would be no impacts to communication systems.

Electricity and Natural Gas

Net changes in long-term electrical demand from the operation of the new facilities would be minimal. The electrical system is overdesigned for current usage. The system has a capacity of 100 MW with only an existing peak load of 25 MW. Natural gas usage has recently decreased because of the demolition of World War II era wooden frame buildings. The natural gas supply and distribution system has approximately 58 percent unused capacity.

Potable Water Supply

Project 2a or 2b (AGE building) would require connection to the Vandenberg SFB potable water system, which has sufficient capacity to supply the facility. The water supply system has approximately 19 percent unused capacity. Therefore, there would be no impacts to the potable water supply system under the Proposed Action Alternatives.

Sanitary Sewer

Project 2a or 2b (AGE building) would require connection to the Vandenberg SFB sanitary sewer system which connects to the City of Lompoc for treatment. The AGE building would produce a relatively small amount of wastewater, primarily during the one or two deployments per year. The City of Lompoc wastewater treatment has sufficient capacity to handle the proposed usage at the AGE building. There would be no impacts to the sanitary sewer system under the Proposed Action Alternatives.

Solid Waste Management

Solid waste generated by the Proposed Action Alternatives would be collected and reused or recycled through Installation programs, with residual waste transported off Base for disposal in the municipal landfill operated by the City of Santa Maria. There would be non-significant, short-term impacts to solid waste during facility construction due to the temporary increase in construction debris that would require disposal.

Hazardous Materials and Waste Management

Hazardous Materials and Wastes

A limited use of hazardous materials may be required during operation of F-15E/F-15EX aircraft and facility construction and demolition activities. With the use of appropriate EPMs, impacts to hazardous materials and waste would not be significant.

Fuel Storage

None of the proposed construction or demolition projects on the Installation would impact the current fuel storage system. Fuel use associated with F-15 operations would be limited to one to two weeks of the year; therefore, impacts to fuel storage or from fueling under Proposed Action Alternatives would be short term and not significant.

Environmental Restoration Program (ERP) Sites

Alternative 1: Project 2a would be located within Area of Concern (AOC)-57, the site of a total petroleum hydrocarbons gasoline spill that was associated with an oil and water separator. The soil within this area has been previously excavated to 10 feet below ground surface and has been replaced with clean backfill soils. With implementation of health and safety precautions associated with AOC-57, impacts to ERP sites would be short term and not significant under Alternative 1.

Alternative 2: Under Alternative 2, Project 2b would be in proximity to closed site AOC-58 Because this site has been determined to be closed, no adverse effects would be expected to occur. Impacts to ERP sites under Alternative 2 would not be significant.

Perfluoroalkyl Substances (PFAS) and Aqueous Film Forming Foam (AFFF)

As of 2017 and in compliance with *Comprehensive Environmental Response, Compensation, and Liability Act* regulations, US military airports have phased out the use of PFAS and AFFF. These substances would not be used in construction projects or flight operations under the Proposed Action Alternatives; therefore, no impacts would occur.

Radon

Radon would be managed in new facilities by incorporating features into the design that limit the ability for radon to enter buildings and employing EPMs, such as conducting periodic radon testing in each new or renovated building. Post-construction radon management measures, such as installing ventilation systems to remove radon that has already entered the building, would be taken in buildings that test higher than 4 pCi/L. Therefore, impacts would be long term but not significant under the Proposed Action Alternatives.

Pesticides

Use of pesticides, herbicides, fungicides, insecticides, and rodenticides during demolition or after construction activities would be conducted on an as-needed basis consistent with federal, state, and local regulations. Therefore, potential adverse impacts from pesticide usage would be short term and not significant under the Proposed Action Alternatives.

Safety

Ground Safety

Construction of facilities and access roads would temporarily increase potential safety hazards associated with common industrial construction projects. Work along and on the active taxiway and runway would create ground hazards associated with flight operations. Coordination of construction activity with airfield management would minimize potential hazards. With the implementation of safety standards established by Occupational Safety and Health Administration and the DAF, development of contractor safety programs, and coordination with SLD 30 organizations for overseeing safety programs and emergency

responses, potential impacts to ground safety would be short term and not significant under the Proposed Action Alternatives.

Explosives Safety

The hazards of munitions storage are mitigated by adhering to the required setback distances of storage sites from inhabited buildings and general transportation route. Existing DAF munitions handling, and transport protocols and standards would be followed. These are operations that are routinely conducted at DAF bases. With the implementation of DAF guidelines, procedures, and regulations for storing, transporting, and handling munitions, impacts related to explosives safety would be long term but not significant under the Proposed Action Alternatives.

Flight Operation Safety

The DAF Aviation Safety Program is designed to minimize the potential for any defined class of mishaps. Air Combat Command would coordinate with Vandenberg SFB airfield operations to schedule proposed periodic deployments of F-15 aircraft at Vandenberg to minimize conflicts with other airspace operations. The aircraft arresting system would provide an added safety mitigation for potential emergencies during takeoffs and landings. The F-15 aircraft would not be carrying live ordnance during training missions or explosive warheads. Therefore, impacts from mishaps while carrying munitions would not be significant. With the implementation of the DAF Aviation Safety Program standards and requirements and coordination with Vandenberg SFB airfield operations, impacts related to flight operation safety would be long term (i.e., during ongoing operations) but not significant under the Proposed Action Alternatives.

Socioeconomics

The Proposed Action Alternatives would have short-term, non-significant beneficial impacts to employment due to the need for local construction personnel to complete construction actions. The Proposed Action Alternatives would have no significant impacts on housing, education resources, or population.

Cumulative Impacts

The EA considered cumulative impacts that could result from the incremental impact of implementation of the Proposed Action Alternatives when added to other past, present, or reasonably foreseeable environmental trends or planned actions at Vandenberg SFB. No significant cumulative impacts were identified.

Mitigation

The EA analysis concluded that the Proposed Action Alternatives would not result in significant environmental impacts. EPMs have been identified for potentially affected resources and would be implemented as appropriate during the short-term construction phase and the longer-term operational phase of the Proposed Action.

Finding of No Practicable Alternative. Pursuant to Executive Order (EO) 11990, *Protection of Wetlands* and considering all supporting information, the DAF finds that there is no practicable alternative to the access road for Project 5 being located in a wetland as discussed in the attached EA. The wetland site is characterized by a temporary ponding regime from seasonal precipitation. In accordance with EO 11988, the Air Force considered alternative locations for Project 5 within Vandenberg SFB. However, the proposed location was the only site that met both of the explosives safety and operational mission requirements. Relocation of the access road outside the wetland boundary was not feasible, and the associated wetland impacts are unavoidable.

Finding of No Significant Impact. After review of the EA prepared in accordance with the requirements of NEPA and 32 CFR Part 989, and which is hereby incorporated by reference, I have determined that the proposed activities would not have a significant impact on the quality of the human or natural environment. Accordingly, an Environmental Impact Statement will not be prepared. This decision was made after considering all submitted information, including a review of agency comments submitted during the 30-day public comment period, and considering a full range of practical alternatives that meet project requirements and are within the legal authority of the DAF.

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Marcia L. Quigley, Colonel, USAF
Director, Space Force Mission Sustainment
(Engineering, Logistics, & Force Protection)

DATE

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ACRONYMS AND ABBREVIATIONS

30 CES/CEIE	30th Civil Engineer Squadron/Installation Management Flight, Environmental Section
AAS	aircraft arresting system
ACAM	Air Conformity Applicability Model
ACC	Air Combat Command
ACM	asbestos-containing materials
ADI	Area of Direct Impact
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFFF	aqueous film forming foam
AFMAN	Air Force Manual
AFOSH	Air Force Occupational Safety and Health
AGE	aerospace ground equipment
AOC	Area of Concern
APCD	Air Pollution Control District
APE	Area of Potential Effects
APZ	Accident Potential Zones
AST	aboveground storage tank
BASH	Bird/Wildlife Aircraft Strike Hazard
BCC	Birds of Conservation Concern
BMP	best management practices
CAA	Clean Air Act
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CARB	California Air Resources Board
CCA	California Coastal Act of 1976
CCC	California Coastal Commission
CCMP	California's Coastal Management Program
CCWA	Central Coast Water Authority
CDFW	California Department of Fish and Wildlife
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
CO_2e	carbon dioxide-equivalent
CWA	Clean Water Act
CZ	Clear Zones
CZMA	Coastal Zone Management Act of 1972
DAF	Department of the Air Force
DNL	Day-Night Average Sound Level
DNWG	Defense Noise Working Group
DoD	Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EISA	Energy Independence and Security Act of 2007
EO	Executive Order
EOD	explosive ordnance disposal
EPM	environmental protection measure
ERP	Environmental Restoration Program
ESA	Endangered Species Act
°F	degree Fahrenheit
ft^2	square feet
GHG	greenhouse gas
GIS	geographic information system
GOB	Guidance Operations Building

HazMart	Hazardous Materials Pharmacy
HAZMAT	hazardous wastes and materials
HD	hazard division
HUC	Hydrologic Unit Code
IRP	Installation Restoration Program
kg	kilogram
LBP	lead-based paint
LID	low-impact development
LOLA	live ordnance loading area
MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act
MMRP	Military Munitions Response Program
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAVAID	navigational aid
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
PBO	Programmatic Biological Opinion
PCB	polychlorinated biphenyl
PFAS	per- and Polyfluorinated Substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
ppm	parts per million
POI	point of interest
PSD	Prevention of Significant Deterioration
QD	quantity distance
ROI	region of influence
RWQCB	Regional Water Quality Control Boards
SARA	Superfund Amendments and Reauthorization Act
SCCIAQCR	South Central Coast Intrastate Air Quality Control Region
SFB	Space Force Base
SHPO	State Historic Preservation Office
SLC	Space Launch Complex
SLD 30	Space Launch Delta 30
SPL	sound pressure level
SSC	Species of Special Concern
SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
tpy	tons per year
UFC	Unified Facilities Criteria
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	underground storage tank
$\mu g/m^3$	micrograms per cubic meter

CHAPTER 1 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The United States (US) Department of the Air Force (DAF) Headquarters Air Combat Command (ACC), Langley Air Force Base (AFB), Virginia, proposes to periodically operate F-15E and/or F-15EX fighter jets at Vandenberg Space Force Base (SFB), California, for the purposes of testing and homeland defense. The periodic operations would include a temporary deployment of up to 12 F-15E or F-15EX aircraft with test operations of approximately one week in duration occurring a maximum of two times per year. The periodic operations require munitions storage and permanent change of station for up to 35 individuals.

Vandenberg SFB is located on California's Central Coast in Santa Barbara County and occupies 99,604 acres, approximately 45 miles northwest of the city of Santa Barbara (**Figure 1-1**). Vandenberg SFB is surrounded by the Santa Ynez mountains and the communities and ranch land of northern Santa Barbara County, extending to the Pacific Ocean shoreline. The communities of Lompoc and Santa Maria are east and north of the Vandenberg SFB, respectively. The Santa Ynez River and State Highway 246 divide Vandenberg SFB into two distinct parts: North Base and South Base.

The DAF has determined that the proposed federal action is subject to compliance with the *National Environmental Policy Act of 1969*, as amended (*42 United States Code* [USC] § 4321 et seq.) (NEPA) and numerous other laws and regulations. Space Launch Delta 30 (SLD 30) at Vandenberg SFB is the lead federal agency responsible for complying with NEPA and other associated, relevant laws and regulations for the proposed federal action. The ACC and SLD 30 operate under the DAF; therefore, the Proposed Action would be implemented under DAF regulations.

This Environmental Assessment (EA) was prepared in accordance with NEPA, as amended by the *Fiscal Responsibility Act of 2023* (Public Law 118-5), and the DAF NEPA regulations at *32 Code of Federal Regulations* (CFR) Part 989, *Environmental Impact Analysis Process (EIAP)*. The EIAP complies with the prescriptive timeline and page limits for an EA. This EA promotes NEPA streamlining through the implementation of the DAF EIAP. To render this document more concise, links are provided to online data sources to which the reader can refer for more information. Should the reader not have internet access, please contact the DAF point of contact listed on the **Cover Sheet** of this EA and accommodation will be made to provide printed copies of relevant information requested.

These federal regulations establish both the administrative process and substantive scope of the environmental impact analysis designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action. The Proposed Action at Vandenberg SFB would only commence upon satisfactory completion of this EA and issuance of a Finding of No Significant Impacts. Should the Proposed Action and Alternatives affect wetlands, the Vandenberg SFB would also prepare a Finding of No Practicable Alternative.

1.2 PURPOSE OF THE ACTION

The **purpose** of the Proposed Action is to provide a suitable location for testing and training for a homeland defense mission with the F-15E and F-15EX fighter jets that can be performed with minimal conflict with other ongoing DAF operations.

1.3 NEED FOR ACTION

The DAF continues to develop new weapons to fulfill its mission to defend the US. The Proposed Action is needed to test weapons systems and train personnel in the execution of the homeland defense mission. The testing of new weapon systems and training of personnel in the use of those systems are essential to establishing a homeland defense mission capability.

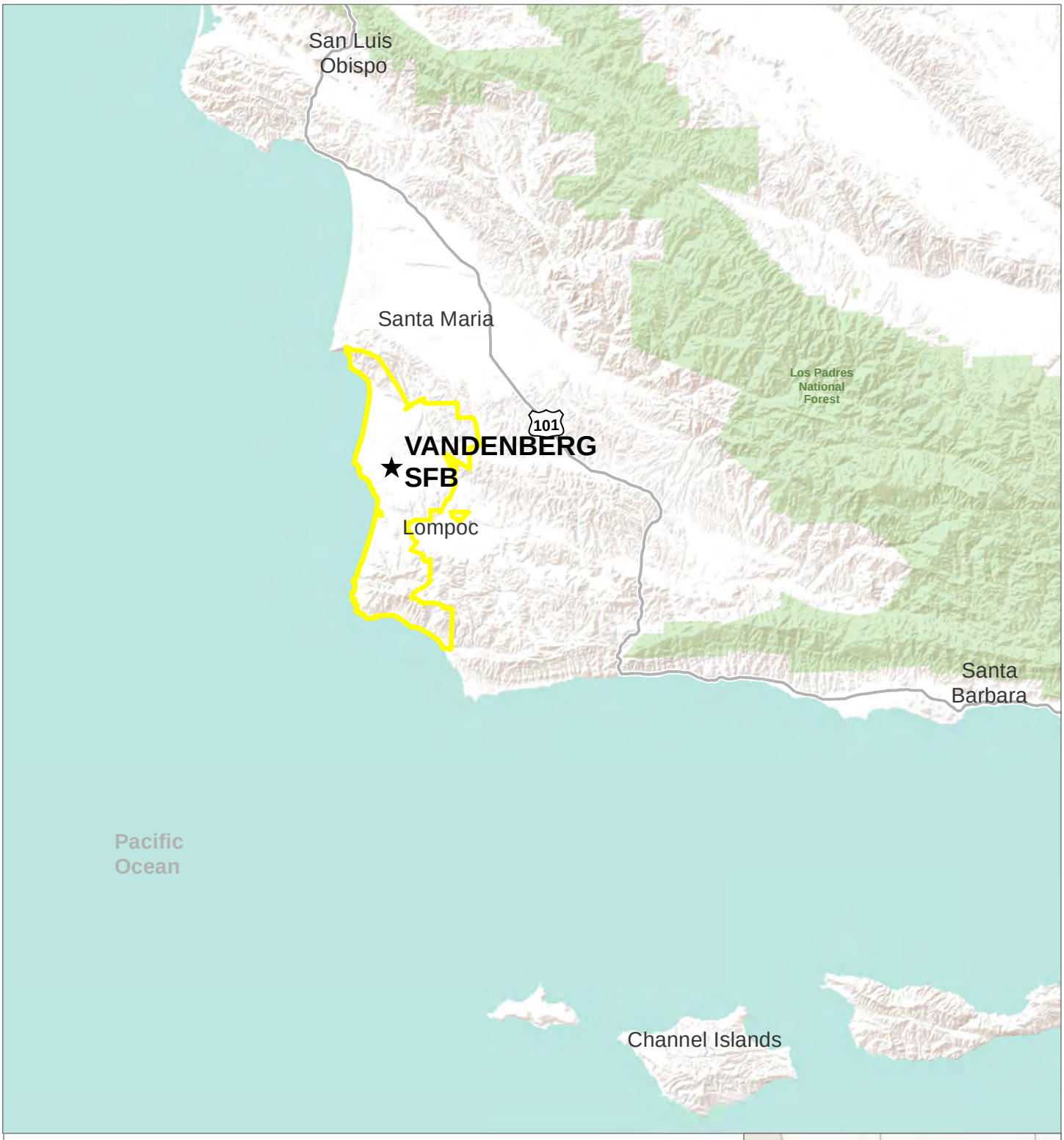

FIGURE 1-1
Regional Overview

Installation Boundary

N

0 10 Mile

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N

1.4 INTERGOVERNMENTAL COORDINATION, PUBLIC AND AGENCY PARTICIPATION

In accordance with 32 CFR 989.14(l), SLD 30 involved other federal agencies, state, tribal, and local governments, and the public in preparation of the EA. In meeting this requirement, as well as EO 12372, *Intergovernmental Review of Federal Programs*, SLD 30 notified and consulted with relevant federal and state agencies on the Proposed Action and Alternatives to identify potential environmental issues and regulatory requirements associated with project implementation and made the Draft EA available on the Vandenberg SFB website (https://www.vandenberg.spaceforce.mil/About-Us/Environmental/EAS/) and in local public libraries for review by interested stakeholders and members of the public (**Table 1-1** and **Appendix A**). SLD 30 notified stakeholders by mailing a Notice of Availability (NOA) and publishing the NOA in local newspapers.

Table 1-1
Intergovernmental Coordination, Agency Consultation and Review, and Public Participation

Organization/Agency	Applicable Regulation/Coordination
Native American tribal governments	• National Historic Preservation Act • EO 13175, Consultation and Coordination with Indian Tribal Governments
US Fish and Wildlife Service	• Endangered Species Act
National Marine Fisheries Service	• Marine Mammal Protection Act
Executive Orders	• EO 11988, Floodplain Management • EO 11990, Protection of Wetlands
California State Historic Preservation Office	• National Historic Preservation Act
California Coastal Commission	• Coastal Zone Management Act of 1972 • California Coastal Act of 1976
Agency/stakeholder review	• Notice of Availability of Draft EA mailed to stakeholders.
Public review	• Notice of Availability of Draft EA published in local newspapers. • Draft EA available in local public libraries.

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CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The DAF proposes to periodically operate F-15E and/or F-15EX fighter jets at a designated location for the purposes of testing of and training for a homeland defense mission.

2.1 SELECTION STANDARDS FOR ALTERNATIVE SCREENING

NEPA and EIAP regulations mandate the consideration of reasonable alternatives for a proposed action. "Reasonable alternatives" are those that also could be utilized to meet the purpose of and need for a proposed action. Under EIAP regulations, selection standards are used to identify alternatives for meeting the purpose of and need for the Proposed Action.

Consistent with 32 CFR § 989.8(c), the following selection standards meet the purpose of and need for the DAF's Proposed Action (see **Section 1.3**) and were used to identify reasonable alternative locations for the Proposed Action for analysis in this EA. The alternative locations

1. must be a DAF or SFB with a runway and airfield capable of supporting F-15E/F-15EX periodic operations. The runway must be at least 10,000 feet long by 150 feet wide;

2. must not have any foreign flightline presence or joint civil/military use to maintain integrity of the sovereign homeland defense mission;

3. must have an airfield ground temperature between 45 degrees Fahrenheit (ºF) and 95ºF. The higher the percentage of time an airfield meets this standard, the higher it was ranked. "Top tier" locations would meet this requirement more than 90 percent of the time, while "second tier" locations would meet the requirement between 75 and 89 percent of the time. The identified temperature criteria represent the best year-round conditions for operations when considering the assets being tested and loaded onto aircraft;

4. must be within 100 nautical miles of international waters; and

5. must be located on the west coast of the US to enable use of airspace over the Pacific Ocean, which requires less de-confliction than airspace off the east coast of the US.

Section 2.2 describes the analysis of the alternative locations for the Proposed Action. **Section 2.3** describes the site-specific alternative locations considered but eliminated from detailed analysis. **Section 2.4** describes the alternative locations retained for more detailed analysis, including the No Action Alternative.

2.2 ANALYSIS OF ALTERNATIVE LOCATIONS FOR THE PROPOSED ACTION

The DAF considered an initial list of 54 Air Force and Space Force bases as potential sites for testing and training for and executing a homeland defense mission. Based on Selection Standards 1 and 2, the list of potential alternative sites was reduced to 31 installations. The list of 31 potential installations was then evaluated against Selection Standard 3. Sixteen of the 31 installations met the criterion of having air temperatures between 45 degrees Fahrenheit (ºF) and 95ºF greater than 75 percent of the time. The 16 installations were categorized as "top tier" or "second tier" locations based on air temperature profile. The group of 16 installations was reduced to three alternatives that met the criteria for a "top tier" site based on airfield ground temperature profiles and also being within 100 nautical miles of international waters. The list of three sites includes MacDill AFB near Tampa, Florida; Tyndall AFB near Panama City, Florida; and Vandenberg SFB near Lompoc, California (**Table 2-1**). All three alternative sites meet Selection Standards 1–4. However, both MacDill and Tyndall AFBs are located on the east coast of the US, and neither base meets Selection Standard 5. Vandenberg SFB is located on the west coast of the US with easy access to Pacific Ocean airspace. Three other west coast sites, Beale AFB, Edwards AFB, and Travis AFB, were among the 16 installations but were second tier sites based on air temperature profiles and were eliminated

from further consideration. Upon application of each of the five selection standards, only Vandenberg SFB remained as a reasonable alternative location for the Proposed Action.

Table 2-1
Selection Criteria for Proposed Action Location

Alternative	Selection Standards				
	Runway & Airfield (>10,000 feet)	Foreign Presence or Joint Use (yes/no)	Meets Airfield Temperature >90% of Time	Proximity to International Waters (<100 miles)	West Coast Location
	(1)	(2)	(3)	(4)	(5)
Vandenberg SFB, California	15,000	No	93%	14	Yes
Tyndall AFB, Florida	10,004	No	94%	14	No
MacDill AFB, Florida	11,421	No	98%	27	No

AFB = Air Force Base; SFB = Space Force Base

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Both MacDill AFB and Tyndall AFB were considered as alternative locations. However, as indicated in **Section 2.2**, both Tyndall and MacDill AFB utilize East Coast airspace, which has more conflicts with existing airspace use, complicating the ability to complete testing operations. Therefore, these alternatives were eliminated from further analysis.

2.4 ALTERNATIVES RETAINED FOR DETAILED ANALYSIS

As described in **Section 2.2**, Vandenberg SFB was selected as the only reasonable alternative location that would meet the DAF's purpose of and need for the Proposed Action. Therefore, Vandenberg SFB is retained as the location for the Proposed Action and the alternative for more detailed analysis in this EA.

2.5 PROPOSED ACTION AT VANDENBERG SFB

The Proposed Action at Vandenberg SFB consists of the periodic operation of F-15E and/or F-15EX aircraft, basing of up to 35 permanent support staff, and implementing six facility construction projects (**Table 2-2, Figure 2-1**).

2.5.1 Flight Operations

Flight operations under the Proposed Action would include the periodic operation of 12 F-15E or F-15EX aircraft. The aircraft would operate for approximately one week during each deployment, assuming no delays in either flight or ground operations from weather or other Vandenberg SFB operations during the deployment time. During the first year of the Proposed Action, approximately 176 sorties (one takeoff and landing) would be flown annually over the course of two, one-week deployments. In subsequent years, approximately 88 sorties per year would be flown during one, one-week deployment. While at Vandenberg SFB, the F-15 aircraft would perform both ground and flight tests and training events. Up to 250 Air Force personnel would deploy to Vandenberg SFB to support a one-week deployment.

The operational and training flights would potentially use existing special-use airspace and would be flown over the Pacific Ocean at altitudes from 10,000 to 50,000 feet above sea level. Each sortie would be approximately 1.5 hours in duration. The estimated total overwater flight time during the first year of the Proposed Action would be approximately 264 hours (176 sorties times1.5 hours), or 132 hours for each one-week deployment. In subsequent years, the total overwater flight time would be about 132 hours during the one, one-week deployment based upon the estimated 88 sorties per year. No sonic booms would be caused by F-15 aircraft. On takeoff and landing, the F-15 aircraft would maintain a flight elevation at the coastline no lower than 1,900 feet above sea level to avoid impacts to nesting snowy plovers and California least terns (March 1–September 20) (USFWS, 2015). Some night operations may occur with up to 50

percent of the sorties potentially being flown at night (night operations refers to flights after sunset and before sunrise). The time of night operations could vary based on the month.

Table 2-2
Construction Project Descriptions

Project #	Project	Project Description	New Impervious Surface (ft^2)
1	F-15 ramp space and tie-downs/grounding points and temporary aerospace ground equipment (AGE) storage pad	Demolish existing and install new ramp tie-downs/grounding points and mark F-15 parking space with new lines. Construct small (approximately 1,500 ft^2) AGE pad for use during flight operations.	1,500
2a	AGE storage/administration building – Hangar Building Alternative	Construct a new AGE storage/administration building to support F-15 operations southeast of the drive-through Hangar Building including a new all-weather access road from Airfield Road and from the AGE building to the F-15 ramp space with tie-in to the temporary AGE storage pad.	4,000
2b	AGE storage /administration building – Building 1754 Alternative	Demolish Building 1754 and replace with new AGE storage/administration building to support F-15 operations.	0
3	Aircraft arresting system	Install an aircraft arresting system on each end of the runway.	4,000
4	Live ordnance loading area (LOLA)	Construct new entry/exit ramps and apron to use as a LOLA with a capacity of four F-15 aircraft.	292,000
5	Complex of four earth-covered munitions storage igloos – Flightline Alternative	Construct four earth-covered 7-bar Navy Containerized Long Weapons Storage Magazine structures northeast of the flightline with an access road to the airfield and upgrade a gravel access road to a paved road for delivery of munitions and emergency access. Connect igloos to electrical and communications utilities.	251,576
6	Single earth-covered munitions storage igloo and access road	Construct a single earth-covered 7-bar Navy Containerized Long Weapons Storage Magazine structure near Building 980.	19,994

AGE = aerospace ground equipment; ft^2 = square feet; LOLA = live ordnance loading area;

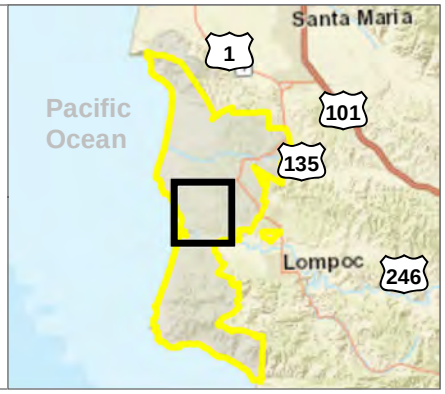
FIGURE 2-1
Project Locations (Project Descriptions in Table 2-2)

Installation Boundary

N

0 ½ Miles

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N



2.5.2 Personnel Basing

Up to 35 new Air Force personnel would be permanently based at Vandenberg SFB with implementation of the Proposed Action. These personnel would be integrated into the existing Vandenberg SFB infrastructure and would support the weapons testing and training mission, including flight operations and maintenance of the infrastructure developed as part of the Proposed Action.

2.5.3 Facilities Construction

2.5.3.1 Project 1 – Ramp Space and Tie-Downs

Figure 2-2 Existing Ramp Tie-Down

Under the Proposed Action, modifications to the existing Vandenberg SFB airfield apron would be required for parking and tying down 12 F-15 aircraft. Under Project 1 of the Proposed Action, the existing tie-downs/ground points for aircraft would be demolished and backfilled (**Figure 2-2**). New tie-downs/grounding points would be installed based on the selected ramp space configuration and in accordance with United Facilities Criterion (UFC) 3-260-01, *Airfield And Heliport Planning And Design*, Section B11-5, *Air Force Tiedowns*. The DAF considered constraints such as aircraft orientation, size of the jet blast zone, limited ramp space, the need to maintain access to a nearby drive-through Hangar Building, and the need to reserve maneuver room for larger aircraft (e.g., C-5) when evaluating alternatives for aircraft parking configurations. The DAF determined that two rows of six aircraft was the most reasonable configuration (**Figure 2-3**). Existing apron markings would be removed and new paint markings for the aircraft parking stalls and taxi lanes would be added.

Because of limited ramp space, the DAF may construct a cement or paved pad of approximately 1,000 to 1,500 ft^2 adjacent to the aircraft parking area to temporarily store aerospace ground equipment (AGE) during flight operations (**Figure 2-3**).

2.5.3.2 Project 2 – Aircraft Ground Equipment Storage/Administration Building

The Proposed Action would involve construction of a new AGE storage/administration building. Two alternative locations, 2a and 2b, are under consideration for locating the new building, as described below.

Project 2a – Hangar Building Alternative

Project 2a of the Proposed Action would involve constructing an AGE storage/administration building southeast of the drive-through Hangar Building (Building 1735) on an existing cement and paved area (see **Figure 2-3**). The new permanent AGE building would measure 75 feet by 125 feet (9,375 ft^2) and would include storage space for AGE, administrative space with two or more offices, a conference room, open office space with approximately 30 workstations, and support spaces (restrooms; janitor's room; and communications, electrical, and mechanical room) to support the F-15 operations. The building would consist of a pre-engineered metal structure with insulated panels and a metal roof. Water, communications, and electrical lines would be connected to existing, nearby utilities. Two new all-weather access roads would be constructed. One road, approximately 15 feet by 250 feet, would provide access to the AGE building from Airfield Road (**Figure 2-3**). More than half the length of the road would be on previously disturbed land. The second access road, approximately 230 feet in length, would connect the AGE building to the F-15 aircraft parking area and cross a maintained grass field within the airfield (**Figure 2-3**). This road would tie-in to the temporary AGE storage pad (see **Section 2.5.3.1**) and provide direct access to the F-15 aircraft.

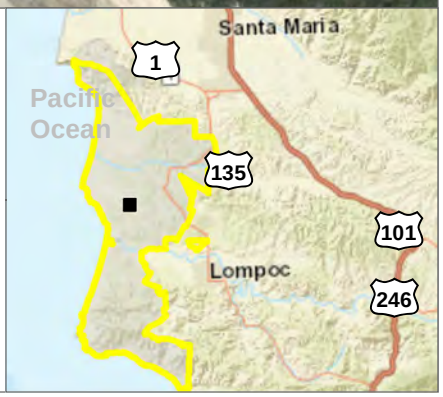
FIGURE 2-3
AGE Building and F-15 Parking Area (Project #)

F15 Aircraft Zone
AGE Building
AGE Storage Pad

N

0 500 Feet

Imagery: ESRI, 2021.
Coordinate System: NAD 83 UTM Zone 10N



Project 2b – Building 1754 Alternative

Project 2b of the Proposed Action would involve demolition of Building 1754 and construction of an AGE storage/administration building adjacent to Building 1755 in an existing paved area (see **Figure 2-3**). Building 1754 is approximately 1500 ft^2 in size, is past its useful life, and may contain asbestos-containing materials and lead-based paint. The design and layout of the facility would be the same as described for the Hangar Building location. The existing parking lot would be repaved and marked with new painted parking spaces. New fire hydrants would be installed, and water, communications, and electrical lines would be built upon the existing utility infrastructure that would be disconnected with the demolition of Building 1754.

2.5.3.3 Project 3 – Aircraft Arresting System

The Proposed Action would require the installation of an aircraft arresting system (AAS) on each end of the Vandenberg SFB runway as an emergency landing system (see **Figure 2-1**). An AAS is used to ensure that aircraft can stop on the runway in a landing or takeoff emergency. The AAS would be bi-directional with two energy absorbers located on opposite sides of the runway (**Figure 2-4**).

An AAS contains several components, including catch tape, Fairlead Beam Assembly, foundation, and an energy absorber system. The catch tape would stretch across the runway and connect to the Fairlead Beam Assembly, which guides the tape from the tape reel and would be located about 10 feet from the edge of the runway. The assembly would be anchored to a 4.5-foot-deep foundation approximately 17 feet long by 10 feet wide. A rotary friction energy absorber (e.g., BAK-12) with a 65-horsepower diesel engine for recoiling the cable if the system is deployed would be located 275 feet from the center of the runway. Generator engines would be enclosed with internal fuel tanks and would not require utility lines. The energy absorber system would be mounted either on a surface foundation or in a belowground vault foundation with a foundation size of about 12 feet by 20 feet. The tape from the Fairlead Beam Assembly would connect to the energy absorber unit through a Fairlead tube anchored every 10 feet. Aboveground runway lights in the vicinity of the arresting tape may have to be replaced with flush, in-ground lights to prevent damage from deployment of the tape (i.e., sweep area) (**Figure 2-4**). The approximate footprint of each assembly would be about 1,000 ft^2 on each side and each end of the runway for a total of 4,000 ft^2. An additional 2,000–3,000 ft^2 may be used temporarily around each assembly during construction for excavation and installation of equipment.

2.5.3.4 Project 4 – Live Ordnance Loading Area

Under the Proposed Action, a new live ordnance loading area (LOLA) would be constructed with a new apron, shoulders, and entry/exit ramps on which the F-15 aircraft would be parked and loaded with weapons and ordnance. The proposed location is the northeast side of the airfield along the existing taxiway (**Figure 2-5**). The entry/exit ramps to the LOLA would be built over an existing drainage channel along the taxiway using culverts; the apron would be constructed between the drainage channel and the existing airfield fence. The length of the LOLA from the centerline of the entry/exit ramps would be approximately 1,500 feet and would provide parking for four F-15 aircraft with a minimum spacing of 200 feet between aircraft parking stalls, each of which would be 64 feet long and 54 feet wide. New taxi lanes and parking stall paintings would be installed on the new apron and ramps. Blast diverters may be installed between the aircraft parking stalls and the airfield fence depending on final design configurations. Taxiway ground lighting on the LOLA would be installed in accordance with UFC 3-535-01, Change 4, *Visual Air Navigation Facilities*. Electrical power would be acquired from an existing 5,000-volt ring located near the taxiway; the power would be stepped down with a new transformer and distributed in a new circuit from a panelboard.

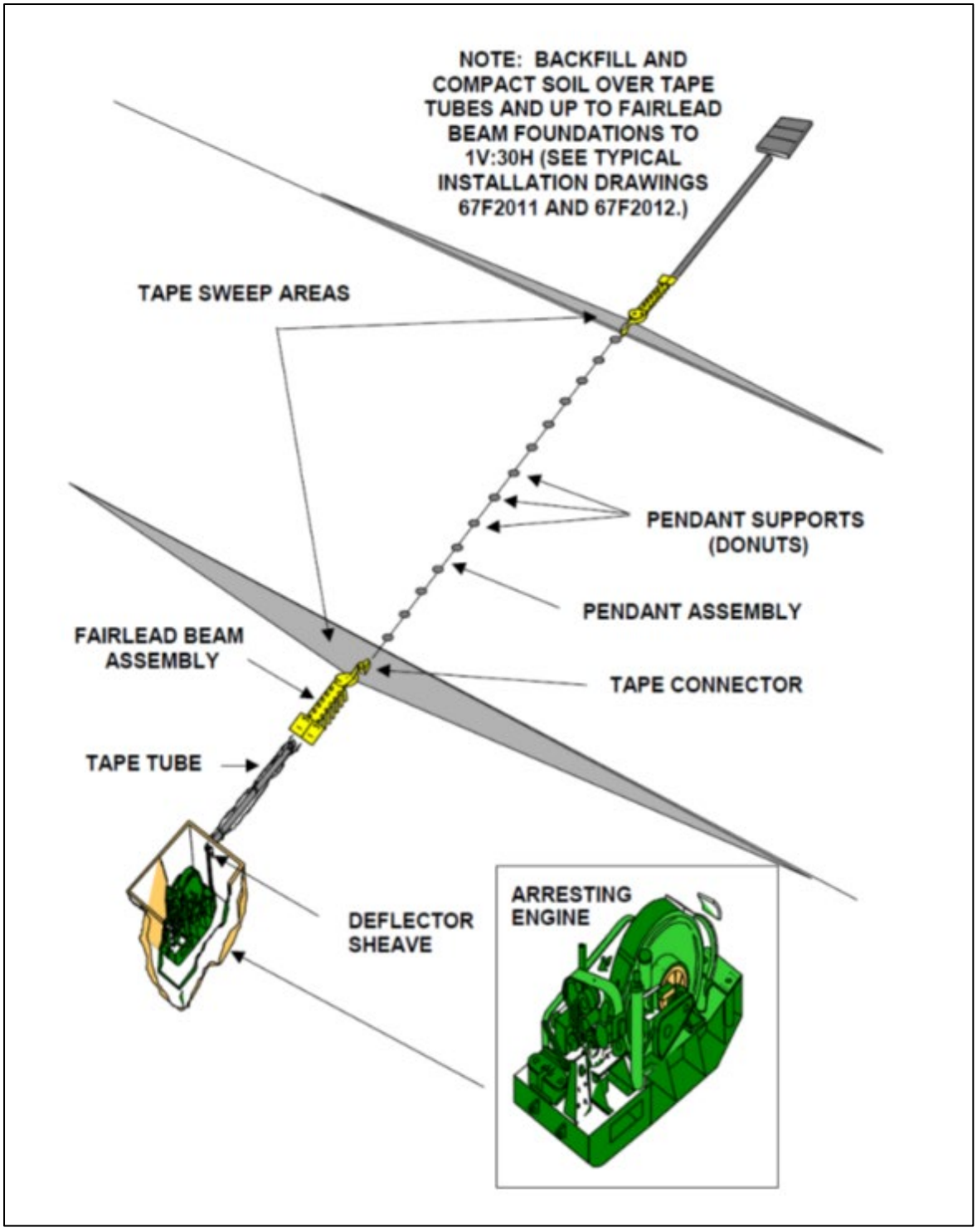


Figure 2-4 Illustration of an Aircraft Arresting System

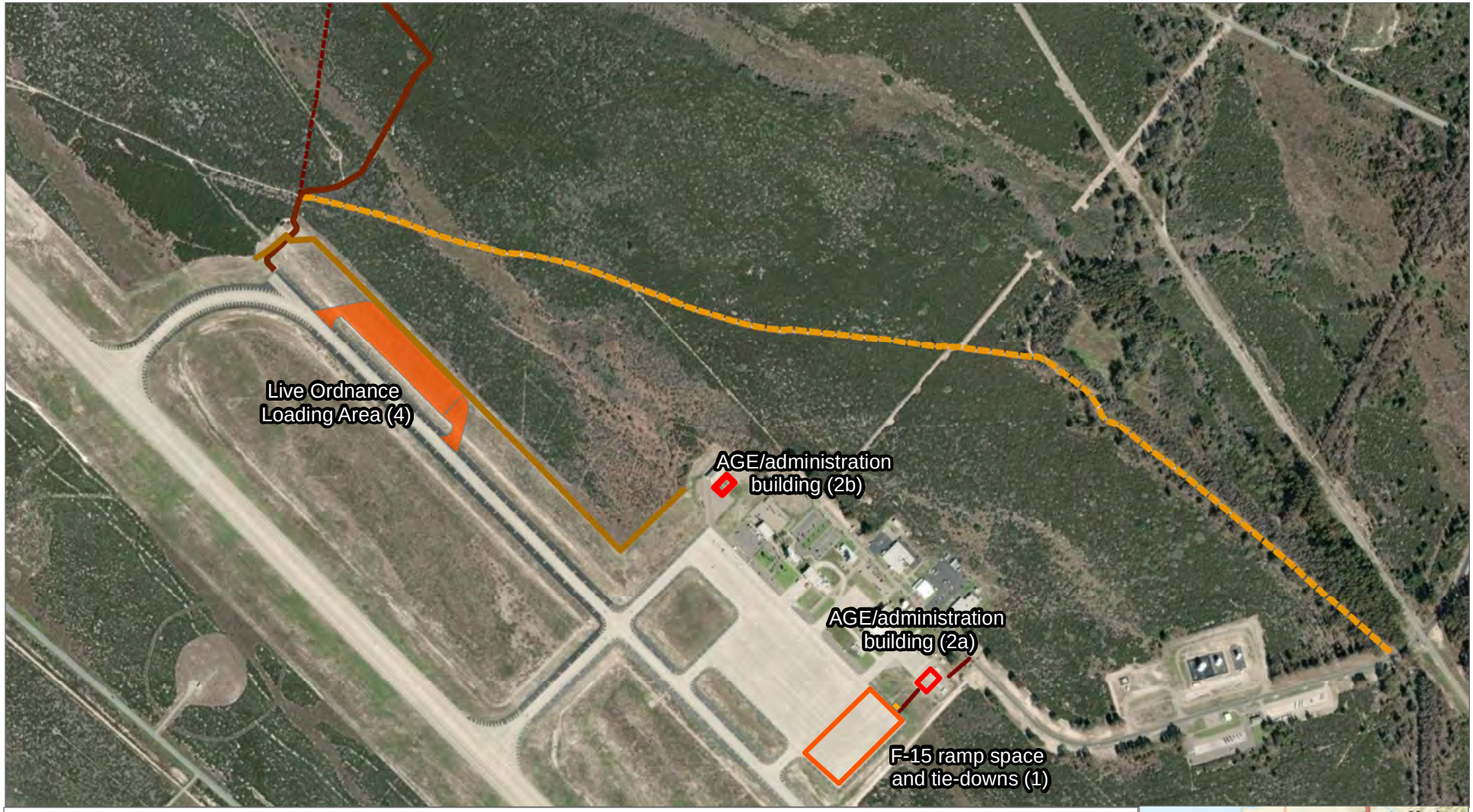


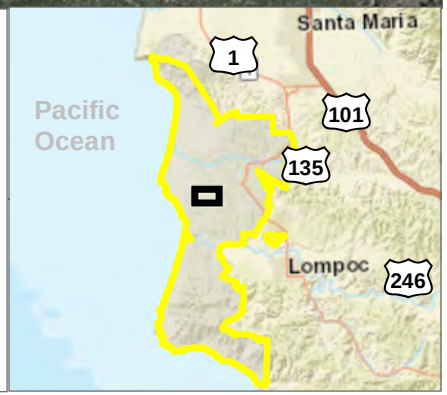
FIGURE 2-5
Live Ordnance Loading Area (LOLA) and Access Road (Project #s)

- AGE/Administration Building
- Existing Airfield Fence
- New Access Road to Proj. 5 (Alt 1)
- New Access Road to Proj. 5 (Alt 2)
- New Access Road to Flightline Igloos
- F-15 Aircraft Zone
- AGE Storage Pad
- LOLA Apron Ramps

N

0 ½ Miles

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N



2.5.3.5 Project 5 – Four Earth-Covered Munitions Storage Igloos

The Proposed Action would involve the construction of four earth-covered munitions storage igloos. The storage igloos would be a 7-bar Navy Containerized Long Weapons Storage Magazine design, each measuring approximately 40 feet wide by 123 feet deep (4,920 ft^2) and approximately 27 feet high. The headwall of each igloo would be about 158 feet wide, with a door opening of 32 feet wide with a minimum height of 14 feet. The igloos would be constructed of reinforced concrete with an earth layer covering the roof and sides and would be blast and corrosion resistant. The doors of the igloos would be oriented with consideration of explosives safety quantity distance (QD) arcs in relation to existing facilities and other locations used by personnel with Installation access (i.e., roads and beaches). Multiple alternative locations on Vandenberg SFB were evaluated as potential sites for the munitions storage igloos. The DAF used the following criteria for site selection:

1. The four munitions storage earth-covered igloos must be sited together in a group for efficient access and storage. Each igloo must be capable of storing a minimum of 180,000 pounds (lbs) net explosives weight.

2. Must be in an area without general access roads, railroads, taxiways, aircraft, inhabited buildings, or critical infrastructure that are generally used or inhabited by personnel with Installation access. Defense Explosive Safety Regulation 6055.09_AFMAN 91-201, *Explosives Safety Standards* (DESR6055.09_AFMAN), requires setback distances (i.e., QD) for siting munitions storage facilities based on the net explosives weight to be stored. The QDs are defined as the radius of a circle around the munitions storage facility/facilities. The QD for inhabited buildings is longer than for roads or railroads, taxiways, and aircraft. Roads are used by Vandenberg SFB personnel to routinely access work locations and facilities. The inhabited building QD safety arc radius is 2,607 feet, which encompasses approximately a 490-acre circular area surrounding the igloos. The QD arc radius for general traffic routes is 1,564 feet. No other inhabited buildings or roadways may be constructed within the larger QD arc radius that are not directly associated with the munitions storage facilities.

3. Does not interfere or conflict with other committed Vandenberg SFB missions and operations.

4. Must be near the flightline to minimize munitions transportation time to the LOLA, The ACC operational performance requirement for the Proposed Action is the capability to load **four** F-15 with munitions on the LOLA in **120 minutes (2 hours) or less**. This supports standard operating procedures for homeland defense alert missions. This time includes removing munitions from the igloo, loading munitions to a transport vehicle, transporting munitions to the LOLA, off-loading the munitions to the LOLA tarmac, and loading munitions onto the aircraft. The key variable is transportation time from the storage igloo to the LOLA, which is dependent on igloo location and associated travel distance. Munitions transport vehicles cannot exceed 25 mph for safety reasons. Munitions transport time from the storge igloos to the LOLA must be approximately 2 minutes or less to meet the mission-critical operational performance requirement. The other variables that comprise the load time are relatively fixed and independent of site location. Proximity to the airfield also reduces potential conflicts with other Vandenberg SFB traffic and minimizes explosives safety hazards by avoiding general access roads.

5. Within the restraints imposed by the Proposed Action's minimum munitions storage capacity requirement, the explosive's safety setback criteria, non-interference with other committed Vandenberg SFB missions, and the requirement to be sufficiently near the airfield to meet the 120-minute operational performance criterion for loading four F-15 aircraft, preference would be given to sites with a lower environmental impact. These might include sites that have been previously disturbed, do not contain federally listed threatened or endangered species, historic properties, minimize potential impacts to wetlands, and are geologically stable.

To identify potential sites that meet these selection criteria, the DAF placed QD arcs based on the required explosives storage capacity around inhabited buildings and sites that qualify as general traffic routes such

as roads routinely used by Vandenberg SFB personnel, runways, taxiways, and railroads in the area surrounding the Vandenberg SFB airfield. These identified areas that could not be used as potential munitions sites because they did not meet explosives safety standards—and thus did not meet the purpose of and need for the Proposed Action—were eliminated from further analysis. Among the areas eliminated from further analysis was a previously disturbed area (Titan Site 395) on the southwestern side of the runway because it was too close to inhabited buildings. Six potential sites were identified that met the explosives safety standard setbacks for inhabited buildings and general traffic routes (Criterion 2) and were further evaluated to determine whether they met site Selection Criteria 3 and 4). If more than one site met Criteria 3 and 4, those sites would be evaluated to determine which ones may have a lower environmental impact (Criterion 5). **Table 2-3** and **Figure 2-6** summarize and illustrate the six potential locations for the munitions storage igloos against the selection criteria.

Table 2-3
Summary of Site Selection for the Potential Sites Considered for the Munitions Storage Igloos

Criterion	Attribute	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
1. Storage Capacity of Munitions Igloos	Each igloo stores a minimum of 180,000 lbs. of HD 1.1 explosives.	Yes	Yes	Yes	Yes	Yes	No
2. Explosive Safety Quantity Distance Arcs	Minimum distance of 2,607 feet to nearest inhabited building. Minimum distance of 1,564 feet to nearest general traffic route.	Yes	Yes	Yes	Yes	Yes	No
3. Conflict with Other Vandenberg SFB Missions and Programs	No interference with existing Vandenberg SFB missions and programs.	Yes	?	Yes	Yes	No	Yes
4. Maximum Load Time for 4 F-15 Aircraft	Maximum time to load four F-15 aircraft is 120 minutes.	Yes	No	No	No	No	No

Note:
Green = meets criterion, Yellow = concern with meeting criterion, Red = does not meet criterion

Site 1 – Site 1 is located on the northeastern side of the airfield. The four munitions storage igloos would be set back from the nearest taxiway and LOLA by approximately 2,000 feet. An access road of about 0.5 mile would be constructed to access the approximately 3.5-acre munitions storage area and transport munitions to the proposed LOLA. The area is not committed to any existing Vandenberg SFB missions or programs. The estimated travel distance for transporting munitions to the LOLA is 0.5 mile, with a travel time of approximately 2 minutes. The travel route does not use any general traffic routes available to Vandenberg SFB personnel. The estimated time to load four F-15 aircraft on the LOLA is 120 minutes, which meets the minimum operational performance requirement established by ACC.

Site 2 – Site 2 is located southwest of the airfield between the former Titan Site and the Vandenberg SFB explosive ordnance disposal (EOD) area. It is possible that the presence of the EOD area may affect the storage capacity of the igloos. This site would require construction of new, paved access roads to connect to existing roads. Site 2 is located approximately 6.75 miles from the LOLA and would use newly constructed and existing Vandenberg SFB roads to transport munitions. The area is not currently committed to existing Vandenberg SFB missions or programs. The estimated travel time for transporting munitions to the LOLA, which is on the opposite side of the airfield from Site 2, is approximately 16 minutes assuming no delays while traveling on traffic routes used by Vandenberg SFB personnel. The estimated time to load four F-15 aircraft on the LOLA from Site 2 is 176 minutes, which does not meet the minimum operational performance requirement established by ACC.

FIGURE 2-6
Potential Sites Considered for the Munition Storage Igloos

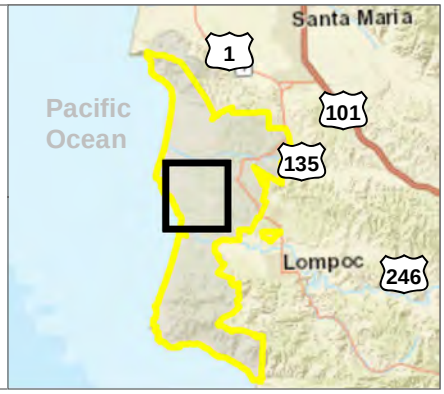
Installation Boundary

Munitions Sites Considered

N

0 ½ Miles

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N



Site 3 – Site 3 is located north of the airfield. This site would require construction of a new, paved access road in a currently undisturbed area to connect to existing roads. The estimated travel distance for transporting munitions to the LOLA is 6.3 miles. Site 3 is in an undisturbed area that is not currently committed to existing Vandenberg SFB missions or programs. The estimated travel time for transporting munitions to the LOLA from Site 3 is approximately 15 minutes assuming no delays while traveling on traffic routes used by Vandenberg SFB personnel. The estimated time to load four F-15 aircraft on the LOLA from Site 3 is 172 minutes, which does not meet the minimum operational performance requirement established by ACC.

Site 4 – Site 4 is located northeast of the airfield. Because of an existing inhabited Vandenberg SFB facility located off Washington Avenue and a ravine to the northeast, Site 4 is limited in area but of sufficient size for the Proposed Action. Approximately 0.5 mile of new road would be constructed in an undisturbed area and 0.75 mile of existing gravel road would have to be upgraded to a paved road. Total travel distance from the storage igloos to the LOLA is approximately 4 miles. The area is not currently committed to existing Vandenberg SFB missions or programs. Travel time for munitions from Site 4 to the LOLA is approximately 8 minutes assuming no delays while traveling on traffic routes used by Vandenberg SFB personnel. The estimated time to load four F-15 aircraft on the LOLA from Site 4 is 144 minutes, which does not meet the minimum operational performance requirement established by ACC.

Site 5 – Site 5 is located northwest of the RC Airfield and northeast of the Vandenberg airfield. This location is the currently authorized SuperHawk drop zone for parachute landing and is unavailable. The DAF maintains a memorandum of agreement with the 346th Theater Aerial Delivery Company for use of the drop zone as a training site.

Site 6 – Site 6 is located southwest of the existing Munitions Storage Area on the south side of 35th Street. Because of surrounding general traffic routes and inhabited buildings, the munitions storage igloos at this site would have to be placed near the cliffs overlooking the Santa Ynez River valley. At that location, the individual igloos would have to be widely spaced (950 feet) to achieve sufficient explosives safety setback distances, which would allow space for only three igloos. The average storage capacity of the three igloos would be 172,000 lbs, which does not meet the minimum operational performance requirement established by ACC. The estimated time to load four F-15 aircraft on the LOLA from Site 6 is 172 minutes, which also does not meet the minimum operational performance requirement established by ACC.

Site 1 is the only site that meets all operational performance requirements and thus meets the purpose of and need for the Proposed Action.

Earth-Covered Munitions Storage Igloo Sites Eliminated from Further Analysis

Sites 2, 3, and 4 were eliminated and not carried forward for further analysis because each site did not meet the operational performance requirement for loading four F-15 aircraft in 120 minutes or less because the igloo locations would be too far from the LOLA. Site 5 was eliminated from further analysis because the area is committed to an existing DAF program. Site 6 does not have the explosives storage capacity required because of restrictions from nearby inhabited buildings and roadways. Site 6 also does not meet the 120-minute load time requirement because of the distance from the LOLA.

Earth-Covered Munitions Storage Igloo Sites Carried Forward for Further Analysis

Site 1 is located near the airfield and LOLA and is the only munitions storage site that meets all the required siting criterion (**Figure 2-1**). Site 1 is the only munitions storage site being carried forward for further analysis in this EA. Site 1 is hereafter referred to as the Flightline Munitions Storage Igloos (Flightline Igloos).

The location of the flightline igloos would be dictated by the QD arcs in relation to the airfield tower facilities and the LOLA (**Section 2.5.3.4**). The four igloos would store up to 1,145,446 pounds of hazard division (HD) 1.1 explosive. Pad areas approximately 112 feet by 112 feet (12,544 ft^2) and connected to an access road would be constructed in front of each storage igloo. Electrical power would be brought to the complex by connecting to existing power lines nearby. Approximately 2.9 miles of new communications lines would be installed along new access roads as there are no communications lines nearby. The facility would

include a security gate and chain-link security fence approximately 33 feet from the igloos, enclosing the pad area and igloos. An approximately 50-foot-wide space would be cleared and maintained by mowing around the igloos for wildfire safety.

A paved access road measuring approximately 0.5 mile in length and 12 feet wide would be constructed from the taxiway to the igloo complex. Two alternative routes for the access road are being evaluated in this EA. Both routes would use approximately 0.2 mile of an existing gravel road and open, cleared area near the taxiway. Outside the airfield, Alternative 1 for the access road would use an existing gravel road to the northeast along a former power line. A new paved road of approximately 240 feet in length would be constructed to connect the power line road to the igloo site (**Figure 2-7**). The existing power line road is approximately 18 feet wide and crosses an area identified as a floodplain and is clear of vegetation. The roadbed would be further built up and engineered to prevent flooding of the road. Alternative 2 for the access road would follow an existing 10-foot-wide gravel road to the southeast for about 300 feet and turn northeast following a gravel trail (remnant of a former road overgrown with vegetation) to the igloos. This road would also cross a wetland area.

An existing gravel road that connects Airfield Road to the new access roads to the flightline igloo complex, measuring approximately 1.6 miles in length and approximately 18 feet wide, would be upgraded to a paved road. This road is located northeast of the airfield and would provide an access route for delivering munitions to the flightline igloos and for emergency response if needed (**Figure 2-7**). The new paved access road would avoid potential conflict with airfield operations, as munitions deliveries to the igloo complex would otherwise require traveling through the airfield.

Flightline Munitions Storage Igloo Complex Alternative

The Flightline Munitions Storage Igloo Complex would be located approximately 1 mile northwest of the control tower and 0.5 mile from the taxiway near the proposed LOLA (Project 5a) (see **Figure 2-6**). The placement location of the complex would be dictated by the QD arcs in relation to the airfield tower facilities and the LOLA (**Section 2.5.3.4**). The storage capacity of the igloos would range from 223,000 to 315,000 pounds of HD 1.1 explosive. A security fence with gate would enclose the entire storage complex. The Flightline Munitions Storage Igloo Complex would contain four igloos. The facility would include a security gate and chain-link security fence approximately 33 feet from the igloos, enclosing the pad area and igloos. An approximately 50-foot-wide space would be cleared and maintained by mowing around the igloos for wildfire safety.

An access road measuring approximately 0.5 mile in length and 12 feet wide would be constructed along the southwest side of the igloo complex, from the taxiway to the igloos. Part of the route (0.2 mile) would utilize either an existing gravel road or open, cleared area near the taxiway. Pad areas approximately 112 feet by 112 feet (12,544 ft^2) and connected by the access road would be constructed in front of each storage igloo. Electrical power would be brought to the site by connecting to existing overhead powerlines nearby. No communications lines exist nearby, and approximately 2.9 miles of communications lines would be installed along new access roads.

A new paved access road to the flightline igloo complex, measuring approximately 1.6 miles in length and approximately 18 feet wide, would be constructed on existing gravel roads located northeast of the airfield to provide an alternative access route for delivering munitions and for emergency response (see **Figure 2-6**). The new paved access road would be necessary to avoid potential conflict with airfield operations, as delivery to the igloo complex would otherwise require traveling through the airfield.

2.5.3.6 Project 6 – Single Earth-Covered Munitions Storage Igloo

Project 6 is a single earth-covered munitions storage igloo to be constructed near Building 980 to provide support to training activities in the area (**Figure 2-8**). The storage igloo would be of the same design and specifications as described above. Doors for the igloo would be oriented with consideration of explosives safety QD arcs in relation to existing facilities and general access locations (i.e., roads and beaches). The design capacity of this storage igloo based on the QD arcs (1,804 feet) is a minimum of 180,000 lbs of HD 1.1 explosives.

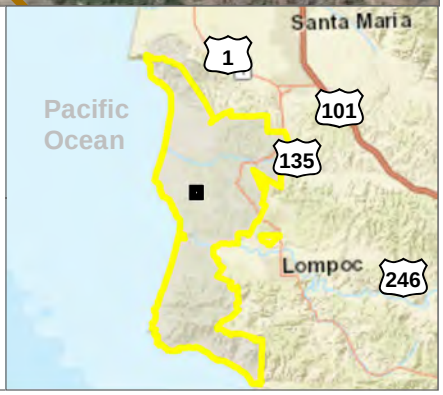
FIGURE 2-7
Flightline Munitions Storage Igloo Complex (Project #s)

- Existing Airfield Fence
- New Access Road to Airfield
- New Access Road to Project 5 (Alt 1)
- New Access Road to Project 5 (Alt 2)
- LOLA Apron Ramps
- Munitions Igloos

N

0 500 Feet

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N



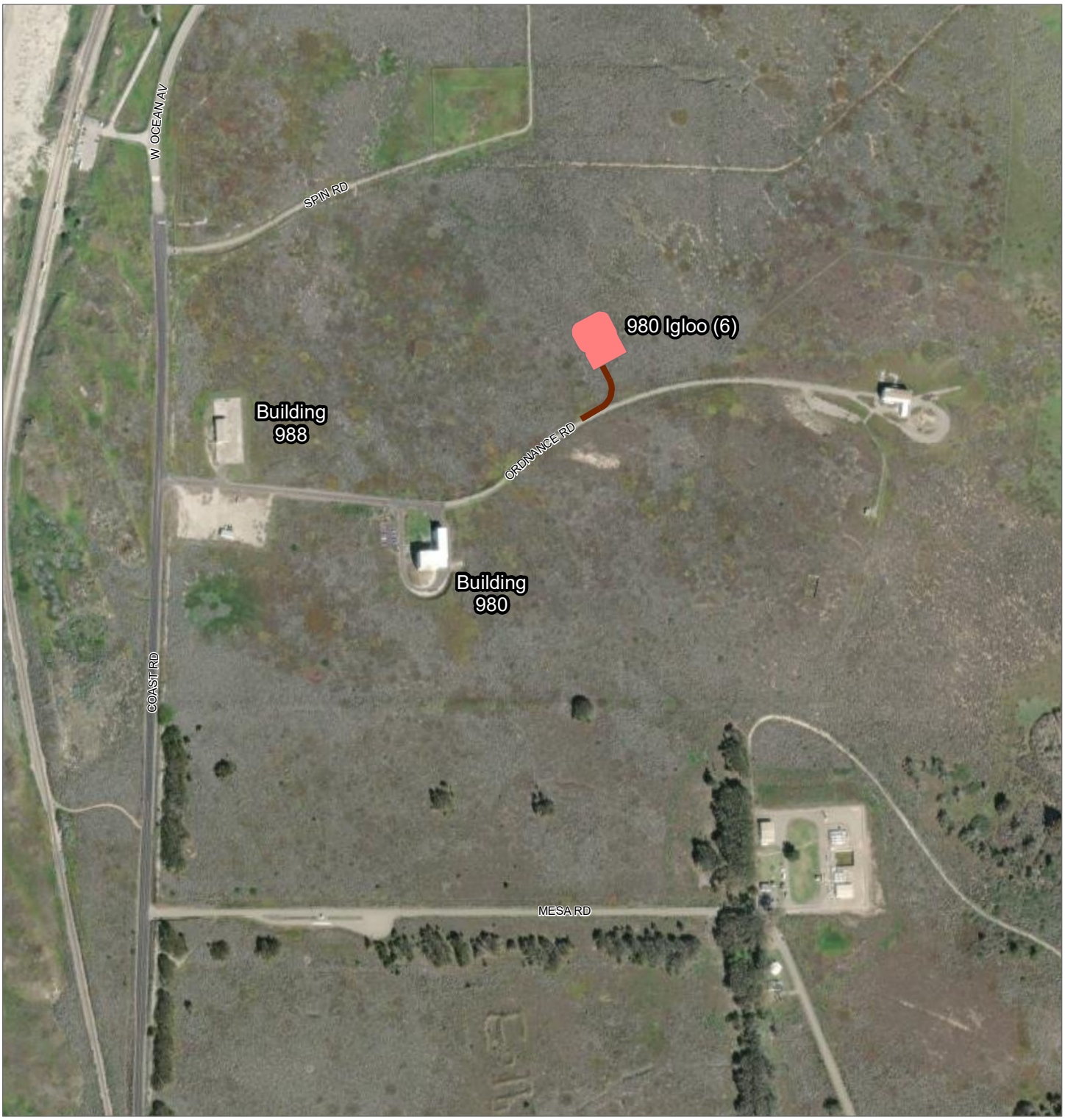


FIGURE 2-8
Munitions Storage Igloo near Building 980 (Project #s)

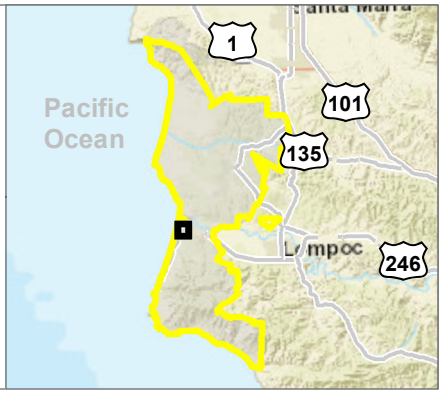
New Access Road

Munitions Igloo

N

0 500 Feet

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N



The site would include a paved pad area approximately 112 feet by 112 feet (12,544 ft^2) in front of the doors to accommodate a tractor-trailer with sufficient space to maneuver. The facility would include a chain-link security fence and gate approximately 33 feet from the igloo and enclosing the pad area. An approximately 50-foot-wide space would be cleared and maintained by mowing around the igloo for wildfire safety.

Ordnance Road provides access to the proposed igloo site, but the pavement is in poor condition, partially covered in vegetation, and would require upgrading to accommodate a tractor-trailer. A secondary access road, approximately 225 feet long and 12 feet wide (2,700 ft^2), would be constructed from Ordnance Road to the storage igloo. New below- or aboveground ground electrical and communications lines to the storage igloo would be constructed from the vicinity of Building 980 and would follow the access roads (**Figure 2-8**).

2.5.4 Alternatives

2.5.4.1 No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E and/or F-15EX fighter jets at Vandenberg SFB to test and execute a homeland defense mission. No additional personnel would be stationed at Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 beddown. Over time, the mission capabilities of weapons systems would diminish without additional testing to improve F-15 and F-15EX fighter capabilities along with the DAF's ability to fulfill its mission to defend the US.

While the No Action Alternative would not satisfy the purpose of and need for the Proposed Action, this alternative is retained to provide a comparative baseline against which to analyze the effects of the Proposed Action, in accordance with NEPA and the EIAP.

2.5.4.2 Alternative 1

Under Alternative 1, the DAF would conduct proposed flight operations (**Section 2.5.1**), permanently base additional personnel at Vandenberg SFB (**Section 2.5.2**), and implement the following facility construction projects:

- Install ramp space and tie-downs (**Section 2.5.3.1**)
- Construct the AGE building near the drive-through Hangar Building (**Section 2.5.3.2, Project 2a**)
- Install an AAS (**Section 2.5.3.3**)
- Construct the LOLA (**Section 2.5.3.4**)
- Construct the Flightline Munitions Storage Igloo Complex with four munitions storage igloos, upgrade the main gravel access road to a paved road, and construct Alternative 1 for the access road to the igloo site (**Section 2.5.3.5**)
- Construct a single earth-covered munitions storage igloo near Building 980 (**Section 2.5.3.6**).

2.5.4.3 Alternative 2

The actions under Alternative 2 would be the same as those under Alternative 1 with the following differences:

- Construct the AGE building on the site of Building 1754, which would be demolished (**Section 2.5.3.2, Project 2b**)
- Construct the Alternative 2 access road to the Flightline Munitions Storage Igloo Complex (**Section 2.5.3.5**).

2.5.4.4 Comparison of the Action Alternatives

Approximately 32,375 ft^2 of new buildings and structures would be constructed under either Alternative 1 or 2 to include the new AGE building, four earth-covered munitions storage igloos near the LOLA, one earth-covered munitions storage igloo near Building 980, and the AAS (see **Table 2-2**). Because Building 1754 would be demolished under Alternative 2, the net increase in building space would be approximately 1,500 ft^2 less than under Alternative 1. Alternative 1 would create approximately 573,070 ft^2 of new impervious surfaces, such as paved roads, pad areas, structures, and buildings, compared to 569,070 ft^2 under Alternative 2. Much of this new impervious surface area (292,000 ft^2) is attributable to the construction of the LOLA that would be constructed under both alternatives.

Alternative 1 is the Preferred Alternative because slightly less native vegetation would be disturbed by using an existing road to access the munitions storage igloos (Project 5), and the AGE building would be located south of Building 1735 (drive-through hangar) and would not conflict with the proposed location of a new air traffic control tower.

2.6 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Table 2-4 summarizes the potential impacts under the Proposed Action and No Action Alternative. The summary is based on information discussed in detail in **Chapter 3** of this EA and includes a concise definition of the issues addressed and the potential environmental impacts associated with each alternative.

Table 2-4
Summary of Environmental Consequences[a]

Resource Area	Alternative 1	Alternative 2	No Action Alternative
Land Use	• Inhabited buildings and general transportation routes would be prohibited within the respective QD arcs surrounding the munitions storage igloos.	• Inhabited buildings and general transportation routes would be prohibited within the respective QD arcs surrounding the munitions storage igloos.	No impacts
Earth Resources	• Non-significant short-term impacts to soils from project construction would be expected. • Seismic hazards to the AGE building are expected to be long-term but not significant for the munitions storage igloos.	• Non-significant short-term impacts to soils from project construction would be expected. • Seismic hazards to the AGE building are expected to be long-term but not significant for the munitions storage igloos.	No impacts
Air Quality	• All air emissions including GHG emissions are far below the PSD thresholds of significance. Construction emissions would be short-term.	• All air emissions including GHG emissions are far below the PSD thresholds of significance. Construction emissions would be short-term.	No impacts
Water Resources	• No impacts to floodplains. • Long-term but non-significant impacts to non-jurisdictional wetlands. • No long-term impacts to water quality.	• No impacts to floodplains. • Long-term but non-significant impacts to non-jurisdictional wetlands. • No long-term impacts to water quality.	No impacts

Resource Area	Alternative 1	Alternative 2	No Action Alternative
Biological Resources	• Long-term but non-significant impacts to Burton Mesa Chaparral. • Short-term but non-significant impacts to wildlife species. • Non-significant impacts to threatened or endangered species.	• Long-term but non-significant impacts to Burton Mesa Chaparral. • Short-term but non-significant impacts to wildlife species. • Non-significant impacts to threatened or endangered species.	No impacts
Cultural Resources	• No impacts to historic properties would occur.	• No impacts to historic properties would occur.	No impacts
Noise	• Noise effects from proposed flight operations would be confined to Vandenberg SFB for most noise metrics. • The existing unweighted 100-dB SPL contour line would not change with the implementation of the Proposed Action.	• Noise effects from proposed flight operations would be confined to Vandenberg SFB for most noise metrics. • The existing unweighted 100-dB SPL contour line would not change with the implementation of the Proposed Action.	No impacts
Coastal Zone	• The Proposed Action is consistent with the enforceable policies of the CCMP.	• The Proposed Action is consistent with the enforceable policies of the CCMP.	No impacts
Infrastructure, Transportation, and Utilities	• No impact to infrastructure, transportation, and utility services.	• No impact to infrastructure, transportation, and utility services.	No impacts
Hazardous Materials and Waste	• With the use of appropriate BMPs, short-term, non-significant impacts to hazardous wastes and materials would be anticipated.	• With the use of appropriate BMPs, short-term, non-significant impacts to hazardous wastes and materials would be anticipated.	No impacts
Safety	• With the implementation of OSHA and DAF safety standards impacts to ground safety are expected to be non-significant. • With the implementation of DAF guidelines, procedures, and regulations for storing, transporting, and handling of munitions, the safety risk from munitions would be long-term but not significant. • With the implementation of DAF aviation safety programs, flight safety risks are expected to be long-term and not significant.	• With the implementation of OSHA and DAF safety standards impacts to ground safety are expected to be non-significant. • With the implementation of DAF guidelines, procedures, and regulations for storing, transporting, and handling of munitions, the safety risk from munitions would be long-term but not significant. • With the implementation of DAF aviation safety programs, flight safety risks are expected to be long-term and not significant.	No impacts
Socioeconomics	• Economic impact would be beneficial but not significant.	• Economic impact would be beneficial but not significant.	

Notes:
a Definition of significant consequences is provided in **Section 3.1**.
AGE = aerospace ground equipment; BMP = best management practice; CCMP = California Coastal Management Plan; DAF = Department of the Air Force; GHG = greenhouse gas; OSHA = Occupational Safety and Health Administration; PSD = Prevention of Significant Deterioration; QD = quantity distance; SFB = Space Force Base; SPL = sound pressure level

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CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 FRAMEWORK FOR ANALYSIS

To provide a framework for the analyses in this EA, the DAF defined a study area specific to each resource or sub-resource area. Referred to as a Region of Influence (ROI), these areas delineate a boundary where possible effects from the considered alternatives would have a reasonable likelihood to occur. Beyond these ROIs, potential adverse effects on resources would not be anticipated. For the purposes of analysis, potential effects are described as follows:

- **Not significant –** effects that are below one or more significance threshold(s) according to the criteria in 42 CFR 1501.3(d) and, where there may be significant impacts, such impacts may be mitigated to below a significance threshold. The terms “non-significant” and “insignificant” may also be used in this EA to mean “not significant”
- **Significant –** adverse effects the agency has identified as significant based on the criteria in 40 CFR 1501.3(d) as not mitigable to not significant
- **Direct –** effects that occur at the same time and place in which the proposed actions are taking place
- **Indirect –** effects that are caused by the proposed action that take place later in time or are farther removed in distance, but are still reasonably foreseeable
- **Cumulative –** effects on the environment that result from the incremental effects of the proposed action when added to the effects of other past, present, and reasonably foreseeable future actions regardless of who undertakes the other actions.

When relevant to the analyses in this EA, potential effects may be further categorized as short or long term or adverse or beneficial.

Based upon the nature of the Proposed Action and the affected environment, both qualitative and quantitative thresholds were used as benchmarks to qualify effects. Further, each resource analysis section (i.e., **Sections 3.5–3.16**) concludes with a cumulative effects analysis considering the effects on the environment that result from the incremental effects of the Proposed Action when added to the effects of other past, present, and reasonably foreseeable actions at Vandenberg SFB.

3.2 RESOURCES ELIMINATED FROM DETAILED ANALYSIS

In accordance with NEPA and the EIAP, the DAF considered but eliminated from further analysis the following resources:

- **Aesthetics or Visual Resources** – Facility construction associated with the Proposed Action would occur entirely within Vandenberg SFB and would not be visible to members of the public. The munitions storage igloos would be approximately 27 feet in height and covered with an earthen layer as part of the design and would blend into the landscape. Other facilities, such as the AGE building, would be near other similar airfield facilities and be consistent with the existing visual landscape. Aircraft operations under the Proposed Action would involve similar aircraft that currently use the Vandenberg SFB and would not be discernible from existing operations. Therefore, impacts to visual resources would not occur from implementation of the Proposed Action.
- **Farmland** – Vandenberg SFB does not contain any soil classified as prime farmland. Vandenberg SFB has a long history of serving as a military base and does not contain farmland. No impacts to farmland would occur.
- **Groundwater** – The current water source for Vandenberg SFB is four water wells located within the San Antonio Creek basin. The Proposed Action would use water temporarily for dust control

during facility construction. The AGE building would be connected to existing water utilities for sanitary water needs. The water usage under the Proposed Action would not be significant in comparison to existing groundwater use on Vandenberg SFB.

3.3 RESOURCES CARRIED FORWARD FOR DETAILED ANALYSIS

Based on the evaluation of the Proposed Action, the following resources were carried forward for analysis: land use; earth, water, biological, and cultural resources; air quality; noise; coastal zone management; infrastructure, including transportation and utilities; hazardous materials and waste; and safety.

3.4 CUMULATIVE EFFECTS

An effort was made to identify past, present, and reasonably foreseeable actions that would affect lands included in the proposed action alternatives as well as in the region. A cumulative effects analysis has been conducted for each resource section. This analysis considers the effects on the environment that result from the incremental effects of the proposed action when added to the effects of other past, present, and reasonably foreseeable actions at Vandenberg SFB. The past, present, and reasonably foreseeable future major projects anticipated to occur on or near Vandenberg are listed in **Table 3-1**.which briefly describes the proposed or planned projects identified for consideration of potential cumulative impacts when combined with the effects of the proposed action at Vandenberg SFB and on a regional scale.

Table 3-1
Past, Present, and Reasonably Foreseeable Future Actions at Vandenberg SFB

No.	Action	Description/Status
Past Actions		
1.	Honda Creek culverts repair and corrosion prevention	Repaired two 13-foot-diameter culverts running under Coast Road at Honda Creek crossing. NEPA analysis and project completed in 2023.
2.	22.5 MW solar farm on Vandenberg SFB	Completed.
3.	Military and commercial rocket launches on Vandenberg SFB	Completed.
4.	Regular aircraft takeoffs and landings at Vandenberg SFB airfield	Completed; types of aircraft are described in **Section 3.11.2** of this EA.
5.	Replacement of overhead distribution line A5	Demolished and replaced components of the A5 electrical distribution line, including creating 20-foot-wide access roads where needed. NEPA analysis and project completed.
Present Actions		
6.	Commercial space rocket launches and landings on Vandenberg SFB	Launches by SpaceX, Firefly, and United Launch Alliance are ongoing at four active Space Launch Complex (SLC) facilities and other support facilities.
7.	Missile launches	Ongoing missile launches include the Minuteman III, an Intercontinental Ballistic Missile that is launched from underground silos, and interceptor and target vehicles by Missile Defense Agency.
8.	Regular aircraft takeoffs and landings at Vandenberg SFB airfield	Current aircraft usage of the Vandenberg SFB airfield is described in **Section 3.11.2**.
Reasonably Foreseeable Future Actions		
9.	Repairs to a culvert (Culvert 10) under Coast Road	NEPA analysis is currently in process for repairs to Culvert 10 along Coast Road. Construction is anticipated to commence in 2025.
10.	Continued and increased commercial space rocket launches and landings on Vandenberg SFB	New locations for future launch facilities have been approved for development but have not completed NEPA analysis. A NEPA analysis has been completed for a small launch pad at SLC-5 for Phantom Space projected use; but no construction has started for that

No.	Action	Description/Status
		launch activity. SLC-6 may be modified for a future launch program.
11.	Development of a Small Launch Vehicles program	This program will involve up to 100 additional launches per year of small rockets with payloads of approximately 4,400 pounds.
12.	Missile launches	The Missile Defense Agency will update its program to next-generation interceptors.
13.	Future testing of the new Ground-Based Strategic Defense program	The Sentinel program is intended to replace the existing Minuteman III program.
14.	Regular aircraft takeoffs and landings at Vandenberg SFB airfield with potential increases to support changes in the rocket and missile launch programs	Potential increases are intended to support future changes in rocket and missile programs.
15.	Construction of a new air traffic control tower	The new air traffic control tower would be constructed on or near the site of Building 1754.
16.	Replacement of the airfield fence	The existing security fence surrounding the airfield would be replaced.

SFB = Space Force Base; SLC = Space Launch Complex

3.5 LAND USE

3.5.1 Definition of the Resource

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. Land use descriptions are often codified in local zoning laws; however, no nationally recognized convention or uniform terminology has been adopted for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions. Land use on Vandenberg SFB is broadly classified through the identification of planning districts; that is, areas that contain compatible land uses. Various land uses may be prohibited or permitted in each district to ensure that any future development within those areas will not disrupt Vandenberg SFB’s mission. However, Vandenberg SFB, itself, is not governed by local land use planning districts since it is federally owned property. However, Vandenberg SFB applies some of the planning strategy and terminology to plan for and describe the various uses of Vandenberg SFB property in the implementation of its Installation Development Plan.

The ROI for land use includes the Vandenberg SFB Planning Districts in which the Proposed Action would occur (**Section 3.5.2**). The ROI includes the extent of the QD arcs that surround projects that involve storage of or working with explosives.

3.5.2 Existing Conditions

Vandenberg SFB occupies 99,604 acres along California’s Central Coast in Santa Barbara County, near the cities of Lompoc, Santa Maria, and Guadalupe. Land use on Vandenberg SFB is devoted to the Installation’s primary missions of launching and tracking satellites in space, testing and evaluating US Intercontinental Ballistic Missile systems, and supporting aircraft operations in the Western Range, an area beginning at the coastal boundaries of Vandenberg SFB and extending west to Hawai‘i and the western Pacific (Vandenberg SFB, 2020). Vandenberg SFB is divided into 11 planning districts that were formed based on established land use, transportation patterns, and a framework plan that was developed during workshops for the Installation Development Plan (Vandenberg SFB, 2020). Projects 1 through 5 in the Proposed Action would occur mostly in the Airfield District. The Airfield District is located immediately west of the main cantonment area, which contains administrative offices, community services, and Vandenberg SFB housing (**Figure 3-1**). The Airfield District contains Vandenberg’s single active runway, which is 15,000 feet long and accompanied by a parallel taxiway and a parking apron. Vandenberg SFB has no assigned flying mission, but airfield operations support aeronautical, flight test, and ballistic and space launch operations. Most of the airfield traffic at Vandenberg SFB is transient and consists of visiting aircraft. A

more detailed description of aircraft operations is provided in **Section 3.11**. Project 5 would include a small area in the Purisima Planning District, which surrounds the airfield on the north and west sides. This district consists mostly of open space and facilities for developmental testing and evaluation activities. Administrative and industrial land use is also permitted in the Purisima District (Vandenberg SFB, 2020). Project 6 would occur in the northwest corner of the Arguello District near several existing buildings. The Arguello District is south of the Santa Ynez River and makes up almost a third of the total area of Vandenberg SFB and contains nearly all the South Base. The Arguello District is characterized by steep slopes and is the location of the primary operating space launch, control, and tracking facilities at Vandenberg SFB. An Amtrak Station and the adjacent, publicly accessible Surf Beach (federally owned property) are in the district's northwestern corner. The primary focus of land use now and in the future in the Arguello District are space launch operations (Vandenberg SFB, 2020).

3.5.3 Environmental Consequences

Potential impacts on land use from implementation of the Proposed Action are based on the compatibility of the action with existing conditions and potential effects on future land use. A land use impact would be adverse and significant if it

- is inconsistent or noncompliant with existing land use plans or policies,
- precludes the viability of existing land use,
- precludes continued use or occupation of an area to the detriment of the Vandenberg SFB mission,
- is incompatible with adjacent land use to the extent that public health or safety is threatened, or
- conflicts with Installation planning criteria established to ensure the safety and protection of human life and property.

3.5.3.1 Alternative 1 (Preferred)

Flight Operations

Under Alternative 1, the periodic operation of 12 F-15E or F-15EX aircraft would occur in the airfield and use existing approved airspace that is currently used by other similar aircraft. The Proposed Action is consistent with the current uses of the airfield. The F-15 flight operations would not require any closures or changes in Vandenberg SFB missions or operations outside of the airfield, and no impacts or conflicts with existing land uses on Vandenberg SFB are expected. Coordination between the F-15 operations and existing space launch or missile programs would ensure that those programs do not conflict because of potential operational closures related to rocket or missile launches.

Personnel Basing

The permanent basing of up to 35 DAF personnel at Vandenberg SFB under Alternative 1 would not be anticipated to result in impacts to existing land use, as personnel would be integrated into existing infrastructure in the cantonment area. The new AGE building would also provide workspace for some of the personnel.

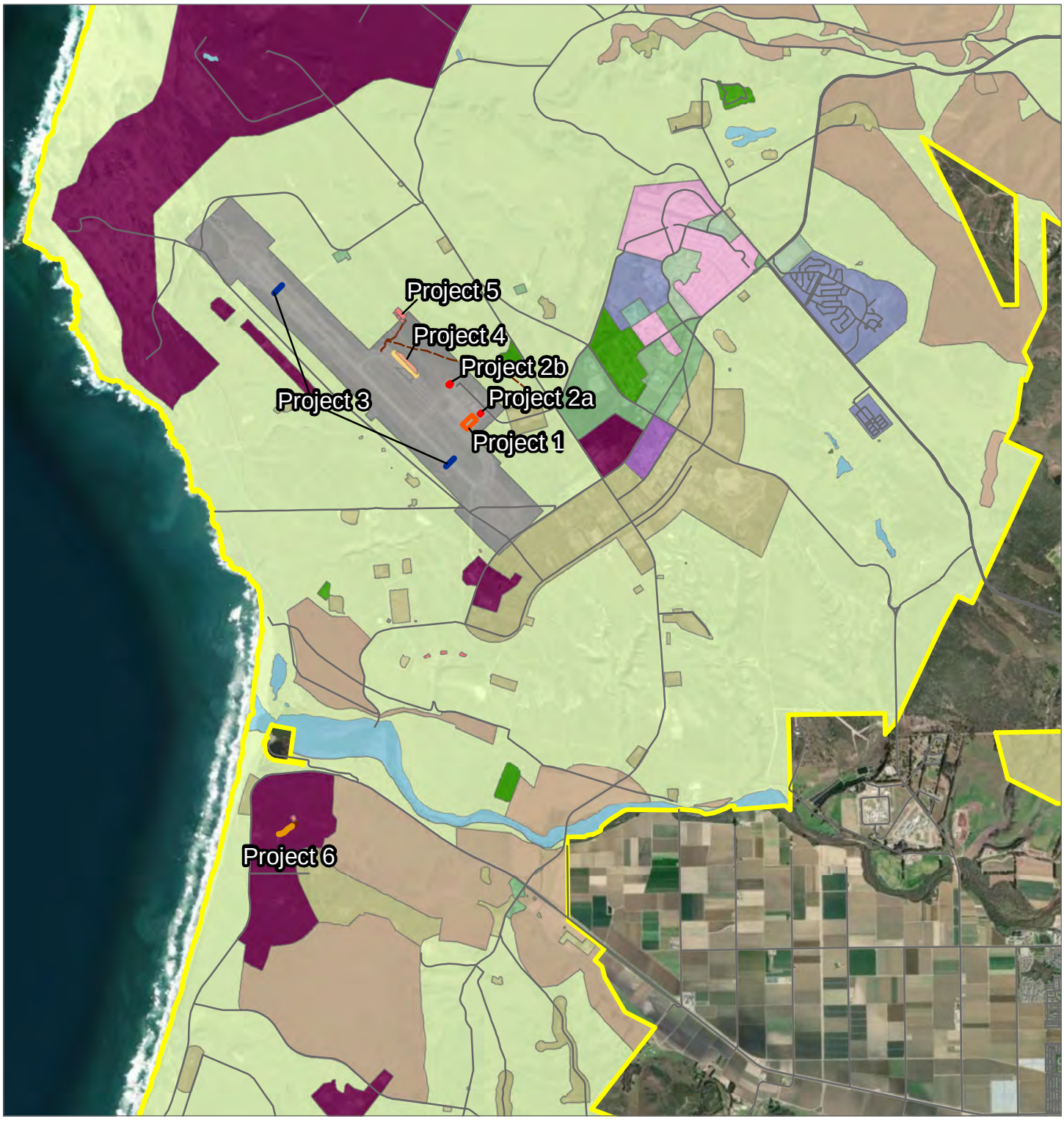


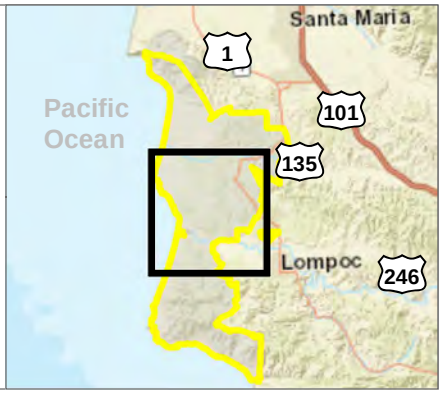
FIGURE 3-1
Land Use

- Roadways
- AETC
- Administrative
- Agriculture
- Airfield
- Community (Commercial)
- Community (Service)
- Housing
- Industrial
- Installation Boundary
- Launch Operations
- Medical
- Open Space
- Outdoor Recreation
- Water

N

0 2 Miles

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N



Facilities Construction

Under Alternative 1, construction of new facilities would occur within the existing boundaries of the Installation. Projects 1–5 would be compatible with existing activities and facilities. The layout of the F-15 parking spaces and tie-downs (Project 1) is designed to minimize potential conflicts with any concurrent use of the airfield aprons by other aircraft and to maintain access to the drive-through Hangar Building (Building 1735). Because the flight operations of the Proposed Action would only occur during two different weeks in year one and only one week in years thereafter, operational conflicts are not expected to be significant.

The AGE building would be constructed within the existing area developed for airfield support operations and functions (Project 2a). The installation of the AAS (Project 3) on the runway is consistent with airfield operations.

Construction of the four earth-covered munitions storage igloos (Project 5) northeast of the airfield would have long-term impacts on future land use by restricting future development in the surrounding area. As described in **Section 2.5.3.5**, the DAF's explosive safety criteria require minimum setback distances for munitions storage igloos from inhabited buildings and general traffic routes based on the amount of stored explosive material. For Project 5, the inhabited building setback distance is 2,607 feet; that is, a circular area of radius 2,607 feet or an approximate area of 490 acres surrounding the munitions storage igloos. The public traffic route setback distance is 1,564 feet. Within the larger QD arc, construction of the munitions storage igloos would prohibit future development of any inhabited facilities within the 490-acre area surrounding Project 5. Likewise, no new general traffic route (non-project traffic) could be developed within a 1,564-foot radius of Project 5. The gravel access road to Project 5, which would be upgraded to a paved road, would have additional access controls because it enters the restricted activity area surrounding the munitions storage igloos.

Project 6, a single munitions storage igloo, would be located in the northwest corner of the Arguello Planning District in the vicinity of Buildings 980 and 988. The project would not conflict with any existing land uses in the area. The inhabited building QD arc for explosives safety would be 1,804 feet from the back and 2,177 feet from the sides of the igloo. Future development in the area surrounding the igloo would be restricted. Access to the existing road near Building 980 that leads to the igloo site would be controlled.

Under Alternative 1, land use impacts would be long term but not significant because the restrictions on future land use in the areas surrounding the munitions storage igloos would not affect the viability of existing land uses in the surrounding area and would not have a detrimental effect to the mission of the Vandenberg SFB.

3.5.3.2 Alternative 2

Under Alternative 2, the potential land use impacts would be the same as under Alternative 1 except for Project 2. Under Project 2b, the AGE building would be constructed on the site of Building 1754, which would be demolished under Alternative 2. Vandenberg SFB is planning the potential construction of a new air traffic control tower on or near the same site. Construction of the AGE building on this site potentially would conflict with plans for the air traffic control tower.

3.5.3.3 No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E or F-15EX fighter jets at Vandenberg SFB for testing of and training for a homeland defense mission. No additional personnel would be stationed at Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 operations. Over time, the mission capabilities of homeland defense systems would diminish along with the DAF's ability to fulfill its mission to defend the US. Under the No Action Alternative, there would be no land use restrictions imposed in the area proposed on Vandenberg SFB for the four munitions storage igloos northeast of the airfield or near Building 980 surrounding the proposed one munitions storage igloo. No impacts to land use beyond baseline conditions would occur.

3.5.3.4 Cumulative Effects

The past and present activities at Vandenberg SFB consist of rocket and missile launch missions and aircraft operations. In addition, Vandenberg SFB has been and is currently used for transient military aircraft operations. The rocket and missile launch missions are expected to continue and potentially increase in number of launches. Accordingly, aircraft operations that support those missions may potentially increase. Redevelopment of missile or rocket launch sites or construction of new launch sites would create a long-term commitment of land resources and prevent alternative land uses in the area surrounding those projects. The Proposed Action would create land use restrictions around the munitions storage igloos. When considered in conjunction with other reasonably foreseeable future actions at Vandenberg SFB (**Table 3-1**), cumulative land use impacts would be long term but not significant because it would not affect future land use for any reasonably foreseeable future action.

3.5.3.5 Environmental Protection Measures for Land Use

The measures listed in **Table 3-2** would be taken to implement land use controls.

Table 3-2
Land Use Control Measures

Land Use Measures
Create a GIS layer for each of the QD arcs for inhabited building and general road traffic distances for the munitions storage igloos that are constructed and enter into the Vandenberg SFB GIS database. The QD arc GIS layers will identify the restricted area for specific uses surrounding each igloo site. and identify restricted land use areas for future installation planning.

GIS = geographic information system; QD = quantity distance; SFB = Space Force Base

3.6 EARTH RESOURCES

3.6.1 Definition of the Resource

Earth resources include the physiography, topography, geology, and soils of a given area. Physiography and topography are the shape and arrangement of a land surface, including its height and the position of its natural and human-made features. Geology is the study of the Earth's composition and structure and configuration of surface and subsurface features. Soils are the unconsolidated materials overlying bedrock or other parent material. Soils are described by their composition, slope, and physical characteristics. Attributes of soil such as their structure, elasticity, load-bearing capacity, shrink-swell potential, and erosion potential determine their suitability to support land uses.

The ROI for earth resources is the individual project sites and the immediately surrounding areas.

3.6.2 Existing Conditions

3.6.2.1 Geology and Topography

Vandenberg SFB includes a 42-mile section of coastline in the southwestern part of the Santa Maria basin. Vandenberg SFB is bounded by the Casmalia Hills to the north and the Santa Ynez Mountains and Sudden Flats to the south. Between these two ranges are the broad and generally flat areas of the San Antonio Terrace, Burton Mesa, and Lompoc Terrace, on which most of the Vandenberg SFB occurs.

Vandenberg SFB is a geologically complex area that includes the transition zone between the Southern Coast Range and Western Transverse Range Geomorphic Provinces of California. The major geomorphic features of Vandenberg SFB include the Casmalia Hills, San Antonio Terrace, Barka Slough, Purisima Hills, Burton Mesa, Lompoc Valley, Lompoc Terrace, Santa Ynez Mountains, and Sudden Flats. The geological features of Vandenberg SFB have been an important factor in the development of the diversity of natural habitats.

Vandenberg SFB is characterized by coastal sand dunes and alluvium (i.e., sediment deposited by flowing water) underlain predominately by marine sedimentary rocks of Late Mesozoic age (140–70 million years before the present) and Cenozoic age (70 million years to the present) (Dibblee, 1950). Extensive folding and faulting throughout the Vandenberg SFB area has created four structural regions: the Santa Ynez Range, the Lompoc lowland, the Los Alamos syncline, and the San Rafael Mountain uplift (Reynolds, Smith, and Hill, Inc., 1985).

3.6.2.2 Soils

Dominant soil types on Vandenberg SFB where the Proposed Action would occur include the Tanngair-Narlon and Marina-Oceano associations (Shipman, 1981, Appendix A, Figure 4-2).

The Tangair-Narlon soil association is on nearly level to strongly sloping terrain. Poorly drained and moderately well drained sands and loamy sands, located primarily on terraces, characterize this soil type. This soil type is the only soil type in Alternative 1 and permeability is rapid; surface runoff is slow to very slow. The dominant soil type is Tangair sand, which occurs in the Airfield District. Areas of Narlon sand and Narlon loamy sand occur around the perimeter of the Tangair sand.

The Marina-Oceano soil association consists of drained sands on mesas and dunes. This soil is characterized as somewhat excessively drained, slow to rapid runoff, moderate permeability. The single earth-covered munitions storage igloo near Building 980 is located on this soil association. The two soil types that occur near the single earth-covered munitions storage igloo are Oceano sand and sandy terrace escarpments.

3.6.2.3 Seismicity

The Santa Barbara County region is seismically active, with a major earthquake occurring in the region about every 15–20 years (DAF, 1987). The Santa Ynez fault is an east-to-west structure located along the north side of the Santa Ynez and Topatopa ranges and is largely responsible for the uplift of these ranges. The total fault length is 92 miles (Treiman, 2000). It is a well-constrained fault with a slip rate of less than 0.2 millimeter per year. The Lions Head fault traverses north and north-west of the project area. These fault systems within the Transverse Ranges are considered active (Jennings, 1994) and capable of generating damaging earthquakes. Moderate or major earthquakes along these fault systems could generate strong or intense ground motions in the area and possibly result in surface ruptures of unmapped faults within or close to Vandenberg SFB. The primary geologic hazard within the Proposed Action area is strong seismically induced ground shaking. There are no known areas within the Proposed Action area where liquefaction has occurred. The area most prone to liquefaction on Vandenberg SFB are near San Antonio Creek and the Santa Ynez River. The potential for liquefaction on Vandenberg SFB, despite these areas is considered low (DAF 1987).

3.6.3 Environmental Consequences

3.6.3.1 Evaluation Criteria

Evaluation of environmental consequences to earth resources considers potential impacts to unique or important geological features, soil erosion, and the siting of facilities in relation to potential geologic hazards. Impacts can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering design are incorporated into project development.

An earth resource impact would be significant if it

- substantially alters unique or valued geologic or topographic features,
- develops on soils or underlying geology that are considered unsuitable for intended purpose,
- is incompatible with the seismic risk of the project area, or
- alters geological structure that affects underlying aquifer systems.

3.6.3.2 Alternative 1 (Preferred)

Geology

New construction projects under Alternative 1 would not substantially alter the topography, affect any important geologic features, or diminish slope stability. All projects would occur in topographically flat areas in or near the existing airfield and of the same geological composition as the existing Vandenberg SFB airfield and surrounding facilities. No impacts to or from geological resources would be anticipated under Alternative 1.

Soils

Approximately 6 acres of previously undisturbed land would be disturbed for building and road construction. There is a potential for increased erosion and soil loss during construction activity. Measures implemented to avoid and/or minimize surface erosion are listed in **Tables 3-13** and **3-15** in **Sections 3.7.3.6** and **3.8.3.6**, respectively. Approximately one half of the disturbed areas would be occupied by new building structures or hard surface areas. The remaining area, primarily for firebreaks, would be seeded with native grasses and forbs and maintained in a mown condition. Therefore, short-term, not significant impacts to soils from construction would be anticipated.

Seismicity

The potential for geologic hazards associated with slope instability and liquefaction are minimal in the ROI. Potential structural damage or injuries during operations from seismic ground shaking and fault rupture during an earthquake would be minimized by adherence to UFC 3-310-04, *Seismic Design of Buildings*, Change 1. The munitions storage igloos are built with reinforced concrete to explosive safety standards that would also provide structural protection during an earthquake. Therefore, impacts with respect to seismic hazards would be anticipated to be long term and not significant for the AGE building and long term and not significant for the munitions storage igloos.

3.6.3.3 Alternative 2

Under Alternative 2, the potential land use impacts would be the same as under Alternative 1 except for Project 2. Under Project 2b, the AGE building would be constructed on the site of Building 1754, which would be demolished under Alternative 2. The access road from the airfield to the munitions storage igloo site would follow the remnants of a former road, now overgrown with vegetation, and enter the site on the south side. Neither difference would change the impacts to earth resources and would be the same as Alternative 1.

3.6.3.4 No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E or F-15EX fighter jets at Vandenberg SFB for testing of and training for a homeland defense mission. No additional personnel would be stationed at Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 operations. Over time, the mission capabilities of homeland defense systems would diminish along with the DAF's ability to fulfill its mission to defend the US. Under the No Action Alternative, no building or road construction activities would occur; therefore, no impacts to earth resources beyond baseline conditions would occur.

3.6.3.5 Cumulative Effects

The past and present activities at Vandenberg SFB consists of rocket and missile launch missions and aircraft operations. In addition, Vandenberg SFB has been and is currently used for transient military aircraft operations. The rocket and missile launch missions are expected to continue and potentially increase in number of launches. Accordingly, aircraft operations that support those missions may potentially increase. When considered in conjunction with other reasonably foreseeable future actions at Vandenberg SFB

(**Table 3-1**), cumulative geology and soils impacts would be short term and not significant. Cumulative impacts related to seismic hazards, such as impacts to the AGE building and munitions storage igloos, would be anticipated to be long term and not significant.

3.6.3.6 Environmental Protection Measures for Earth Resources

Measures to avoid or minimize impacts to soils are identified in **Section 3.7.3.6** (Air Quality) for minimizing wind erosion of soil and preventing emissions of fugitive dust and in **Section 3.8.3.6** (Water Resources) for avoiding or minimizing water erosion, sedimentation, and discharge of pollutants (e.g., fuels and equipment fluids).

3.7 AIR QUALITY AND METEOROLOGY

3.7.1 Definition of the Resource

Air pollution is a threat to human health and damages trees, crops, other plants, waterbodies, and animals. It creates haze or smog that reduces visibility in national parks and cities and interferes with aviation. To improve air quality and reduce air pollution, Congress passed the Clean Air Act (CAA) and its amendments in 1970 and 1990, which set regulatory limits on air pollutants to ensure basic health and environmental protection from air pollution.

The USEPA divided the country into geographical regions known as air quality control regions to evaluate compliance with the National Ambient Air Quality Standards (NAAQS). Vandenberg SFB is located in Santa Barbara County, California, which is in the South Central Coast Intrastate Air Quality Control Region (SCCIAQCR) (40 CFR § 81.166) and serves as the ROI for the projects within Vandenberg SFB.

3.7.1.1 Criteria Pollutants

In accordance with CAA requirements, the air quality in each region is measured by the concentration of various pollutants in the atmosphere. Measurements of these “criteria pollutants” in ambient air are expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu g/m^3$).

The CAA directed the USEPA to develop, implement, and enforce environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, the USEPA developed numerical concentration-based standards (i.e., NAAQS) for pollutants that have been determined to impact human health and the environment and established both primary and secondary NAAQS under the provisions of the CAA (**Table 3-3**). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represents the maximum pollutant concentration allowable for the protection of vegetation, crops, and other public resources in addition to maintaining visibility standards.

Ozone is not usually emitted directly into the air but is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants, or “ozone precursors.” These ozone precursors consist primarily of nitrogen oxides and volatile organic compounds that are directly emitted from a wide range of emission sources. For this reason, regulatory agencies limit atmospheric ozone concentrations by controlling volatile organic compound pollutants (also identified as reactive organic gases) and nitrogen oxides.

Table 3-3
National Ambient Air Quality Standards

Pollutant		Primary/ Secondary[a,b]	Averaging Time	Level[c]	Form
Carbon monoxide		Primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead		Primary and Secondary	Rolling 3-month average	0.15 µg/m^3	Not to be exceeded
Nitrogen dioxide		Primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Primary and Secondary	1 year	53 ppb	Annual mean
Ozone		Primary and Secondary	8 hours	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	Primary	1 year	12.0 µg/m^3	Annual mean, averaged over 3 years
		Secondary	1 year	15.0 µg/m^3	Annual mean, averaged over 3 years
		Primary and Secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	Primary and Secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year onaverage over 3 years
Sulfur dioxide		Primary	1 hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Source: NAAQS table

µg/m^3 = micrograms per cubic meter; NAAQS = National Ambient Air Quality Standards; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; ppb = parts per billion; ppm = parts per million; USEPA = US Environmental Protection Agency

Notes:

a. Primary Standards: the levels of air quality necessary, with an adequate margin of safety to protect public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the USEPA.

b. Secondary Standards: the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

c. Concentrations are expressed first in units in which they were promulgated.

(1) In areas designated nonattainment for the lead standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect.

(2) The level of the annual nitrogen dioxide standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) ozone standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) ozone standards.

(4) The previous sulfur dioxide standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous sulfur dioxide standards or is not meeting the requirements of a state implementation plan call under the previous sulfur dioxide standards (40 CFR § 50.4(3)). A state implementation plan call is a USEPA action requiring a state to resubmit all or part of its state implementation plan to demonstrate attainment of the required NAAQS.

3.7.1.2 General Conformity and Attainment

When a region or area meets NAAQS for a criteria pollutant, that region or area is classified as in "attainment" for that pollutant. When a region or area fails to meet NAAQS for a criteria pollutant, that region or area is classified as "nonattainment" for that pollutant. In cases of nonattainment, the affected state, territory, or local agency must develop a state implementation plan for USEPA review and approval. The state implementation plan is an enforceable plan developed at the state level that identifies how the state will comply with air quality standards. If air quality improves in a region that is classified as nonattainment, and the improvement results in the region meeting the criteria for classification as attainment, then that region is reclassified as a "maintenance" area.

Under the CAA, the General Conformity Rule requires proposed federal agency activities in designated nonattainment or maintenance areas (i.e., attainment areas reclassified from a prior nonattainment designation) to demonstrate conformity with the state implementation plan for attainment of NAAQS. Agencies are required to show that the net change in emissions from a federal proposed action would be below applicable *de minimis* threshold levels (i.e., so minor as to merit disregard).

3.7.1.3 New Source Review

Per the CAA, the USEPA's Prevention of Significant Deterioration (PSD) New Source Review permit program regulates criteria and certain non-criteria air pollutants for air quality control regions designated as unclassified or in attainment status with respect to the federal standards. In such areas, a PSD review is required for new "major source" or "major modification of existing source" emissions that exceed 100 or 250 tons per year (tpy) of a regulated CAA pollutant, dependent on the type of major stationary source. For "minor source" emissions, a PSD review is required if a project increases a "major source" threshold.

3.7.1.4 Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere helps regulate the earth's temperature and contributes to global climate change. GHGs include water vapor, carbon dioxide, methane, nitrous oxide, ozone, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential, which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from the earth's surface. The global warming potential of a particular gas provides a relative basis for calculating its carbon dioxide-equivalent (CO_2e) or the amount of CO_2e to the emissions of that gas. Carbon dioxide has a global warming potential of 1 and is therefore the standard by which all other GHGs are measured. The GHGs are multiplied by their global warming potential, and the resulting values are added together to estimate the total CO_2e.

The USEPA regulates GHG primarily through a permitting program known as the GHG Tailoring Rule. This rule applies to GHG emissions from larger stationary sources. Additionally, the USEPA promulgated a rule for large GHG emission stationary sources, fuel and industrial gas suppliers, and carbon dioxide injection sites if they emit 25,000 metric tons or more of CO_2e per year (40 CFR § 98.2(a)(2)). The Air Force however has adopted the PSD threshold for GHG of 75,000 tpy of CO_2e as an indicator or "threshold of insignificance" for NEPA air quality impacts in all areas. This indicator provides a threshold to identify actions that are insignificant or too trivial or minor to merit consideration. Actions with a net change in GHG (CO_2e) emissions below the PSD threshold are considered too insignificant on a global scale to warrant any further analysis. Actions with a net change in GHG (CO_2e) emissions above the PSD threshold are considered potentially significant and require further assessment to determine if the action poses a significant impact (Air Force Civil Engineer Center [AFCEC], 2023).

3.7.1.5 Operating Permits

The California Air Resources Board (CARB) has transferred its authority over stationary source criteria pollutant and hazardous air pollutant emissions to the local air districts. Because Vandenberg SFB is located within Santa Barbara County, regulatory and reporting requirements are established by the Santa

Barbara County Air Pollution Control District (APCD). The California Environmental Protection Agency (CalEPA) has established more stringent air quality standards than those set by the USEPA. These more stringent regulations are also under the APCD regulatory authority.

Permitting requirements for federal owners and operators are largely based on a “potential to emit,” defined as the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design or configuration. Calculations are used to determine whether a federal facility is defined as a “major source” under the CAA requiring a Title V Operating Permit; however, some “non-major” or “minor source” federal owners or operators are subject to other stationary permitting requirements.

The AAS generator engines must have the USEPA national security exemption or must comply with USEPA and California emissions requirements. The national security exemption should be acquired during the generator procurement process prior to installation to avoid regulatory issues and delays in permitting, if required, which can take up to eight months.

3.7.2 Existing Conditions

The SCCIAQCR, in which the ROI is located, is in attainment for all NAAQS pollutants. However, the Santa Barbara County APCD has classified the county as nonattainment under the state of California standard for PM_{10}.

As a federal installation that is considered a “major source” contributor for air pollution, Vandenberg SFB maintains a Title V Operating Permit, which requires monitoring emissions and reporting the findings. Title V is a federal program designed to standardize air quality permits and the permitting process for major sources of emissions across the country and requires the USEPA to establish a national operating permit program. USEPA defines a major source as a facility that emits or has the potential to emit any criteria pollutant or hazardous air pollutant at levels equal to or greater than the major source thresholds. The major source threshold for criteria pollutants may vary depending on the attainment status (e.g., marginal, serious, extreme) of the geographic area and the criteria or hazardous air pollutant in which the facility is located.

3.7.2.1 Air Emission Sources at Vandenberg SFB

Stationary source emissions generated at Vandenberg SFB include internal and external combustions sources, heaters, aboveground storage tanks (ASTs) and fuel loading racks, landfills, munitions, surface coatings, and abrasive cleaning sources. **Table 3-4** lists the most recent stationary source emissions inventories for Vandenberg AFB.

3.7.2.2 Regional Climate

Santa Barbara County's Mediterranean climate is typically warm and dry in summer and cool and wet in winter. Most of the county's rivers, creeks, and streams remain dry during the summer months. The proximity of the Pacific Ocean tends to moderate temperature near the coast, while the steep mountain ranges produce a significant "orographic effect.” This occurs when storms approaching the county from the Pacific Ocean are forced upward against the mountains resulting in increased precipitation release with topographic elevation. The orographic effect, in conjunction with steep, short watersheds occasionally result in flash flooding along the county's south coast. (Waterwise, 2024)

The regional climate of the Vandenberg SFB area tends to be moderate. However, extreme highs and lows can occur (National Oceanic and Atmospheric Administration [NOAA], 2024). August is the hottest month, with an average daily high temperature of 77.7 degrees Fahrenheit (°F) and an average low temperature of 60.3°F. Average temperatures in spring, summer, and fall are 61.2°F (April), 68.3°F (July), and 65.8°F (October), respectively. Winter temperatures tend to be mild; December is the coolest month of the year, with an average daily high temperature of 66.2°F and an average low temperature of 46.5°F (NOAA, 2024).

Precipitation in the Vandenberg SFB area occurs almost entirely in the form of rain. Vandenberg SFB normally receives about 18.98 inches of precipitation annually (NOAA, 2024). Winter rains occur primarily in December, January, and February with an annual average of 3.07, 4.43, and 4.41 inches, respectively.

Winter rains originate from frontal systems that begin in the Pacific Ocean and move eastward across California. Santa Barbara County's climate is primarily influenced by the Pacific High Pressure System. During the dry summer months, high pressure usually dominates the area northeast of Hawai'i. In winter, it weakens and moves to the south, allowing cold storm systems to enter the area from the northwest (Waterwise, 2024).

Table 3-4
Vandenberg SFB Stationary Source Emission Summary (tpy)

Source Category	VOC	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$
Abrasive cleaning	- (a)	-	-	-	0.017	0.002
Above ground storage tanks	0.16	-	-	-	-	-
Misc chemical usage	1.866	-	-	-	-	-
Degreasing/solvent cleaning	0.003	-	-	-	-	-
External combustion	0.621	18.28	7.67	1.57	0.862	0.008
Fuel dispensing	0.852	-	-	-	-	-
Fuel loading racks	0.0013	-	0.0126	-	-	-
Heaters/ovens/dryers	0.0054	0.053	0.0939	0.014	0.0075	
Internal combustion	0.627	5.285	8.3925	0.0215	0.347	0.161
Landfills	1.502	0.292	-	-	-	-
Munitions	-	0.139	0.0072	-	0.0036	0.00262
Open burn	0.0001	0.0036	0.0002	-	0.00002	0.000061
Pesticide application	.0121	-	-	-	-	-
Surface coating	.7004	-	-	-	0.1469	0.1413
Welding/soldering/cutting	-	-	-	-	0.0062	.006
Woodworking	-	-	-	-	.000001	-
Totals	**6.353**	**24.052**	**16.173**	**1.608**	**1.39**	**0.321**

Source: Vandenberg AFB, 2021
Note:
a Hyphen indicates that there are no emissions.
CO = carbon monoxide; NOx = nitrogen oxides; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

3.7.3 Environmental Consequences

3.7.3.1 Evaluation Criteria

The environmental impact methodology for evaluating air quality impacts from flight operations presented in this EA is derived from Air Force Manual (AFMAN) 32-7002, *Environmental Compliance and Pollution Prevention*. Flight operations data, for example flight duration, aircraft, and engine testing, is input into the DAF's Air Conformity Applicability Model (ACAM). The air emissions analysis for the Proposed Action construction projects uses the California Emissions Estimator Model (CalEEMod), which quantifies ozone precursors, criteria pollutants, and GHG emissions from the construction and land development in California. The development projects are broken down into basic units. For example, a basic development project that consists of replacing a building with a new building could be broken down into demolition (square feet [ft^2]), grading (ft^2), building construction (ft^2 and height), architectural coatings (ft^2), and paving (ft^2).

The results of the ACAM (flight operations) and CalEEMod (construction) analyses are combined into an emissions summary for each specific criteria and precursor pollutant, as defined in the NAAQS, for the Proposed Action and Alternatives. The combined emissions are compared against the applicable threshold based on the attainment status of the ROI. If the annual net increase in emissions is below the applicable thresholds, then the respective alternative is not considered a significant emissions source and would not be subject to any further conformity determination. Assumptions of the models, methods, and detailed summary results are provided in **Appendix B** of this EA.

The SCCIAQCR is in attainment for all NAAQS standards (40 CFR § 81.305) (USEPA, 2024a). The Santa Barbara County APCD has classified the county as nonattainment under the state of California standard for PM_{10}. Due to the nonattainment status, the 250 tpy PSD value is not used for PM_{10}; instead, a more restrictive 100 tpy value is used. Due to the toxicity of lead, the use of the lead PSD threshold as an indicator of potential air quality impact insignificance is not protective of human health or the environment. Therefore, the *de minimis* value of 25 tpy is used instead. The Air Force has adopted a PSD value of 75,000 tpy for CO_2e. The following thresholds are applicable for the Proposed Action within the SCCIAQCR:

- 25 tpy de minimis value for lead
- 100 tpy de minimis value for PM_{10}
- 75,000 tpy PSD value for CO_2e.

Methodology

For the purpose of the CalEEMod model, the demolition, construction, grading, and trenching activities for the Proposed Action are assumed to take 2 years to complete.

Aircraft emit pollutants while they operate on the ground and during flight. Due to atmospheric mixing, some of these in-flight emissions affect ground-level pollutant concentrations. The portion of the atmosphere that is completely mixed begins at the earth's surface and may extend to a height of a few thousand feet. The volume is often referred to as the mixing zone. All pollutant emissions in the mixing zone must be accounted for in the emissions inventory; however, flight operations above the mixing zone do not need to be accounted for in the emissions inventory (DAF, 2019).

The aircraft operating in the mixing zone are defined as those in the landing and takeoff cycle. The standard landing and takeoff cycle begins when the aircraft enters the mixing zone as it approaches the airport on its descent from cruising altitude, lands, and taxis to the gate. The cycle continues as the aircraft taxis back out to the runway, takes off, and climbs out of the mixing zone and back up to cruising altitude. The five specific operating modes in a standard landing and takeoff are approach, taxi/idle-in, taxi/idle-out, takeoff, and climb out (DAF, 2019). The air quality impacts of the landing and takeoff cycle of the Proposed Action flight operations are modeled with ACAM.

The addition of 35 permanent DAF personnel is also modeled with ACAM. The 250 temporary personnel for the one-week deployment are not easily modeled with ACAM and were instead converted to permanent personnel. The manhours of 250 personnel for one week are equivalent to approximately five permanent personnel. A total of 40 permanent personnel were used in the ACAM model. The default AGE equipment was used in the ACAM model, as detailed in **Appendix B**.

3.7.3.2 Alternative 1 (Preferred)

Air Emissions

The estimated air emissions for Alternative 1 from the CalEEMod/ACAM model analysis annualized over the course of implementation of the Proposed Action are presented in **Table 3-5**. **Table 3-6** summarizes the highest estimated annual emissions for each pollutant under Alternative 1 compared to their respective thresholds within the SCCIAQCR. The steady-state air emissions represent the ongoing annual emissions in future years.

The proposed development projects in Alternative 1 include 37,125 ft^2 of new construction and 545,920 ft^2 of paving. Alternative 1 emissions from the construction projects are expected to be short term and are all significantly below PSD thresholds of significance within the SCCIAQCR. Nitrogen oxide emissions are primarily from aircraft operations, which are short term and are also below the PSD threshold of significance.

Table 3-5
Estimated Annual Air Emissions of the Proposed Action (tpy) – Alternative 1

Pollutant	2025	2026	Steady State
Volatile organic compound	1.75	8.06	5.35
Nitrogen oxides	19.62	16.92	17.99
Carbon monoxide	8.96	6.41	14.93
Sulfur oxides	1.05	0.93	0.95
PM_{10}	1.23	0.77	2.77
$PM_{2.5}$	0.91	0.63	1.20
Lead	0.00	0.00	0.00
Ammonia	0.01	0.01	0.01
Carbon dioxide-equivalent	3,790.13	3,092.48	7,491.09

$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; tpy = ton per year

Table 3-6
Estimated Highest Annual Air Emissions and PSD Thresholds – Alternative 1

Pollutant	Highest Annual Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (yes or no)
Volatile organic compound	8.06	250	No
Nitrogen oxides	19.62	250	No
Carbon monoxide	14.93	250	No
Sulfur oxides	1.05	250	No
PM_{10}	2.77	100	No
$PM_{2.5}$	1.20	250	No
Lead	0.00	25	No
Ammonia	0.01	250	No
Carbon dioxide-equivalent	7,491.09	75,000	No

$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter

Greenhouse Gas and Climate Change – CO_2e Emissions

The total combined direct and indirect GHG emissions were estimated through ACAM and CalEEMod for the estimated ongoing operations of the Proposed Action (**Table 3-7**).

Table 3-7
Estimated GHG Emissions (MT/yr) – Alternative 1

Year	CO_2	CH_4	N_2O	CO_2e	Exceedance
2025	3,417	35.80	35.63	3,438	No
2026	2,791	17.93	17.82	2,805	No
2027–2047 (steady state)	6,528	25.65	18.03	6,796	No

CH_4 = methane; CO_2 = carbon dioxide; CO_2e = carbon dioxide-equivalent; MT/yr = metric tons per year; N_2O = nitrous oxide

Unlike regional air quality, the affected area of GHG and climate change is global. As such, the intensity or degree of the GHG/climate change effects of the Proposed Action are compared with the state and US GHG emission inventories (**Table 3-8**). Under Alternative 1, GHG emissions would be insignificant compared to California and US GHG inventories.

Table 3-8
Comparison of Total GHG Emissions Relative to California and US Inventories (MT) – Alternative 1

Parameter		CO_2	CH_4	N_2O	CO_2e
2025–2047	State total	7,749,857,395	7,749,857,395	7,749,857,395	7,749,857,395
2025–2047	US total	118,138,446,117	118,138,446,117	118,138,446,117	118,138,446,117
2025–2047	Alternative 1	143,306	592	432	148,956
Percent of state total		0.0018491%	0.0000076%	0.0000056%	0.0019220%
Percent of US total		0.0001213%	0.0000005%	0.0000004%	0.0001261%

3.7.3.3 Alternative 2

Air Emissions

The estimated air emissions for Alternative 2 from the CalEEMod/ACAM model analysis annualized over the course of implementation of the Proposed Action are presented in **Table 3-9**. **Table 3-10** summarizes the highest estimated annual emissions for each pollutant under Alternative 2 compared to their respective thresholds within the SCCIAQCR. The steady-state air emissions represent the ongoing annual emissions in future years.

The proposed installation development projects in Alternative 2 include 37,125 ft^2 of new construction, 541,320 ft^2 of paving, and 1,500 ft^2 of demolition. Alternative 2 emissions from the construction operations are expected to be short-term and are all significantly below PSD thresholds of significance. Nitrogen oxide emissions are primarily from aircraft operations and are similar between Alternative 1 and 2. The air quality impacts from these mission-critical operations are expected to be insignificant.

Table 3-9
Estimated Annual Air Emissions – Alternative 2 (tpy)

Pollutant	2025	2026	Steady State
Volatile organic compound	1.7497	8.3147	5.2925
Nitrogen oxides	19.6108	16.9155	17.9601
Carbon monoxide	8.9441	6.404	14.7237
Sulfur oxides	1.05004	0.92896	0.9479
PM_{10}	1.2263	0.7721	2.7364
$PM_{2.5}$	0.9057	0.6336	1.187
Lead	0	0	0
Ammonia	0.008	0.008	0.008
Carbon dioxide-equivalent	3,780.6194	3,087.203	6,977.5071

$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; tpy = ton per year

Table 3-10
Estimated Highest Annual Air Emissions and PSD Thresholds – Alternative 2

Pollutant	Highest Annual Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (yes or no)
Volatile organic compound	8.31	250	No
Nitrogen oxides	19.61	250	No
Carbon monoxide	14.72	250	No
Sulfur oxides	1.05	250	No
PM_{10}	2.74	100	No
$PM_{2.5}$	1.19	250	No
Lead	0.00	25	No
Ammonia	0.01	250	No
Carbon dioxide-equivalent	6,977.5071	75,000	No

$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter

Greenhouse Gas and Climate Change – CO_2e Emissions

The total combined direct and indirect GHG emissions were estimated through ACAM and CalEEMod for the estimated ongoing operations of Alternative 2 (**Table 3-11**).

Table 3-11
Estimated GHG Emissions (MT/yr) – Alternative 2

Year	CO_2	CH_4	N_2O	CO_2e	Exceedance
2025	3,409	35.80	35.63	3,430	No
2026	2,787	17.93	17.82	2,801	No
2027–2047 (steady state)	6,066	25.53	18.02	6,330	No

CH_4 = methane; CO_2 = carbon dioxide; CO_2e = carbon dioxide-equivalent; MT/yr = metric ton per year; N_2O = nitrous oxide

Unlike regional air quality, the affected area of GHG and climate change is global. As such, the intensity or degree of the GHG/climate change effects of the Proposed Action are compared with the state and US GHG inventories in metric tons (**Table 3-12**). As with Alternative 1, under Alternative 2, GHG emissions would be relatively insignificant compared to California and US GHG inventories.

Table 3-12
Comparison of Total GHG Emissions Relative to California and US Inventories (MT) – Alternative 2

Parameter		CO_2	CH_4	N_2O	CO_2e
2025–2047	State total	7,749,857,395	7,749,857,395	7,749,857,395	7,749,857,395
2025–2047	US total	118,138,446,117	118,138,446,117	118,138,446,117	118,138,446,117
2025–2047	Alternative 2	133,591	589.9152	431.9221	139,158
Percent of state total		0.0018491%	0.0017238%	0.0000076%	0.0000056%
Percent of US total		0.0001213%	0.0001131%	0.0000005%	0.0000004%

3.7.3.4 No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E or F-15EX fighter jets at Vandenberg SFB for testing of and training for a homeland defense mission. No additional personnel would be stationed at Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 operations. Over time, the mission capabilities of homeland defense systems would diminish along with the DAF's ability to fulfill its mission to defend the US. Under the No Action Alternative, no impacts to air quality beyond baseline conditions would occur.

3.7.3.5 Cumulative Effects

The past and present activities at Vandenberg SFB consist of rocket and missile launch missions and aircraft operations. In addition, Vandenberg SFB has been and is currently used for transient military aircraft operations. The rocket and missile launch missions are expected to continue and potentially increase in number of launches. Accordingly, aircraft operations that support those missions may potentially increase. When considered in conjunction with other existing and reasonably foreseeable future actions at Vandenberg SFB (**Table 3-1**), cumulative impacts from air emissions would be long term but not significant.

3.7.3.6 Environmental Protection Measures for Air Quality

The measures listed in **Table 3-13** and recommended or required by the Santa Barbara County APCD and/or CARB would be implemented to avoid or minimize impacts to air quality and minimize wind erosion of soils.

Table 3-13
Air Quality Dust Control Measures

Air Quality Dust Control Measures
Water—preferably reclaimed—shall be applied at least twice daily to dirt roads, graded areas, and dirt stockpiles created during construction and demolition activities to prevent excessive dust. Watering frequency would be increased when wind speed exceeds 15 miles per hour.
After completing construction/demolition activities, disturbed soil shall be treated by watering, revegetating, or applying soil binders to prevent wind erosion of the soil.
All fine material transported off site shall be either sufficiently watered or securely covered to prevent excessive dust.
On-Base vehicle speeds shall be limited to 15 miles per hour.
Ground disturbance shall be limited to the smallest practicable area to minimize the exposure of bare soil to wind.
Designated personnel shall monitor project activities to ensure that excessive dust is not generated at construction or demolition sites.
Any portable equipment powered by an internal combustion engine with a rated horsepower of 50 break horsepower or greater used for this project shall be registered in the California State-wide Portable Equipment Registration Program or have a valid APCD Permit to Operate.
Comply with APCD Rule 345, Control of Fugitive Dust from Construction and Demolition Activities, which prohibits construction, demolition, or earth-moving activities from causing discharge of visible dust beyond the property line. Use standard BMPs (e.g., water, tarps) to minimize dust from truck hauling, track-out/carry-out from active construction sites, and demolition activities.
Off-road construction equipment shall comply with all federal, state, and local regulations.
Use ultra-low sulfur diesel fuel (15 parts per million by volume) for all diesel equipment to comply with state and local regulations.
Follow CARB-developed idling regulations for trucks during loading and unloading to comply with state and local regulations.

APCD = Air Pollution Control District; CARB = California Air Resources Board

3.8 WATER RESOURCES

3.8.1 Definition of Resource

For this EA, water resources include surface water and water quality. Surface water includes all lakes, ponds, rivers, streams, impoundments, and wetlands. Surface water also includes floodplains, which are relatively flat areas adjacent to rivers, streams, watercourses, bays, or other bodies of water subject to inundations during flood events. A 100-year floodplain is an area that is subject to a 1-percent chance of flooding in any particular year, or, on average, once every 100 years. Water quality describes the chemical and physical composition of water as affected by natural conditions and human activities. For the purposes of this analysis, freshwater quality is evaluated with respect to possible releases of contaminants and erosion-induced sedimentation resulting from the Proposed Action.

Section 404 of the *Clean Water Act* (33 USC § 1251 et seq.) (CWA) regulates the discharge of dredged or fill material into waters of the US (including wetlands) and establishes a permit program administered by the US Army Corps of Engineers (USACE). EO 11990, *Protection of Wetlands*, requires federal agencies to minimize the destruction, loss, or degradation of wetlands. Federal agencies must avoid undertaking or providing assistance for new construction located in wetlands unless there is no practicable alternative to such construction and the Proposed Action includes all feasible measures to minimize harm to wetlands that may result from such use. Section 401 of the CWA requires any applicant for a federal license or permit that may result in a discharge of a pollutant into waters of the US to obtain a certification from the state in which the discharge originates or would originate. In California, the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs) are responsible for establishing the water quality standards (objectives) required by the CWA and regulating discharges to ensure dischargers meet water quality objectives.

A National Pollutant Discharge Elimination System (NPDES) permit under Section 402 of the CWA is required for discharges into waters of the US. Projects that have a total area of 1 acre or more of land disturbance or are less than 1 acre but are part of a larger project (common plan of development) that is 1 acre or more may need to obtain coverage under the 2022 Construction Stormwater General Permit, SWRCB Order No. 2022-0057- NPDES No. CAS 000002. Land disturbance includes clearing, grading, grubbing, scarifying, excavation, demolition, stockpiling, trenching, laydown area and access road construction, and full pavement removal. Compliance with the NPDES Construction General Permit requires preparation and implementation of a project-specific stormwater pollution prevention plan (SWPPP).

Based on the CWA, in October 2004, the DoD-issued UFC 3-210-10, *Low Impact Development*. The DoD-issued guidance on LID was most recently updated on 28 August 2023. This is a stormwater management strategy designed to maintain the hydrologic functions of a site and mitigate the adverse impacts of stormwater runoff from applicable DoD construction projects. All DoD construction projects are required to be compliant with these LID building designs. Following UFC 3-210-10, Section 438 of the *Energy Independence and Security Act of 2007* (42 USC § 17094) (EISA) has also been implemented by the DoD. This goes further with stricter stormwater runoff requirements for federal development projects. EISA Section 438 requires federal agencies to develop facilities having a footprint that exceeds 5,000 square feet in a manner that maintains or restores the pre-development site hydrology to the maximum extent technically feasible. Agencies can meet the pre-development hydrology requirements in two ways: (1) managing onsite the total volume of rainfall from the 95th percentile storm, or (2) managing onsite the total volume of rainfall based on a site-specific hydrologic analysis through various engineering techniques. For projects in the airfield area that are permitted under the NPDES Small Municipal Separate Storm Sewer Systems General Permit (NPDES No. CAS000004), a Storm Water Control Plan would be prepared for approval by the Vandenberg SFB Environmental Section Storm Water Program Manager per Vandenberg SFB post-construction standards and the EISA, Section 438.

As required by EO 11988, *Floodplain Management*, federal agencies must take action to reduce the risk of flood loss and restore and preserve the values of floodplains. To minimize the risk of damage associated with these areas, EO 11988 was issued to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practical alternative. EO 11988 outlines different requirements for federal projects located in 100-year and 500-year floodplains (i.e., that area with a 1-percent or greater chance or 0.2-percent or greater chance, respectively, of flooding in any given year).

The ROI for water resources is the project areas and surrounding areas where wetland areas may be disturbed and stormwater runoff from projects could affect water quality.

3.8.2 Existing Conditions

No permanent waterbodies or riverine features occur within the ROI. Groundwater would not be affected by the Proposed Action and was not carried forward for further analysis (**Section 3.2**). Wetlands, floodplains, and water quality are the water resources evaluated in the EA. The Proposed Action would occur within the San Antonio Creek watershed and the Santa Ynez River watershed (Hydrologic Unit Codes [HUC] 8-18060009 and 8-18060010, respectively). The airfield projects are also in HUC 12-18060090203, which contains Canada Tortuga, a partially ephemeral stream, not a waters of the US. Project 6, which would be south of the Santa Ynez River, is in the coastal watershed (HUC 12-180600130102). The San Antonio Creek watershed has a drainage area of 154 square miles. The upper reaches of San Antonio Creek have intermittent flows that generally result from runoff of winter rains. The lower reaches of San Antonio Creek are perennial and are fed by surfacing groundwater. In the lower San Antonio Creek basin, creek water flows west-northwest to the Pacific Ocean (Vandenberg SFB, 2021a). The Santa Ynez River flows west along the northern base of the Santa Ynez Mountains to the coastline at Vandenberg SFB. The river watershed has a total drainage area of about 900 square miles and ranges in elevation from sea level to about 6,800 feet. Less than 5 percent of this area is within Vandenberg SFB. Flow in the Santa Ynez River varies seasonally in response to precipitation and runoff. From June through November, the river flow typically is very low to completely dry, while it can be completely inundated in the winter months (Vandenberg SFB, 2021a). The San Antonio Creek and Santa Ynez River watersheds contain the Installation's main cantonment area and adjacent private agricultural lands; as such, these areas are heavily influenced by human activity.

3.8.2.1 Wetlands and Floodplains

The Proposed Action would not occur within the 100-year floodplains of San Antonio Creek or the Santa Ynez River. **Figure 3-2** shows the Proposed Action projects in relation to the Santa Ynez River 100-year floodplain. The project areas have no surface hydrology connectivity to the San Antonio or Santa Ynez watersheds. A storm drain inlet occurs near Project 2a (AGE building, Alternative 1) that leads to a storm drain outfall near Project 2b (AGE building, Alternative 2). The outfall connects to a surface water drainage outside the airfield fence. The F-15 ramp space has some connectivity via a nearby storm drain system to Canada Tortuga, a partially ephemeral stream but not a waters of the US. The LOLA has an open storm channel that parallels the taxiway,

A delineation of potential waters of the US, including wetlands, was conducted within a 100-foot boundary of project areas in 2023 and 2024. The final delineation report is provided as **Appendix C** to this EA. Wetlands that occur within the ROI are classified as palustrine emergent wetlands, which are characterized by herbaceous water-dependent vegetation (Cowardin et al., 1979). All wetlands mapped within the ROI are palustrine emergent, with persistent vegetation, and have a temporarily flooded water regime (**Figures 3-3–3-6**). Based on wetland delineation surveys, none of the wetlands mapped in the ROI are considered jurisdictional waters of the US.

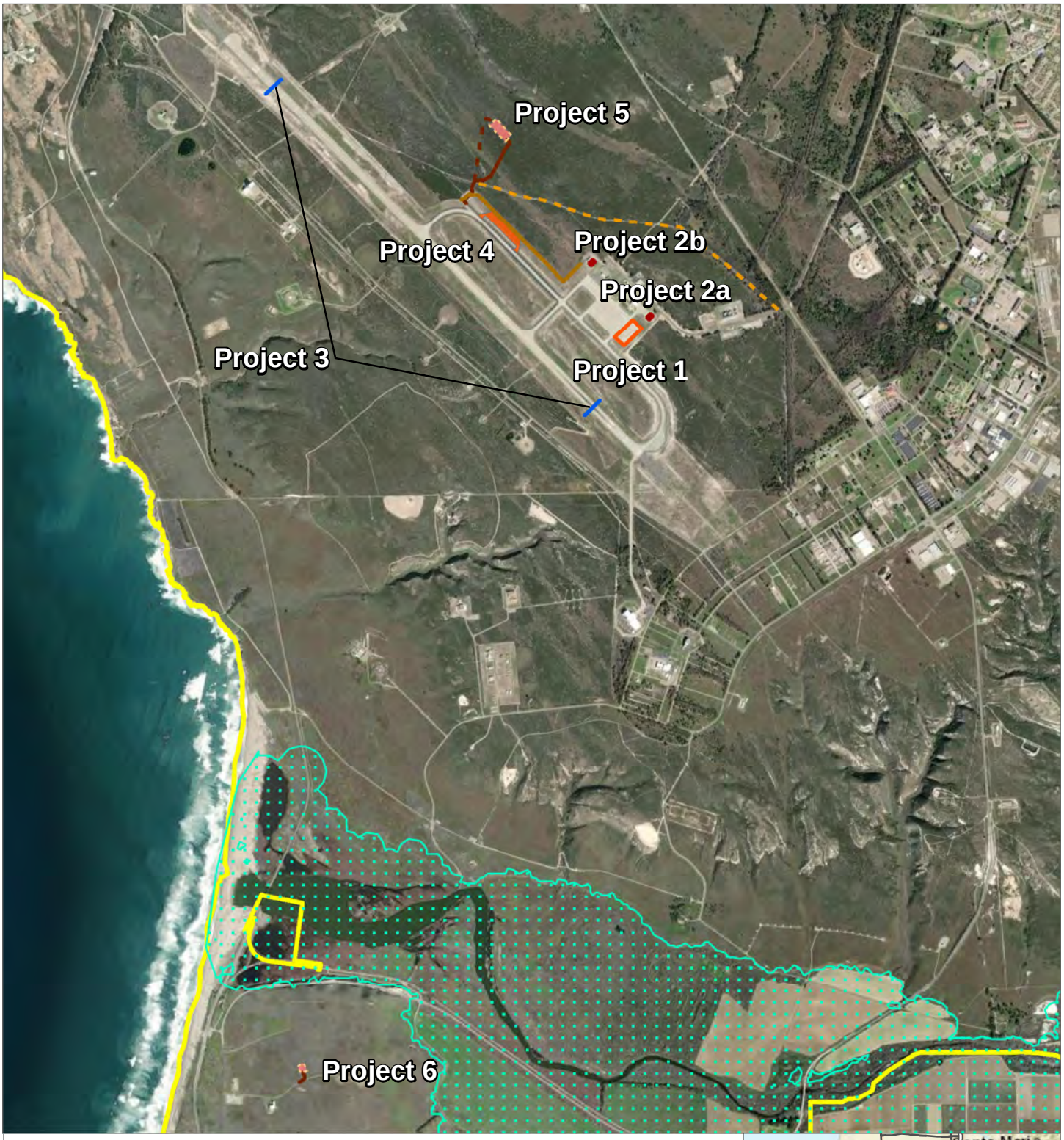


FIGURE 3-2
Floodplains near the Proposed Projects (Project #s)

- Installation Boundary
- Aircraft Arresting System
- Existing Airfield Fence
- New Access Road
- New Access Road to Airfield
- New Access Road to Project 5 (Alt 1)
- New Access Road to Project 5 (Alt 2)
- AGE Storage
- AGE Building
- F-15 Aircraft Zone
- LOLA Apron Ramps
- Munitions Igloo
- Floodplains

N

0 ½ Miles

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N

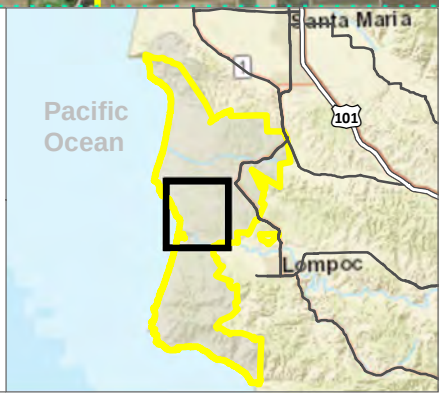


FIGURE 3-3

Vegetation and Wetlands near AGE Building and F-15 Parking Area (Project #s)

- Installation Boundary
- Installation Road
- Existing Airfield Fence
- AGE Storage
- AGE Building
- F-15 Aircraft Zone
- New Access Road
- 100-foot Buffer of Project Features

Vegetation Habitat Type

- Developed
- Mowed/maintained

N

0 500 Feet

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N

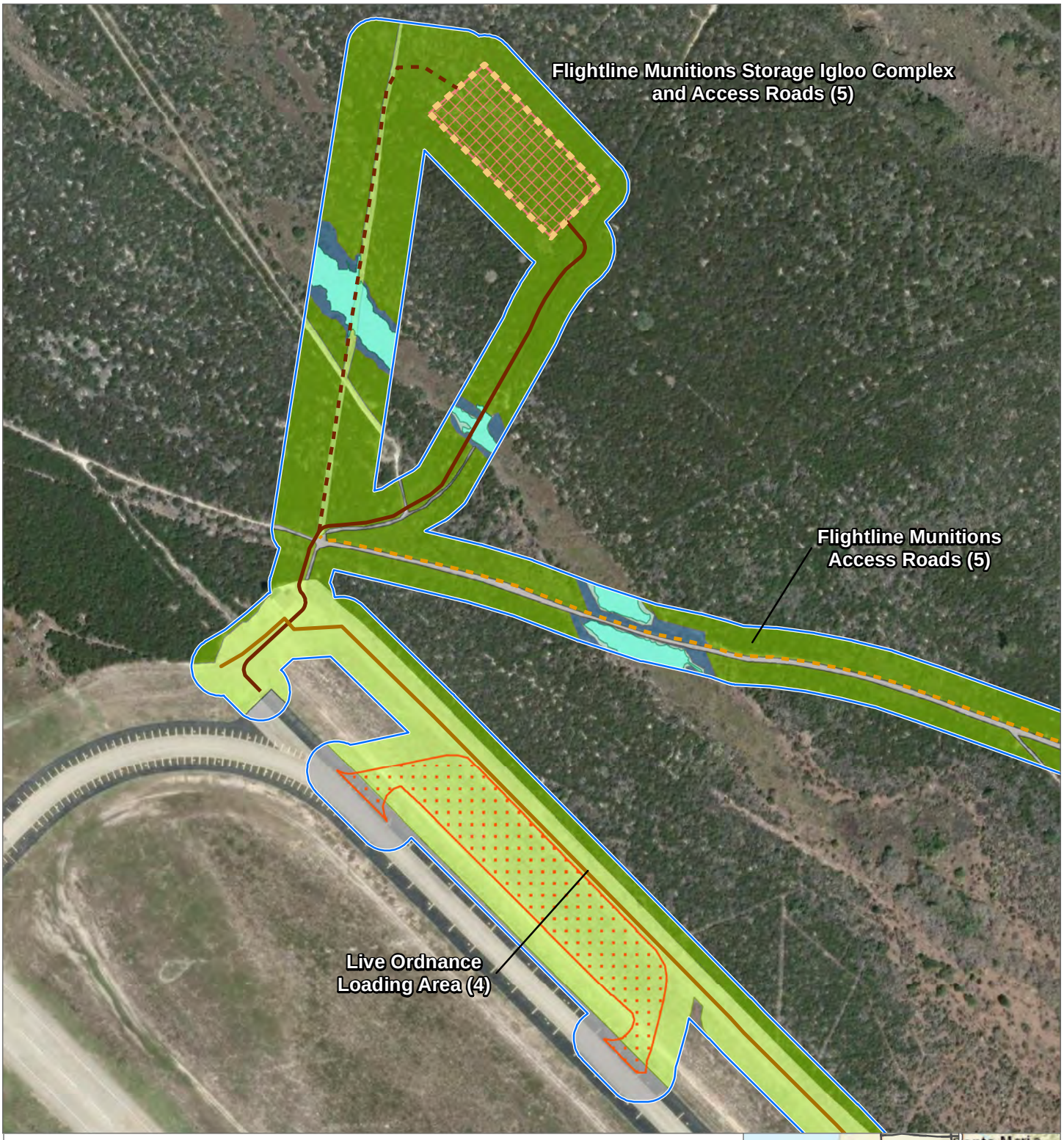


FIGURE 3-4

Vegetation and Wetlands near Flightline Munitions Storage Complex (Project #s)

- Installation Boundary
- Existing Airfield Fence
- New Access Road to Airfield
- New Access Road to Project 5 (Alt 1)
- New Access Road to Project 5 (Alt 2)
- New Security Fence
- LOLA Apron Ramps
- Munitions Igloo
- 100-foot Buffer of Project Features
- Wetland (PEM1A)

Vegetation Habitat Type

- Arctostaphylos (purissima, rudis) Shrubland Special Stands
- Baccharis pilularis Shrubland Alliance
- Developed
- Juncus (effusus, patens) - Carex (pansa, praegracilis) Herbaceous Alliance
- Mowed/maintained

N

0 200 Feet

Imagery: ESRI, 2021.
Coordinate System:
WGS 1984 UTM Zone 10N

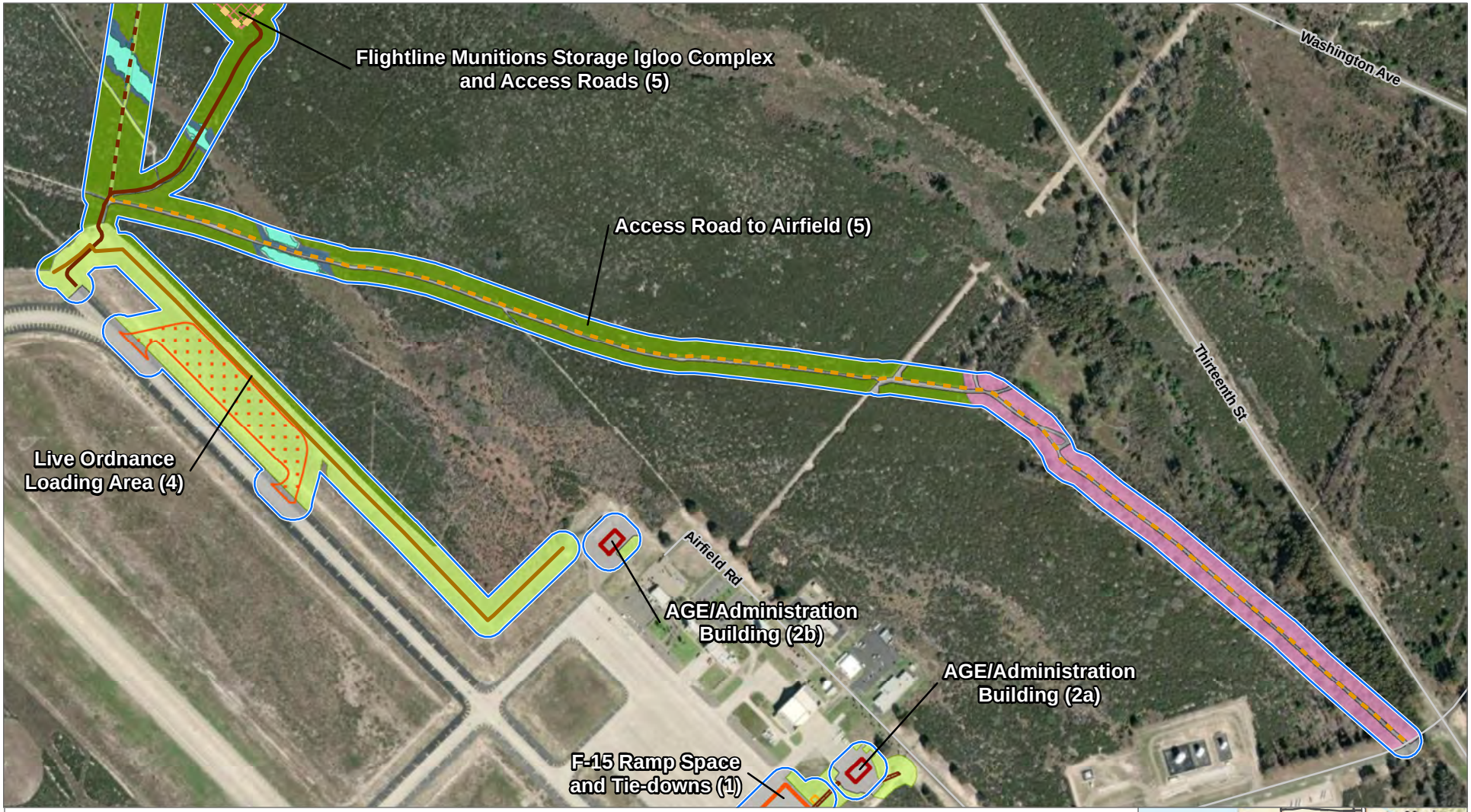


FIGURE 3-5

Vegetation and Wetlands near Live Ordnance Loading Area and Access Road (Project #s)

- Installation Boundary
- Installation Road
- Existing Airfield Fence
- New Access Road to Airfield
- New Access Road to Project 5 (Alt 1)
- New Access Road to Project 5 (Alt 2)
- New Security Fence
- AGE Storage
- AGE Building
- F-15 Aircraft Zone
- LOLA Apron Ramps
- Munitions Igloo
- New Access Road
- 100-foot Buffer of Project Features
- Wetland (PEM1A)

Vegetation Habitat Type

- Arctostaphylos (purissima, rudis) Shrubland Special Stands
- Baccharis pilularis Shrubland Alliance
- Developed
- Eucalyptus spp. - Ailanthus altissima - Robinia pseudoacacia Woodland Semi-Natural Alliance
- Juncus (effusus, patens) - Carex (pansa, praegracilis) Herbaceous Alliance
- Mowed/maintained

N

0 200 Feet

Imagery: ESRI, 2021.
Coordinate System:
WGS 1984 UTM Zone 10N

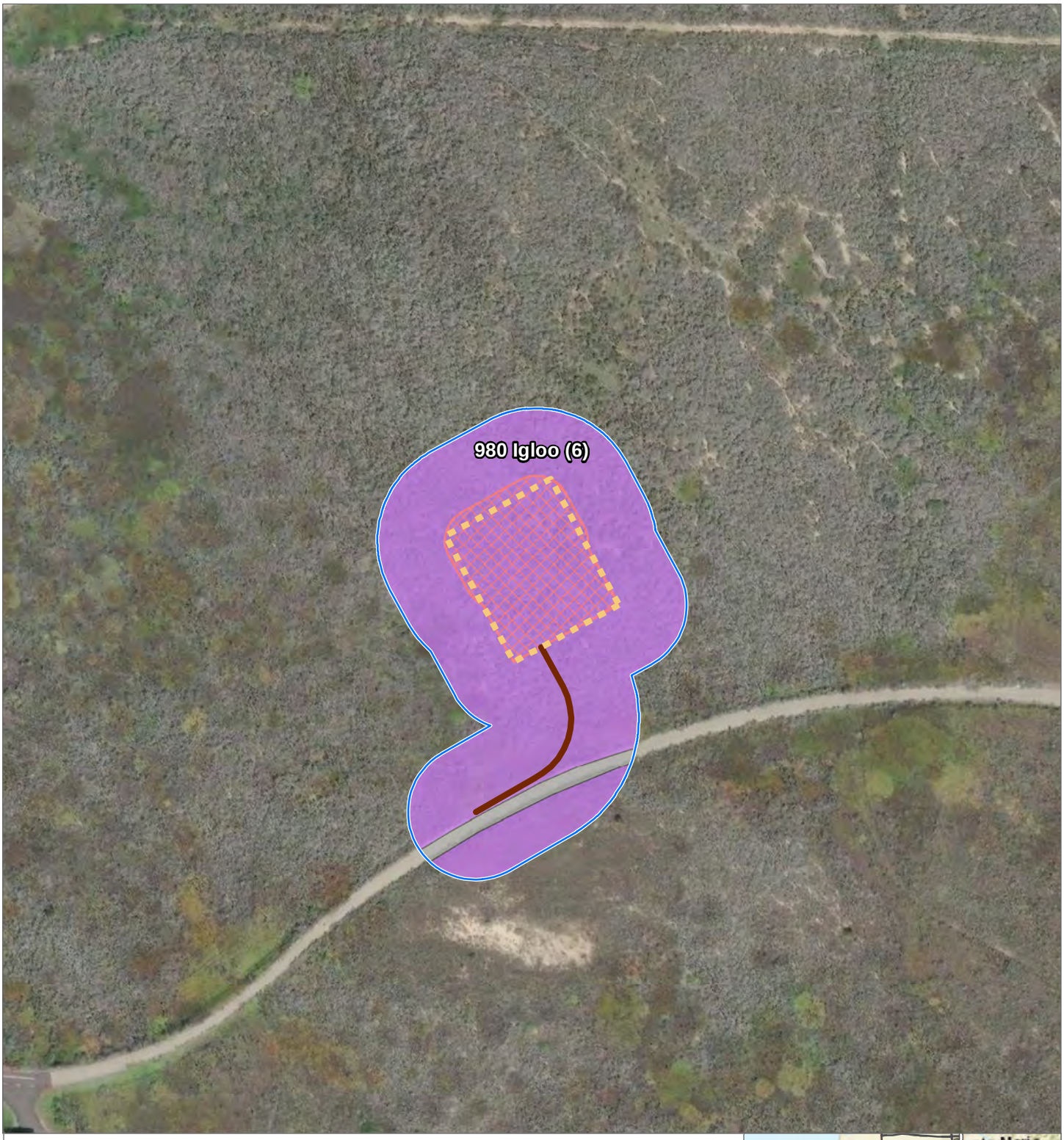


FIGURE 3-6

Vegetation and Wetlands near Munitions Storage Igloo near Building 980 (Project #s)

Installation Boundary
New Access Road
New Security Fence
Munitions Igloo
100-foot Buffer of Project Features

Vegetation Habitat Type

Artemisia californica - Salvia mellifera Shrubland Alliance
Developed

N

0 100 Feet

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N

3.8.2.2 Water Quality

Watershed protection and the preservation of water quality are important to the health and function of natural resources on Vandenberg SFB. The primary causes of degraded water quality generally include disease-causing agents found in untreated sewage, oxygen demanding wastes, water-soluble inorganic chemicals, inorganic plant nutrients, organic chemicals, erosion sediments, and thermal pollution. Degraded water quality may cause ecosystems to become vulnerable to other adverse environmental factors (Vandenberg SFB, 2021a).

Water quality impacts associated with activities on Vandenberg SFB include pollution related to domestic wastewater, industrial wastewater, stormwater, pesticide and fertilizer use, organic chemical use, and erosion. Not all of these water quality threats are directly related to activities occurring on Vandenberg SFB. Off-Base activities are not within Vandenberg SFB's control, but healthy aquatic systems are more resilient to upstream impacts than those already degraded by erosion and other forms of pollution (Vandenberg SFB, 2021a).

Vandenberg SFB uses many methods to control potential impacts to water resources, including regulating land use, air pollution, pesticide and fertilizer use, wastewater discharges, and stormwater discharges. Effective control of water quality on Vandenberg SFB requires the integration of watershed planning and management. The RWQCB oversees Vandenberg SFB programs addressing indirect and direct impacts on water quality. These programs include indirect impacts on water quality from hazardous waste disposal, underground storage tanks (USTs), and landfill operations. Vandenberg SFB's wastewater management plan, industrial wastewater management plan, SWPPP, and stormwater management plan provide direction for controlling direct impacts on local water quality (Vandenberg SFB, 2021b).

The lower Santa Ynez River is currently listed as an impaired waterbody for benthic community effects, chloride, Escherichia coli (*E. coli*), molybdenum, nitrate, dissolved oxygen, sedimentation/siltation, sodium, water temperature, total dissolved solids, and toxicity, in accordance with CWA § 303(d). San Antonio Creek is also listed as a CWA § 303(d) impaired waterbody for ammonia, arsenic, boron, chloride, *E. coli*, nitrate, dissolved oxygen, selenium, sodium, and toxicity (SWRCB, 2022).

3.8.3 Environmental Consequences

3.8.3.1 Evaluation Criteria

Evaluation of potential impacts to water resources considers the level of regulatory protection, changes to stormwater control systems, and disturbance of areas located within wetlands or the 100-year floodplain. Evaluation of potential impacts to water resources also considers whether the Proposed Action and alternative construction and operations activities would result in reduced surface water quality in creeks, rivers, streams, or the ocean from erosion, discharges of sediment, or pollutants in storm water runoff.

3.8.3.2 Alternative 1

Wetlands and Floodplains

The projects are far from the Santa Ynez River (0.65 mile) and San Antonio Creek (2 miles) and have no surface hydrologic connectivity to these waterbodies. The Proposed Action would not occur within the 100-year floodplains of either river system. Therefore, there would be no impacts to floodplains under Alternative 1.

Approximately 0.09 acre (3,920 ft^2) of wetlands may be impacted under Alternative 1 (see **Figure 3-4** above and **Table 3-14** below). The access road would follow an existing two-track road through the wetland crossing. The road grade would be raised to avoid flooding. Culverts would be installed to maintain a hydrologic connection between wetland areas on either side of the road. The access road surface would be paved, which would prevent sediment runoff. The jurisdictional delineation surveys found that none of the wetlands mapped in the project area are considered jurisdictional waters of the US (see **Appendix C**). Per the USACE/USEPA final rule amending the definition of waters of the US (88 FR 61964, 8 September

2023), the wetlands in the ROI would not be considered jurisdictional wetlands, as they are all isolated wetlands that do not maintain a "continuous surface connection" to any other bodies of water that could definitively be considered waters of the US under the current rule.

Table 3-14
Potential Impacts to Wetlands under Alternative 1 and 2

Cowardin Classification	Access Road to Project 5	Acres
PEM1A	Alternative 1	0.09
PEM1A	Alternative 2	0.02

PEM1A = palustrine, emergent, persistent, temporarily flooded

Impacts to wetlands would be long term but not significant because only 0.09 acre of palustrine emergent wetland, which is currently partially disturbed, would be permanently impacted. Development within a 2,607-foot radius of the munitions storage igloos would be restricted, providing protection of wetland areas from future development and disturbance.

Water Quality

Construction activities under Alternative 1 have the potential to impact surface water quality from erosion, sedimentation, and/or stormwater runoff. The nearest project site to the wetland area would be the flightline igloos, which are farther than 500 feet away but on a level ground surface. The potential for runoff is low. The LOLA would be constructed near a stormwater channel for the airfield. The AGE building alternatives and F-15 ramp space are near storm drains. The F-15 ramp space has some connectivity via the storm drain system to Canada Tortuga, a partially ephemeral stream. The potential for erosion and runoff pollution would be short term during the construction phase. The construction contractor would implement a SWPPP under the NPDES Construction General Permit. The SWPPP would include best management practices (BMPs) for erosion and sediment controls, material storage, vehicle and equipment fueling and maintenance, spill prevention and control, waste management, stockpile management, and septic waste management.

Ground disturbance activities would not result in short-term or long-term erosion because erosion and sedimentation control measures would be fully implemented during construction to prevent and minimize soil- and pollutant-dispersion to surface waters. Any vegetated areas that are exposed during construction would be permanently stabilized with vegetation to prevent erosion and meet the NPDES Construction General Permit requirements. The access road would be paved, which would prevent erosion.

For projects near the airfield, a Storm Water Control Plan would be prepared during design for approval by the Vandenberg SFB Environmental Section Storm Water Program Manager, describing low-impact development (LID) measures to maintain pre-development hydrology in accordance with Vandenberg SFB post-construction standards and EISA Section 438. The F-15 flight operations would be added to the Vandenberg SFB Industrial SWPPP for compliance with the NPDES Industrial General Permit. With implementation of environmental protection measure (EPMs) for spill prevention during fueling operations activities, flight operations would have no impact to water quality.

Therefore, with implementation of EPMs (see **Section 3.8.3.6**), construction and operational activities would have no short- or long-term impacts to water quality under Alternative 1.

3.8.3.3 Alternative 2

Wetlands and Floodplains

Under Alternative 2, impacts to water resources would be similar to Alternative 1. The access road to the flightline igloos would disturb approximately 0.02 acre (871 ft^2) of non-jurisdictional wetlands (see **Figure 3-3** and **Table 3-14** above). As with Alternative 1, the road grade of the access road would be raised to prevent flooding, and culverts would be installed to maintain the hydrologic connection between the wetlands on either side of the road. The access road would be paved, which would prevent sediment runoff. Although the wetland area that would be disturbed is less than under Alternative 1, the Alternative 2 access

road would follow a former road overgrown with Burton Mesa Chaparral that would be cleared to construct the road. Impacts to water resources would be anticipated to be insignificant under Alternative 2.

Water Quality

The potential impacts to water quality would be the same as Alternative 1. Similar measures to prevent erosion and sedimentation would be implemented.

3.8.3.4 No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E or F-15EX fighter jets at Vandenberg SFB for testing of and training for a homeland defense mission. No additional personnel would be stationed at Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 operations. Over time, the mission capabilities of homeland defense systems would diminish along with the DAF's ability to fulfill its mission to defend the US. Under the No Action Alternative, no impacts to water resources beyond baseline conditions would occur.

3.8.3.5 Cumulative Effects

The past and present activities at Vandenberg SFB consist of rocket and missile launch missions and aircraft operations. In addition, Vandenberg SFB has been and is currently used for transient military aircraft operations. The rocket and missile launch missions are expected to continue and potentially increase in number of launches. Accordingly, aircraft operations that support those missions may potentially increase. Redevelopment of missile or rocket launch sites or construction of new launch sites would create long-term land disturbances. The DAF may also construct a new air traffic control tower in the airfield and replace the airfield fence. The Proposed Action would create minor impacts to a wetland area for construction of an access road. When considered in conjunction with other reasonably foreseeable future actions at Vandenberg SFB (**Table 3-1**), cumulative water resources impacts, including those to wetlands, would be anticipated to be long term but minor.

3.8.3.6 Environmental Protection Measures for Water Resources

The measures listed in **Table 3-15** would be implemented to avoid or minimize impacts to water resources and stormwater.

Table 3-15
Water Resources and Stormwater Control Measures

Water Resources and Stormwater Measures
Comply with SWPPPs, including BMPs therein to prevent water pollution and comply with the NPDES Construction and Industrial General Permits.
Preserve existing vegetation to the extent feasible to minimize the exposure of bare soil to water to prevent erosion and soil runoff.
Stockpile mulched native vegetation for use in temporary and permanent erosion control. Use erosion control devices made from biodegradable materials and/or mulched native vegetation produced from vegetation clearing at the site.
After construction is complete, establish vegetation cover in exposed soil areas to prevent soil erosion and meet Construction General Permit requirements. De-compact the soil to a sufficient depth and amend soil as needed to sustain plant life and allow for seed germination. Apply hydroseed with a certified weed-free wood fiber mulch covering 80% of the soil surface. The seed mix will include a sterile annual grass to serve as a cover crop and native vegetation as approved by the 30 CES/CEIE botanist.
Maintain seeded/planted areas and repair any erosion until vegetation is established and Construction General Permit requirements are met. Inspect seeded areas weekly. Water, reseed and mulch as needed to prevent bare soil spots. Protect seeded areas from traffic.
Use sediment control devices for the storm drain near the project areas during construction to prevent soil runoff and sedimentation.

Water Resources and Stormwater Measures
Properly maintain all equipment to keep free of leaks during operation and carry out all necessary repairs with proper spill containment.
Fueling equipment would only occur in pre-designated areas with spill containment materials placed around the equipment before refueling to prevent the release of hydrocarbon fluids. Stationary equipment would be outfitted with drip pans and hydrocarbon absorbent pads.
Maintain adequate spill response supplies at the site during construction and operation for immediate response and cleanup of any fuel spills.
Store hazardous materials in proper containers, place in proper containment facilities, and cover prior to rain events to prevent the release of hazardous materials.
Properly secure portable toilets to prevent tipping in windy conditions.
Properly manage concrete curing compounds, concrete waste, and washout water to prevent the discharge of concrete compounds and evaporation of washout water.
install multiple open-bottom culverts or span wetlands with a bridge to maximize water flow under the munitions storage igloo access road in the wetland area to maintain hydrologic connection between wetland areas on either side of the road.
Follow guidance in the Vandenberg SFB Wetlands and Riparian Habitats Management Plan (Vandenberg SFB, 2022) regarding disturbances in wetland areas to mitigate any loss of wetland area.

SFB = Space Force Base; 30 CES/CEIE = 30th Civil Engineer Squadron/Installation Management Flight, Environmental Section

3.9 BIOLOGICAL RESOURCES

3.9.1 Definition of Resource

Biological resources include plant and animal species and the habitats within which they occur. This analysis focuses on species that are important to the function of ecosystems, are of special societal importance, or are protected under federal law or statute. For the purposes of this EA, these resources are divided into the following categories:

- **Vegetation** – includes plant associations and dominant species that occur in the ROI. Wetlands are discussed in **Section 3.8**. Federally protected plant species are discussed in **Sections 3.9.2.3** and **3.9.3**.
  - *Disturbed* areas include those that have been affected by natural or human-caused events (e.g., fires, colonization by invasive species, herbivory, or off-road use) that cause any level of disruption to existing habitat.
  - *Mowed* or *maintained* areas include paths, roads, utility structures, bushes, gardens, lawns, or planted ornamental vegetation that receive regular cleaning or upkeep.
- **Wildlife** – includes the characteristic animal species that occur in the ROI. Special consideration is given to bird species protected under the *Migratory Bird Treaty Act* (16 USC § 703–712) (MBTA) and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* and recognized as US Fish and Wildlife Service (USFWS) Birds of Conservation Concern (BCC), and California Department of Fish and Wildlife (CDFW) Species of Special Concern (SSC). Federally listed wildlife species are discussed in **Sections 3.9.2.3** and **3.9.3**.
- **Federally Listed Species** – species that are listed, have been proposed for listing, or are candidates for listing by the USFWS in accordance with the *Endangered Species Act of 1973*, as amended (16 USC § 1531 et seq.) (ESA). The federal ESA protects federally listed threatened and endangered species and their designated critical habitats. In addition, the bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*) are both federally protected under the *Bald and Golden Eagle Protection Act of 1940,* as amended (16 USC §§ 668–668d) (BGEPA).

The ROI for biological resources is the project areas where vegetation would be disturbed and a 500-foot buffer zone around each construction site where federally listed threatened or endangered species could be affected.

3.9.2 Existing Conditions

3.9.2.1 Vegetation

Vegetation was mapped within a 100-foot boundary of all project areas in 2023 and 2024. Vegetation alliances were classified and mapped following the *Manual of California Vegetation*, Second Edition (Sawyer et al., 2009). **Figures 3-3–3-6** show the vegetation alliances within the ROI, as well as a 100-foot buffer surrounding the ROI. The dominant vegetation alliances in the project areas are as follows:

- ***Arctostaphylos* (*purissima, rudis*) Shrubland Special Stands** – Also known as Burton Mesa Chaparral, this alliance is dominated by *Arctostaphylos purissima* and/or *A. rudis*, with other more commonly occurring chaparral species as co-dominants. Both dominant species in this alliance have a California Rare Plant Ranking of 1B (rare, threatened, or endangered in California and elsewhere) (California Native Plant Society, 2024). This alliance is also ranked by the CDFW as being critically imperiled and at very high risk of extinction or elimination due to restricted range, very few populations/occurrences, very steep declines, or other factors (CDFW, 2023).
- ***Artemisia californica* – *Salvia mellifera* Shrubland Alliance** – Commonly known as California sagebrush-black sage scrub, this alliance is a diverse community. It is dominated by California sagebrush and black sage with a variety of co-dominant shrubs and occurs on dry slopes and soils near the coast to the interior foothills. Many perennial and annual herbs and grasses also occur in this community.
- ***Baccharis pilularis* Shrubland Alliance** – This alliance is dominated by coyote brush (*B. pilularis*) a native shrub species that is widespread throughout California. Stands of this alliance are often transitional and abut woodland habitats; seedlings of *B. pilularis* can also invade grasslands along the coast, forming stands with decreased fire regimes.
- ***Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural Alliance** – This alliance refers to a variety of nonnative tree species that have become naturalized in California. Often, these species were planted in the past as groves or windbreaks, and there is very often little shrub or herb layer. There are portions of remnant *E. globulus* windbreaks that overlap with the ROI.
- ***Juncus* (*effusus, patens*) – *Carex* (*pansa, praegracilis*) Herbaceous Alliance** – This alliance is a wetland/marsh community that can be dominated by a variety of sedge and/or rush species. Most often, this alliance occurs in seasonally saturated soils on flats, depressions, or gentle slopes. In the ROI, this alliance is dominated by the brown-headed rush (*Juncus phaeocephalus*).

3.9.2.2 Wildlife

Wildlife species that may occur in the ROI predominantly include those associated with the central California coast's coastal scrub and chaparral habitats. Vandenberg SFB contains a wide variety of wildlife species, including many that are delisted or not federally listed as threatened or endangered but are afforded other federal and/or state protections, such as the MBTA. **Table 3-16** lists species with the potential to occur within the ROI.

Table 3-16
Wildlife of Management Concern on Vandenberg SFB with the Potential to Occur within the ROI

Common Name	Scientific Name	Relevant Status
Birds		
Allen's hummingbird	*Selasphorus sasin*	BCC, MBTA
American peregrine falcon	*Falco peregrinus anatum*	BCC, MBTA
Belding's savannah sparrow	*Passerculus sandwichensis beldingi*	BCC, MBTA, SE
Black oystercatcher	*Rynchops niger*	BCC, MBTA
Black-chinned sparrow	*Spizella atrogularis*	BCC, MBTA
Bullock's oriole	*Icterus bullockii*	BCC, MBTA
California thrasher	*Toxostoma redivivum*	BCC, MBTA
Grasshopper sparrow	*Ammodramus savannarum*	MBTA, SSC
Lawrence's goldfinch	*Carduelis lawrencei*	BCC, MBTA
Little willow flycatcher	*Empidonax traillii brewsteri*	MBTA, SE
Loggerhead shrike	*Lanius ludovicianus*	MBTA, SSC
Long-eared owl	*Asio otus*	BCC, MBTA, SSC
Mountain plover	*Charadrius montanus*	BCC, MBTA, SSC
Northern harrier	*Circus cyaneus*	BCC, MBTA, SSC
Nuttall's woodpecker	*Picoides nuttallii*	BCC, MBTA
Oak titmouse	*Baeolophus inornatus*	BCC, MBTA
Olive-sided flycatcher	*Contopus cooperi*	BCC, MBTA, SSC
Purple martin	*Progne subis*	MBTA, SSC
Short-eared owl	*Asio flammeus*	BCC, MBTA, SSC
Tricolored blackbird	*Agelaius tricolor*	BCC, MBTA, SSC, ST
Vaux's swift	*Chaetura vauxi*	MBTA, SSC
Western burrowing owl	*Athene cunicularia*	BCC, MBTA, SSC
White-tailed kite	*Elanus leucurus*	MBTA, SFP
Wrentit	*Chamaea fasciata*	BCC, MBTA
Yellow-breasted chat	*Icteria virens*	MBTA, SSC
Yellow warbler	*Setophaga petechia*	MBTA, SSC
Mammals		
American badger	*Taxidea taxus*	SSC
California sea lion	*Zalophus californianus*	MMPA
Northern elephant seal	*Mirounga angustirostris*	MMPA
Northern fur seal	*Callorhinus ursinus*	MMPA
Pacific harbor seal	*Phoca vitulina*	MMPA
Pallid bat	*Antrozous pallidus*	SSC
San Diego desert woodrat	*Neotoma lepida intermedia*	SSC
Townsend's big-eared bat	*Corynorhinus townsendii*	SSC
Western mastiff bat	*Eumops perotis californicus*	SSC
Reptiles		
California legless lizard	*Anniella pulchra*	SSC
Blainville's horned lizard	*Phrynosoma blainvilli*	SSC
Two-striped garter snake	*Thamnophis hammondii*	SSC

Source: USFWS, 2021; Vandenberg SFB, 2021a; CDFW, 2024
BCC = Bird of Conservation Concern; MBTA = Migratory Bird Treaty Act; MMPA = Marine Mammal Protection Act; SE = State Endangered; SFP = State Fully Protected; SSC = (California) Species of Special Concern; ST = State Threatened

3.9.2.3 Federally Listed, Proposed Listed, and Candidate Species

Federally listed, proposed listed, and candidate species that are known or have the potential to occur at Vandenberg SFB are listed in **Table 3-17**. Known or potential occurrence within the project area was determined by vegetation mapping and habitat assessments conducted in 2023, previous documentation, and the suitability of habitat for each of the species. Known locations of federally listed species in the vicinity of the project area components are shown on **Figures 3-7** and **3-8**.

Table 3-17
Federally Listed, Proposed Listed, and Candidate Species at Vandenberg SFB

Common Name	Scientific Name	Federal Status	Habitat/Range	Occurrence at Vandenberg SFB	Potential to Occur in Project Area
Mammals					
Southern Sea Otter	*Enhydra lutris nereis*	Threatened	Kelp beds along California coast	Resident breeding colonies occur at the Purisima Point and Sudden Flats kelp beds	Potential to be exposed to aircraft noise
Birds					
California Condor	*Gymnogyps californianus*	Endangered	Cliffs, open grasslands, woodland foothills, and coastal mountains	One transient individual recorded in 2017	Low potential as transient
California Least Tern	*Sterna antillarum browni*	Endangered	Forages offshore and nests on soft sand in colonies along coast	Seasonally nest on North Base from approximately May to August	Potential to be exposed to aircraft noise
Marbled murrelet	*Brachyramphus marmoratus*	Threatened	Nearshore waters	Purisima Point, Point Sal	No potential
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Endangered	Favors willows and other riparian tree cover	Observed during nesting season (May to August) in three arroyo willow thickets along the Santa Ynez River	Low potential, as no riparian habitat occurs in the project area
Western Snowy Plover	*Charadrius nivosus nivosus*	Threatened	Beaches and coastal dunes	Along the length of the coast on Vandenberg SFB	Potential to be exposed to aircraft noise
Amphibians/Reptiles					
California Red-Legged Frog	*Rana draytonii*	Threatened	In or near water sources like streams or stock ponds and associated terrestrial cover	Nearly all permanent streams and ponds	May utilize wetlands and/or traverse upland habitats
California tiger salamander	*Ambystoma californiense*	Endangered	Burrows in grassland, woodland and coastal scrub. Breeds in vernal pools	Occurs near, but never found on Vandenberg SFB	No potential

Common Name	Scientific Name	Federal Status	Habitat/Range	Occurrence at Vandenberg SFB	Potential to Occur in Project Area
Western spadefoot	*Spea hammondii*	Proposed Threatened	Grassland, vernal pools in or near loose sandy or loamy soils	Known to utilize vernal pools on Vandenberg SFB	May occur
Southwestern pond turtle	*Actinemys pallida*	Proposed Threatened	Perennial and ephemeral aquatic water habitats and adjacent uplands	Known to occur in perennial lakes, ponds, and streams	May occur
Invertebrates					
Black abalone	*Haliotis cracherodii*	Endangered	Coastal reefs and rocky shorelines	Observed	No potential
Monarch Butterfly	*Danaus plexippus*	Candidate	Monterey pine and Eucalyptus groves	Roosts in pine and eucalyptus groves, feeds on milkweed	Likely to occur
Vernal Pool Fairy Shrimp	*Branchinecta lynchi*	Threatened	Freshwater vernal pools	Vernal pools on North Base and South Base	Potential to occur
Fishes					
Tidewater goby	*Eucyclogobius newberryi*	Endangered	Perennial streams	Observed	No potential
Unarmored threespine stickleback	*Gasterosteus aculeatus williamsoni*	Endangered	Coastal perennial streams	Observed	No potential
Plants					
Beach Layia	*Layia carnosa*	Threatened	Coastal dunes	Two populations known on Vandenberg SFB	No potential
Gambel's Water Cress	*Nasturtium gambelii*	Endangered	Coastal wetlands	One population known on Vandenberg SFB	No potential
Gaviota Tarplant	*Deinandra increscens ssp. villosa*	Endangered	Coastal bluffs and scrub	Three populations known on Vandenberg SFB	No potential
La Graciosa Thistle	*Cirsium scariosum var. loncholepis*	Endangered	Coastal dune swale wetlands, and brackish salt marsh	Last confirmed observation near Vandenberg SFB was in 1958	No potential
Lompoc Yerba Santa	*Eriodictyon capitatum*	Endangered	Chaparral	Four populations known on Vandenberg SFB	Surveys found no individuals near project areas
Vandenberg Monkeyflower	*Diplacus vandenbergensis*	Endangered	Burton Mesa Chaparral	Four populations known on Vandenberg SFB	Potential, but no known locations

Source: USFWS, 2023; Vandenberg SFB, 2021a
SFB = Space Force Base

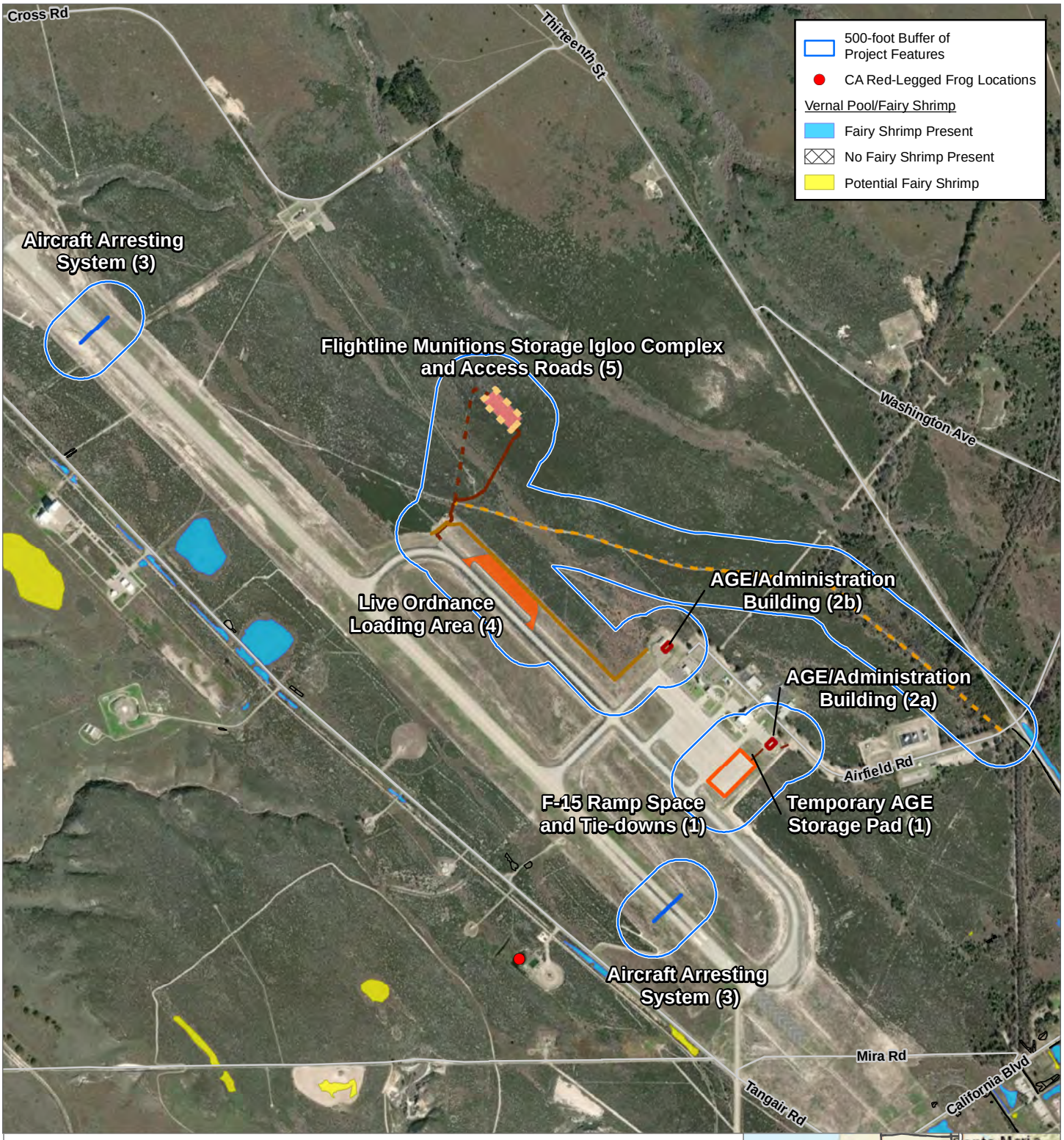


FIGURE 3-7

Federally Listed Species near Flightline Projects (Project #s)

- Installation Boundary
- Installation Road
- Aircraft Arresting System
- Existing Airfield Fence
- New Access Road to Airfield
- New Access Road to Project 5 (Alt 1)
- New Access Road to Project 5 (Alt 2)
- New Fence
- AGE Storage
- AGE Building
- Area of Shrub Removal
- F-15 Aircraft Zone
- LOLA Apron Ramps
- Munitions Igloo

N

0 ½ Miles

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N

FIGURE 3-8

Federally Listed Species near Munitions Storage Igloo near Building 980 (Project #s)

Installation Boundary
New Access Road
New Security Fence
Munitions Igloo
500-foot Buffer of Project Features
Vernal Pool/Fairy Shrimp
Potential Fairy Shrimp

N

0 500 Feet

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N

3.9.3 Environmental Consequences

3.9.3.1 Evaluation Criteria

The significance of potential impacts to biological resources is based on

- the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource;
- the proportion of the resource that would be affected relative to its occurrence in the region;
- the sensitivity of the resource to proposed activities; and
- the duration or ecological ramifications of the impact(s).

A biological resources impact would be adverse if

- species or habitats of concern were affected over relatively large areas, or
- disturbances caused reductions in population size or distribution of a federally listed species.

3.9.3.2 Alternative 1 (Preferred)

Vegetation

Table 3-18 lists the estimated area of vegetation that would be disturbed under Alternative 1. Construction of the flightline igloos (Project 5) would have the greatest impact. Approximately 3.4 acres of the *Arctostaphylos* (*purissima, rudis*) Shrubland Special Stands (commonly known as Burton Mesa Chaparral community) would be permanently removed. The CDFW considers Burton Mesa Chaparral a critically imperiled habitat in California. The estimate of remaining Burton Mesa Chaparral is highly variable, ranging from 13,061 acres (Schmalzer and Hinkle, 1987, as cited in Vandenberg, 2021a) to 8,645 acres (Davis, Hickson, and Odion, 1988, as cited in Gevirtz et al., 2007). Using a conservative estimate of 8,500 acres, the approximately 3.8 acres of chaparral that would be disturbed by the Proposed Action represents approximately 0.04 percent of the remaining chaparral vegetation. The construction of the munitions storage igloos would limit future development in the chaparral surrounding the igloo site because of explosives safety restrictions. Impacts to vegetation would be long term but not significant under Alternative 1 because a relatively small area would be disturbed.

Table 3-18
Vegetation Removal Under Alternative 1

Plant Alliance/Habitat	Acreage by Project Component[a]				
	Project 1	Project 4	Project 5	Project 6	TOTAL
Shrubs and Chaparral					
Arctostaphylos (*purissima, rudis*) Shrubland Special Stands	-	-	3.36	-	3.36
Artemisia californica – Salvia mellifera Shrubland Alliance	-	-	-	1.06	1.06
Baccharis pilularis Shrubland Alliance	-	-	0.01	-	0.01
Herbaceous					
Juncus (*effusus, patens*) – Carex (*pansa, praegracilis*) Herbaceous Alliance	-	-	0.03	-	0.03
Land Use and Non-vegetated Classes					
Mowed/Maintained	0.03	6.23	0.36	-	6.62
TOTAL	**0.03**	**6.23**	**3.76**	**1.06**	**11.08**

Note:
a Only project components that would impact vegetation are listed. Project components occurring on developed land are not included.

Wildlife

Impacts to wildlife under Alternative 1 could occur from aircraft activities (direct strike or noise impacts) and construction activities (loss of habitat, noise, crushing or physical harm to individuals).

Under Alternative 1, the number of sorties flown (176 sorties during the first year and 88 sorties in subsequent years) would not significantly increase the overall number of sorties flown out of Vandenberg SFB (see **Section 3.11.2.1**). In addition, all aircraft activities would continue to be carried out under the Vandenberg SFB Bird/Wildlife Aircraft Strike Hazard (BASH) Plan, which is implemented to reduce the potential for aircraft to strike birds and other wildlife. Therefore, impacts from bird/wildlife strikes are expected to be not significant under Alternative 1.

Noise modeling that was completed for the Proposed Action (see **Section 3.11** and **Appendix D**) found that noise generated by F-15E/EX flight activities would have a smaller (100 dB) sound pressure level contour compared to baseline conditions at Vandenberg SFB. Therefore, although noise generated by individual aircraft may impart behavioral changes to individual wildlife species, the noise generated under Alternative 1 would not impart louder noises than those that currently occur at Vandenberg SFB. In addition, no sonic booms would be caused by operating aircraft, and flight elevation at the coastline on takeoff and landing would be no lower than 1,900 feet above ground level. Flight activities under the Proposed Action would be consistent with ongoing aircraft operations at Vandenberg SFB in accordance with the *Programmatic Biological Opinion on Routine Mission Operations and Maintenance Activities* (USFWS, 2015). As described in **Section 2.5.1**, flight elevation over the ocean would be between 10,000 and 50,000 feet above sea level. Therefore, impacts to wildlife, including coastal and marine species, would be anticipated to be short term and not significant under Alternative 1.

Construction under Alternative 1 would remove up to approximately 4.5 acres of native wildlife habitat, including 3.4 acres of Burton Mesa Chaparral (see **Table 3-18**). Although removal of native habitats would displace wildlife individuals from utilizing those habitats, construction of the project components would not remove a significant percentage of any habitat nor significantly alter the connectivity of the surrounding habitats for wildlife use.

Construction equipment (e.g., excavators, tractors, concrete mixers, and trucks) could generate temporary noise levels between 75 and 89 dBA at a distance of 50 feet. Because sound attenuates at approximately 6 dB for every doubling of the distance from the source (see **Section 3.11.1**), at 400 feet, most construction noise would be less than about 65 dB. In addition, individual wildlife that may be exposed to construction noise will temporarily avoid the area during construction activities.

Direct mortality or injury from construction equipment is possible under Alternative 1. Although larger, mobile species (e.g., birds, mammals, and reptiles) likely would avoid construction equipment, smaller, less mobile species (e.g., invertebrates and burrowing species) may not be able to avoid construction equipment. However, given that construction footprints would be relatively small compared to the overall amount of habitat on Vandenberg SFB, any loss of wildlife individuals would have insignificant impacts on the status or viability of any population of wildlife species.

Bird species, including those protected under the MBTA, could potentially be exposed to the environmental stressors described above. However, implementation of EPMs (see **Section 3.9.3.6**) would reduce the potential for significant impact to birds, including species protected under the MBTA. If construction activities occur during the bird breeding and nesting season (15 February–15 August [Vandenberg SFB, 2021a]), the project area would be surveyed for nests or evidence of nesting prior to implementation. If nests are observed, a 100-foot buffer (or other size sufficient to prevent disturbance) around any nests that are found to reduce risk of nest abandonment would be delineated. Therefore, impacts to wildlife species would be anticipated to be short term and insignificant under Alternative 1.

Federally Listed Species

Federally listed species may be impacted by construction activities as described above for vegetation and wildlife. The ROI for construction-related impacts was defined as a 500-foot buffer zone around each construction site (see **Figures 3-7** and **3-8**). Based on available data and surveys that were conducted in

2023 and 2024, there are no known occurrences of federally listed species within the construction ROI. The nearest known locations of federally listed species to the construction footprints are shown on **Figures 3-7** and **3-8** above. Although a historical occurrence of the California red-legged frog (*Rana draytonii*) and a vernal pool that contains vernal pool fairy shrimp (*Branchinecta lynchi*) occurs southwest of the runway, they are both farther than 0.25 mile from the ROI and outside of the airfield fenceline. In addition, a vernal pool that may contain vernal pool fairy shrimp occurs more than 1,000 feet northwest of Building 980 (**Figure 3-8**). However, the vernal pool is far enough away and on the opposite side of a dirt road that it would not be affected by the Proposed Action. Although federally listed bird species may fly over the construction footprint during transit, they are not known to nest, roost, or otherwise utilize the proposed construction areas.

As described above for wildlife, noise modeling that was completed for the Proposed Action (**Appendix D**) found that noise generated by F-15E/EX flight activities would have a smaller (100 dB) sound pressure level contour than baseline conditions at Vandenberg SFB. Therefore, Alternative 1 flight activities would not introduce any new impacts to federally listed species beyond what currently occurs under baseline conditions. In addition, no sonic booms would be caused by operating aircraft, and flight elevation at the coastline on takeoff and landing would be no lower than 1,900 feet above ground level. As described in **Section 2.5.1**, flight elevation over the ocean would be between 10,000 and 50,000 feet above sea level. Therefore, flight activities would be consistent with ongoing measures to reduce impacts to coastal and marine species (see **Section 3.12**).

The DAF evaluated the wetland crossing for the access road to the flightline munition storage igloos for potential impacts to the California red-legged frog. Habitat surveys determined that the ephemeral wetland swale areas do not contain breeding habitat for the red-legged frog. No frogs were observed during field surveys in 2023 and 2024. The nearest known California red-legged frog occurrence is over 0.25 mile southwest of the Proposed Action construction project components (**Figure 3-7**). Additionally, the drainage swale that occurs approximately 220 meters (722 feet) north of Project 5 has no records of red-legged frogs. and it does not contain breeding habitat. Based on the absence of red-legged frog breeding habitat and the distance to known red-legged frog locations, the DAF has determined that the Proposed Action may affect but would not likely adversely affect the California red-legged frogs or their habitat.

Based on available data, field surveys, and the absence of any threatened or endangered species or their habitat in the project areas and ROI, the DAF has determined that the Proposed Action would have no adverse effect on any federally listed species or their habitat. Vandenberg SFB conducted informal consultation with USFWS under Section 7 of the ESA regarding the California red-legged frog. The USFWS issued on 12 February 2025 a letter of concurrence with the DAF determination that the Proposed Action may affect but would not likely adversely affect the California red-legged based on discountable effects (see **Appendix A**). Vandenberg SFB will implement the EPM as specified in the letter of concurrence and existing Vandenberg SFB programmatic biological opinions (PBOs) (USFWS 2015, 2018) and the draft PBO reinitiation that is in progress (022-0003583-S7-016). Therefore, no adverse impacts to federally listed species would occur under Alternative 1.

3.9.3.3 Alternative 2

Under Alternative 2, impacts to biological resources would be the same as under Alternative 1, except that impacts to vegetation would vary slightly, as detailed in **Table 3-19**.

Notably, construction of the flightline igloos (Project 5) under Alternative 2 would require the removal of approximately 3.78 acres of *Arctostaphylos* (*purissima, rudis*) Shrubland Special Stands (Burton Mesa Chaparral), 0.42 acre more than under Alternative 1.

Table 3-19
Vegetation Removal Under Alternative 2

Plant Alliance/Habitat	Acreage by Project Component[a]				
	Project 1	Project 4	Project 5	Project 6	TOTAL
Shrubs and Chaparral					
Arctostaphylos (*purissima, rudis*) Shrubland Special Stands	-	-	3.78	-	3.78
Artemisia californica – Salvia mellifera Shrubland Alliance	-	-		1.06	1.06
Baccharis pilularis Shrubland Alliance	-	-	0.01	-	0.01
Herbaceous					
Juncus (*effusus, patens*) – Carex (*pansa, praegracilis*) Herbaceous Alliance	-	-	0.02	-	0.02
Land Use and Non-vegetated Classes					
Mowed/Maintained	0.03	6.23	0.15	-	6.41
TOTAL	**0.03**	**6.23**	**3.96**	**1.06**	**11.28**

Note:
a Only project components that would impact vegetation are listed. Project components occurring on developed land are not included.

3.9.3.4 No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E or F-15EX fighter jets at Vandenberg SFB for testing of and training for a homeland defense mission. No additional personnel would be stationed at Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 operations. Over time, the mission capabilities of homeland defense systems would diminish along with the DAF's ability to fulfill its mission to defend the US. Under the No Action Alternative, no impacts to biological resources beyond baseline conditions would occur.

3.9.3.5 Cumulative Effects

The past and present activities at Vandenberg SFB consist of rocket and missile launch missions and aircraft operations. In addition, Vandenberg SFB has been and is currently used for transient military aircraft operations. The rocket and missile launch missions are expected to continue and potentially increase in number of launches. Accordingly, aircraft operations that support those missions may potentially increase. Redevelopment of missile or rocket launch sites or construction of new launch sites would create long-term land disturbances. The DAF may also construct a new air traffic control tower in the airfield and replace the airfield fence. The Proposed Action would create minor impacts to Burton Mesa Chaparral for construction of munitions storage igloos. When considered in conjunction with other reasonably foreseeable future actions at Vandenberg SFB (**Table 3-1**), cumulative biological resources impacts, including those to chaparral vegetation areas, would be anticipated to be long term but not significant.

3.9.3.6 Environmental Protection Measures for Biological Resources

The measures listed in **Table 3-20** would be implemented to avoid or minimize impacts to biological resources. For those EPMs that require different levels of biological competency (i.e., education and experience), 30 CES/CEIE shall coordinate with the USFWS for any required reviews and approval of personnel credentials and assure that appropriately qualified personnel are assigned to specific tasks as needed. General protection measures include actions to minimize habitat disturbance, maintain a clean project area during and after construction, and restore disturbed sites no longer needed for project implementation. Protection measures for special-status species are designed to protect specific species or groups of species. Special-status species include federally listed species, migratory birds, bald and golden eagles, state-listed species, species of conservation concern, and any other species that the DAF takes active measures to protect.

Table 3-20
Biological Resources Control Measures

Biological Resources Measures
Prior to initial site preparation, 30 CES/CEIE shall determine if any pre-activity biological surveys would be required and whether a qualified biologist needs to be present during site preparation (e.g., clearing/grubbing, discing, mowing) to monitor for special-status species. If needed, pre-activity surveys for specific special-status species would be performed to determine presence or absence. These surveys are performed to avoid or minimize incidental take.
General Measures for Protecting Biological Resources
Keep project footprints to the minimum extent necessary to minimize disturbances of plant and wildlife habitat. Prior to conducting any project activities, a qualified biologist will clearly mark special-status species habitats within the project site and the immediate area to prevent workers or equipment from adversely affecting species or habitats that are not expected to be damaged during the project.
Salvage native topsoil in the project area and use wherever possible.
Remove and transport all excess materials excavated to a designated waste or fill site.
Implement BMPs that are appropriate to the site and situation to reduce soil erosion, sedimentation, and adverse effects to water quality. All erosion control materials used would be from weed-free sources and, if left in place following project completion, constructed from 100% biodegradable erosion control materials (e.g., erosion blankets, wattles).
Dispose of all human-generated trash at the project site in proper containers and remove from the work site and dispose of properly at the end of each workday with specific attention concerning food waste. Proper waste disposal is deposition of material into a trash receptacle with a lid that will not blow open in the wind. Trash receptacles shall not be overfilled to the point that the lids do not fit properly. Large dumpsters can be maintained at staging areas for this purpose. All construction debris and trash shall be removed from the work areas upon completion of the project and disposed of at a designated waste or fill site.
Thoroughly clean (i.e., power washed) equipment vehicles (e.g., dozers, mowers) of weed seeds prior to use in the project area to prevent the introduction of weeds and have inspected by a qualified biological monitor to verify weed-free status prior to use. Prior to site transport, any skid plates shall be removed and cleaned. Equipment should be cleaned of weed seeds daily especially wheels, undercarriages, and bumpers. Prior to leaving the project area, vehicles with caked-on soil or mud shall be cleaned with hand tools such as bristle brushes and brooms at a designated exit area; vehicles may subsequently be washed at an approved wash area. Vehicles with dry dusted soil (not caked-on soil or mud), prior to leaving a site at a designated exit area, shall be thoroughly brushed; vehicles may alternatively be air blasted on site.
A qualified biological monitor shall inspect any equipment left overnight prior to the start of work. Equipment would be checked for presence of special-status species in the vicinity and for fluid leaks.
Do not leave holes and trenches open overnight. Plywood sheets or steel plates may be used to cover holes or trenches or an escape ramp for wildlife would be installed if left open overnight. The biological monitor would inspect these locations before the resumption of work.
Conduct vegetation clearing during daylight hours, during periods where there is no rainfall.
During the design and construction of the live ordnance loading area, the design will consider appropriate distances to avoid impacts to the Burton Mesa Chaparral outside the airfield fence from jet blast (temperature and air velocity). Blast diverters would be installed as needed according to design configurations to minimize potential impacts.
For sites to be revegetated, submit a seeding, planting, and monitoring plan for approval by 30 CES/CEIEA. The planting/seed mix would be similar to surrounding native vegetation. Weed control would be conducted for one-year post-construction to achieve at least the same amount or more of pre-construction native plant cover.
Fuel vehicles and equipment on impervious surfaces and at least 250 feet away from riparian habitats and wetlands to the maximum extent practicable. Spill containment equipment will be present at all project sites where fuels or other hazardous substances are brought to the site. In addition, qualified personnel will conduct daily inspections of the equipment and the staging and maintenance areas for leaks of hazardous substances.
When it is not practical to stage or operate project vehicles or equipment on paved or existing roadways and trails, stage and operate vehicles and equipment on nonnative vegetation to the maximum extent practicable.
Special-Status Species Measures
Qualified biologists will conduct pre-activity surveys at each project site for all project activities that may affect the federally listed species analyzed within the Vandenberg SFB PBO.

Biological Resources Measures
Vandenberg SFB will implement the EPMs for the California red-legged frog specified in the USFWS letter of concurrence (12 February 2025) for the "may affect but not likely to adversely affect" determination, as well as in the existing PBOs (USFWS 2015, 2018) and the draft PBO reinitiation that is in progress (022-0003583-S7-016). These EPMs are specified in the USFWS 12 February letter included in **Appendix A**.
A qualified biologist(s) shall brief all project personnel prior to participating in construction activities. At a minimum, the training would include a description of the special-status biological resources occurring in the area, the general and specific measures, and restrictions necessary to protect these resources during project implementation.
If vegetation clearing occurs during the nesting period for non-raptor species (15 February through 15 August) a qualified biologist would survey the area for nesting birds and delineate 100-foot buffers (or other size sufficient to prevent disturbance) around any nests that are found to reduce risk of nest abandonment.
The earthen igloo shall include early successional Burton Mesa Chaparral herbaceous plant species as part of mitigation restoration in coordination with SLD 30 CES/CEI staff to ensure project personnel and contractors plan and implement mitigation requirement at the igloo site. Weed control would be conducted for one-year post-construction to achieve at least the same amount or more of pre-construction native plant cover.

30 CES/CEIEA = 30th Civil Engineer Squadron/Installation Management Flight, Environmental Conservation; GIS = geographic information system; IRP = Installation Restoration Program; SLD 30 = Space Launch Delta 30;

3.10 CULTURAL RESOURCES

3.10.1 Definition of the Resource

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture or community for scientific, traditional, religious, or other purposes. Cultural resources include the following subcategories:

- Archaeological sites (i.e., prehistoric or historic sites where human activity has left physical evidence of that activity, but no structures remain standing);
- Historic Architectural properties (i.e., buildings, structures, groups of structures, or designed landscapes that are of historic or aesthetic significance); and
- Traditional Cultural Properties (resources of traditional, religious, or cultural significance to American Indian tribes).

Significant cultural resources (i.e., historic properties) are those listed on the National Register of Historic Places (NRHP) or determined to be eligible for listing. To be eligible for the NRHP, properties must be 50 years old and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They must possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance and meet at least one of four criteria for evaluation:

a. Associated with events that have made a significant contribution to the broad patterns of our history (Criterion A);
b. Associated with the lives of persons significant in our past (Criterion B);
c. Embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C); and/or
d. Have yielded or be likely to yield information important in prehistory or history (Criterion D).

Properties that are less than 50 years old can be considered eligible for the NRHP under criteria consideration G if they possess exceptional historical importance. Those properties must also retain historic integrity and meet at least one of the four NRHP criteria (Criteria A, B, C, or D). The term "historic property" refers to National Historic Landmarks, NRHP-listed, and NRHP-eligible cultural resources.

Cultural resources are protected and identified under several federal laws including the *American Indian Religious Freedom Act of 1978* (42 USC § 1996), the *Archaeological Resources Protection Act of 1979*, as

amended (16 USC §§ 470aa–470mm), the *Native American Graves Protection and Repatriation Act of 1990* (25 USC §§ 3001–3013), the NHPA, and associated regulations (36 CFR Part 800). The NHPA requires federal agencies to consider effects of federal undertakings on historic properties prior to deciding or taking an action and integrating historic preservation values into their decision-making process. Federal agencies fulfill this requirement by completing the NHPA Section 106 consultation process, as set forth in 36 CFR Part 800. NHPA Section 106 also requires agencies to consult with federally recognized American Indian tribes with a vested interest in the undertaking. NHPA Section 106 requires all federal agencies to seek to avoid, minimize, or mitigate adverse effects to historic properties (36 CFR § 800.1(a)).

For cultural resources analyses, the ROI is defined by the Area of Potential Effect (APE). The APE is defined as the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR § 800.16(d)) and thereby diminish their historic integrity. An analysis of potential impacts also considers an Area of Direct Impact (ADI), which comprises the area disturbed by project activities and a 10-meter (32-foot) buffer around the project, and a 120-dB noise (L_{max}) contour for the F-15E/EX proposed flight operations. For the purposes of surveying cultural resources, a 200-meter (656-foot) buffer around the project disturbance was used.

3.10.2 Existing Conditions

The prehistory of California's Central Coast spans the entire Holocene and may extend back to late Pleistocene times. Excavations on Vandenberg SFB reveal occupations dating back nearly 11,000 years (Lebow et al., 2014, 2015). People living in the Vandenberg SFB area prior to historic contact are grouped with the Purisimeño Chumash (Greenwood, 1978; King, 1984; Landberg, 1965), one of several linguistically related members of the Chumash culture. In the Santa Barbara Channel area, the Chumash people lived in large, densely populated villages and had a culture that was as elaborate as that of any hunter-gatherer society on earth"(Moratto, 1984). Relatively little is known about the Chumash in the Vandenberg SFB region. Drastic changes to Chumash lifeways resulted from the Spanish occupation that began with the Portolá expedition in 1769.

Vandenberg SFB history is divided into the Mission, Rancho, Anglo-Mexican, Americanization, Regional Culture, and Suburban periods. A review of the cultural history and historical development of Vandenberg SFB is provided in more detail in the *Cultural Resource Investigations Supporting Section 106 Compliance for Air Combat Command Strategic Basing for F-15E Testing on Vandenberg Space Force Base Santa Barbara County, California* report (Pitts-Olmedo et al., 2024). The existing knowledge of cultural resources on Vandenberg SFB is based on nine major archaeological studies: (1) excavations during the 1970s at various sites on south Vandenberg SFB for the Space Transportation System; (2) investigations on the San Antonio Terrace for the Missile X program and associated test facilities as well as subsequent studies on the San Antonio Terrace; (3) studies associated with development of space launch complexes on south Vandenberg SFB; (4) excavations for the Union Oil of California pipeline project; (5) investigations for the Coastal Branch Aqueduct; (6) investigations associated with infrastructure development along Combat Road; (7) investigations for infrastructure development along Tranquillon Mountain Road; (8) excavations for the San Antonio Creek Stream Restoration project; and (9) archaeological excavations at various eroding sites on Vandenberg SFB performed under Section 110 of the *National Historic Preservation Act* (54 USC § 300101 et seq.) (NHPA).

Additional archaeological surveys were conducted in the APE for this EA. Background research found that most areas within the ADI and within the 200-meter buffer have been systematically surveyed for cultural resources; however, the area within and around Project 5 had not been previously surveyed. Review of the Vandenberg SFB archaeological records indicated that six known cultural resources have been recorded within the ADI and buffer area. These include one prehistoric archaeological site (CA-SBA-1130), three historical archaeological sites (CA-SBA-1779H, CA-SBA-2086H, and CA-SBA-3575H), one historic facility (P-42-041230), and one district (P-42-041282).

Site CA-SBA-1130 is on south Vandenberg SFB, about 300 feet northeast of Building 980 and bounded by Ordnance Road to the south. The site covers an area of approximately 5 acres on the Lompoc Terrace at an elevation of 110 feet above mean sea level and appears as a surface scatter of low-grade chert chunks. However, previous investigations have not found substantial evidence of archaeological material. The site

overlaps the west end of Project 6, a single munitions storage igloo. Site CA-SBA-1130 has not been previously evaluated for NRHP eligibility.

Site CA-SBA-1779H intersects the 120-dB contour ADI for the F-15E/EX proposed flight operations. Known as the Winn Camp, the site is the remnants of a freight haulers' campsite and was identified in 1982 during construction associated with airfield expansion. It was recorded as three concentrations of historic artifacts dating back to the late 1890s—1950s. Except for the northeastern most portion of the site, it was largely destroyed by the airfield expansion (Lebow, 2020). SLD 30 evaluated this site and found that the Winn Camp does not meet any of the eligibility criteria for inclusion in the NRHP. The State Historic Preservation Officer (SHPO) concurred in 2021 that CA-SBA-1779H is not eligible for NRHP inclusion.

Site CA-SBA-2086H intersects both the 120-dB contour for the proposed F-15E/EX flight operations and the proposed access road for Project 5. Originally recorded by Weaver (1986) as the Historical Tangair Siding to Pine Canyon Road freight haul road, it was a 5.35-mile-long road that traversed the Burton Mesa from the Tangair Siding to Pine Canyon Road. This road originated as a standard 10-foot-wide, two-track dirt road as early as the 1910s and was reportedly used in this capacity through the 1930s. Today, the road no longer goes all the way to Pine Canyon Road and now terminates at Airport Road. In 1941, 2 miles of the original road were redeveloped for the Camp Cooke cantonment area, the road was divided when the airfield was constructed, and historic maps indicate that the road between Tangair Siding and Airport Road was improved (most likely paved). SLD 30 evaluated this site in 2022 and found that the road does not meet any of the eligibility criteria for inclusion in the NRHP. The SHPO concurred in 2023 (Polanco, 2023).

Site CA-SBA-3575H also intersects the 120-dB contour ADI for the proposed F-15E/EX flight operations. It is a system of masonry drainage ditches constructed in 1941 southeast of the airfield as part of the World War II-era Camp Cooke. These drainage ditches were purportedly built using prisoners of war labor, but no construction records exist. The SHPO concurred in 2017 that CA-SBA-3575H is not eligible for NRHP inclusion.

The proposed access road for Project 5 would intersect a portion of the MOD-II Command Guidance Station (42-041230). It was constructed between 1957 and 1959 to support Atlas D launches from Complex 576-A. The station featured a centralized Guidance Operations Building (GOB, Facility 1768); a transmitter pad (Facility 1777); a tracking radar and a receiver pad; four rate pads radiating outward in an "X" configuration, each a distance of approximately 4,500 feet from the GOB; and wave guide trays that connected the rate pads to the rate transmitter building. The Complex 576-A MOD-II Command Guidance Station meets NRHP Criteria A and C for its historical associations and design and construction merits. However, due to the loss of so many of the primary structural components that defined the MOD-II ground-based guidance system, the resource lacks sufficient historical integrity to convey those important historical associations. Consequently, the MOD-II Command Guidance Station is not eligible for listing on the NRHP (Polanco,_2020).

SLD 30 evaluated the Vandenberg Airfield District (P-42-041282) and 16 structures contained within the district in 2021 and recommended that the district and its structures were not eligible for listing in the NRHP. The SHPO concurred in 2021 that the Vandenberg Airfield District is not eligible for listing in the NRHP, and that none of the 16 structures within the district were individually eligible for listing. Building 1754, which would be demolished under Alternative 2b, was not listed among the 16 buildings and therefore not assessed. Building 1754 is a vernacular, prefabricated, mobile building, that once supported the Vandenberg SFB Aero Club. The building appears to have been moved to or constructed in its current location sometime between 1960 and 1973 based on available evidence. The building lacks a foundation and instead rests on concrete blocks. It is a one-story, wood-framed building that is rectangular in plan, measuring approximately 47 feet long by 25 feet wide, with an approximately 15 by 6-foot addition on the west elevation. Both the building's exterior and interior are in a state of disrepair. The interior, which is not readily accessible, currently stores partially disassembled office-like furniture. At the time of recordation, the building was not connected to utilities, and airfield personnel stated that it has been abandoned for approximately 20 years.

3.10.3 Environmental Consequences

3.10.3.1 Evaluation Criteria

A cultural resource impact would be adverse if it

- physically alters, damages, or destroys all or part of a resource;
- alters characteristics of the surrounding environment that contribute to the resource's significance;
- introduces visual or audible elements that are out of character with the property or alter its setting or feeling;
- neglects the resource to the extent that it deteriorates or is destroyed; or
- results in the sale, transfer, or lease of the property out of agency ownership (or control) without adequate enforceable restrictions or conditions to ensure preservation of the property's historic significance.

For the purposes of this EA, an impact is considered significant if it alters the integrity of a NRHP-listed, eligible, or potentially eligible, resource or potentially impacts Traditional Cultural Properties.

3.10.3.2 Alternative 1 (Preferred)

Previous surveys have determined that the Airfield District and the individual resources therewithin are not eligible for listing in the NRHP. Therefore, Projects 1–4 would have no impacts to cultural resources under Alternative 1.

Approximately 8.9 acres were surveyed for the presence of cultural resource materials surrounding Project 5. The survey included the munitions storage igloo site and access roads. Thirty shovel test pits were excavated for a volume of 3.75 cubic yards to determine if any subsurface cultural materials were present (Pitts-Olmedo et al., 2024, Figure 10-3). No cultural materials were observed during the surface surveys, and all excavated units were negative for cultural materials. Under Alternative 1, the existing gravel access road from Airfield Road to the four munitions storage igloos would be upgraded to a paved road. This access road follows what was once the Historical Tangair Siding to Pine Canyon Road freight haul road (Site CA-SBA-2086H). CA-SBA-2086H has been determined by the SHPO to not be eligible for inclusion in the NRHP. This access road would also cross a wave guide tray that is a part of the MOD-II Command Guidance Station (42-041230). 42-041230 has been determined by the SHPO to not be eligible for inclusion in the NRHP. Based on field surveys and previous cultural resources evaluations, Project 5 would have no impacts to cultural resources under Alternative 1.

Project 6 would be located near Building 980. This project site is adjacent to and slightly overlaps the west end of archaeological Site CA-SBA-1130. Approximately 1.8 acres, including the igloo site and access road, were previously surveyed. Seventeen shovel test pits were excavated for a total excavated volume of 1.9 cubic yards to determine the presence of subsurface cultural materials (Pitts-Olmedo et al., 2024, Figure 10-9). No cultural materials were observed during the surface surveys and all excavated units were negative for cultural remains. Project 6 would have no impacts to cultural resources under Alternative 1.

The APE for cultural resources also includes an approximately 540-acre area within and outside the airfield where flight operations would create a sound pressure level (SPL) of at least 120 dB during a single event, such as an F-15 takeoff. This is the lowest noise and vibration level with the potential to affect certain types of historic buildings (those made of wood or adobe material) and rock resources such as cairns and rock art. The 120-dB noise contours were used to measure the areas within which a flight could have adverse effects to eligible rock art or built resources. Background research confirmed that no historic buildings or rock cairn, rock shelter, or rock art resources are within the 120-dB area. However, a portion of the 120-dB contour crosses a masonry drainage ditch within the former Camp Cooke cantonment area. CA-SBA-3575H includes this ditch and several others that were constructed by the USACE as early as September 1941. In addition, the 120-dB contour crosses the Winn Camp (CA-SBA-1779H), which includes the remnants of a

freight haulers' campsite. Because CA-SBA-3575H and CA-SBA-1779H were determined not eligible for listing in the NRHP, and because the 120-dB contour area does not consist of historic buildings or rock cairn, rock shelter, or rock art resources, no further testing or evaluations are required, and vibration impacts to cultural resources would not be anticipated under Alternative 1.

The DAF consulted with the California SHPO under NHPA Section 106 regarding potential impacts to historic properties. The SHPO reviewed the DAF determination and concurred with the DAF's finding that the Proposed Action would not affect historic properties (**Appendix A**).

3.10.3.3 Alternative 2

Alternative 2 would have the same impacts as Alternative 1 except for Project 2b. Project 2b would occur on the site of existing Building 1754. Building 1754 would be demolished and removed. Project 2b would occur within the Vandenberg Airfield District. However, Building 1754 was not included in the previous survey of individual resources therewithin. As discussed in Section 3.10.2, Building 1754 has been abandoned for over 20 years and does not meet the threshold to be considered historically significant under any of the evaluation criteria. Therefore, there would be no impacts to cultural resources under Alternative 2.

3.10.3.4 No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E or F-15EX fighter jets at Vandenberg SFB for testing of and training for a homeland defense mission. No additional personnel would be stationed at Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 operations. Over time, the mission capabilities of weapons systems would diminish along with the DAF's ability to fulfill its mission to defend the US. Under the No Action Alternative, no impacts to cultural resources beyond baseline conditions would occur.

3.10.3.5 Cumulative Effects

The past and present activities at Vandenberg SFB consist of rocket and missile launch missions and aircraft operations. In addition, Vandenberg SFB has been and is currently used for transient military aircraft operations. The rocket and missile launch missions are expected to continue and potentially increase in number of launches. Accordingly, aircraft operations that support those missions may potentially increase. The construction of support facilities for the periodic operation of F-15 aircraft would not affect any cultural resources. When considered in conjunction with other reasonably foreseeable future actions at Vandenberg SFB (**Table 3-1**), no cumulative impacts to cultural resources would be anticipated.

3.10.3.6 Environmental Protection Measures for Cultural Resources

The measures listed in **Table 3-21** would be implemented to avoid or minimize impacts to cultural resources.

Table 3-21
Cultural Resources Protective Measures

Cultural Resources Measures
SLD 30/CEIEA requires archaeological and Native American monitoring during construction through any known archaeological site or within 60 meters of the recorded boundary of any known site, regardless of a site's National Register of Historic Places eligibility. Archaeological and Native American monitors would therefore be present during construction disturbance and vegetation clearing activities in or within 60 meters of known archaeological sites.
If previously undocumented cultural resources are discovered during construction activities, work would stop, and the procedures established in 36 CFR § 800.13 and the Vandenberg SFB Integrated Cultural Resources Management Plan shall be followed.

CFR = Code of Federal Regulations; SLD 30 = Space Launch Delta 30

3.11 NOISE

3.11.1 Definition of the Resource

Noise is undesirable or unwanted sound that interferes with verbal communication and hearing. Sound is a physical phenomenon of minute vibrations exhibited as waves, measured in frequency and amplitude, which travel through a medium, such as air or water, and are sensed by the human ear. SPL, described in decibels, is used to quantify sound intensity. Unwanted sound can be based on objective effects (such as hearing loss or damage to structures) or subjective judgments (community annoyance). Noise analysis thus requires assessing a combination of physical measurement of sound, physical and physiological effects, plus psycho- and socio-acoustic effects. Human hearing sensitivity to differing sound pitch, measured in cycles per second or hertz, varies by frequency. To account for this effect, sound measured for environmental analysis utilizes A-weighting, which emphasizes sound roughly within the range of typical speech and de-emphasizes very low and very high frequency sounds. All decibels (dB) presented in this EA utilize A-weighted (dBA or dB[A]) but are presented as dB for brevity, unless otherwise noted.

The *Noise Control Act of 1972* (42 USC §§ 4901–4918) directs federal agencies to comply with applicable federal, state, and local noise control regulations. In 1974, the USEPA provided information suggesting continuous and long-term noise levels greater than 65 dBA are normally unacceptable for noise-sensitive receptors, such as residences, schools, churches, and hospitals. Normal speech equates to a sound level of approximately 60 dB, sound levels above 120 dB begin to be felt inside the human ear as discomfort, and sound levels between 130 and 140 dB are felt as pain (Berglund and Lindvall, 1995).

The primary noise metric utilized in the US for noise impacts is the Day-Night Average Sound Level (L_{dn}, also written as DNL), which is A-weighted applicable for subsonic aircraft operations. DNL is a cumulative metric that includes all noise events occurring in a 24-hour period. The daytime period is 7 a.m.–10 p.m. and the nighttime period is 10 p.m.–7 a.m. An adjustment (penalty) of 10 dB is added to events occurring during the nighttime period to account for the added intrusiveness while people are most likely to be relaxing at home or sleeping. The Community Noise Equivalent Level (CNEL) noise metric, specified by the state of California for environmental noise like airport operations, mirrors DNL with the same energy averaged sound level measured over a 24-hour period and 10 dB penalty for nighttime events. However, CNEL adds an "evening" penalty of 3 times the dB (equivalent to 4.77 dB penalty) if occurring between 7 p.m. and 10 p.m. **Table 3-22** provides the metrics used to define noise (expanded in **Appendix D**).

The ROI for noise includes Vandenberg SFB and the surrounding communities that contain potential sensitive receptors of noise (e.g., residences, schools, threatened or endangered species, and historic properties).

Table 3-22
Summary of Metrics Used To Evaluate Potential Noise Impacts

Metric	Symbol	Definition	Used to Evaluate
Day-Night Average Sound Level	L_{dn} or DNL	Cumulative metric for all noise events in a 24-hour period with a nighttime noise penalty for events between 10 p.m. and 7 a.m. The daytime period is 7 a.m. to 10 p.m. (A-weighted metric)	Overall noise environment
Community Noise Equivalent Level	CNEL	State of California noise metric that is the same as DNL except evening events are multiplied by 3 (equivalent to 4.77 dB penalty) if occurring between 7 p.m. and 10 p.m.	Overall noise environment
Maximum Sound Level	L_{max}	The highest A-weighted sound level measured during a single event in which the sound changes with time is the maximum A-weighted sound level; does not account for how long the sound is heard	Residential speech interference
Sound Exposure Level	SEL	Combines sound intensity and its duration, providing the sound level that would contain the same sound energy of an event if occurring over a 1-second period; provides a better metric for comparison of aircraft flyovers than L_{max}	Residential sleep disturbance
Number of Events	-	Represents the number of sound events that are at or above a threshold value	Non-school speech interference
Equivalent Sound Level	L_{eq}	Cumulative metric combining a series of noise events over a time period by averaging the sound energy; the time period is typically provided along with the value and relates to a type of activity and presented in parenthesis (e.g., $L_{eq(8hr)}$ is used in this EA to represent an 8-hour time period)	Classroom learning interference; potential hearing loss
Sound Pressure Level	SPL	Unweighted sound pressure level measured during a single event and the true instantaneous sound pressure level	Assessment of disturbance to sensitive biological and cultural resources

3.11.2 Existing Conditions

3.11.2.1 Aircraft Operations

Two types of sound can be created by aircraft—subsonic and supersonic. Subsonic sound is generated by aircraft traveling at less than the speed of sound and is the typical case for aircraft currently using the Vandenberg airfield. Supersonic sound is created by an aircraft, rocket, or missile traveling at greater than the speed of sound that creates a pressure wave, which is heard as a sonic boom. Vandenberg SFB has no assigned flight squadrons. The airfield supports transient military aircraft operations on a regular basis as a stopover location during cross-country flights, as an unfamiliar airfield for practice approaches, or as a diverted landing location during severe weather. These aircraft include fighter jets, cargo transports, and helicopters. Also, an MQ-9 detachment trains annually at Vandenberg on two separate occasions. Materials and personnel supporting the Vandenberg SFB space- and missile launch programs are also transported to and from Vandenberg by cargo-type or passenger aircraft such as the C-5, C-21 and B-737-500. Estimated existing airfield activity includes 809 arrival/departures, 5,715 closed patterns, and 7,366 total operations per year. A full description of aircraft using the airfield and number of flight operations is summarized in **Appendix D** of this EA. **Table 3-23** lists the maximum sound level generated by representative aircraft that currently use the Vandenberg airfield.

Table 3-23
Individual Overflight Maximum Noise Level Generated by Representative Aircraft Types at Vandenberg SFB

Aircraft (engine type)	Power Setting[a]	Power Unit	L_{max} Values (in dB) at Varying Distances (in feet)				
			500	1,000	2,000	5,000	10,000
Takeoff/Departure Operations							
C-5B	4.50	EPR	114	106	97	82	68
C-21	90%	NC	89	82	74	62	51
F-16 (P220)	92.4%	NC	111	103	95	83	72
F-22	100%	ETR	120	113	104	92	81
F-35A[b]	100%	ETR	119	111	103	90	79
F-35A (afterburner)[b]	150%	ETR	124	117	108	97	87
Single-engine, fixed-pitch propeller	100%	RPM	77	70	63	53	45
T-38 (non-afterburner)	99%	RPM	109	101	91	76	63
Landing/Arrival Operations							
C-5B	2.39	EPR	111	104	95	79	61
C-21	68%	NC	77	70	62	50	40
F-16 (P220)	80%	NC	90	83	75	63	53
F-22	43%	ETR	111	104	96	83	71
F-35A[b]	40%	ETR	100	93	85	72	60
Single-engine, fixed-pitch propeller	30%	RPM	59	53	46	36	29
T-38	96%	RPM	96	88	79	66	54

Source: Omega10 using standard weather conditions of 59 degrees Fahrenheit and 70 percent relative humidity.
a Engine power settings are not constant during flight. The power settings shown are typical.
b Values are based on field noise-level measurements conducted at Edwards AFB in 2013 (DAF, 2020).
SFB = Space Force Base; dB = decibel; EPR = engine pressure ratio; L_{max} = Maximum Noise Level; NC = engine core; RPM = revolutions per minute

3.11.2.2 Noise Exposure from Vandenberg SFB Airfield

Noise levels above 65 dB measured as CNEL generated from existing aircraft operations at Vandenberg SFB remain entirely within the Base boundary (**Figure 3-9**). Approximately 772 acres of land within Vandenberg SFB are exposed to a CNEL of 65 dB or greater. No off-Base areas are exposed to a CNEL greater than 65 dB. Points of interest (POIs) such as schools, residential areas (both on and off Base), and beach areas were identified to evaluate existing noise exposure levels (**Appendix D**). The existing CNEL at all POIs were less than 45 dB except for Purisima Point on the coastline west of the airfield, which is 49 dB.

3.11.2.3 Classroom Learning Interference and Non-School Speech Interference

The school screening threshold of 60 dB $L_{eq(8hr)}$ equates to an interior level of 45 dB $L_{eq(8hr)}$ with windows open and represents the point at which studies have found that sound impacts classroom learning (Department of Defense Noise Working Group [DNWG], 2009, 2013a). Existing flight operations at Vandenberg SFB do not expose the exterior of any learning facility (i.e., schools and daycare centers) with windows open to a $L_{eq(8hr)}$ of 60 dB. Because no learning facility met the threshold value, no additional analysis was done.

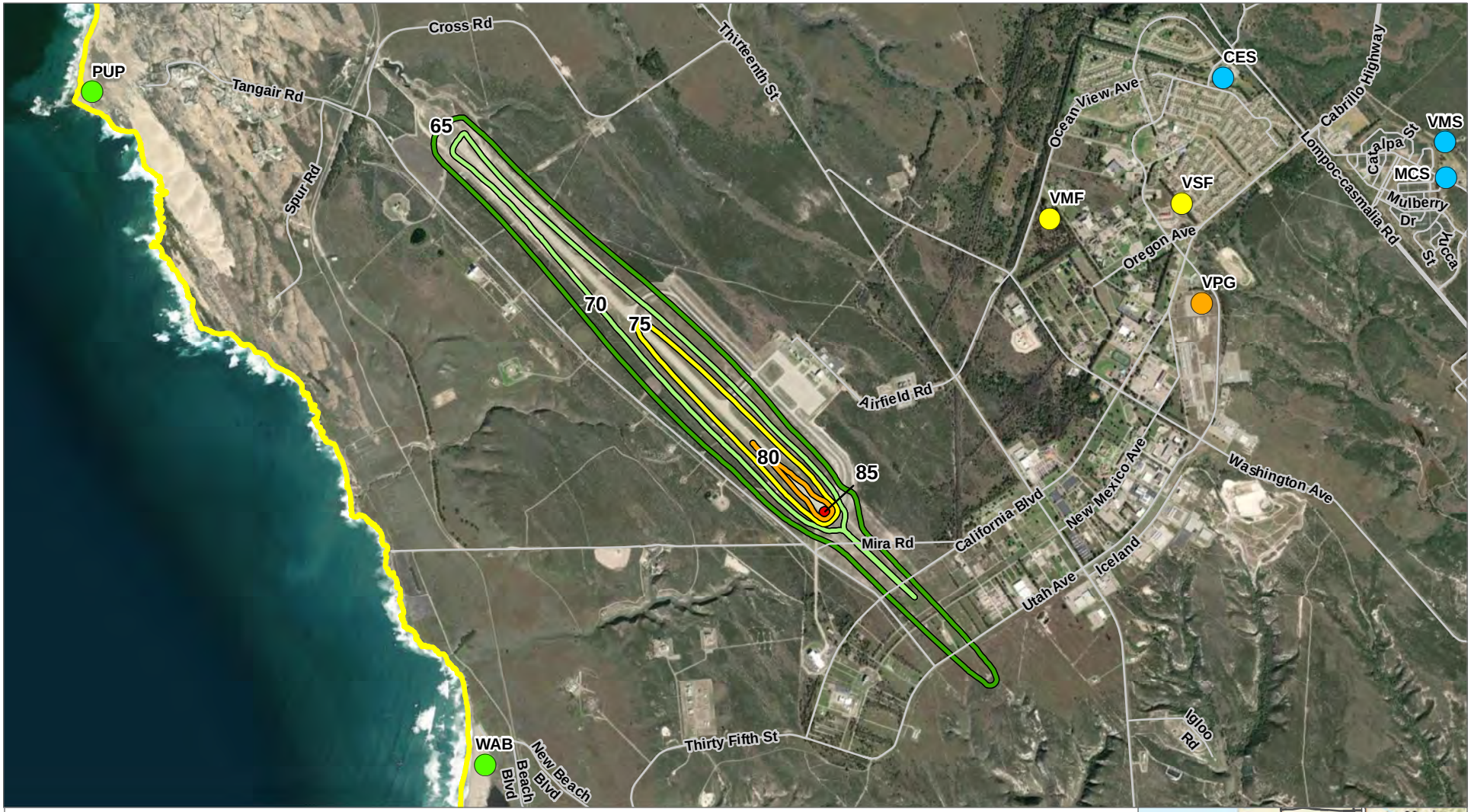


FIGURE 3-9

Baseline/Existing CNEL Noise Contours and Noise Points of Interest

Installation Boundary

Installation Road

Points of Interest

- Biological
- Public Assembly
- Residential Area
- School

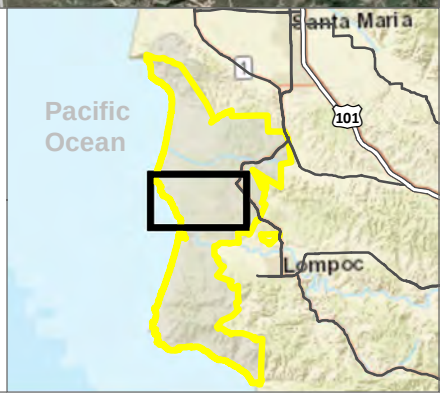
Baseline/Existing Conditions Contours (CNEL)

- 65 dB
- 70 dB
- 75 dB
- 80 dB
- 85 dB

N

0 ½ Miles

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N



The baseline conditions for non-school speech interference considered beach areas, residential areas (on and off Base), Lompoc Federal Prison, and several schools (**Appendix D**). The evaluation was based on the number of sound events per average hour during the CNEL daytime period for both windows open and closed (for buildings) conditions. No speech interfering events (>= 60 dB) occurred for any the POIs under existing flight operations.

3.11.2.4 Residential Sleep Disturbance

The probability of awakening (i.e., sleep disturbance) is determined by number and the SEL of nighttime aircraft events. Because of the low number of Vandenberg SFB nighttime aircraft operations, the estimated probability of awakening at all POIs from existing flight operations is nearly zero under windows open and zero with the windows closed (**Appendix D**).

3.11.2.5 Potential for Hearing Loss

The screening process evaluating potential for hearing loss begins with identifying residential areas exposed to a CNEL of 80 dB or greater (DNWG, 2013b). No areas outside of the Vandenberg SFB airfield boundary are exposed to a CNEL of 80 dB or greater, so no residents on or off Vandenberg SFB experience the potential for hearing loss from existing airfield operations.

3.11.2.6 Sound Pressure Level

The unweighted SPL of 100 dB is used to evaluate potential impacts on sensitive biological resources such as nesting shorebirds. The 120-dB SPL is used to evaluate impacts on cultural resources. The 100-dB and 120-dB SPL contour lines for existing aircraft operations are depicted in **Figure 3-10**. Approximately 18,228 acres are included within the 100-dB SPL contour line, and 422 acres are within the 120-dB SPL contour line. The existing 120-dB SPL occurs entirely within the boundaries of Vandenberg SFB, while the 100-dB SPL extends just beyond the Vandenberg SFB boundary near the Santa Ynez River valley and also extends over the Pacific Ocean north of Purisima Point.

3.11.3 Environmental Consequences

When evaluating noise effects, several aspects are examined:

- the degree to which noise levels generated by aircraft operations, as well as construction, demolition, and renovation activities, would be higher than the existing ambient noise levels;
- the degree to which there would be hearing loss and/or annoyance; and
- the proximity of noise-sensitive receptors (e.g., residences, schools, hospitals, parks) to the noise source.

The analysis of potential effects of noise generated by the Proposed Action on the local population includes the extent and magnitude of the noise in comparison to the existing noise environment. Flight operations under the Proposed Action are not expected to create sonic booms, and supersonic sound is not discussed further in this EA. The full analysis of potential noise effects is in **Appendix D**. The key findings are discussed below.

FIGURE 3-10

Baseline/Existing and Proposed Sound Pressure Level Contours and Noise Points of Interests

Installation Boundary

Points of Interest
- Biological
- Public Assembly
- Residential Area
- School
- Services

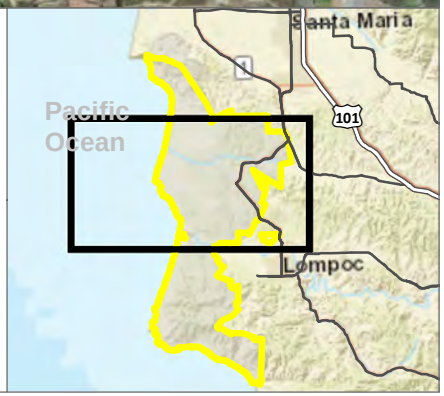
Baseline/Existing Sound Pressure Level Contours
- 100 dB
- 120 dB

Proposed Sound Pressure Level Contours
- 100 dB
- 120 dB

N

0 1 Miles

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N



3.11.3.1 Alternative 1 (Preferred)

Community Noise Effects

The proposed periodic operation of F-15 aircraft at Vandenberg SFB would be the same as the existing CNEL baseline for current flight operations and have no effect on the CNEL off Vandenberg SFB (**Table 3-24**). Therefore, none of the POIs surrounding and on Vandenberg SFB would experience any increase over the existing baseline CNEL. Within Vandenberg SFB, the periodic operation of F-15 aircraft would increase the acreage exposed to greater than 65 dB measured as CNEL by 395 acres. Seventy percent, or 276 of those acres, would have a CNEL of less than 75 dB. The acres with increased CNEL would be exclusively surrounding the airfield with an area extending southeast of Runway 30 (**Figure 3-11**). The Proposed Action would have no impact on the CNEL in the surrounding communities.

Table 3-24
Noise Exposure Levels under the Proposed Action[a]

CNEL (dB)	Baseline Acreage			Proposed Acreage			Difference		
	On Base	Off Base	Total	On Base	Off Base	Total	On Base	Off Base	Total
65–70	435	0	425	584	0	584	149	0	149
70–75	212	0	196	339	0	339	127	0	127
75–80	111	0	102	130	0	130	19	0	19
80–85	14	0	7	95	0	95	81	0	81
85+	0	0	0	19	0	19	19	0	19
Total >65 dB	**772**	**0**	**730**	**1,167**	**0**	**1,167**	**395**	**0**	**395**

Note:
a The noise exposure levels are estimated as CNEL in 5 dB increments surrounding the Vandenberg SFB airfield for existing flight operations and with the added proposed periodic operation of F-15 aircraft.
> = greater than; dB = decibel; CNEL = Community Noise Equivalent Level

Classroom Learning Interference and Non-school Speech Interference

Potential noise effects that would interfere with classroom were measured as $L_{eq(8hr)}$. Under the Proposed Action, the number of schools exposed to greater than 60 dB $L_{eq(8hr)}$ would be identical to the baseline; that is, no school types would be exposed to greater than 60 dB $L_{eq(8hr)}$. Similarly, Alternative 1 would not create any non-school speech interference events (>= 60 dB) whether windows were open or closed. (Non-school speech interference considers noise events during the CNEL daytime period defined as 7 a.m.–7 p.m.) Therefore, there would be no impacts to classroom learning or school speech interference under Alternative 1.

Residential Sleep Disturbance

Sleep disturbance is measured as an estimated probability of awakening. For the residential points of interest, including Lompoc and single and multifamily homes on Vandenberg SFB, the probability of awakening for current flight operations is less than 1 percent. Under the Proposed Action, the probability of awakening would remain the same—less than 1 percent. Therefore, there would be no impacts to residential sleep under Alternative 1.

Potential Hearing Loss

Implementation of the Proposed Action would not expose areas outside of the Vandenberg SFB airfield boundary to 80 dB CNEL or greater, so no residents, whether on or off Base, would experience the threshold value for potential for hearing loss under Alternative 1. Therefore, there would be no impacts related to hearing loss under Alternative 1.

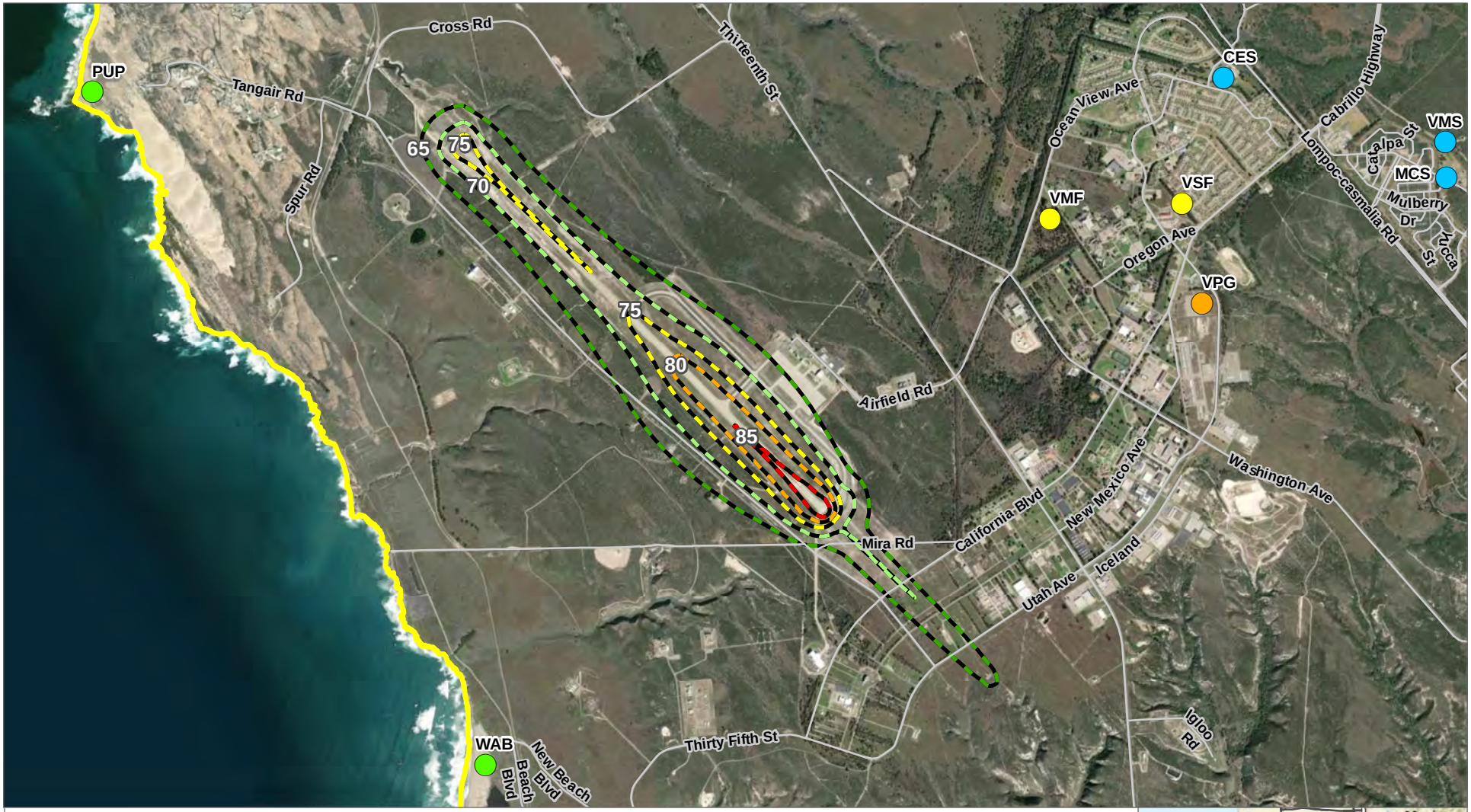


FIGURE 3-11

Proposed CNEL Noise Contours and Noise Points of Interests

Installation Boundary

Installation Road

Points of Interest

- Biological
- Public Assembly
- Residential Area
- School

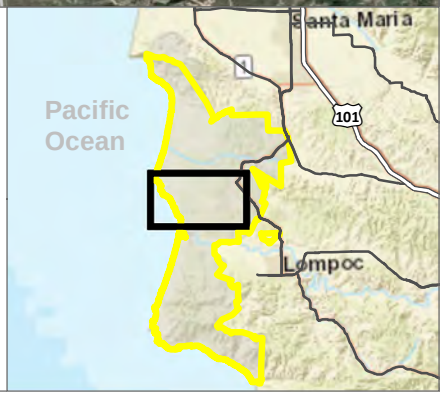
Proposed Action Contours (CNEL)

- 65 dB
- 70 dB
- 75 dB
- 80 dB
- 85 dB

N

0 ½ Miles

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N



Sound Pressure Level

The primary purpose of evaluating the impact of the Proposed Action on the 100-dB and 120-dB SPL contour lines is to evaluate potential impacts on sensitive biological resources (e.g., threatened or endangered species) and cultural resources (e.g., rock art, historic structures). Those potential impacts are discussed in **Sections 3.9.3** and **3.10.3**, respectively.

The Proposed Action would not change the 100-dB SPL contour line. SPL is the unweighted sound pressure level measured during a single event and is the true instantaneous sound pressure level. Because other transient aircraft currently use Vandenberg SFB, including other fighter jets and large transport cargo planes, it is not unexpected that the unweighted 100-dB SPL for a single event would not change. Of the POIs evaluated for the other noise metrics, only Purisima Point is within the 100-dB SPL contour line (see **Figure 3-10** above). Alternative 1 would expand the acreage within the 120-dB SPL contour line by 120 acres, which is confined to the Vandenberg SFB airfield. No POIs occur within the 120-dB SPL contour line; therefore, there would be no associated impacts under Alternative 1.

Construction Noise

Construction of the munitions storage igloos, upgrading existing roads and developing paved access roads, and constructing the AGE building would involve using diesel-powered heavy equipment, including excavation, filling, delivering materials, mixing and pouring cement and asphalt, trenching, and erecting structures. Construction and materials-handling equipment (e.g., excavators, tractors, concrete mixers, and trucks) could generate temporary noise levels between 75 and 89 dBA at a distance of 50 feet. Because sound attenuates at approximately 6 dB for every doubling of the distance from the source, at 400 feet, most construction noise would be less than about 65 dB (**Table 3-25**). None of the construction noise would be audible to any off-Base POIs. The munitions storage igloos are the largest construction project under Alternative 1, but would be sited in a remote location for explosives safety reasons and would not be audible to on-Base personnel. Impacts from construction noise would be anticipated to be short term and not significant under Alternative 1.

Table 3-25
Typical Construction and Material Handling Equipment and Expected Sound Levels (L_{max})

Equipment Description	Actual Measured Average L_{max} at 50 feet	Approximate Received L_{max} at[a]		
		100 Feet	200 Feet	400 Feet
Backhoe	78	72	66	60
Compactor (ground)	83	77	71	65
Concrete mixer truck	79	73	67	61
Crane	81	75	69	63
Dozer	82	76	70	64
Dump truck	76	70	64	58
Excavator	81	75	69	63
Grader	89	83	77	71
Paver	77	71	65	59
Pickup truck	75	69	63	57
Roller	80	74	68	62

Source: Federal Highway Administration, 2006
Note:
a Assumes sound attenuation of 6 dB per every doubling of distance
L_{max} = maximum sound level

3.11.3.2 Alternative 2

Alternative 2 would have the same impacts as Alternative 1; therefore, impacts related to noise would be anticipated to be short term and not significant under Alternative 2.

3.11.3.3 No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E or F-15EX fighter jets at Vandenberg SFB for testing of and training for a homeland defense mission. No additional personnel would be stationed at Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 operations. Over time, the mission capabilities of weapons systems would diminish along with the DAF's ability to fulfill its mission to defend the US. Under the No Action Alternative, no impacts to the noise environment beyond baseline conditions would occur.

3.11.3.4 Cumulative Effects

The past and present activities at Vandenberg SFB consist of rocket and missile launch missions and aircraft operations. In addition, Vandenberg SFB has been and is currently used for transient military aircraft operations. The rocket and missile launch missions are expected to continue and potentially increase in number of launches. Accordingly, aircraft operations that support those missions may potentially increase. The construction noise associated with the Proposed Action would be short term and not significant. When considered in conjunction with other reasonably foreseeable future actions at Vandenberg SFB (**Table 3-1**), cumulative impacts associated with noise would be long term but not significant.

The additional noise under the Proposed Action was estimated to have no effect to off-Base receptors based on multiple noise metrics. The Proposed Action would create limited flight operations at Vandenberg SFB (i.e., one to two weeks per year). The Proposed Action would not create any supersonic sound (i.e., sonic booms). Therefore, there would be no associated cumulative impacts when considered in conjunction with the projects listed in **Table 3-1**.

3.11.3.5 Environmental Protection Measures for Noise

No specific EPMs have been identified for noise impacts. As indicated in **Section 3.15.3.5**, the DAF would comply with Occupational Safety and Health Administration (OSHA), Air Force Occupational Safety and Health, California Division of Occupational Safety and Health regulations, and other recognized standards and applicable DAF regulations or instructions related to personnel working in high noise environments such as the airfield.

3.12 COASTAL ZONE MANAGEMENT ACT

3.12.1 Definition of the Coastal Zone Resource

As defined in the Section 304 of the *Coastal Zone Management Act of 1972* (16 USC §§ 1451–1465) (CZMA), as amended through the *Energy Policy Act of 2005* (Public Law 109-58):

> "the term 'coastal zone' means the coastal waters (including the lands therein and thereunder) and the adjacent shorelands (including the waters therein and thereunder), strongly influenced by each other and in proximity to the shorelines of the several coastal states, and includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches. … The zone extends inland from the shorelines only to the extent necessary to control shorelands, the uses of which have a direct and significant impact on the coastal waters, and to control those geographical areas which are likely to be affected by or vulnerable to sea level rise. Excluded from the coastal zone are lands the use of which is by law subject solely to the discretion of or which is held in trust by the Federal Government, its officers or agents."

Vandenberg SFB is owned and operated by the Federal Government and is therefore excluded from the coastal zone.

3.12.2 Existing Conditions

The CZMA is the primary federal law for managing coastal zone resources. Federal activities, as defined in the CZMA, that may have reasonably foreseeable effects on natural resources or land or water uses in the coastal zone, regardless of the project's location, are required to be consistent, to the maximum extent practicable, with the enforceable policies of federally approved state coastal management programs (16 USC § 1456; 15 CFR Part 930). The state of California implements the CZMA through its federally approved California Coastal Management Plan (CCMP) under the *California Coastal Act of 1976* (CCA). As noted, federally controlled lands are not part of the coastal zone (15 CFR § 923.33); however federal agencies submit a consistency determination when an action could have reasonably foreseeable effects on coastal zone uses or resources. DAF's implementing policy incorporates this requirement and also states that a consistency determination must be accomplished when the activity is likely to affect such resources in the reasonably foreseeable future (AFMAN 32-7003, *Environmental Conservation*, Section 3.26.2, *Federal Consistency Determination*). If a federal activity would not foreseeably affect the coastal use or resource, then the federal agency may prepare a negative determination for that action. The state, through the CCC, reviews the DAF's consistency or negative determinations for federally authorized projects pursuant to the CZMA and the CZMA's implementing regulations. As of the publication of this EA for public comment, the CCC has not provided DAF with its decision on its review of the consistency determination.

The ROI for coastal zone management extends to those coastal resources off Vandenberg SFB property that may be affected by the Proposed Action. The CCA defines the coastal zone as the water extending seaward to the outer limits of the state's jurisdiction; land extending inland approximately 1,000 yards from the mean high tide line; or land in significant coastal estuarine, habitat, and recreational areas, extending inland to the first major ridgeline paralleling the sea or five miles from the mean high tide line of the sea, whichever is less.

3.12.3 Environmental Consequences

The DAF reviewed the CCMP to identify potentially enforceable policies relevant to the Proposed Action according to Division 20 of the California Public Resources Code and prepared a consistency determination (see **Appendix E**). **Table 3-26** presents the identified policies outlined in the consistency determination. The DAF has determined that the Proposed Action is consistent with the relevant policies of the CCA.

Table 3-26
Enforceable Policies of the CCMP Relevant to the Proposed Action

Article	Section	State Enforceable Policy
Article 4: Marine Environment	30230	Marine resources; maintenance
	30231	Biological productivity; water quality
Article 5: Land Resources	30240	Environmentally sensitive habitat areas; adjacent developments
	30244	Archaeological or paleontological resources

The DAF evaluated the F-15 aircraft and sortie frequencies in addition to existing aircraft usage. Noise levels of the periodic flight operations would be no different than existing Vandenberg SFB airfield operations and would have no discernible effect on the marine environment or nesting western snowy plovers or California least terns. Continued implementation of minimization and avoidance measures under existing biological opinions and letters of assurance would assure no impacts and consistency with relevant enforceable polices. The Proposed Action would affect only a small area of Burton Mesa Chaparral (only 0.04 percent of remaining chaparral vegetation), and it has no ecological connection or impact to similar resources outside the Vandenberg SFB boundaries. Additionally, the siting of the munitions storage igloos would create land use restrictions in the surrounding area, preventing future development and disturbances to remaining Burton Mesa Chaparral. As discussed in **Sections 3.8.3.3** and **3.10.3**, respectively, the Proposed Action would have no impacts to water quality or cultural resources. In accordance with the analysis in the consistency determination (summarized herein), the DAF determined that the Proposed Action would be consistent with the relevant policies under Articles 4 and 5 of the CCA (see **Table 3-26**).

3.12.4 No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E or F-15EX fighter jets at Vandenberg SFB for testing of and training for a homeland defense mission. No additional personnel would be stationed at Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 operations. Over time, the mission capabilities of weapons systems would diminish along with the DAF's ability to fulfill its mission to defend the US. Vandenberg SFB would continue to be consistent to the maximum extent practicable with the enforceable polices of the CCA.

3.12.5 Cumulative Effects

The past and present actions at Vandenberg SFB consists of rocket and missile launch missions and aircraft operations. In addition, Vandenberg SFB has been and is currently used for transient military aircraft operations. The rocket and missile launch missions are expected to continue and potentially increase in number of launches. Accordingly, aircraft operations that support those missions may potentially increase. Redevelopment of missile or rocket launch sites or construction of new launch sites would create additional land disturbances. The DAF may also construct a new air traffic control tower in the airfield and replace the airfield fence. When considered in conjunction with other reasonably foreseeable future actions at Vandenberg SFB (**Table 3-1**), cumulative impacts to sensitive habitats would not be significant because the projects would be designed to minimize impacts to sensitive habitat areas to the extent practicable. In addition, the construction of the munitions storage igloos would prevent future development and disturbance to sensitive habitat in the area surrounding the igloo sites.

3.13 INFRASTRUCTURE, INCLUDING TRANSPORTATION AND UTILITIES

3.13.1 Definition of the Resource

Infrastructure consists of the systems and structures that enable a population in a specified area to function. Infrastructure is wholly man-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as developed. Infrastructure components include transportation, utility systems, solid waste management, and stormwater infrastructure. The availability of infrastructure and its capacity to support more users, including future development of an area, are generally regarded as essential to continued economic growth.

Transportation infrastructure is the system of roadways, highways, and transit services that provide access to and from a particular location, as well as access to regional goods and services. Utilities include communications systems, electricity, natural gas, potable water, and sanitary sewage. Solid waste management relates to landfill capacity for disposal of non-hazardous solid waste (e.g., construction waste). Stormwater infrastructure includes the man-made conveyance systems that function alongside natural drainages to collect and control the rate of surface runoff during and after a precipitation event. In urbanized areas, stormwater that is not discharged to a waterbody is conveyed to sanitary sewers, which are systems that collect, move, and treat liquid waste prior to its discharge back into the environment. **Section 3.8** of this EA discusses stormwater conditions and potential impacts from the Proposed Action.

The ROI for infrastructure is Vandenberg SFB and the external infrastructure components and services relied upon to operate Vandenberg SFB.

3.13.2 Existing Conditions

3.13.2.1 Transportation

Vandenberg SFB can be accessed by vehicle via US Highway 101 and State Routes 1, 135, and 246. There are also six local access roads to Vandenberg SFB: Brown Road to the north, Lompoc-Casmalia Road to the southwest, Lompoc Road (which has two access roads to the south), West Ocean Avenue on the far south of Vandenberg SFB, and San Lucia Canyon Road, which is the access corridor for trucks onto the Installation. There are two local public bus services that connect the Installation to the nearby cities of

Santa Maria and Lompoc, both of which are operated on a regular schedule during weekdays. There are railroad lines that follow the coastline through the Installation, including one passenger train service operated by Amtrak. There are six airports surrounding Vandenberg SFB, including one on the Installation itself. The Pacific Ocean serves as Vandenberg SFB's western boundary, and marine traffic in the area consists mainly of fishing and commercial vessels. One boat dock is located on the Installation and is used for periodic loading and unloading of equipment (Vandenberg SFB, 2020).

Driving is the primary mode of transportation on Vandenberg SFB due to the distance between facilities. There are over 190 miles of roads on the Installation and three traffic lights. Six miles of State Route 1 run through Vandenberg SFB with four primary operating gates, three secondary gates, and one gate that is no longer in use. There are no issues with parking availability within the ROI. The transportation and road networks are in good condition and have sufficient capacity to meet current mission needs as well as the capacity to expand to accommodate future mission demand (Vandenberg SFB, 2020).

3.13.2.2 Communications

The communications system on Vandenberg SFB consists of Air Force Network non-secure and secure networks, telephone, power over ethernet, television service, Giant Voice (Vandenberg SFB's mass notification system), and Land Mobile Radio. The 30th Space Communications Squadron operates and maintains the Vandenberg SFB communications system. There are 116 towers, 55 navigational aids (NAVAIDs), and 86 radar systems. NAVAIDs are primarily clustered around the airfield while various towers and radar equipment are situated at different points across the Installation and communications lines are primarily located in the main cantonment area. While the communications system within the main cantonment area is adequate, the communications system within the ROI overall has limited connectivity in the southern portion of Vandenberg SFB. The communications architecture is currently undergoing projects to provide a more robust communication system that meets current and future mission needs (Vandenberg SFB, 2020).

3.13.2.3 Electricity and Natural Gas

Vandenberg SFB owns and maintains its own primary high-voltage power with a double redundant feeder. Pacific Gas and Power provides approximately 65 percent of the energy requirements of Vandenberg SFB through natural gas generation. A solar farm located by the main gate and owned by Pacific Gas and Power generates approximately 22 megawatts (MW) and accounts for about 35 percent of the Vandenberg SFB's energy needs.

Southern California Gas supplies natural gas to Vandenberg SFB. Natural gas is the main source of heating fuel for facilities on Vandenberg SFB. A recent project demolished many of the wood frame buildings within the ROI, leading to an approximately 50-percent reduction in natural gas usage on the Installation. The natural gas system is in good condition and there is sufficient capacity to meet current and future mission needs (Vandenberg SFB, 2020).

3.13.2.4 Potable Water Supply

The Coastal Branch of the Central Coast Water Authority (CCWA) supplies water to Vandenberg SFB. Water allotment is based on a percentage of state-wide precipitation from the previous year under the California State Water Project. The Installation has a minimum water requirement of approximately 1,946,033 gallons per day (gpd). When the allotment is below the requirement or when the system requires maintenance, Vandenberg SFB relies on well water. There are four wells and two 4-million-gallon water storage tanks in the northern portion of Vandenberg SFB and four water storage tanks with a total capacity of 750,000 gallons in the southern portion of the Base. Vandenberg SFB has a total combined water storage capacity of 15 million gallons.

There are six water treatment facilities on the Installation: the San Antionio Plant, four booster plants, and an emergency plant. The water system is in good condition and has the capacity to meet current mission needs as well as the capacity to expand to accommodate future mission demand (Vandenberg SFB, 2020).

3.13.2.5 Sanitary Sewage

Vandenberg SFB conveys wastewater to the City of Lompoc for treatment through a series of seven siphons. Flow to the plant is metered. The City of Lompoc has sufficient capacity to handle the wastewater demand from the Installation. The main pipes are asbestos-cement and clay pipe. There are issues with tree root intrusion causing damage, and most repairs involve slip-lining pipes. The overall system is in moderate condition and has capacity to meet current and future mission needs (Vandenberg SFB, 2020).

3.13.2.6 Solid Waste Management

Non-hazardous solid waste generated within the ROI is sent to the Santa Maria Municipal Landfill. Transportation of the waste between Vandenberg SFB and the landfill is conducted by Waste Management. Recycling is handled on Vandenberg SFB at a recycling center operated by two civilian personnel, which provides a source of revenue for the Installation.

3.13.3 Environmental Consequences

3.13.3.1 Evaluation Criteria

An infrastructure impact would be adverse if it causes

- measurable change or service reduction within the regional transportation network,
- prolonged or repeated interruption of public transportation services regionally,
- prolonged or repeated service disruptions to utility end users, or
- substantial increase in utility demand relative to existing and planned regional uses.

The condition and available capacity of infrastructure systems on Vandenberg SFB were obtained from the *Installation Development Plan, Vandenberg Air Force Base, California* (Vandenberg SFB, 2020). Both the existing condition and available capacity were used qualitatively to evaluate potential impacts of the Proposed Action to the infrastructure systems.

3.13.3.2 Alternative 1 (Preferred)

Transportation

Alternative 1 would not impact the transportation systems at Vandenberg SFB. Projects 2a, 5, and 6 involve general access roads but would not impact the public roads or other transportation systems. During construction of the access roads for Project 2a and 5, there may be temporary, minor, adverse impacts to transportation where the roads connect to Airfield Road. Local and regional roadways are considered in good condition and would be able to readily absorb construction-related traffic (Vandenberg SFB, 2020). Therefore, impacts to transportation would be temporary and not significant under Alternative 1.

Communications

The existing communications system at Vandenberg SFB is considered to meet the current missions of Vandenberg SFB but with some limitations, primarily on South Base. Under Alternative 1, Projects 5 and 6 would require the installation of new communications lines along existing roads. These communications lines would tie into the existing communications system at Vandenberg SFB. With the installation of new communication lines, the communications systems would have the capacity to meet the demand; therefore, there would be no impacts under Alternative 1.

Electricity and Natural Gas

Under Alternative 1, Projects 2a, 4, and 5 would involve the construction of the AGE building, four munitions storage igloos, and the lighting system for the LOLA, respectively, which would connect to the electrical system at Vandenberg SFB. Energy-efficient construction of new buildings, consistent with EO 13693, *Planning for Federal Sustainability in the Next Decade*, may minimize any increases in energy consumption. Therefore, net changes in long-term electrical demand would be anticipated to be minimal from the operation of the new facilities. The electrical system is overdesigned for current usage. The system has a

capacity of 100 MW with an existing peak load of just 25 MW (Vandenberg SFB, 2020). Natural gas usage has recently decreased because of the demolition of World War II-era wooden frame buildings (Vandenberg SFB, 2020). The natural gas supply and distribution system has approximately 58 percent unused capacity. The AGE building is the only facility in the Proposed Action that would add heating requirements. The Proposed Action would have no significant impacts to the existing natural gas system. Any potential short-term disruptions to electrical or natural gas service within the ROI during construction activities would be mitigated during project planning. Disruptions may occur from temporary service interruptions during disconnections for rerouting of above- or belowground service lines, or during installation of connections to the AGE building. Therefore, impacts related to electricity and natural gas service would not be significant under Alternative 1.

Potable Water Supply

Project 2a would require connection to the Vandenberg SFB potable water system, which has sufficient capacity to supply the facility. The water supply system has approximately 19 percent unused capacity. Therefore, there would be no impacts to the potable water supply system under Alternative 1.

Sanitary Sewer

Project 2a would require connection to the Vandenberg SFB sanitary sewer system, which connects to the City of Lompoc for treatment. The AGE building would produce a relatively small amount of wastewater, primarily during the one or two deployments per year. The City of Lompoc wastewater treatment has sufficient capacity to handle the proposed usage at the AGE building (Vandenberg SFB, 2020). Therefore, there would be no impacts to the sanitary sewer system under Alternative 1.

Solid Waste Management

In accordance with AFMAN 37-7002, *Environmental Compliance and Pollution Prevention*, generated solid waste would be collected and reused or recycled through Installation programs, with residual waste transported off Base for disposal in the municipal landfill operated by the City of Santa Maria. As done under current operations, contractors would comply with federal, state, and local regulations for the collection and disposal of solid waste from the proposed projects under the Proposed Action.

There would be non-significant, short-term impacts to solid waste during facility construction due to the temporary increase in construction debris that would require disposal under Alternative 1.

3.13.3.3 Alternative 2

Under Alternative 2, impacts to Vandenberg SFB infrastructure systems would be the same as Alternative 1 except for project 2b. Demolition debris from Building 1745 may contain lead-based paint and may require disposal at facilities permitted to handle such material (see **Section 3.14.3**). Current Vandenberg SFB waste disposal programs and procedures would be followed; current systems are sufficient to handle this waste type. Other impacts to infrastructure, including transportation and utilities, under Alternative 2 would be the same as Alternative 1.

3.13.3.4 No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E or F-15EX fighter jets at Vandenberg SFB for testing of and training for a homeland defense mission. No additional personnel would be stationed at Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 operations. Over time, the mission capabilities of weapons systems would diminish along with the DAF's ability to fulfill its mission to defend the US. Under the No Action Alternative, no impacts to infrastructure, including transportation and utilities, beyond baseline conditions would occur.

3.13.3.5 Cumulative Effects

The past and present activities at Vandenberg SFB consist of rocket and missile launch missions and aircraft operations. In addition, Vandenberg SFB has been and is currently used for transient military aircraft operations. The rocket and missile launch missions are expected to continue and potentially increase in

number of launches. Accordingly, aircraft operations that support those missions may potentially increase. The projects identified in **Table 3-1** would involve improvements to Vandenberg SFB utility systems and energy security on the Installation. While the Proposed Action and these project would result in a small cumulative increase in demand for utility services, long-term cumulative impacts would be anticipated to be not significant but beneficial.

3.13.3.6 Environmental Protection Measures for Infrastructure, Transportation, and Utilities

The measures listed in **Table 3-27** would be implemented to avoid or minimize impacts to infrastructure, including transportation and utilities.

Table 3-27
Infrastructure, including Transportation and Utilities Protective Measures

Infrastructure, Transportation, and Utilities Measures
Provide warning signs, cones, and flaggers when necessary to warn roadway users of construction activity near Airfield Road and to control traffic flow if necessary.
Report the disposal of construction debris off Base to the SLD 30, Installation Management Flight (SLD 30/CEI) Solid Waste Manager.
Coordinate solid waste disposal with SLD 30, Installation Management Flight (SLD 30/CEI) Solid Waste Manager and the recycling center to divert any recyclable material from landfill disposal.
Install utility infrastructure in accordance with any applicable codes and regulations.

SLD 30 = Space Launch Delta 30

3.14 HAZARD MATERIALS AND WASTE

3.14.1 Definition of the Resource

The *Comprehensive Environmental Response, Compensation, and Liability Act* (42 USC § 9601 et seq.) (CERCLA), as amended by the *Superfund Amendments and Reauthorization Act* (SARA) and the *Toxic Substances Control Act* (15 USC § 2601 et seq., as implemented by 40 CFR Part 761), defines hazardous materials (HAZMAT) as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. The OSHA is responsible for the enforcement and implementation of federal laws and regulations pertaining to worker health and safety under 29 CFR Part 1910. OSHA also includes the regulation of HAZMAT in the workplace and ensures appropriate training in their handling.

The *Solid Waste Disposal Act*, as amended by the *Resource Conservation and Recovery Act* (42 USC § 6901 et seq.), which was further amended by the *Hazardous and Solid Waste Amendments of 1984* (Public Law 98-616), defines hazardous wastes as any solid, liquid, contained gaseous, or semi-solid waste, or any combination of wastes, that pose a substantial present or potential hazard to human health or the environment. In general, both HAZMAT and hazardous wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health and welfare or the environment when released or otherwise improperly managed.

Toxic substances might pose a risk to human health but are not regulated as contaminants under the hazardous waste statutes. Included in this category are asbestos-containing materials (ACMs), lead-based paint (LBP), radon, and polychlorinated biphenyls (PCBs). The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards such as locations, quantities, and conditions help in determining the significance of a proposed action.

In accordance with Air Force Policy Directive 32-70, *Environmental Considerations in Air Force Programs and Activities*, the DAF is committed to performing the following actions:

- cleaning up environmental damage resulting from its past activities,
- meeting all environmental standards applicable to its present operations,
- planning its future activities to minimize environmental impacts,
- responsibly managing the irreplaceable natural and cultural resources it holds in public trust, and
- eliminating pollution from its activities wherever possible.

Department of the Air Force Manual 32-1067, *Water and Fuel Systems*, identifies compliance requirements for USTs and ASTs, and associated piping, that store petroleum products and hazardous substances. Evaluation of HAZMAT and hazardous wastes focuses on USTs and ASTs as well as the storage, transport, and use of pesticides, fuels, oils, and lubricants. Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a Proposed Action. In addition to being a threat to humans, the improper release of HAZMAT and hazardous wastes can threaten the health and wellbeing of wildlife species, botanical habitats, soil systems, and water resources. In the event of HAZMAT and hazardous wastes release, the extent of contamination would vary based on the type of soil, topography, weather conditions, and water resources that occur in the vicinity of the event.

AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, establishes procedures and standards that govern management of HAZMAT throughout the DAF. This manual applies to all personnel acting on behalf of the DAF who authorize, procure, issue, use, or dispose of HAZMAT, and to those who manage, monitor, or track any associated activities.

The DAF Environmental Restoration Program (ERP), also known as the DAF Environmental Cleanup Program, responds to releases of hazardous substances, pollutants, and contaminants resulting from mission activities, including manufacturing, industrial, maintenance, and other DAF operations. The ERP operates on a risk-based framework, in that the sites posing the greatest environmental risk are prioritized first for cleanup to ensure the worst sites are addressed first. Vandenberg SFB complies with all applicable legal requirements governing cleanup, including the Defense ERP statute (10 USC §§ 2700–2711) and CERCLA and its implementing regulations, and is guided by policy issued by DoD. The DAF ERP addresses two categories of cleanup sites, the Installation Restoration Program (IRP) and the Military Munitions Response Program (MMRP), at active installations in the US and its territories. The Defense Environmental Restoration Account is authorized to fund cleanup at active, Reserve, and US Space Force installations. Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in the identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be foreclosed where a groundwater contaminant plume remains to complete remediation).

The ROI for the Proposed Action for hazardous materials and waste is Vandenberg SFB in the proposed projects and any areas used for storing and managing HAZMAT or hazardous waste that would be generated under the Proposed Action.

3.14.2 Existing Conditions

3.14.2.1 Hazardous Materials and Wastes

HAZMAT is used throughout Vandenberg SFB in various uses and quantities. Types of hazardous substances found on Vandenberg SFB may include propellants, batteries, fuels, hydraulic fluids, and munitions. Hazardous and toxic substances generated at Vandenberg SFB are regulated through the HAZMAT management process per AFMAN 32-7002 and 40 CFR Part 112.

USEPA considers Vandenberg SFB a large-quantity generator of hazardous waste, which means that the facility disposes of more than 1,000 kilograms (about 1 ton) of hazardous waste per month or more than 1 kilogram per month of acutely hazardous waste per month. Under the USEPA regulations, large-quantity generators are not limited to the quantity of hazardous waste accumulated on Vandenberg SFB but may

only accumulate hazardous waste on Base for 90 days. Generated waste must be contained and is subject to the requirements defined in 40 CFR Part 265, subparts W and DD; 40 CFR Part 262, subparts B and M; pre-transport requirements under 40 CFR § 262.30–262.33; 40 CFR Part 268; and are required to submit a biennial hazardous waste report (USEPA, 2023a; Vandenberg SFB, 2022b).

3.14.2.2 Fuel Storage

There are six USTs used at Vandenberg SFB for the storage of automotive fuel (Vandenberg SFB, 2022c). The Military Vehicle Fueling Facility (Building 10726) has three 10,000-gallon USTs. Three 12,000-gallon USTs are located at the Army and Air Force Exchange Service (Building 14400). Aircraft fuel is stored in ASTs in the fuel farm on Airfield Road near the flightline. The fuel farm contains a tank truck loading/ unloading rack and has secondary containment with sufficient capacity to account for precipitation. Aircraft are fueled by truck or bowser directly on the tarmac and any defueling occurs by bowser adjacent to the Flight Maintenance Hangar. The mobile refueling trucks are equipped with maintained spill response equipment. Additional fuel for equipment use is stored in fuel cans in the heavy equipment shop while vehicles are serviced off Installation by the Vehicle Maintenance Squadron. Waste fuel is managed in accordance with the Vandenberg SFB Hazardous Waste Management Plan (Vandenberg SFB, 2022b).

3.14.2.3 Installation Restoration Program and Other Potentially Contaminated Sites

The IRP was established in 1975 under the Defense ERP to address contamination from past activities and seeks to restore lands to useable conditions. The IRP program is managed by the Air Force Civil Engineer Center Installation Support Section at Edwards AFB and is subject to CERCLA regulations (Vandenberg SFB, 2022b).

Within the Installation, 604 (556 IRP/48 MMRP) sites are documented in the Vandenberg SFB database. These sites occur throughout Vandenberg SFB. Thirty-nine sites remain open in various stages of investigation or remediation. Additionally, several areas of concern are located throughout the Installation. In the ROI, sites are primarily centered around the main developed areas to the south and east. These areas are characterized by contaminants that include hazardous wastes storage and disposal, fueling, oil storage and separators, and other various HAZMAT storage used for maintenance and operations activities (**Figure 3-12**).

3.14.2.4 Perfluoroalkyl Substances and Aqueous Film Forming Foam

PFAS is a group of synthetic fluorinated chemicals employed in a wide variety of residential, commercial, and industrial uses and can be found in everyday items such as nonstick cookware, stain-resistant fabric and carpet, certain types of food packaging, and firefighting foam (AFCEC, 2024). Scientific studies have shown that exposure to some PFAS in the environment may be linked to harmful health effects in humans and animals. In recent years, the USEPA has been taking steps to address PFAS and protect communities across the US. In 2016, the USEPA announced advisory levels for two types of PFAS in drinking water, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). In April 2024, the USEPA finalized a critical rule to designate two of the most widely used PFAS (PFOA and PFOS) as hazardous substances under CERCLA (USEPA, 2024b).

Aqueous film forming foam (AFFF), which the DAF began to use in the 1970s to extinguish petroleum-based fires, contains both PFOS and PFOA. In August of 2016, the DAF began phasing out PFOS-based AFFF and other AFFF products and introduced newer, more environmentally friendly formulas. In August 2017, the DAF finished the phase-out and completed the new foam delivery. All DAF investigation and mitigation work relating to PFOS and PFOA is performed in accordance with CERCLA, applicable state laws, and the USEPA's lifetime drinking water health advisory of 70 parts per trillion (AFCEC, 2024).

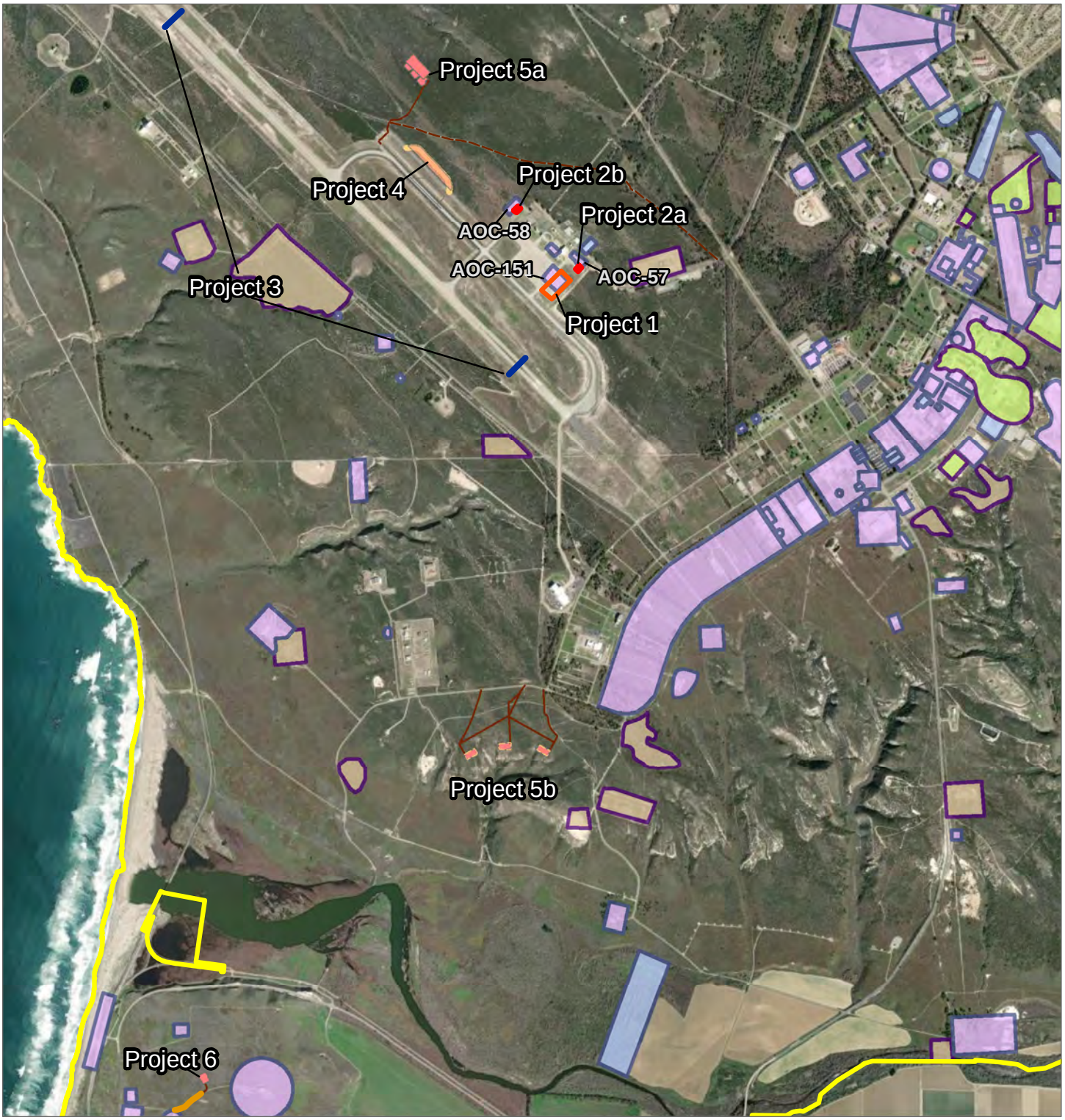


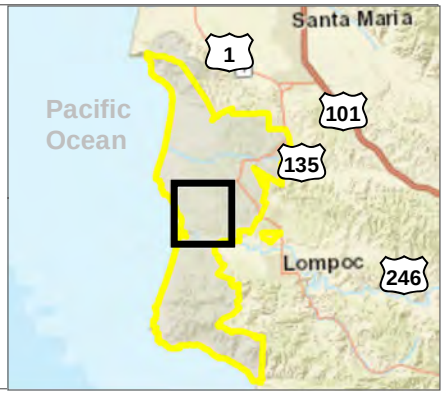
FIGURE 3-12
Hazardous Waste

Installation Boundary
Area of Concern (Closed)
Area of Concern (Open)
Installation Restoration Program Site (Closed)
Installation Restoration Program Site (Open)

N

0 ½ Miles

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N



There are five AFFF release sites located in vicinity of the runway and the cantonment area of the Installation centered on California Boulevard. Of these sites, two are associated with fuel spills on the adjacent Cabrillo Highway, and the other three are centered around the airfield and include the former fire training area, a spray nozzle (refractometer) test area, and a 2009 AFFF release. Per a 2019 site inspection report, each of these three releases contain soil analysis concentrations of PFOS that exceed USEPA screening values (Vandenberg SFB, 2019). The site inspection report also determined that groundwater analysis at the locations of the former fire training area and the two fuel spills contained concentrations of PFOS, PFOA, and combined PFOS and PFOA that exceed USEPA health advisory limits and the spray nozzle test area exceeded values for PFOS and PFOA in sediment analysis.

3.14.2.5 Radon

Radon is an odorless, colorless, radioactive gas that develops from the natural breakdown of uranium in soil and rock. Radon can migrate through permeable rocks and soils and seep into buildings or structures, thereby posing an atmospheric human health risk. The national standard of concern for indoor radon is 4 picocuries per liter (pCi/L) in the air. USEPA and the United States Surgeon General have evaluated the radon potential around the country to organize and assist building code officials in deciding whether radon-resistant features are applicable in new construction. Radon zones can range from 1 (high) to 3 (low). The USEPA radon zone for Santa Barbara County, California is Zone 1 (high potential, predicted indoor average level greater than 4 pCi/L); however, variations in the radon level throughout the county may exist (USEPA, 2023). Each zone designation reflects the average short-term radon measurement that can be expected in a building without the implementation of radon control methods.

3.14.2.6 Pesticides

The application of all pesticides at Vandenberg SFB includes herbicides, fungicides, insecticides, and rodenticides and occurs in accordance with the *Federal Environmental Pesticide Act of 1972* (7 USC § 136) (Vandenberg SFB, 2021b).

3.14.3 Environmental Consequences

3.14.3.1 Evaluation Criteria

A HAZMAT or hazardous waste impact would be adverse if it

- generates, uses, or stores HAZMAT or hazardous wastes in violation of federal or state regulations; or
- exposes construction workers to increased health risks from working in existing contamination without proper training and equipment.

3.14.3.2 Alternative 1 (Preferred)

Hazardous Materials and Wastes

Under Alternative 1, a limited use of certain HAZMAT may be required during operation of F-15E/F-15EX aircraft and facility construction and demolition activities. Such HAZMAT might include paints, welding gases, solvents, preservatives, sealants, and pesticides. Additionally, hydraulic fluids and petroleum products, such as diesel, gasoline, and jet fuel are expected to be used in construction and demolition equipment and vehicles and for aircraft operations. As such, Alternative 1 would have the potential for the accidental discharge or spill of HAZMAT that could contaminate the environment or result in exposure of personnel to such contaminants.

Construction activities under Alternative 1 would have the potential to unearth contaminants in environmental media not yet known or identified for management action. Even without a major release or discovery event, multiple minor releases of HAZMAT could affect the environment or persons in the vicinity. If encountered, HAZMAT used or generated during construction activities would be handled, stored, and disposed of in accordance with federal, state, and local laws and regulations. All applicable permits for the

handling and disposal of HAZMAT would be obtained prior to starting construction activities. Construction work under Alternative 1 would be subject to the procedural requirements of the Vandenberg SFB Hazardous Waste Management Plan and other applicable management plans to prevent and minimize risks associated with contaminant release or transport in the environment. During construction or demolition, if HAZMAT is discovered, work in that location would stop until the potential contamination has been properly evaluated and addressed.

The use of ACM, LBP, and PCBs was banned in 1977, 1978, and 1979, respectively; therefore, facilities constructed under Alternative 1, would not use ACM, LBP, or PCBs.

With the use of appropriate BMPs, impacts to HAZMAT and hazardous waste would not be significant under Alternative 1.

Fuel Storage

None of the proposed construction or demolition projects on the Installation would impact the current fuel storage system. Fuel use associated with F-15 operations would be limited to one to two weeks of the year; therefore, adverse impacts to fuel storage or from fueling under Alternative 1 would be short term and not significant.

Environmental Restoration Program Sites

Under Alternative 1, Projects 1 and 2a would be located within proximity of closed areas of concern (see **Figure 3-12**). Project 2a would be located within Area of Concern (AOC)-57, the site of a total petroleum hydrocarbons gasoline spill that was associated with an oil and water separator. The soil within this area has been previously excavated to 10 feet below ground surface and has been replaced with clean backfill soils. The site has been determined to be accepted as a closed AOC; however, various soil contamination in the vicinity may be of concern and health and safety precautions for future construction in this area are recommended.

Project 1 would be located within proximity of AOC-151. A 1997 report determined that AOC-151 is closed, and no further sampling is needed at this site (CalEPA 1997a, 1997b).

Projects 3, 4, 5, and 6 would not be in the vicinity of known AOC or ERP sites; therefore, no impacts would occur from implementation of these actions.

With implementation of health and safety precautions associated with AOC-57, impacts to ERP sites would be short term and not significant under Alternative 1.

Perfluoroalkyl Substances and Aqueous Film Forming Foam

As of 2017 and in compliance with CERCLA regulations, US military airports have phased out the use of PFAS and AFFF, requiring all fire suppression systems to replace PFAS and AFFF containing materials with fluorine-free foam products by October 2024. As such, these substances would not be used in construction projects or flight operations under Alternative 1; therefore, no adverse impacts would occur.

Radon

The USEPA radon zone for Santa Barbara County is Zone 1 (high potential, predicted indoor average level greater than 4 pCi/L). It is possible that new facilities constructed under Alternative 1 could have indoor radon screening levels greater than 4 pCi/L. Radon would be managed in new construction by incorporating passive features into the design that limit the ability for radon to enter buildings and employing BMPs, such as conducting periodic radon testing in each new or renovated building. Post-construction radon management measures, such as installing ventilation systems to remove radon that has already entered the building, would be taken in buildings that test higher than 4 pCi/L. Therefore, adverse impacts would be long term but not significant under Alternative 1.

Pesticides

Under Alternative 1, there could be an increase in the application of pesticides, herbicides, fungicides, insecticides, and rodenticides used during construction, renovation, and demolition activities. Herbicide and pesticide applications would have the potential to adversely impact non-target species, result in downstream contamination from application site runoff, and cause unintentional releases to the environment by spills and application errors of chemicals. Use of pesticides, herbicides, fungicides, insecticides, and rodenticides during demolition or renovation and after construction activities would be conducted on an as-needed basis consistent with federal, state, and local regulations. Therefore, potential adverse impacts from increased pesticide usage would be short term and not significant under Alternative 1.

3.14.3.3 Alternative 2

Hazardous Materials and Wastes

Under Alternative 2, Project 2b would involve the demolition of Building 1754, which would be replaced by a new AGE/administration building in support of F-15 operations. Concerns of ACM, LBP, and PCB are associated with the age of a building, specifically buildings constructed during or before 1974. The use of ACM, LBP, and PCBs was banned in 1977, 1978, and 1979, respectively.

Two 2022 building inspection reports identified that Building 1754 contains leaded materials. As such, BMPs for proper handling and disposal of materials would be required to limit contamination and exposure concerns when demolishing the building. Appropriate work plans would be prepared and coordinated with the SLD 30 manager of toxic materials to ensure that all regulatory requirements are met.

Impacts to HAZMAT and hazardous wastes from Projects 1, 3, 4, 5, and 6 under Alternative 2 would be the same as Alternative 1. With the use of appropriate BMPs, impacts from Project 2b would be short term and not significant under Alternative 2.

Environmental Restoration Program Sites

Under Alternative 2, impacts from Project 1 would be the same as those identified in Alternative 1. Project 2b would be in proximity to closed site AOC-58 (see **Figure 3-12**). Because this site has been determined to be closed, no adverse effects would be expected to occur.

Projects 3, 4, 5, and 6 would not be in the vicinity of known AOC or ERP sites; therefore, no impacts would occur from implementation of these actions.

Perfluoroalkyl Substances and Aqueous Film Forming Foam

Under Alternative 2, impacts from PFAS and AFFF would be the same as Alternative 1.

Radon

Under Alternative 2, impacts from radon would be the same as Alternative 1.

Pesticides

Under Alternative 2, impacts from pesticide use would be the same as Alternative 1.

3.14.3.4 No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E or F-15EX fighter jets at Vandenberg SFB for testing of and training for a homeland defense mission. No additional personnel would be stationed at Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 operations. Over time, the mission capabilities of weapons systems would diminish along with the DAF's ability to fulfill its mission to defend the US. Under the No Action Alternative, construction within AOC-57 would not occur and no concerns of exposure to contaminated soil would be expected. Therefore, long-term, minor, beneficial impacts to hazardous wastes, as well as contaminated sites, would

be expected to occur. Impacts related HAZMAT, fuel storage, PFAS and AFFF, radon, and pesticides beyond baseline conditions would not occur.

3.14.3.5 Cumulative Impacts

The past and present activities at Vandenberg SFB consist of rocket and missile launch missions and aircraft operations. In addition, Vandenberg SFB has been and is currently used for transient military aircraft operations. The rocket and missile launch missions are expected to continue and potentially increase in number of launches. Accordingly, aircraft operations that support those missions may potentially increase. The projects listed in **Table 3-1** would have the potential to increase the need for and use of HAZMAT and may in turn increase the generation of hazardous waste through construction and an increase in activities such as rocket launches. These increases could occur temporarily during construction or maintenance activities, and/or over the long term due to new and continued operation and upkeep requirements. Depending on the amounts and types of HAZMAT and hazardous waste that are associated with each project, there could be a potential increased need for physical infrastructure used to manage these materials and personnel to process and track materials present on the Installation. Therefore, when considered in conjunction with other reasonably foreseeable future actions at Vandenberg SFB, cumulative impacts to HAZMAT and hazardous waste would be long term but minor because the projects would be required to comply with the DAF regulations and the Vandenberg SFB Hazardous Waste Management Plan.

3.14.3.6 Environmental Protection Measures for Hazardous Materials and Waste

The measures listed in **Table 3-28** would be implemented to avoid or minimize impacts from HAZMAT and hazardous waste.

Table 3-28
Hazardous Materials and Waste Control Measures

Hazardous Materials and Waste Measures
Properly dispose of hazardous waste through identification, characterization, sampling (if necessary), and analysis of wastes generated. Coordinate demolitions with the Vandenberg SFB Toxics Manager as well as all disposals of hazardous waste.
Properly identify and use all hazardous materials in accordance with manufacturer's specifications to avoid accidental exposure to or release of hazardous materials required to operate and maintain construction equipment.
Procure and gain approval of hazardous materials through the Vandenberg Hazardous Materials Pharmacy (HazMart). Report monthly usage of hazardous materials to the HazMart to meet legal reporting requirements.

HazMart = Hazardous Materials Pharmacy

3.15 SAFETY

3.15.1 Definition of the Resource

This section discusses safety associated with ground, explosives, and flight operations. Ground safety considers all ground operations including construction of facilities that would support the F-15 flight operations and associated mission training activities. Ground safety also considers the safety of personnel and facilities on the ground that may be placed at risk from flight operations in the vicinity of the airfield and in the airspace. Although ground and flight safety are addressed separately, in the immediate vicinity of the runway, risks associated with safety-of-flight issues are interrelated with ground safety concerns.

Explosives safety relates to the management and safe use of ordnance and munitions. Flight safety considers aircraft flight risks such as mid-air collision, BASH, and in-flight emergencies. The Air Force has safety procedures and aircraft-specific emergency procedures produced by the original equipment manufacturer of the aircraft.

The ROI for Safety includes areas of Vandenberg SFB where construction of facilities would occur, and operational areas including the munitions storage igloos, LOLA, AGE building, airfield, and airspaces surrounding Vandenberg SFB.

3.15.2 Existing Conditions

3.15.2.1 Ground Safety

Ground safety includes risks during facility construction, ground and industrial operations, and motor vehicle use. Ground mishaps can occur from the use of equipment or materials and from maintenance functions. All Vandenberg SFB activities are subject to OSHA, Air Force Occupational Safety and Health (AFOSH), and California OSHA regulations and procedures. The AFOSH program is explained in Air Force Instruction (AFI) 91-202, *The US Air Force Mishap Prevention Program*. and AFMAN 91-203, *Air Force Occupational Safety, Fire, and Health Standards*. AFMAN 91-203 defines the DAF's minimum safety, fire protection, and occupational health standards, including additional requirements not addressed by the OSHA standards. DAF safety programs covering industrial activities, operation of motor vehicles and other equipment, and everyday operations are continuously refined as new activities and new information becomes available. The SLD 30 Safety Office oversees implementation of safety programs to ensure that all civilian and military personnel, including contractors, implement safety requirements and procedures in their operations.

Ground access is either restricted or limited in Clear Zones (CZ) and Accident Potential Zones (APZs) around the airfield where there is a higher aircraft accident potential (see **Section 3.15.1.3**). These areas extend out from both ends of the runway where aircraft are either taking off or landing and may include lateral CZs along the runway.

The Fire and Emergency Services Flight of the 30th Civil Engineer Squadron provides structural, hazardous material, aircraft crash, fire prevention, fire protection, and emergency medical response services for all facilities and personnel.

3.15.2.2 Explosive Safety

Explosives safety includes concerns from aircraft munitions, propellants (solid and liquid), pyrotechnics, warheads, explosives devices, and chemical agent substances and associated components that present real or potential hazards to life, property, or the environment. DESR6055.09_AFMAN, *Explosives Safety Standards*, defines the guidance and procedures for munitions storage and handling.

The EOD Flight of the 30th Civil Engineer Squadron provides emergency response capabilities for the mitigation of explosives hazards including military munitions.

3.15.2.3 Flight Operation Safety

There are no flight squadrons based at Vandenberg SFB. The airfield supports regular transient military aircraft operations, including aircraft delivering materials and personnel supporting the Vandenberg SFB space launch mission. Approximately 7,366 flight operations occur annually at the Vandenberg SFB airfield. AFI 91-202 defines four categories of aircraft mishaps based on descending amount of property damage and impact to human life: in order of decreasing damage, Classes A, B, C, and D. Class A mishaps are of primary concern because of their potentially catastrophic effects on human life and financial consequences. The recent 5-year average (fiscal years 2017–2021) Class A mishap rate for the F-15 is 1.41/100,000 flying hours (Air Force Safety Center, 2024).

In accordance with DoD Instruction 4165.57, *Air Installations Compatible Use Zones*, APZs are established at military airfields to delineate recommended compatible land uses for the protection of people and property on the ground. APZs define the areas of a military airfield that would have the highest potential to be affected if an aircraft mishap were to occur. Air Installation compatible use zone guidelines identify three types of APZs for airfields based on aircraft mishap patterns: CZ, APZ I, and APZ II. The standard Air Force CZ for Class B runways, such as Runway 12/30 at Vandenberg SFB, is a rectangular area that extends

3,000 feet from the end of a runway, is 3,000 feet wide, and identifies the area with the highest probability for mishaps. APZ I, which typically extends 5,000 feet from the end of the CZ, has a lower mishap probability, and APZ II, which typically extends 7,000 feet from the end of APZ I, has the lowest mishap probability of the three zones.

A BASH threat exists at Vandenberg SFB from resident and migratory birds and the local deer population. SLD 30 has developed and implements a BASH plan to minimize the potential risk to operating aircraft from bird strikes or collisions with other wildlife (Vandenberg SFB, 2016). The BASH plan is based on habitat management, airfield management, and active risk mitigation measures. Habitat management includes practices to make the habitat near the flight line less attractive to birds and other wildlife such as maintaining grass height between 7 and 14 inches and maintaining drainage ditches to minimize retention of water. Airfield management includes removing animal carcasses to avoid attracting scavengers, frequent inspection, and repair, if necessary, of the perimeter fence, and ensuring perimeter gates are closed. Active risk reduction measures to remove or prevent birds and other wildlife from entering the airfield include mobile harassment (e.g., horns, sirens, flashing lights), bioacoustics, and propane gas cannons. Video surveillance cameras and night-vision technology are used to help detect the presence of deer and other wildlife. The plan is integrated among the SLD 30 Squadrons through defined roles and responsibilities and lines of communication identified in the BASH plan.

The Airfield Operations Flight of the 30th Operations Support Squadron manages the airfield, provides air traffic control and airfield services, and implements safety protocols for all airfield activity.

3.15.3 Environmental Consequences

Safety-related impacts from a proposed activity are assessed according to the potential to increase or decrease safety risks to personnel, the public, property, or the environment. Adverse impacts related to safety would occur if the Proposed Action results in an exceedance in AFOSH criteria or the improper implementation of established or proposed safety measures, creating an unacceptable safety risk to personnel or the public.

An impact would adversely affect safety if it:

- substantially increases risks associated with the safety of construction personnel, contractors, military personnel, or the local community,
- substantially hinders the ability to respond to an emergency, or
- introduces a new health or safety risk for which Vandenberg SFB is not prepared or does not have adequate management and response plans in place.

3.15.3.1 Alternative 1 (Preferred)

Ground Safety

Construction of the munitions storage igloos, AGE building, LOLA, and access roads would temporarily increase potential safety hazards associated with common industrial construction projects. Potential hazards would occur from operation of large machinery and earth-moving equipment, falls, use of hand and power tools, hoisting of materials, electricity, mobile work platforms and scaffolding, welding and other hot work, and handling and using hazardous chemical or materials. These and other ground safety hazards are identified and addressed in AFMAN 91-203.

Projects 1, 2, 3, and would occur within the airfield. Work along and on the active taxiway and runway would create ground hazards associated with flight operations. Coordination of construction activity with airfield management would minimize potential hazards.

With the implementation of safety standards established by OSHA and the DAF, development of contractor safety programs, and coordination with SLD 30 organizations for overseeing safety programs and

emergency responses, potential impacts to ground safety would be short term and not significant under Alternative 1.

Explosive Safety

The location of the munitions storage igloos is based on the required setback distances from inhabited buildings and general transportation routes, as prescribed in DESR6055.09_AFMAN. These standards are intended to provide a margin of safety in case of an explosion of munitions. Other potential safety risks would arise from handling individual munitions. This would occur during unloading munitions to and loading munitions from the storage igloos, transporting munitions to the LOLA, and loading munitions onto the F-15 aircraft. Existing DAF munitions handling and transport protocols and standards would be followed. These are operations that are routinely conducted at DAF bases. With the implementation of DAF guidelines, procedures, and regulations for storing, transporting, and handling munitions, impacts related to explosives safety would be long term but not significant under Alternative 1.

Flight Operation Safety

Flight operations pose an inherent safety risk. Aircraft mishaps and their prevention are of paramount concern to the DAF. The DAF Aviation Safety Program is designed to minimize the potential for any defined class of mishaps. ACC would coordinate with Vandenberg SFB airfield operations to schedule proposed periodic deployments of F-15 aircraft at Vandenberg to minimize conflicts with other airspace operations (e.g., rocket and missile launches, MQ-9 training, or SuperHawk drop zone). Installation of the AAS provides an added safety mitigation for potential emergencies during takeoffs and landings. During training missions, the F-15 aircraft will carry munitions with explosive components as stored in the igloos but will not be armed with a bomb/warhead. Based on DAF experience, there is almost no risk when carrying munitions. Therefore, impacts from mishaps while carrying munitions would not be significant. With the implementation of the DAF Aviation Safety Program standards and requirements and coordination with Vandenberg SFB airfield operations, impacts related to flight operation safety would be long term (i.e., during ongoing operations) but not significant under Alternative 1.

3.15.3.2 Alternative 2

Ground Safety

Impacts to ground safety under Alternative 2 would be the same as Alternative 1.

Explosives Safety

Impacts related to explosives safety under Alternative 2 would be the same as Alternative 1.

Flight Operations Safety

Impacts related to flight operation safety under Alternative 2 would be the same as Alternative 1.

3.15.3.3 No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E or F-15EX fighter jets at Vandenberg SFB for testing of and training for a homeland defense mission. No additional personnel would be stationed at Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 operations. Over time, the mission capabilities of weapons systems would diminish along with the DAF's ability to fulfill its mission to defend the US. Under the No Action Alternative, no impacts to safety beyond baseline conditions would occur.

3.15.3.4 Cumulative Impacts

The past and present activities at Vandenberg SFB consist of rocket and missile launch missions and aircraft operations. In addition, Vandenberg SFB has been and is currently used for transient military aircraft operations. The rocket and missile launch missions are expected to continue and potentially increase in

number of launches. Accordingly, aircraft operations that support those missions may potentially increase. When considered in conjunction with other reasonably foreseeable future actions at Vandenberg SFB (**Table 3-1**), cumulative safety-related impacts would be long term but not significant. However, previous experience in performing launch and flight operations and implementation of standard safety procedures would mitigate many of the safety risks. Similarly, the storage and handling of munitions are routinely done by the DAF and would be performed under standard explosives safety procedures. The potential construction of a new air traffic control tower and replacement of the existing airfield fence would have long-term beneficial cumulative effects on airfield safety through a potential reduction in BASH incidents.

3.15.3.5 Environmental Protection Measures for Safety

The measures listed in **Table 3-29** would be implemented to avoid or minimize impacts related to and safety.

Table 3-29
Safety Protective Measures

Safety Measures
All project activities would comply with Occupational Safety and Health Administration, Air Force Occupational Safety and Health, California Division of Occupational Safety and Health regulations, and other recognized standards and applicable Department of Air Force regulations or instructions.
Restrict general access to the proposed construction site through use of signs and fencing if feasible.
Comply with all provisions and procedures prescribed for the control and safety of personnel and visitors to the job site.
Provide for the health and safety of workers and all subcontractors who may be exposed to operations or services. Submit a health and safety plan to Vandenberg SFB and appoint a formally trained individual to act as safety officer. The appointed individual would be the point of contact on all problems involving job site safety.
Coordinate with the weapons safety specialist regarding the explosives safety standards for marking and establishing access control to the Munitions Storage Igloo sites.

3.16 SOCIOECONOMICS

3.16.1 Definition of the Resource

Socioeconomics is the relationship between economics and social elements, such as population levels and economic activity. Employment data identify gross numbers of employees, employment by industry or trade, and unemployment trends. Socioeconomic data are presented at the installation level to characterize baseline socioeconomic contributions at the county level.

3.16.2 Existing Conditions

Vandenberg SFB's military and civilian population and the related contractors' workforce directly contribute to the economic development in San Luis Obispo and Santa Barbara counties through capital investment, employment, and defense contracting and indirectly by enhancing regional household expenditures and demand by local businesses (Ramezani et al., 2021). Collectively, Vandenberg SFB's economic activities result in significant tax revenues, with large fiscal impact on the local and state governments. The existing combined military and civilian employment is approximately 4,287 staff (Ramezani et al., 2021). In 2020, the estimated economic output for Vandenberg SFB in Santa Barbara and San Luis Obispo counties was $4.52 billion.

3.16.3 Environmental Consequences

Consequences to socioeconomic conditions were assessed qualitatively in terms of the potential impacts on the local economy from implementation of the Proposed Action. The level of impacts from expenditures associated with the Proposed Action was assessed in terms of the existing socioeconomic affect the Vandenberg SFB has on the local economy in Santa Barbara and San Luis Obispo counties. The magnitude

of potential impacts can vary greatly depending on the location of an action. For example, implementation of an action that creates 10 employment positions might be unnoticed in an urban area or on a large active military base but might have significant impacts in a rural region. In addition, if potential socioeconomic changes from a Proposed Action result in substantial shifts in population trends or in adverse effects to regional spending and earning patterns, such changes may be considered adverse.

3.16.3.1 Alternative 1 (Preferred)

The proposed construction projects in the Proposed Action would create a short-term (two-year) beneficial demand for construction workers and equipment in addition to construction materials. During the operational phase, the Proposed Action would not create a large influx of military personnel (less than 1 percent). Up to 35 military personnel may be permanently stationed at Vandenberg SFB for implementation of the Proposed Action. The limited number of permanent personnel that may be assigned to Vandenberg SFB would not create a significant demand on schools or for housing.

During the one-week F-15 aircraft deployments that would occur each year, up to 250 military personnel may temporarily deploy to Vandenberg SFB. The deployed personnel would only be on the Base for two, one-week periods during the first year and for one, one-week period in subsequent years. It is anticipated that a majority of the deployed personnel would reside in on-Base housing and use Base facilities. Some personnel may use local hotels and restaurants, but the temporary deployment is expected to have no significant economic impact in the surrounding communities or counties.

The overall economic impact of the Proposed Action is expected to be beneficial but not significant in comparison to the estimated total economic output of $4.52 billion for Vandenberg SFB in 2020 in Santa Barbara and San Luis Obispo counties (Ramezani et al., 2021).

3.16.3.2 Alternative 2

The expected socioeconomic impact of Alternative 2 would be the same as Alternative 1.

3.16.3.3 No Action Alternative

Under the No Action Alternative, the DAF would not periodically operate F-15E or F-15EX fighter jets at Vandenberg SFB for testing of and training for a homeland defense mission. No additional personnel would be stationed at or temporarily deployed to Vandenberg SFB, and additional facilities would not be constructed in support of the proposed F-15 operations. Over time, the mission capabilities of weapons systems would diminish along with the DAF's ability to fulfill its mission to defend the US. Under the No Action Alternative, no beneficial impacts to socioeconomics in the region would occur.

3.16.3.4 Cumulative Impacts

The past and present activities at Vandenberg SFB consists of rocket and missile launch missions and aircraft operations. In addition, Vandenberg SFB has been and is currently used for transient military aircraft operations. The rocket and missile launch missions are expected to continue and potentially increase in number of launches. Accordingly, aircraft operations that support those missions may potentially increase. When considered in conjunction with other reasonably foreseeable future actions at Vandenberg SFB (**Table 3-1**), the cumulative effects of the Proposed Action on socioeconomic are expected to be not significant.

3.16.3.5 Environmental Protection Measures for Socioeconomics

No specific EPMs have been identified for socioeconomics.

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CHAPTER 5 REFERENCES

Air Force Civil Engineer Center (AFCEC). 2024. "Air Force Response to PFOS and PFOA." https://www.afcec.af.mil/WhatWeDo/Environment/Perfluorinated-Compounds / (accessed 2 July 2024).

AFCEC. 2023. *Level II, Air Quality Quantitative Assessment, Insignificance Indicators*. Air Force Civil Engineer Center Technical Support Division. April.

Air Force Safety Center. 2024. F-15 Flight Mishap History. https://www.safety.af.mil/Divisions/Aviation-Safety-Division/Aviation-Statistics/ (accessed 7 February 2024).

California Environmental Protection Agency (CalEPA). 1997a. *Work Request 9 Work Plan and Report for Areas Of Concern - Vandenberg Air Force Base, California*. 19 September.

CalEPA. 1997b. *DoD - Vandenberg AFB; Work Request 9 Draft Technical Report, June 29, 1997 and Final Work Plans, July 2,1997*. 24 September.

California Native Plant Society. 2024. California Rare Plant Ranks. https://www.cnps.org/rare-plants/california-rare-plant-ranks.

California Department of Fish and Wildlife (CDFW). 2023. California Natural Community List. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153398&inline. June.

CDFW. 2024. Special Animals List. Available online: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406&inline. (accessed 8 February 2024).

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service. FWS/OBS-79/31. Washington, DC.

Department of Defense Noise Working Group (DNWG). 2009. Technical Bulletin, Using Supplemental Noise Metrics and Analysis Tools. March.

DNWG. 2013a. Technical Bulletin: Speech Interference from Aviation Noise. December.

DNWG. 2013b. Noise – Induced Hearing Impairment Technical Bulletin. December.

Department of the Air Force (DAF). 1987. Mineral Resource Management Plan: Potential Exploration, Development, and Production of Oil and Gas Reserves, Vandenberg Air Force Base.

DAF. 2019. Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide – Fundamental, Volume 1 of 2.

DAF. 2020. Noisefile Reference Noise Level Database. https://wasmerconsulting.com/baseops.htm (accessed 4 May 2020).

DAF. 2023. *Level II, Air Quality Quantitative Assessment, Insignificance Indicators*. Air Force Civil Engineer Center Technical Support Division. April.

Dibblee, T.W., Jr. 1950. Geology of the Southwestern Santa Barbara County, California. California Division of Mines Bulletin 150.

Federal Highway Administration. 2006. *Construction Noise Handbook*. "Chapter 9.0 Construction Equipment Noise Levels and Ranges." FHWA-HEP-06-015. August. https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm

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 Service, Inc., Prepared for California Department of Fish and Game, State of California.

Greenwood, R.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.

Jennings, C.W. 1994. Fault Activity Map of California and Adjacent Areas, with Locations of Recent Volcanic Eruptions: California Division of Mines and Geology Geologic Data Map 6, 92 p., 2 pls., scale 1:750,000.

King, C.D. 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.

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

Lebow, C.G., D.R. Harro, R.L. McKim, C.M. Hodges, A.M. Munns, E.A. Enright, and L.G. Haslouer. 2014 The Sudden Flats Site: A 10,910–10,600-Year-Old Coastal Shell Midden on Vandenberg Air Force Base, Santa Barbara County, California. Applied EarthWorks, Inc., Lompoc, California. Submitted to 30th Civil Engineer Squadron, Installation Management Flight, Environmental Section, Environmental Assets (30 CES/CEIEA), Vandenberg AFB, California.

Lebow, C.G., D.R. Harro, R.L. McKim, C.M. Hodges, A.M. Munns, E.A. Enright, and L.G. Haslouer. 2015. The Sudden Flats Site: A Pleistocene/Holocene Transition Shell Midden on Alta California's Central Coast. California Archaeology 7:265–294.

Moratto, M.J. 1984. California Archaeology. Academic Press, Orlando, Florida.

National Oceanic and Atmospheric Administration. 2024. Summary of Monthly Normals – Santa Barbara, CA US. National Oceanic Atmospheric Administration.

Pitts-Olmedo, K., R.C. Newcomb, and V.M. Eisenhart. 2024. Draft Cultural Resource Investigations Supporting Section 106 Compliance for Air Combat Command Strategic Basing for F-15E Testing on Vandenberg Space Force Base Santa Barbara County, California, 813-21-038, Prepared by Applied EarthWorks, Inc. for Space Launch Delta 30, Department of the Air Force. (April).

Polanco, J. 2020. Section 110 DOE Atlas ICBM Launch Complexes District at Vandenberg AFB. Letter reply to USAF_2020_1016_022 from J. Polanco, State Historic Preservation Officer, California Office of Historic Preservation, to Lt. Col. Hansen, Vandenberg AFB. November 23.

Polanco, J. 2023. Section 110 Evaluation, Tangair Siding-to-Pine Canyon Freight Haul Road and Staging Camps (CA-SBA-1779H and -2086H), Santa Barbara County. Letter No. USAF_2023_0927_001 from State Historic Preservation Officer, State of California Office of Historic Preservation. November 1.

Ramezani, C., S.F. Hamilton, A. Lustig, and S. Rhode. 2021. Economic Impact of Vandenberg Air Force Base on Santa Barbara and San Luis Obispo Counties. California Polytechnic State University.

Reynolds, Smith, and Hill, Inc. 1985. Phase I Problem Identification and Records Search, Vandenberg AFB IRP. Jacksonville, FL.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento. 1300 pp.

Schmalzer, P.A., and C.R. Hinkle. 1987. Monitoring Biological Impacts of Space Shuttle Launches from Vandenberg Space Force Base: Establishment of Baseline Conditions. NASA Technical Memorandum 100982. Prepared by Bionetics Corporation, John F. Kennedy Space Center, FL.

Shipman, G.E. 1981. Soil Survey of Santa Barbara County, South Coastal Part. U.S. Department of Agriculture, Soil Conservation Service, Washington, DC.

State Water Resources Control Board. 2022. Surface Water Quality Assessment. California Environmental Protection Agency, Final Staff Report. 2020-2022 Integrated Report. For Clean Water Act Sections 303(d) and 305(b). 22 February.

Treiman, J.A. 2000. Fault Number 87a, Santa Ynez Fault Zone, Pacifico Section, in Quaternary Fault and Fold Database of the United States. US Geological Survey.

United States Environmental Protection Agency (USEPA). 2023a. *Categories of Hazardous Waste Generators*. 8 November. https://www.epa.gov/hwgenerators/categories-hazardous-waste-generators#large (accessed 6 February 2024).

USEPA. 2023b. *EPA Map of Radon Zones.* 25 October. https://www.epa.gov/radon/epa-map-radon-zones (accessed 6 February 2024).

USEPA. 2024a. *Designation of Areas for Air Quality Planning Purposes – Section 197 Attainment Status Designations*. https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-81/subpart-C/section-81.305

USEPA. 2024b. Designation of Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) as CERCLA Hazardous Substances. https://www.epa.gov/superfund/designation-perfluorooctanoic-acid-pfoa-and-perfluorooctanesulfonic-acid-pfos-cercla (accessed May 24, 2024)

United States Fish and Wildlife Service (USFWS). 2015. Programmatic Biological Opinion on Routine Mission Operations and Maintenance Activities, Vandenberg Air Force Base, Santa Barbara County, California (8-8-13-F-49R). Ventura Fish and Wildlife Office, Ventura, California.

USFWS. 2018. *Reinitiation of Programmatic Biological Opinion on Routine Mission Operations and Maintenance Activities, Vandenberg Air Force Base, Santa Barbara County, California*. O8EVENOO-201 8-f-0664. 20 November.

USFWS. 2021. Birds of Conservation Concern. https://www.fws.gov/sites/default/files/documents/birds-of-conservation-concern-2021.pdf (accessed 8 February 2024).

USFWS. 2023. Information for Planning and Consulting. https://ipac.ecosphere.fws.gov/location/SSLH5YLYRZCBJGDPOQQRG7CCLM/resources (accessed 8 February 2023).

USFWS. 2024. Vernal Pool Fairy Shrimp. https://www.fws.gov/species/vernal-pool-fairy-shrimp-branchinecta-lynchi (accessed 1 February 2024).

Vandenberg AFB. 2021. *Vandenberg Air Force Base Calendar Year 2020 Criteria Pollutant Emissions Comprehensive Stationary AEI*. United States Air Force. April 27.

Vandenberg SFB. 2016. *Bird/Wildlife-Aircraft Strike Hazard Plan*, 30 SW Plan 91-202. January.

Vandenberg SFB. 2019. Final Site Inspection Report, Site Inspection of Aqueous Film Forming Foam (AFFF) Release Areas, Environmental Programs Worldwide, Vandenberg Air Force Base, Santa Barbara County, California. March.

Vandenberg SFB. 2020. *Installation Development Plan*, *Vandenberg Air Force Base, California.* United States Department of the Air Force. January.

Vandenberg SFB. 2021a. *Integrated Natural Resources Management Plan*. Vandenberg Space Force Base. September.

Vandenberg SFB. 2021b. *Industrial Storm Water Pollution Prevention Plan*. Vandenberg SFB. October 2021.

Vandenberg SFB. 2022a. *Wetlands and Riparian Habitats Management Plan.* Vandenberg Space Force Base, California. January 2022.

Vandenberg SFB. 2022b. *Hazardous Waste Management Plan*. Space Launch Delta 30. Vandenberg Space Force Base, California. January 2022.

Vandenberg SFB. 2022c. *Spill Prevention, Control and Countermeasure Plan*. Space Launch Delta 30. Vandenberg Space Force Base, California. August 2022.

Waterwise. 2024. "Water Wise in Santa Barbara County – Weather." https://www.waterwisesb.org/2431/Weather

Weaver, R. 1986. Site Record, CA-SBA-2086H. On file, 30 CES/CEIEA Cultural Resources Section, Vandenberg SFB.

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Santa Barbara, CA 93110

Sam Cohen
Santa Ynez Band of Chumash Indians
Elders Council
PO Box 517
Santa Ynez, CA 93460

Nakia Zavalla
Santa Ynez Band of Chumash Indians
Elders Council
PO Box 517
Santa Ynez, CA 93460

David Villalobos
Santa Barbara County Board of Supervisors
c/o Santa Barbara County Planning & Development
123 E. Anapamu Street
Santa Barbara, CA 93101

David Lackie
Santa Barbara County Planning & Development
123 E. Anapamu Street
Santa Barbara, CA 93101

Cecilia Ceja
City of Lompoc
Economic & Community Development
100 Civic Center Plaza
Lompoc, CA 93436

Greg Stones
City of Lompoc
Economic & Community Development
100 Civic Center Plaza
Lompoc, CA 93436

California Native Plant Society
Channel Islands Chapter
PO Box 6
Ojai, CA 93024

Russell Marlow
California Trout
21 S. California Street #140
Ventura, CA 93001

Santa Barbara Public Library
40 East Anapamu Street
Santa Barbara, CA 93101

Lompoc Public Library
501 East North Ave
Lompoc, CA 93436

Santa Maria Public Library
421 S. McClelland Street
Santa Maria, CA 93454

Vandenbert Space Force Base Public Library
100 Community Loop
Building 10343A
Vandenberg SFB, CA 93437

State of California • Natural Resources Agency
Gavin Newsom, *Governor*

DEPARTMENT OF PARKS AND RECREATION
OFFICE OF HISTORIC PRESERVATION
Armando Quintero, *Director*

Julianne Polanco, State Historic Preservation Officer
1725 23rd Street, Suite 100, Sacramento, CA 95816-7100
Telephone: (916) 445-7000 FAX: (916) 445-7053
calshpo.ohp@parks.ca.gov www.ohp.parks.ca.gov

September 3, 2024

Reply in Reference to: USAF_2024_0823_001

Ms. Laura L. Miz
Deputy Base Civil Engineer, 30th Civil Engineer Squadron
1172 Iceland Avenue
Vandenberg AFB, CA 93437-6011

VIA ELECTRONIC MAIL

Re: Section 106 Consultation for F-15E and F-15EX Beddown, Vandenberg Space Force Base, Santa Barbara County

Dear Ms. Miz:

The United States Air Force (USAF) is initiating consultation with the State Historic Preservation Officer (SHPO) regarding its effort to comply with Section 106 of the National Historic Preservation Act of 1966 (54 U.S.C. 306108), as amended, and its implementing regulation found at 36 CFR Part 800.

To facilitate the testing and development of new-generation weapons, payloads, and propulsion systems, the USAF is proposing to construct an F-15E and F-15EX Beddown Facility at VSFB in Santa Barbara County, California. A complete project description may be found in the USAF's supporting documentation.

Historic property identification efforts found that Sites CA-SBA-964, CA-SBA-1130, CA-SBA-3407, identified as lithic scatters and Building 1754, a late-1960s prefabricated mobile office, are within the Undertaking's APE. Having evaluated these resources using NRHP criteria, the USAF determined they do not meet NRHP eligibility requirements.

The USAF are requesting concurrence with their APE definition, NRHP eligibility determinations and a finding of no historic properties affected. Upon review of the information provided, the SHPO has the following comments:

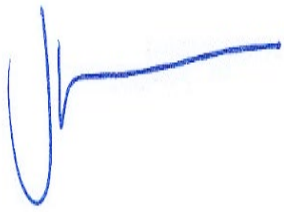
1. The SHPO has no objection to the USAF's area of potential effects definition.

2. The SHPO concurs that Sites CA-SBA-964, CA-SBA-1130, CA-SBA-3407 and Building 1754 do not meet NRHP eligibility requirements.

3. The SHPO concurs with the USAF's finding of no historic properties affected. Be advised that under certain circumstances, such as an unanticipated discovery or a change in project description, the USAF may have future responsibilities for this undertaking under 36 CFR Part 800.

This letter is being sent in electronic format only. Please confirm receipt of this letter and notify Ed Carroll, Historian II, at Ed.Carroll@parks.ca.gov or 916-503-8466 if there are any questions or to request a hard copy of this letter.

Sincerely,



Julianne Polanco
State Historic Preservation Officer

United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Ecological Services
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
2025-0032777-S7-001

February 12, 2025

Beatrice L. Kephart
30 CES/CEI
1028 Iceland Avenue
Vandenberg Air Force Base, California 93437

Subject: Informal Consultation for the Periodic Operations of F-15E/EX Testing Project at Vandenberg Space Force Base

Dear Beatrice Kephart,

The U.S. Fish and Wildlife Service (Service) Ventura Field Office received the request for concurrence on December 13, 2024, from the Department of the Air Force (DAF) on the Periodic Operation of F-15E/EX Testing on Vandenberg Space Force Base (VSFB), Santa Barbara County, California (Project). The DAF's authorization of the project activities described within the request has determined that the proposed action may affect, but is not likely to adversely affect, the federally threatened California red-legged frog (*Rana draytonii*). Your request and our response are made pursuant to Section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

Project Overview

The Project would consist of the construction of roads and buildings within both disturbed and undisturbed habitat for periodic infrequent operations of F-15E/EX fighter jets on VSFB. Operation of these aircraft would necessitate construction within previously developed areas of the airfield fence and within undisturbed natural habitat for munitions support and storage. Project activities would commence in late 2025 to early 2026 with a duration of approximately two years (pers. comm. Whitsitt-Odell 2024a). The action area includes north and south base with ground disturbing construction activities occurring between Tangair Road and 13th Street. The components of the Project that would impact previously undisturbed areas involve projects 5 and 6 (Table 1). Project 5 would consist of the development of four munition storage structures (igloos) for weapon storage and updating an existing access road from gravel to pavement (Alternative 1, see Appendix A, Figure 3). The improved road would be approximately 0.4 mile long and 18 feet wide. The improved road would disturb 0.08 acre of Burton Mesa chaparral habitat, 0.01 acre of coyote brush scrub, 0.03 acre of sedge marsh, and 0.09 acre of previously disturbed roadway with freshwater ephemeral wetland habitat. Additionally, this phase of the Project would connect the new igloo structures to electrical and communication utilities, which would include a 200-foot-segment from the improved road to the igloos. Project 5's igloo

construction would result in the clearance of 3.28 acres of Burton Mesa chaparral, (Service 2025). No site-specific jurisdictional wetland delineation was provided as a part of the biological assessment. Project 6 would consist of constructing a single igloo structure for weapons storage near Building 980 (Appendix A, Figure 5). This stage of the Project would involve the clearance of up to 1.06 acres of California sagebrush scrub. Cumulatively, the completion of the Project (projects 5 and 6 combined) would result in the removal of 4.55 acres of native vegetation (Table 1).

Table 1. Proposed Project Habitat Impact Acreages

Project 5	
Habitat Type	Impacted Acreage
Arctostaphylos (*purissima, rudis*) Shrubland Special Stands (Burton Mesa Chaparral)	3.36
Baccharis pilularis Shrubland Alliance (Coyote brush scrub)	0.01
Juncus (*effusus, patens*) - *Carex* (*pansa, praegracilis*) Herbaceous Alliance (Sedge marsh and freshwater emergent wetland)	0.12
TOTAL	3.49
Project 6	
Habitat Type	Impacted Acreage
Artemisia californica – Salvia mellifera Shrubland Alliance (California sagebrush scrub)	1.06
TOTAL	1.06
CUMULATIVE TOTAL	4.55

Under the proposed Project, F-15E/EX associated flight activities would create noise levels between 100 to 120 dB within the vicinity of the airstrip for approximately 1 week per year during each deployment. Within the first year, approximately 176 sorties (one takeoff and landing) would be flown for two deployments (a two-week period). In following years, 88 sorties would be flown during a single deployment (a one-week period). Each sortie event would be expected to occur for approximately 90 minutes. The DAF has determined that the associated flight activities under the proposed Project would not introduce impacts to any federally listed species. Consequently, the Service will only address the DAF's proposed determination of not likely to adversely affect California red-legged frog below in relation to proposed project construction.

Avoidance and Minimization Measures

The DAF will implement all avoidance and minimization measures for California red-legged frog from the existing programmatic biological opinions (Service 2015, p. 39-42, 48, Service 2018, p. 2-4) and draft programmatic biological opinion reinitiation that is in progress (In prep. Service, 2022-0003583-S7-016)(Refer to Appendix C). Avoidance and minimization measures will also include conducting additional California red-legged frog surveys, conducting a pre-

project briefing, avoiding work during active rainfall or outside of daylight hours, scheduling any wetland work to occur outside of the California red-legged frog breeding season, implement standard storm water pollution prevention best management measures, ensuring all trenches and holes are properly covered at the end of the workday, and requiring the presence of an in person biological monitor. We assume that biological monitors will be present to monitor work in the adjacent ephemeral wetland. In the anticipated unlikely event that a California red-legged frog is found within active work areas, the biological monitor will inform crews to stop work and wait until the individual has moved safely outside of work areas of its own volition.

California red-legged frog

Presently, VSFB supports a mosaic of high-quality habitat for California red-legged frog across North and South Base. The DAF required biologists to conduct surveys and habitat mapping and assessed that the proposed Project footprint includes suitable aquatic (non-breeding), upland, and dispersal habitat for California red-legged frog. Road improvement areas associated with project 5 encompass roughly 0.12 acre of unmaintained roadway with freshwater ephemeral wetland habitat, a portion of which experiences periodic inundation based on available aerial imagery (Service 2025). No California red-legged frog individuals were detected during recent surveys conducted in 2023 and 2024 (DAF 2024, p. 5). No detailed information was provided as to when these surveys were conducted. For the purposes of this analysis, the Service assumes that surveys were conducted within the last year during the appropriate wet season when California red-legged frog would be more readily detectible.

San Antonio Creek is located approximately 2 miles northeast of the project 5 action area and is reported to support a high level of California red-legged frog breeding populations. In relation to project 5, the nearest occurrence of California red-legged frog is located approximately 0.25 mile to the south (DAF 2024, p. 5). For project 6, the closest occurrence of California red-legged frog is approximately 0.66 mile to the east of the project 6 action area, and project 6 boundaries are approximately 0.60 mile from the Santa Ynez River, an occupied feature (USSF 2022).

Project Effects

Transitory California red-legged frog could be subjected to adverse impacts from the Project's ground disturbing activities such as mowing, road, and structure construction. Mobilization of personnel and staging of construction equipment and vehicle use associated with the Project's operations could crush, injure, or kill individuals if they disperse within the project area.

Using available aerial imagery and the National Wetlands Inventory, the Service understands that an unmaintained existing access road associated with project 5 experiences periodic inundation and is located within a freshwater emergent wetland (Service 2025). The DAF has clarified that recent surveys and habitat mapping indicate that the Project's action area does not support suitable conditions (e.g. depth, hydroperiod) for California red-legged frog breeding (DAF 2024, p. 5). Although suitable aquatic (non-breeding) habitat exists within the proposed action area, recent surveys and historical records indicate that there is no current or historic occupancy of California red-legged frogs within the immediate action area or within the drainage feature that is approximately 722 feet north of the project area of project 5. The nearest

occurrence of California red-legged frog is approximately 0.25 mile south of project 5 and approximately 0.66 mile east of project 6, which is within the species' known dispersal distance in wet coastal environments (approximately 3,200 meters (1.9 miles) that may occur in the absence of rainfall and through inhospitable environments (Service 2022, p. 7). However, a minority of adults (10-30 percent of populations) generally disperse to neighboring water features. Typically, dispersing individuals move less than 800 meters (0.5 mile) overland with longer-distance movements most commonly associated during significant rainfall (Service 2022, p. 6-7). Review of the National Wetlands Inventory also indicates there is no hydrological connectivity between this feature and existing known occupied features (Service 2025) which may further reduce likelihood of species' presence. Following review of the available information, the Service anticipates portions of the project areas may support very low levels of transitory California red-legged frog individuals most likely during significant rainfall when they may to be moving across the landscape. To reduce work related potential effects, the DAF will avoid work during significant rainfall and hours of darkness. In addition, they will work with project proponents to rephase portions of the Project to avoid impacts to identified wetland habitat within the project area during peak breeding season (November 15 through March 30) and have a biological monitor present during this work. Considering the available information, the Service anticipates that implementation of these minimization measures would make potential effects to California red-legged frog within the work area unlikely.

Additionally, road improvement and the increased use of vehicles associated with Project operations could result in vehicle strikes to California red-legged frog dispersing within the vicinity of the project area over time (Service 2015). To reduce potential recurring effects, the DAF has designed the roadbed associated with project 5 within freshwater emergent wetland to be lifted and included culvert installation to facilitate maintenance of an existing dispersal corridor. The DAF and Service anticipate that proposed road design and culverts installation will help prevent repeat vehicle disturbance to aquatic habitat and further reduce potential for impact to any unanticipated transitory individuals in the future.

The DAF will also implement all other aforementioned avoidance and minimization measures (Appendix C) for California red-legged frog which the Service anticipates will be effective to help further reduce potential for effects.

Conclusion

The Service concurs with DAF's determination that the proposed activities may affect, but are not likely to adversely affect, California red-legged frog based on discountable effects. Our concurrence is based on the following:

- Recent surveys indicate there is no known current or historic occupancy of California red-legged frog within the action area. No suitable breeding habitat was determined present within the work areas. We expect transitory California red-legged frog levels would be very low, if any, and limited to significant rainfall events.
- Incorporation of other appropriate avoidance and minimization measures, including scheduling activities to occur outside of rain events and nightfall in addition to the presence of a biological monitor should be effective at further reducing potential for effect to discountable levels.

- Rephasing portions of the Project that occur within freshwater emergent wetland habitat to occur outside of peak breeding season will further reduce the likelihood of encountering transitory individuals.
- Project design considerations including culverts should be effective at reducing potential for reoccurring impacts from project operations.

We have included our previous correspondence on this consultation with conservation recommendations in Appendix B (pers. comm. Whitsitt-Odell 2024b). Further consultation pursuant to Section 7(a)(2) of the Act is not required. If new information becomes available or the proposed action changes in any manner that may affect a listed species or critical habitat, you must contact us immediately to determine whether additional consultation is required. If you have any questions regarding this matter, please contact Stephanie Menjivar at stephanie_menjivar@fws.gov and Kayla Schneider at kayla_schneider@fws.gov.

Sincerely,

Sarah Termondt
Senior Biologist

LITERATURE CITED

[DAF] Department of the Air Force. 2024. Letter requesting concurrence of NLAA determination on California red-legged frog on Periodic Operation of F15E/EX fighter jets at Vandenberg Space Force Base (VSFB).

[Service] U.S. Fish and Wildlife Service. 2015. Programmatic Biological Opinion on Routine Mission Operations and Maintenance Activities, Vandenberg Air Force Base, Santa Barbara County, California (8-8-13-F-49R). Ventura Fish and Wildlife Office, Ventura, California. December 3, 2015.

[Service] U.S. Fish and Wildlife Service. 2018. Reinitiation of Programmatic Biological Opinion on Routine Mission Operations and Maintenance Activities, Vandenberg Air Force Base, Santa Barbara County, California. November 21, 2018.

[Service] U.S. Fish and Wildlife Service. 2022. California Red-Legged Frog (Rana draytonii) 5-Year Review: Summary and Evaluation.

[Service] U.S. Fish and Wildlife Service. 2025. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Accessed January 13, 2025. Available online: https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/.

[USSF] U.S. Space Force. 2022. Species Survey information. Shapefiles included within DoDSafe email exchange; Email dated 7 October from Rhys Evans, Vandenberg Space Force Base, California, to Chris Diel, U.S. Fish and Wildlife Service, Ventura, California.

[USSF] U.S. Space Force. 2024a. Email from Tiffany Whitsitt-Odell, Biologist, USSF, sent to Sarah Termondt, Biologist Ventura Fish and Wildlife Office, re: NLAA Submittal: Periodic Operations of F15E/EX Testing at VSFB.

[USSF] U.S. Space Force. 2024b. Email from Tiffany Whitsitt-Odell, Biologist, USSF, sent to Kayla Schnieder, Bologist, USFWS. RE: Periodifc Operations of F-15E/EX Testing at VSFB. Email sent November 20, 2024.

Appendix A – Project Maps

FIGURE 1
Project Locations

Installation Boundary

N

0 ½ Miles

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N

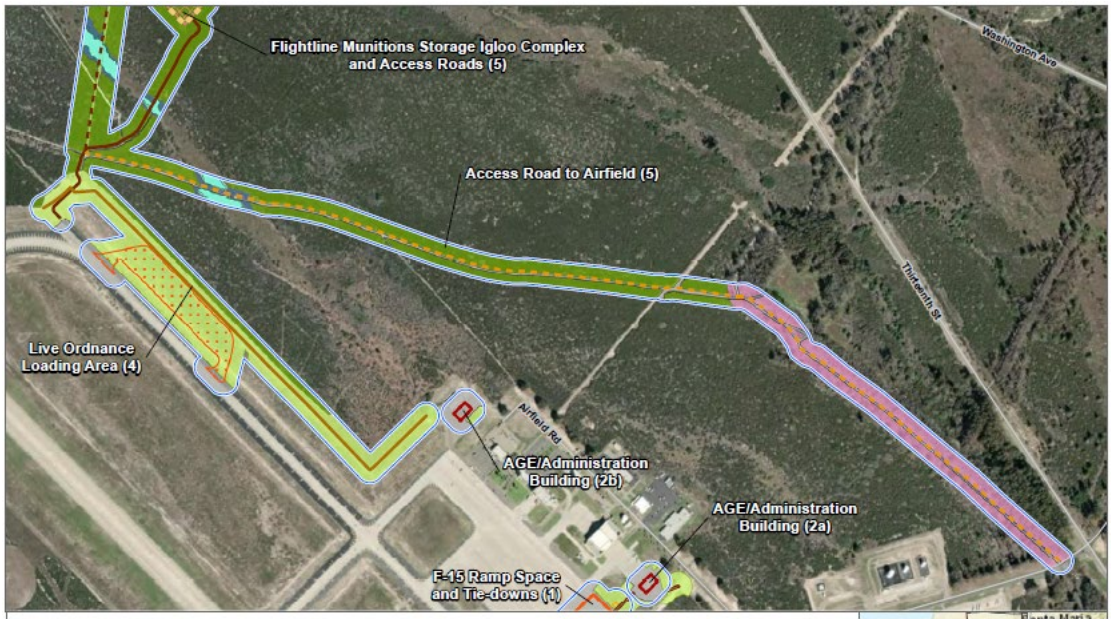


FIGURE 4

Vegetation and Wetlands Near Live Ordnance Loading Area and Access Road (Project #s)

- Installation Boundary
- Installation Road
- Existing Airfield Fence
- New Access Road to Airfield
- New Access Road to Project 5 (Alt 1)
- New Access Road to Project 5 (Alt 2)
- New Security Fence
- AGE Storage
- AGE Building
- F-15 Aircraft Zone
- LOLA Apron Ramps
- Munitions Igloo
- New Access Road
- 100-foot Buffer of Project Features
- Wetland (PEM1A)

Vegetation Habitat Type

- Arctostaphylos (purissima, rudis) Shrubland Special Stands
- Baccharis pilularis Shrubland Alliance
- Developed
- Eucalyptus spp. - Allanthus altissima - Robinia pseudoacacia Woodland Semi-Natural Alliance
- Juncus (effusus, patens) - Carex (pansa, praegracilis) Herbaceous Alliance
- Mowed/maintained

N

0 200 Feet

Imagery: ESRI, 2021.
Coordinate System:
WGS 1984 UTM Zone 10N

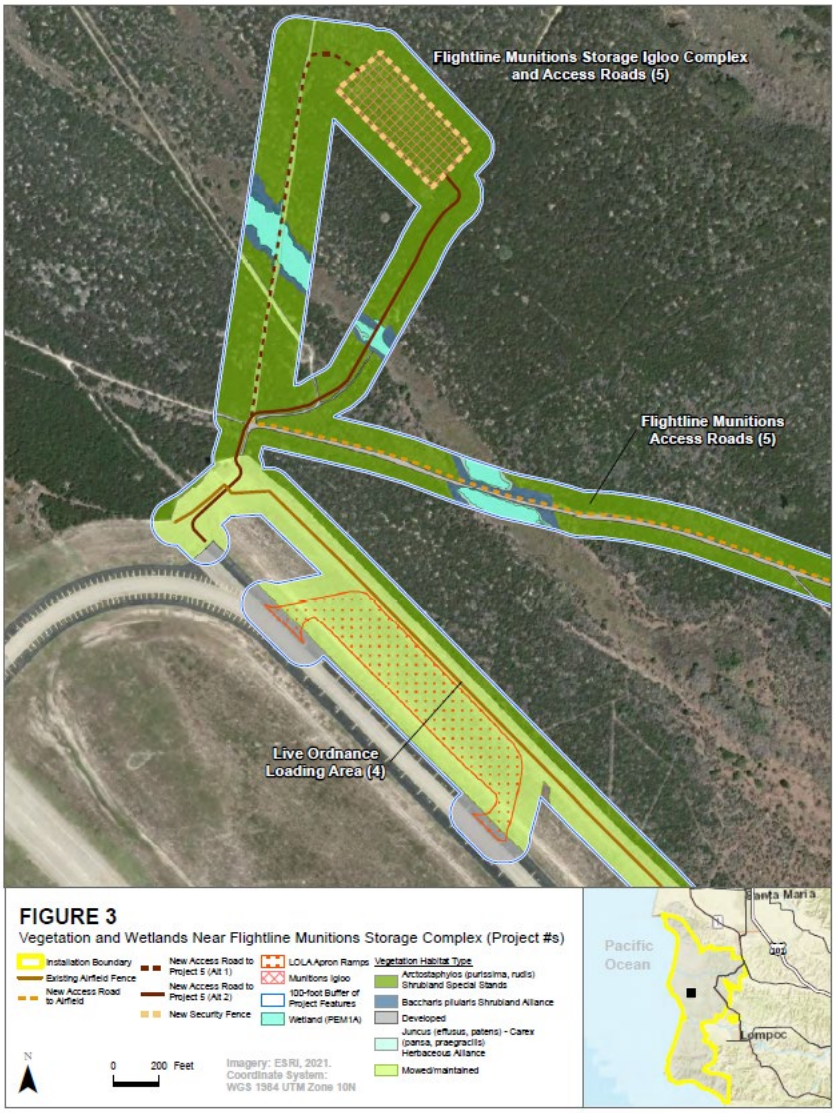

Flightline Munitions Storage Igloo Complex and Access Roads (5)
Flightline Munitions Access Roads (5)
Live Ordnance Loading Area (4)
FIGURE 3
Vegetation and Wetlands Near Flightline Munitions Storage Complex (Project #s)
Installation Boundary
Existing Airfield Fence
New Access Road to Airfield
New Access Road to Project 5 (Alt 1)
New Access Road to Project 5 (Alt 2)
New Security Fence
LOLA Apron Ramps
Munitions Igloo
100-foot Buffer of Project Features
Wetland (PEM1A)
Vegetation Habitat Type
Arctostaphylos (purissima, rudis) Shrubland Special Stands
Baccharis pilularis Shrubland Alliance
Developed
Juncus (effusus, patens) - Carex (pansa, praegracilis) Herbaceous Alliance
Mowed/maintained
N
0
200 Feet
Imagery: ESRI, 2021.
Coordinate System:
WGS 1984 UTM Zone 10N
Pacific Ocean
Lompoc

FIGURE 5

Vegetation and Wetlands Near Munitions Storage Igloo near Building 980 (Project #s)

Installation Boundary
New Access Road
New Security Fence
Munitions Igloo
100-foot Buffer of Project Features
Vegetation Habitat Type
Artemisia californica - Salvia mellifera Shrubland Alliance
Developed

N
0 100 Feet

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N

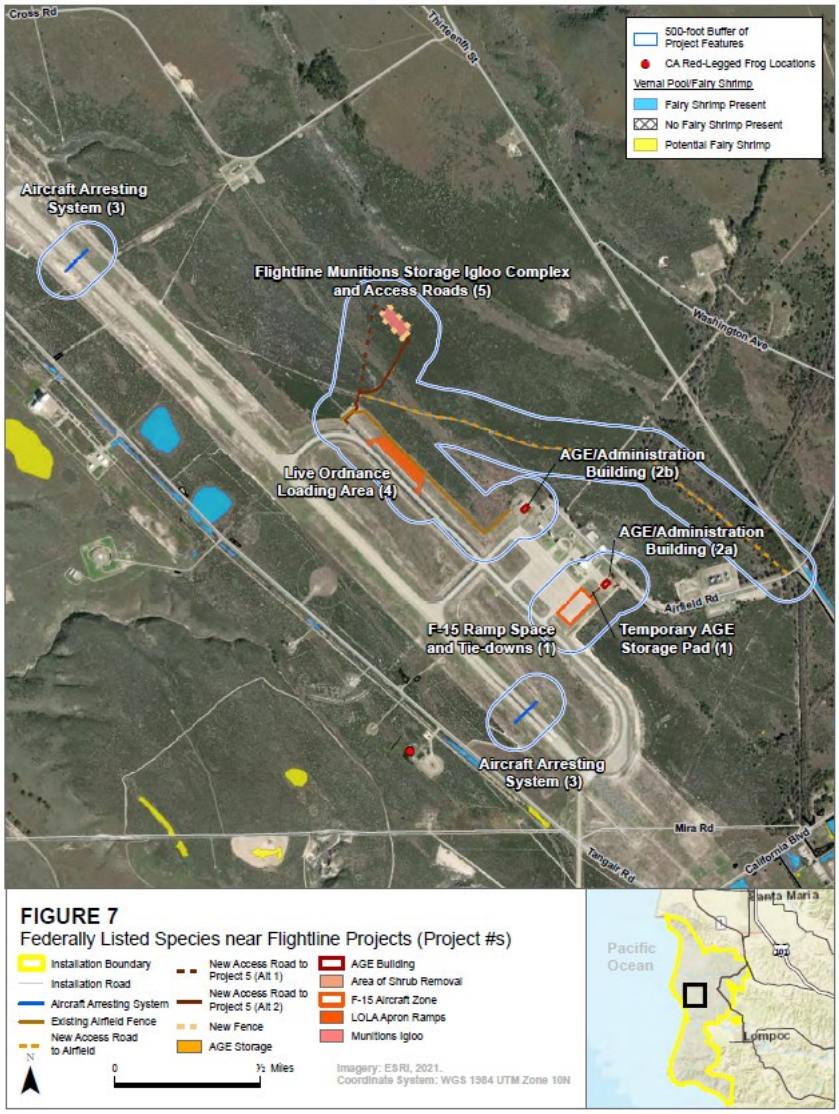


FIGURE 7

Federally Listed Species near Flightline Projects (Project #s)

Appendix B – Conservation Recommendations

Outlook

RE: [EXTERNAL] Prenotification Submittal: Periodic Operations of F-15E/EX Testing at VSFB

From Termondt, Sarah E <sarah_termondt@fws.gov>
Date Tue 11/26/2024 3:51 PM
To WHITSITT-ODELL, TIFFANY A CIV USSF SSC 30 CES/CEIEA <tiffany.whitsitt-odell@spaceforce.mil>; KAISERSATT, SAMANTHA O CIV USSF SSC 30 CES/CEIEA <samantha.kaisersatt@spaceforce.mil>
Cc Schneider, Kayla B <kayla_schneider@fws.gov>; Diel, Christopher <christopher_diel@fws.gov>; GRIFFITHS, JESSICA L CTR USSF SSC 30 CES/CEIEA <jessica.griffiths.ctr@spaceforce.mil>

Hi Samantha and Tiffany,
Thanks again for the phone call further discussing this. I'm sending a quick email for purposes of the record of decision on this project for tracking.
As we collectively discussed, following review, the current project description as described would not be appropriate for inclusion under the existing Programmatic Biological Opinion. We understand that the Space Force will follow up to request a NLAA separate consultation with project information. As we discussed, further changes to the project description that could impact listed species could warrant reinitiation. If project modifications are anticipated, we'd recommend that the Space Force work to refine those details in the project description to include in your request to avoid potential for reinitiation.

Thanks!
Best regards,
Sarah Termondt
Senior Fish and Wildlife Biologist
USFWS, Ventura Field Office
2493 Portola Road, Suite B
Office - 805-677-3334 (x53334)*
Pronouns: she/her
Visit us online or on social media, and check out our Year in Review Magazine and Video for our latest stories.

*Please note that I am currently working from Pullman, WA typically from 8am-5pm Pacific Time. The best way to reach me is via email to set up a phone call.

From: WHITSITT-ODELL, TIFFANY A CIV USSF SSC 30 CES/CEIEA <tiffany.whitsitt-odell@spaceforce.mil>
Sent: Wednesday, November 20, 2024 1:00 PM
To: Schneider, Kayla B <kayla_schneider@fws.gov>; GRIFFITHS, JESSICA L CTR USSF SSC 30 CES/CEIEA <jessica.griffiths.ctr@spaceforce.mil>
Cc: Termondt, Sarah E <sarah_termondt@fws.gov>; KAISERSATT, SAMANTHA O CIV USSF SSC 30 CES/CEIEA <samantha.kaisersatt@spaceforce.mil>
Subject: RE: [EXTERNAL] Prenotification Submittal: Periodic Operations of F-15E/EX Testing at VSFB

Hi Kayla –

Thank you for providing these requests in writing. Please see our responses in BLUE.

Tiffany Whitsitt-Odell

Natural Resource Manager, NH-3, 30 CES/CEIEA

From: Schneider, Kayla B <kayla_schneider@fws.gov>
Sent: Tuesday, November 19, 2024 9:16 AM
To: WHITSITT-ODELL, TIFFANY A CIV USSF SSC 30 CES/CEIEA <tiffany.whitsitt-odell@spaceforce.mil>; GRIFFITHS, JESSICA L CTR USSF SSC 30 CES/CEIEA <jessica.griffiths.ctr@spaceforce.mil>
Cc: Termondt, Sarah E <sarah_termondt@fws.gov>
Subject: [Non-DoD Source] Re: [EXTERNAL] Prenotification Submittal: Periodic Operations of F-15E/EX Testing at VSFB

Hi Tiffany, and Jessica,

Thank you both for taking time to meet, and provide us with clarification pertaining to the Prenotification Request. Per our conversation, we wanted to follow up with a few things that were discussed.

- The Service understands that the Base has made a no effects determination for the operation of the F15E/EX fighter jets, and that the operation period of these aircraft could occur during 1 week interval 2 times at any point of the year. As we've previously included in conservation recommendations in recent consultations for Western snowy plover and California least tern, we recommend that the operation of these vehicles avoid coincidence with the sensitive breeding window for both of these species, particularly during the three week window arrival period of California least tern at Purisima Point. California least tern demonstrate particular sensitivity to visual and auditory disturbance that could result in implications for breeding success (Robinette et al. 2003; Robinette & Rogan 2005 p. 67). We'd recommend the base work with project proponents to avoid operation of these aircraft during this time to avoid potential for unanticipated effects.
  We welcome you to include this as a conservation recommendation. We are in full compliance with the overflight restrictions for this species as agreed upon with the Service.

- The Service understands within recent history, that the Base encountered a population of Lompoc yerba santa immediately east of the airfield within maritime chaparral habitat. We understand the base has conducted surveys within the proposed project footprint for this species and that there is unoccupied suitable habitat. Our recent 5 year review of Lompoc yerba santa (Service 2015, p. 10) recommends 'Conserve and protect habitat in vicinity of and near existing occurrences, with particular attention to maritime chaparral on Burton Mesa'. To overall align with the Service's mitigation policy and to help address unoccupied suitable habitat loss that will result from the project, we'd like to ask if the Space Force is able to proactively build into the project description any form of conservation benefits/actions that can be taken to benefit the species (e.g. associated chaparral species seed collection/nearby revegetation efforts or weed management around the adjacent airfield LYS population)? We understand the chaparral vegetation community type that is being impacted, although not federally listed, is uncommon and consequently we would simply recommend that the base work with the proponent to incorporate these or similar proactive measures.
  We welcome you to include this as a conservation recommendation. We have made a determination of no effect to Lompoc Yerba Santa based on thorough field surveys.

- The Service understands that there will be 0.03 acre of impacts to wetlands as indicated in the project description and in aerials of the project footprint. We also understand that the inundated area of an existing roadway associated with project 5 will be improved and include a culvert to avoid repeat vehicle impacts to occasional ponded water. With respect to AM10 which says "Post-project restoration activities will consider potential

benefits to California red-legged frogs." (Service 2015, p. 48) can you please provide us with the specific proposed restoration/offset activities for us to include within the project description and for our review/consideration for inclusion under the PBO?

The AM10 cited above refers to when post-project restoration is needed in general that we would consider how the restoration could benefit CRLF, this measure does not require habitat offsets. With understanding the Service's policy of no net loss of habitat, I would like to clarify that the impacts to the habitat will be temporary, as the existing roadbeds will be lifted and culverts placed beneath the roadways to ensure water flow under the roadways. This will improve the existing habitat for potential transitory CRLF (breeding habitat is not present). Understanding there may be a very small portion of the anticipated 0.03 acres of wet habitat that could be permanently impacted, we propose including a measure that would design the culvert crossing concrete apron to extend further into the wet area. This area is currently very densely vegetated with rushes and other species, creating an area of open water by extending the concrete would serve to provide some open water resource in this area, a habitat feature that is currently not available to CRLF. The combination of the temporary impacts and the creation of some open water habitat would provide overall long-term benefits to this species.

Thank you!

Kayla Schneider *(she/her)*
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Ventura Field Office
Work: (805) 677-3337
Mobile: (734) 394-9800

I acknowledge that the VFWO's area of responsibility overlaps the traditional tribal territories of the Ohlone, Esselen, Salinan, Chumash, and many other tribes and villages who have stewarded the Central California Coast for generations.

From: Schneider, Kayla B <kayla_schneider@fws.gov>
Sent: Wednesday, November 13, 2024 10:41 AM
To: WHITSITT-ODELL, TIFFANY A CIV USSF SSC 30 CES/CEIEA <tiffany.whitsitt-odell@spaceforce.mil>; GRIFFITHS, JESSICA L CTR USSF SSC 30 CES/CEIEA <jessica.griffiths.ctr@spaceforce.mil>
Cc: Termondt, Sarah E <sarah_termondt@fws.gov>
Subject: Re: [EXTERNAL] Prenotification Submittal: Periodic Operations of F-15E/EX Testing at VSFB

Sure thing, I will be sure that is included.

Thank you!

Kayla Schneider *(she/her)*
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Ventura Field Office
Work: (805) 677-3337
Mobile: (734) 394-9800

I acknowledge that the VFWO's area of responsibility overlaps the traditional tribal territories of the Ohlone, Esselen, Salinan, Chumash, and many other tribes and villages who have stewarded the

Appendix C – Avoidance and Minimization Measures from PBO (Service 2015), Reinitiated PBO (Service 2018), and Draft Reinitiated PBO (In prep. Service, 2022-0003583-S7-016)

California Red-legged Frog

1. When practicable, the Air Force will schedule activities that may affect California red-legged frogs outside of the peak breeding period season (November through March). The following project activities could occur year round: conducting search and rescue operations and emergency response actions; conducting unplanned security and antiterrorism operations; conducting well monitoring actions as part of IRP activities; repairing utilities when broken or leaking; and grazing and livestock operations, excluding non-emergency trough and head box maintenance.

2. When feasible, construction or ground disturbing projects will avoid California red-legged frog habitat (i.e. bore underneath habitat). The 30 CES/CEI biologist will determine the feasibility in consultation with the project proponent.

3. Prior to conducting construction activities, a Service-approved biologist will conduct daily pre-project surveys, and relocate all life stages of California red-legged frogs found within the project area to the nearest suitable habitat outside of the project area but within the same watershed.

4. Stream contours will be returned to their original condition at the end of project activities, unless it is determined by the 30 CES/CEI biologist that it is not feasible or beneficial to the species.

5. If temporary dewatering is required, the intakes of diversion pipes will be screened with a mesh not to exceed 0.125 inches. Water will be released downstream of the project area at an appropriate rate to maintain downstream flows.

6. When herbicide application occurs during the breeding season and within riparian habitat, surveys will be conducted to ensure there are no egg masses or tadpoles within 100 feet downstream or downslope of the application area.

7. When practicable, equipment maintenance and refueling will be conducted at least 250 feet away from riparian habitats and wetlands.

8. Service-approved biologists will permanently remove introduced nonnative species found within California red-legged frog habitat during specific project activities to the extent possible.

9. Grazing will be managed to maintain or improve riparian conditions and will consider potential benefits to California red-legged frogs.

10. Post-project restoration activities will consider potential benefits to California red-legged frogs. The restoration of areas may occur during the rainy season; however, if seeding must occur in the dry season, extra thick hydromulch or watering is recommended. In

unimproved areas, the seed mix shall be approved by 30 CES/CEI. It may also be desirable to set aside the first four inches of topsoil as a seed base.

Tidewater Goby and Unarmored Threespine Stickleback

1. When practicable, the Air Force will not conduct project activities during the peak breeding periods within occupied tidewater goby habitat from April through July, or during peak breeding periods within occupied unarmored threespine stickleback habitat from March through July except during the following circumstances: conducting search and rescue operations and emergency response actions, conducting unplanned security and antiterrorism operations, repairing utilities when broken or leaking, or conducting sensitive species management activities.

2. Two days prior to beginning project activities in occupied habitats, the Air Force will install nets with mesh no larger than 0.125 inch to exclude tidewater gobies and unarmored threespine stickleback from the project area. These nets will be set up within the main channel of the creek 50 feet upstream and 50 feet downstream of the project area. These nets will be removed immediately following the completion of project activities.

3. A Service-approved biologist will relocate all tidewater gobies and unarmored threespine stickleback observed within the project site to suitable habitat immediately downstream of the project site.

4. A Service-approved biologist will monitor the project area every work day, including the exclusion nets, until all tidewater gobies and unarmored threespine sticklebacks are removed from the work site. At that point, the Service-approved biologist may appoint project personnel to periodically monitor the exclusion nets for the duration of the project; however, the Service-approved biologist must be on-call for immediate assistance, if needed, until project completion.

5. If temporary dewatering is required, the intakes of diversion pipes will be screened with a mesh not to exceed 0.125 inches. Water will be released downstream of the project area at an appropriate rate to maintain downstream flows.

6. When practicable, project equipment and holding tank storage, maintenance and refueling will be conducted at least 250 feet away from habitat that is occupied by the tidewater goby or unarmored threespine stickleback, in pre-designated areas approved by the 30 CES/CEI.

7. The Air Force will minimize the disturbance and removal of native willow riparian woodland and freshwater marsh vegetation.

red-legged frog. On June 14, 2018, the Air Force requested reinitiation of formal consultation to further clarify and revise California red-legged frog-specific avoidance and minimization measures.

Superseded Existing Biological Opinions

This section is unchanged from the previous PBO (8-8-13-F-49R) and is incorporated herein by reference.

Qualifying Language

This section is unchanged from the previous PBO (8-8-13-F-49R) and is incorporated herein by reference.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

This project description is unchanged from the previous PBO (8-8-13-F-49R), with the exception of the species-specific avoidance and minimization measures for the California red-legged frog contained in Section 7.2 (pages 48 and 49) of the previous PBO (8-8-13-F-49R). The revised species-specific avoidance and minimization measures proposed by the Air Force (Kephart, in litt. 2018) for the California red-legged frog would supersede the measures provided by the Service to the Air Force in its letter amending the previous PBO (8-8-13-F-49R) dated April 7, 2017 (2017-TA-0334). The proposed revised California red-legged frog-specific avoidance and minimization measures are provided below, with minor clarifying language based on additional coordination with Air Force staff (R. Evans, U.S. Air Force, pers. comm. 2018).

1. When practicable, the Air Force will schedule activities that may affect California red-legged frogs outside of the peak breeding period season (November 15 through March 30). The following project activities may occur year round: conducting search and rescue operations and emergency response actions; conducting unplanned security and antiterrorism operations; conducting well monitoring actions as part of Installation Restoration Program (IRP) activities; repairing utilities when broken or leaking; and grazing and livestock operations, excluding non-emergency trough and head box maintenance.

2. When feasible, construction or ground disturbing projects will avoid California red-legged frog breeding habitat (i.e. bore underneath habitat). A 30th Space Wing Installation Management Flight (30 CES/CEI) biologist will determine the feasibility in consultation with the project proponent.

3. The Air Force will return stream contours to their original condition at the end of project activities, unless it is determined by the 30 CES/CEI biologist that it is not feasible or beneficial to the species.

4. If temporary dewatering is required, the Air Force will screen the intakes of diversion pipes with a mesh not to exceed 0.25 inch. The Air Force will release water downstream of the project area at an appropriate rate to maintain downstream flows.

5. When herbicide application occurs during the breeding season and within riparian habitat, the Air Force will conduct surveys to ensure there are no egg masses or tadpoles within 100 feet downstream or downslope of the application area.

6. When practicable, the Air Force will conduct equipment maintenance and refueling at least 250 feet away from riparian habitats and wetlands.

7. Service-approved biologists will permanently remove introduced nonnative species found within California red-legged frog habitat during specific project activities to the extent possible.

8. The Air Force will manage grazing to maintain or improve riparian conditions and will consider potential benefits to California red-legged frogs.

9. Post-project restoration activities will consider potential benefits to California red-legged frogs. The restoration of areas may occur during the rainy season; however, if seeding must occur in the dry season, extra thick hydromulch or watering is recommended. In unimproved areas, 30 CES/CEI will approve the seed mix. It may also be desirable to set aside the first four inches of topsoil as a seed base.

10. The Air Force will maintain a Geographic Information System (GIS) database of all California red-legged frog localities and occupied habitat. During the planning portion of project management, the Air Force will perform a desktop analysis for all proposed projects with potential to affect California red-legged frogs. If there is any potential for impacts, the Air Force will perform a field assessment to determine site conditions and California red-legged frog habitat suitability. The results of the field assessment will be used to determine the suitable distance required for California red-legged frog surveys, if site conditions warrant increasing survey distances from those stated below.

11. Pre-Project Surveys for California red-legged frogs (these apply to implementation of an approved project):
    a. From 15 November to 31 March, a Service-approved biologist will conduct a pre-construction survey of project areas within suitable aquatic, adjacent upland, or dispersal habitat (210 meters from aquatic habitat or other distance as determined by a Service-approved biologist following adaptive habitat assessment procedures

described in your June 14, 2018, reinitiation request letter (Kephart, in litt. 2018)) immediately before the onset of all work activities.

b. From 1 April to 14 November, the Air Force will conduct a pre-project survey of project areas within suitable aquatic or upland habitat [43 meters from aquatic habitat or other distance as determined by a Service-approved biologist following adaptive habitat assessment procedures described in your June 14, 2018, reinitiation request letter (Kephart, in litt. 2018)] to identify potential artificial water or shelter resources that may contain sheltering California red-legged frogs.
c. The Air Force will repeat surveys following any precipitation event greater than 0.5 centimeter (0.2 inch) during a 24-hour period.
d. A Service-approved biologist will monitor any initial ground disturbance or vegetation removal within suitable aquatic, adjacent upland, or dispersal habitat identified following the adaptive habitat assessment procedures described in your June 14, 2018, reinitiation request letter (Kephart, in litt. 2018). However, after the initial ground disturbance/vegetation removal is complete, no further monitoring would be required within these bare-dirt areas.

12. Relocation: If California red-legged frogs are found within the project area during pre-project surveys, daily monitoring where required, or at any other time, all construction activity within the vicinity of the California red-legged frog occurrence (if any) will cease and the Air Force will notify the Service immediately. If the project site is large and if the Service-approved biologist is satisfied that work in a different area of the project can continue with no threat to California red-legged frogs, then that work can continue. Construction activities within the vicinity of the California red-legged frog occurrence will not begin or resume until the California red-legged frogs are relocated by a Service-approved biologist or the Service has been contacted and provided alternate guidance. The Service-approved biologist will relocate all life stages of California red-legged frogs the shortest distance possible to a location that is (1) within the same drainage, (2) contains suitable aquatic/upland habitat, and (3) is outside of the project impact area.

13. Worker Education: Before construction activities begin on a project, a Service-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a description of the California red-legged frog and its habitat, the specific measures that are being implemented to conserve the California red-legged frog for the current project, and the boundaries within which the project may be accomplished.

14. Precipitation Events: Construction activities will not occur until 24 hours after an actual precipitation event greater than 0.5 centimeter (0.2 inch) accumulating within a 24-hour period.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATIONS

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means “to engage in an action that

BASE 13. The Space Force will implement BMPs that are appropriate to the site and situation to reduce soil erosion, sedimentation, and adverse effects to water quality.

a. The Space Force will use certified weed free materials (i.e., mulch) for erosion control projects.

BASE 16. When project activities affect native habitat and at the discretion of the 30 CES botanist, the Space Force may plant native seeds within disturbed areas after project completion. Personnel may use a biodegradable material to cover the seeds to prevent erosion. Prior to project activities, personnel may remove native vegetation, mulch this material, and spread over the native seed mix after project completion.

a. ~~To the maximum extent feasible, t~~The Space Force will use locally sourced native plant material for restoration efforts. The 30 CES botanist will approve any restoration plans and source material prior to implantation.

b. The Space Force will use certified weed-free materials for restoration projects.

BASE 29. The Space Force will regularly remove trash, including food waste, at the end of each day or secure it in an approved container and will remove project spoils from work sites.

BASE 30. If a project lasts for more than 1 day, the Space Force will cover or provide a wildlife escape route from trenches, holes, and pipeline routes at the conclusion of each day to avoid the entrapment of animals.

BASE 31. If a trench, hole, or pipeline route is to remain open for an extended period with no activity, the Space Force will cover it or provide a wildlife escape route. A Qualified Biologist will inspect these areas on a weekly basis or after a rain event.

BASE 32. If the Space Force observes a federally listed species within a designated work area and activities cannot avoid impacts, all work must stop until a Permitted or Service Approved Biologist relocates the animal outside of the work area or until it leaves on its own accord.

CRLF 4. The Space Force will return stream contours to their original condition at the end of project activities unless a 30 CES biologist determines it is not feasible or beneficial to the species.

CRLF 5. If temporary dewatering is required, the Space Force will screen the intakes of diversion pipes with a mesh not to exceed 0.25 inch. The Space Force will release water downstream of the project area at an appropriate rate to maintain downstream flows.

CRLF 7. The Space Force will require that Qualified Biologists permanently remove introduced non-native wildlife species found within California red-legged frog habitat during project activities to the extent possible. This work will occur during optimal conditions to properly identify individual animals.

a. The Space Force will require Qualified Biologists to complete this work during well-lit conditions (i.e., daylight hours or use of headlamps) and identify animals in hand to reduce potential for misidentification. These restrictions do not apply to Permitted or Service Approved Biologists.

b. The Space Force will require that a Permitted or Service Approved Biologist conduct identification and lethal removal of any non-native tadpoles.

CRLF 13. The Space Force will require that a Service Approved Biologist conducts pre-project surveys for California red-legged frogs for approved projects. If no Service Approved Biologist is determined to be available, the Space Force will require a Qualified Biologist to complete these surveys on an as needed basis. The Space Force will require that all biologists adhere to the following measures:

a. From November 15 to March 31, the Space Force will require that a Service Approved Biologist (or Qualified Biologist, as needed) conduct a pre-construction survey of project areas within suitable aquatic, adjacent upland, or dispersal habitat (690 feet from aquatic habitat or other distance as determined by a Service Approved Biologist) immediately before (within 48 hours) the onset of all work activities. From November 15 to March 31, the Space Force will require that a Service Approved Biologist (or Qualified Biologist, as needed) conduct a pre-construction survey of project areas within suitable aquatic, adjacent upland, or dispersal habitat (690 feet from aquatic habitat or other distance as determined by a Service Approved Biologist) immediately before (within 48 hours) the onset of all work activities.

b. From April 1 to November 14, the Space Force will require that a Service Approved Biologist (or Qualified Biologist, as needed) conduct a pre-project survey of project areas within suitable aquatic or upland habitat (140 feet from aquatic habitat or other distance as determined by a Service Approved Biologist) to identify potential artificial water or shelter resources that may contain sheltering California red-legged frogs. From April 1 to November 14, the Space Force will require that a Service Approved Biologist (or Qualified Biologist, as needed) conduct a pre-project survey of project areas within suitable aquatic or upland habitat (140 feet from aquatic habitat or other distance as determined by a Service Approved Biologist) to identify potential artificial water or shelter resources that may contain sheltering California red-legged frogs.

c. A Service Approved Biologist (or Qualified Biologist, as needed) will repeat surveys following any precipitation event greater than 0.2 inch during a 24-hour period.

d. A Service Approved Biologist (or Qualified Biologist, as needed) will monitor any initial ground disturbance or vegetation removal within suitable aquatic, adjacent upland, or dispersal habitat as determined above. After the initial ground disturbance/vegetation removal is complete, no further monitoring is required within bare-dirt areas.

CRLF 15. Before construction activities begin on a project, the Space Force will require that a Qualified Biologist conduct a training session for all construction personnel. At a minimum, the training will include a description of the California red-legged frog and its habitat, the specific California red-legged frog measures implemented for the current project, and specific project boundaries.

CRLF 16. The Space Force will require that no construction activities occur in areas with suitable aquatic, adjacent upland, or dispersal habitat until 24 hours after an actual precipitation event greater than 0.2-inch accumulating within a 24-hour period.

APPENDIX B. AIR QUALITY ANALYSIS

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AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *Environmental Impact Analysis Process* (EIAP, 32 CFR 989); the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

a. Action Location:

Base: VANDENBERG AFB
State: California
County(s): Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Periodic Operations of F-15E/EX Testing at Vandenberg SFB

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Flight operations under the Proposed Action would include the periodic operation of 12 F-15E or F-15EX aircraft. The aircraft would operate for approximately 1 week during each deployment, assuming no delays in either flight or ground operations from weather or other VSFB operations during the deployment time. During the first year of the Proposed Action, approximately 176 sorties (one takeoff and landing) would be flown annually over the course of two deployments. In subsequent years, approximately 88 sorties per year would be flown during one deployment. While at VSFB, the F-15 aircraft would perform both ground and flight tests and training events. Up to 250 Air Force personnel would deploy to VSFB to support each deployment.
The operational and training flights would potentially use special use airspace and would be flown over the Pacific Ocean at altitudes from 10,000 to 50,000 feet above sea level. Each sortie would be approximately 90 minutes in duration. The estimated total overwater flight time during the first year of the Proposed Action would be approximately 264 hours (176 sorties times 90 minutes) or 132 hours per deployment. In subsequent years, the total flight time would be about 132 hours during the one-week deployment. No sonic booms would be caused by operating aircraft, and flight elevation at the coastline on takeoff and landing would be no lower than 1,900 feet above ground level. Some night operations may occur with up to 50 percent of the sorties potentially being flown at night (Night operations refers to flights after sunset and before sunrise). The time of night operations could vary based on the month

f. Point of Contact:

Name: J. Michael Nied, PE (WI)
Title: Project Manager / Environmental Engineer
Organization: Environmental Assessment Services, LLC
Email: mnied@easbio.com
Phone Number: (608) 797-1326

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the GCR are:

____ applicable
__X__ not applicable

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

Total reasonably foreseeable net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving "steady state" (hsba.e., no net gain/loss in emission stabilized and the action is fully implemented) emissions. The ACAM analysis uses the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the *USAF Air Emissions Guide for Air Force Stationary Sources*, the *USAF Air Emissions Guide for Air Force Mobile Sources*, and the *USAF Air Emissions Guide for Air Force Transitory Sources*.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of the proposed Action's potential impacts to local air quality. The insignificance indicators are trivial (de minimis) rate thresholds that have been demonstrated to have little to no impact to air quality. These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold and 25 ton/yr for lead for actions occurring in areas that are "Attainment" (hsba.e., not exceeding any National Ambient Air Quality Standard (NAAQS)). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutants is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQS. For further detail on insignificance indicators, refer to *Level II, Air Quality Quantitative Assessment, Insignificance Indicators*.

The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicators and are summarized below.

Analysis Summary:

2025

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.469	250	No
NOx	17.149	250	No
CO	6.088	250	No
SOx	1.043	250	No
PM 10	0.735	250	No
PM 2.5	0.667	250	No
Pb	0.000	25	No
NH3	0.008	250	No

2026

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.252	250	No
NOx	15.975	250	No
CO	5.179	250	No
SOx	0.926	250	No
PM 10	0.636	250	No
PM 2.5	0.575	250	No
Pb	0.000	25	No
NH3	0.008	250	No

2027 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.252	250	No

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

NOx	15.975	250	No
CO	5.179	250	No
SOx	0.926	250	No
PM 10	0.636	250	No
PM 2.5	0.575	250	No
Pb	0.000	25	No
NH3	0.008	250	No

None of the estimated annual net emissions associated with this action are above the insignificance indicators; therefore, the action will not cause or contribute to an exceedance of one or more NAAQSs and will have an insignificant impact on air quality. No further air assessment is needed.

J. Michael Nied, PE (WI), Project Manager / Environmental Engineer — Jun 18 2024

Name, Title — **Date**

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to estimate GHG emissions. The analysis was performed in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide. This report provides a summary of GHG emissions analysis.

a. Action Location:

Base: VANDENBERG AFB
State: California
County(s): Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Periodic Operations of F-15E/EX Testing at Vandenberg SFB

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2025

e. Action Description:

Flight operations under the Proposed Action would include the periodic operation of 12 F-15E or F-15EX aircraft. The aircraft would operate for approximately 1 week during each deployment, assuming no delays in either flight or ground operations from weather or other VSFB operations during the deployment time. During the first year of the Proposed Action, approximately 176 sorties (one takeoff and landing) would be flown annually over the course of two deployments. In subsequent years, approximately 88 sorties per year would be flown during one deployment. While at VSFB, the F-15 aircraft would perform both ground and flight tests and training events. Up to 250 Air Force personnel would deploy to VSFB to support each deployment.
The operational and training flights would potentially use special use airspace and would be flown over the Pacific Ocean at altitudes from 10,000 to 50,000 feet above sea level. Each sortie would be approximately 90 minutes in duration. The estimated total overwater flight time during the first year of the Proposed Action would be approximately 264 hours (176 sorties times 90 minutes) or 132 hours per deployment. In subsequent years, the total flight time would be about 132 hours during the one-week deployment. No sonic booms would be caused by operating aircraft, and flight elevation at the coastline on takeoff and landing would be no lower than 1,900 feet above ground level. Some night operations may occur with up to 50 percent of the sorties potentially being flown at night (Night operations refers to flights after sunset and before sunrise). The time of night operations could vary based on the month

f. Point of Contact:

Name: J. Michael Nied, PE (WI)
Title: Project Manager / Environmental Engineer
Organization: Environmental Assessment Services, LLC
Email: mnied@easbio.com
Phone Number: (608) 797-1326

2. Analysis: Total combined direct and indirect GHG emissions associated with the action were estimated through ACAM on a calendar-year basis from the action start through the expected life cycle of the action. The life cycle for Air Force actions with "steady state" emissions (SS, net gain/loss in emission stabilized and the action is fully implemented) is assumed to be 10 years beyond the SS emissions year or 20 years beyond SS emissions year for aircraft operations related actions.

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

GHG Emissions Analysis Summary:

GHGs produced by fossil-fuel combustion are primarily carbon dioxide (CO2), methane (CH4), and nitrous oxide (NO2). These three GHGs represent more than 97 percent of all U.S. GHG emissions. Emissions of GHGs are typically quantified and regulated in units of CO2 equivalents (CO2e). The CO2e takes into account the global warming potential (GWP) of each GHG. The GWP is the measure of a particular GHG's ability to absorb solar radiation as well as its residence time within the atmosphere. The GWP allows comparison of global warming impacts between different gases; the higher the GWP, the more that gas contributes to climate change in comparison to CO2. All GHG emissions estimates were derived from various emission sources using the methods, algorithms, emission factors, and GWPs from the most current Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and/or Air Emissions Guide for Air Force Transitory Sources.

The Air Force has adopted the Prevention of Significant Deterioration (PSD) threshold for GHG of 75,000 ton per year (ton/yr) of CO2e (or 68,039 metric ton per year, mton/yr) as an indicator or "threshold of insignificance" for NEPA air quality impacts in all areas. This indicator does not define a significant impact; however, it provides a threshold to identify actions that are insignificant (de minimis, too trivial or minor to merit consideration). Actions with a net change in GHG (CO2e) emissions below the insignificance indicator (threshold) are considered too insignificant on a global scale to warrant any further analysis. Note that actions with a net change in GHG (CO2e) emissions above the insignificance indicator (threshold) are only considered potentially significant and require further assessment to determine if the action poses a significant impact. For further detail on insignificance indicators see Level II, Air Quality Quantitative Assessment, Insignificance Indicators (April 2023).

The following table summarizes the action-related GHG emissions on a calendar-year basis through the projected life cycle of the action.

Action-Related Annual GHG Emissions (mton/yr)						
YEAR	**CO2**	**CH4**	**N2O**	**CO2e**	**Threshold**	**Exceedance**
2025	2,771	35.69056816	35.59880015	2,781	68,039	No
2026	2,517	17.89349141	17.80969605	2,526	68,039	No
2027 [SS Year]	2,517	17.89349141	17.80969605	2,526	68,039	No
2028	2,517	17.89349141	17.80969605	2,526	68,039	No
2029	2,517	17.89349141	17.80969605	2,526	68,039	No
2030	2,517	17.89349141	17.80969605	2,526	68,039	No
2031	2,517	17.89349141	17.80969605	2,526	68,039	No
2032	2,517	17.89349141	17.80969605	2,526	68,039	No
2033	2,517	17.89349141	17.80969605	2,526	68,039	No
2034	2,517	17.89349141	17.80969605	2,526	68,039	No
2035	2,517	17.89349141	17.80969605	2,526	68,039	No
2036	2,517	17.89349141	17.80969605	2,526	68,039	No
2037	2,517	17.89349141	17.80969605	2,526	68,039	No
2038	2,517	17.89349141	17.80969605	2,526	68,039	No
2039	2,517	17.89349141	17.80969605	2,526	68,039	No
2040	2,517	17.89349141	17.80969605	2,526	68,039	No
2041	2,517	17.89349141	17.80969605	2,526	68,039	No
2042	2,517	17.89349141	17.80969605	2,526	68,039	No
2043	2,517	17.89349141	17.80969605	2,526	68,039	No
2044	2,517	17.89349141	17.80969605	2,526	68,039	No
2045	2,517	17.89349141	17.80969605	2,526	68,039	No
2046	2,517	17.89349141	17.80969605	2,526	68,039	No
2047	2,517	17.89349141	17.80969605	2,526	68,039	No

The following U.S. and State's GHG emissions estimates (next two tables) are based on a five-year average (2016 through 2020) of individual state-reported GHG emissions (Reference: State Climate Summaries 2022, NOAA

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

National Centers for Environmental Information, National Oceanic and Atmospheric Administration. https://statesummaries.ncics.org/downloads/).

State's Annual GHG Emissions (mton/yr)				
YEAR	**CO2**	**CH4**	**N2O**	**CO2e**
2025	336,950,322	1,567,526	55,459	338,573,307
2026	336,950,322	1,567,526	55,459	338,573,307
2027 [SS Year]	336,950,322	1,567,526	55,459	338,573,307
2028	336,950,322	1,567,526	55,459	338,573,307
2029	336,950,322	1,567,526	55,459	338,573,307
2030	336,950,322	1,567,526	55,459	338,573,307
2031	336,950,322	1,567,526	55,459	338,573,307
2032	336,950,322	1,567,526	55,459	338,573,307
2033	336,950,322	1,567,526	55,459	338,573,307
2034	336,950,322	1,567,526	55,459	338,573,307
2035	336,950,322	1,567,526	55,459	338,573,307
2036	336,950,322	1,567,526	55,459	338,573,307
2037	336,950,322	1,567,526	55,459	338,573,307
2038	336,950,322	1,567,526	55,459	338,573,307
2039	336,950,322	1,567,526	55,459	338,573,307
2040	336,950,322	1,567,526	55,459	338,573,307
2041	336,950,322	1,567,526	55,459	338,573,307
2042	336,950,322	1,567,526	55,459	338,573,307
2043	336,950,322	1,567,526	55,459	338,573,307
2044	336,950,322	1,567,526	55,459	338,573,307
2045	336,950,322	1,567,526	55,459	338,573,307
2046	336,950,322	1,567,526	55,459	338,573,307
2047	336,950,322	1,567,526	55,459	338,573,307

U.S. Annual GHG Emissions (mton/yr)				
YEAR	**CO2**	**CH4**	**N2O**	**CO2e**
2025	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2026	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2027 [SS Year]	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2028	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2029	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2030	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2031	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2032	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2033	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2034	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2035	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2036	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2037	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2038	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2039	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2040	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2041	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2042	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2043	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2044	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2045	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2046	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2047	5,136,454,179	25,626,912	1,500,708	5,163,581,798

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

GHG Relative Significance Assessment:

A Relative Significance Assessment uses the rule of reason and the concept of proportionality along with the consideration of the affected area (yGba.e., global, national, and regional) and the degree (intensity) of the proposed action's effects. The Relative Significance Assessment provides real-world context and allows for a reasoned choice against alternatives through a relative comparison analysis. The analysis weighs each alternative's annual net change in GHG emissions proportionally against (or relative to) global, national, and regional emissions.

The action's surroundings, circumstances, environment, and background (context associated with an action) provide the setting for evaluating the GHG intensity (impact significance). From an air quality perspective, context of an action is the local area's ambient air quality relative to meeting the NAAQSs, expressed as attainment, nonattainment, or maintenance areas (this designation is considered the attainment status). GHGs are non-hazardous to health at normal ambient concentrations and, at a cumulative global scale, action-related GHG emissions can only potentially cause warming of the climatic system. Therefore, the action-related GHGs generally have an insignificant impact to local air quality.

However, the affected area (context) of GHG/climate change is global. Therefore, the intensity or degree of the proposed action's GHG/climate change effects are gauged through the quantity of GHG associated with the action as compared to a baseline of the state, U.S., and global GHG inventories. Each action (or alternative) has significance, based on their annual net change in GHG emissions, in relation to or proportionally to the global, national, and regional annual GHG emissions.

To provide real-world context to the GHG and climate change effects on a global scale, an action's net change in GHG emissions is compared relative to the state (where action will occur) and U.S. annual emissions. The following table provides a relative comparison of an action's net change in GHG emissions vs. state and U.S. projected GHG emissions for the same time period.

Total GHG Relative Significance (mton)					
		CO2	**CH4**	**N2O**	**CO2e**
2025-2047	State Total	7,749,857,395	36,053,100	1,275,565	7,787,186,060
2025-2047	U.S. Total	118,138,446,117	589,418,969	34,516,276	118,762,381,361
2025-2047	Action	58,142	429.347379	427.412113	58,358
Percent of State Totals		0.00075023%	0.00119088%	0.03350768%	0.00074941%
Percent of U.S. Totals		0.00004921%	0.00007284%	0.00123829%	0.00004914%

J. Michael Nied, PE (WI), Project Manager / Environmental Engineer — Jun 18 2024

Name, Title — **Date**

Infrastructure for operations of F-15E/EX Testing Alternative 1 - Santa Barbara-North of Santa Ynez County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Infrastructure for operations of F-15E/EX Testing Alternative 1

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
General Heavy Industry	578.00	1000sqft	13.27	578,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.1	**Precipitation Freq (Days)**	37
Climate Zone	4			**Operational Year**	2027
Utility Company	Western Community Energy				
CO2 Intensity (lb/MWhr)	531.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - New impervious area; alternative 1 project areas

Construction Phase - added paving time to account for access road paving

Demolition -

Grading - logic doc: alternative 1 site preparation, assumes 20% increase over the paving/construction area

Architectural Coating - interior is 123x40x27 four structures, plus one 75x125 AGE structure. parking for age structure is 9240. Exterior same

Area Coating - updated square footage (interior exterior) based on building dimensions

Water And Wastewater - reduced water usage a lot; only AGE building will use water, very small footprint compared to whole site

Land Use Change -

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Energy Mitigation -

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Stationary Sources - Process Boilers -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Exterior	289000	300000
tblAreaCoating	Area_Nonresidential_Interior	867000	900000
tblGrading	AcresOfGrading	90.00	15.91

2.0 Emissions Summary

Infrastructure for operations of F-15E/EX Testing Alternative 1 - Santa Barbara-North of Santa Ynez County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2025	0.2819	2.4713	2.8686	7.0900e-003	0.4068	0.0872	0.4940	0.1581	0.0815	0.2396	0.0000	646.2440	646.2440	0.1076	0.0282	657.3502
2026	6.8084	0.9453	1.2314	2.9900e-003	0.1056	0.0324	0.1380	0.0287	0.0304	0.0591	0.0000	274.4088	274.4088	0.0393	0.0137	279.4568
Maximum	**6.8084**	**2.4713**	**2.8686**	**7.0900e-003**	**0.4068**	**0.0872**	**0.4940**	**0.1581**	**0.0815**	**0.2396**	**0.0000**	**646.2440**	**646.2440**	**0.1076**	**0.0282**	**657.3502**

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					
2025	0.2819	2.4713	2.8686	7.0900e-003	0.2866	0.0872	0.3738	0.0964	0.0815	0.1779	0.0000	646.2436	646.2436	0.1076	0.0282	657.3497
2026	6.8084	0.9453	1.2314	2.9900e-003	0.1056	0.0324	0.1380	0.0287	0.0304	0.0591	0.0000	274.4087	274.4087	0.0393	0.0137	279.4566
Maximum	**6.8084**	**2.4713**	**2.8686**	**7.0900e-003**	**0.2866**	**0.0872**	**0.3738**	**0.0964**	**0.0815**	**0.1779**	**0.0000**	**646.2436**	**646.2436**	**0.1076**	**0.0282**	**657.3497**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	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**	**23.46**	**0.00**	**19.02**	**33.01**	**0.00**	**20.64**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2025**	**3-31-2025**	0.8576	0.8576
2	**4-1-2025**	**6-30-2025**	0.6201	0.6201
3	**7-1-2025**	**9-30-2025**	0.6270	0.6270
4	**10-1-2025**	**12-31-2025**	0.6345	0.6345
5	**1-1-2026**	**3-31-2026**	0.6153	0.6153
6	**4-1-2026**	**6-30-2026**	3.7828	3.7828
7	**7-1-2026**	**9-30-2026**	3.3562	3.3562
		Highest	3.7828	3.7828

Infrastructure for operations of F-15E/EX Testing Alternative 1 - Santa Barbara-North of Santa Ynez County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	2.9531	5.0000e-005	5.3000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0103	0.0103	3.0000e-005	0.0000	0.0110
Energy	0.0816	0.7418	0.6231	4.4500e-003		0.0564	0.0564		0.0564	0.0564	0.0000	1,937.2313	1,937.2313	0.0856	0.0233	1,946.3133
Mobile	1.0594	1.2755	9.1176	0.0178	2.0632	0.0137	2.0769	0.5524	0.0128	0.5652	0.0000	1,703.5576	1,703.5576	0.1192	0.0887	1,732.9577
Waste						0.0000	0.0000		0.0000	0.0000	148.8365	0.0000	148.8365	7.3803	0.0000	333.3446
Water						0.0000	0.0000		0.0000	0.0000	47.2900	174.5212	221.8112	0.1736	0.1042	257.1885
Total	**4.0941**	**2.0174**	**9.7460**	**0.0222**	**2.0632**	**0.0701**	**2.1333**	**0.5524**	**0.0692**	**0.6216**	**196.1265**	**3,815.3204**	**4,011.4469**	**7.7587**	**0.2161**	**4,269.8150**

Infrastructure for operations of F-15E/EX Testing Alternative 1 - Santa Barbara-North of Santa Ynez County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	2.9531	5.0000e-005	5.3000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0103	0.0103	3.0000e-005	0.0000	0.0110
Energy	0.0816	0.7418	0.6231	4.4500e-003		0.0564	0.0564		0.0564	0.0564	0.0000	1,937.2313	1,937.2313	0.0856	0.0233	1,946.3133
Mobile	1.0594	1.2755	9.1176	0.0178	2.0632	0.0137	2.0769	0.5524	0.0128	0.5652	0.0000	1,703.5576	1,703.5576	0.1192	0.0887	1,732.9577
Waste						0.0000	0.0000		0.0000	0.0000	148.8365	0.0000	148.8365	7.3803	0.0000	333.3446
Water						0.0000	0.0000		0.0000	0.0000	47.2900	174.5212	221.8112	0.1736	0.1042	257.1885
Total	**4.0941**	**2.0174**	**9.7460**	**0.0222**	**2.0632**	**0.0701**	**2.1333**	**0.5524**	**0.0692**	**0.6216**	**196.1265**	**3,815.3204**	**4,011.4469**	**7.7587**	**0.2161**	**4,269.8150**

	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**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.3 Vegetation

Vegetation

	CO2e
Category	MT
Vegetation Land Change	-25.8600
Total	**-25.8600**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2025	1/28/2025	5	20	
2	Site Preparation	Site Preparation	1/29/2025	2/11/2025	5	10	
3	Grading	Grading	2/12/2025	3/25/2025	5	30	
4	Building Construction	Building Construction	3/26/2025	5/19/2026	5	300	
5	Paving	Paving	5/20/2026	6/16/2026	5	20	
6	Architectural Coating	Architectural Coating	6/17/2026	7/14/2026	5	20	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 15.91

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 867,000; Non-Residential Outdoor: 289,000; Striped Parking Area: 0 (Architectural Coating – sqft)

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

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
Demolition	6	15.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Building Construction	9	243.00	95.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	49.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

3.2 Demolition - 2025

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					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0209	0.1920	0.1942	3.9000e-004		8.5300e-003	8.5300e-003		7.9200e-003	7.9200e-003	0.0000	33.9977	33.9977	9.4900e-003	0.0000	34.2350
Total	**0.0209**	**0.1920**	**0.1942**	**3.9000e-004**	**0.0000**	**8.5300e-003**	**8.5300e-003**	**0.0000**	**7.9200e-003**	**7.9200e-003**	**0.0000**	**33.9977**	**33.9977**	**9.4900e-003**	**0.0000**	**34.2350**

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3.2 Demolition - 2025

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	3.4000e-004	2.2000e-004	2.5600e-003	1.0000e-005	9.3000e-004	0.0000	9.3000e-004	2.5000e-004	0.0000	2.5000e-004	0.0000	0.6814	0.6814	2.0000e-005	2.0000e-005	0.6882
Total	**3.4000e-004**	**2.2000e-004**	**2.5600e-003**	**1.0000e-005**	**9.3000e-004**	**0.0000**	**9.3000e-004**	**2.5000e-004**	**0.0000**	**2.5000e-004**	**0.0000**	**0.6814**	**0.6814**	**2.0000e-005**	**2.0000e-005**	**0.6882**

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					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0209	0.1920	0.1942	3.9000e-004		8.5300e-003	8.5300e-003		7.9200e-003	7.9200e-003	0.0000	33.9976	33.9976	9.4900e-003	0.0000	34.2349
Total	**0.0209**	**0.1920**	**0.1942**	**3.9000e-004**	**0.0000**	**8.5300e-003**	**8.5300e-003**	**0.0000**	**7.9200e-003**	**7.9200e-003**	**0.0000**	**33.9976**	**33.9976**	**9.4900e-003**	**0.0000**	**34.2349**

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3.2 Demolition - 2025

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	3.4000e-004	2.2000e-004	2.5600e-003	1.0000e-005	9.3000e-004	0.0000	9.3000e-004	2.5000e-004	0.0000	2.5000e-004	0.0000	0.6814	0.6814	2.0000e-005	2.0000e-005	0.6882
Total	**3.4000e-004**	**2.2000e-004**	**2.5600e-003**	**1.0000e-005**	**9.3000e-004**	**0.0000**	**9.3000e-004**	**2.5000e-004**	**0.0000**	**2.5000e-004**	**0.0000**	**0.6814**	**0.6814**	**2.0000e-005**	**2.0000e-005**	**0.6882**

3.3 Site Preparation - 2025

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					0.0983	0.0000	0.0983	0.0505	0.0000	0.0505	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0124	0.1262	0.0896	1.9000e-004		5.4300e-003	5.4300e-003		5.0000e-003	5.0000e-003	0.0000	16.7335	16.7335	5.4100e-003	0.0000	16.8688
Total	**0.0124**	**0.1262**	**0.0896**	**1.9000e-004**	**0.0983**	**5.4300e-003**	**0.1037**	**0.0505**	**5.0000e-003**	**0.0555**	**0.0000**	**16.7335**	**16.7335**	**5.4100e-003**	**0.0000**	**16.8688**

Infrastructure for operations of F-15E/EX Testing Alternative 1 - Santa Barbara-North of Santa Ynez County, Annual

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3.3 Site Preparation - 2025

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	2.0000e-004	1.3000e-004	1.5300e-003	0.0000	5.6000e-004	0.0000	5.6000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4088	0.4088	1.0000e-005	1.0000e-005	0.4129
Total	**2.0000e-004**	**1.3000e-004**	**1.5300e-003**	**0.0000**	**5.6000e-004**	**0.0000**	**5.6000e-004**	**1.5000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.4088**	**0.4088**	**1.0000e-005**	**1.0000e-005**	**0.4129**

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					0.0383	0.0000	0.0383	0.0197	0.0000	0.0197	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0124	0.1262	0.0896	1.9000e-004		5.4300e-003	5.4300e-003		5.0000e-003	5.0000e-003	0.0000	16.7335	16.7335	5.4100e-003	0.0000	16.8688
Total	**0.0124**	**0.1262**	**0.0896**	**1.9000e-004**	**0.0383**	**5.4300e-003**	**0.0438**	**0.0197**	**5.0000e-003**	**0.0247**	**0.0000**	**16.7335**	**16.7335**	**5.4100e-003**	**0.0000**	**16.8688**

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3.3 Site Preparation - 2025

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	2.0000e-004	1.3000e-004	1.5300e-003	0.0000	5.6000e-004	0.0000	5.6000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4088	0.4088	1.0000e-005	1.0000e-005	0.4129
Total	**2.0000e-004**	**1.3000e-004**	**1.5300e-003**	**0.0000**	**5.6000e-004**	**0.0000**	**5.6000e-004**	**1.5000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.4088**	**0.4088**	**1.0000e-005**	**1.0000e-005**	**0.4129**

3.4 Grading - 2025

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					0.0988	0.0000	0.0988	0.0506	0.0000	0.0506	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0435	0.4191	0.3950	9.3000e-004		0.0170	0.0170		0.0156	0.0156	0.0000	81.7593	81.7593	0.0264	0.0000	82.4204
Total	**0.0435**	**0.4191**	**0.3950**	**9.3000e-004**	**0.0988**	**0.0170**	**0.1157**	**0.0506**	**0.0156**	**0.0662**	**0.0000**	**81.7593**	**81.7593**	**0.0264**	**0.0000**	**82.4204**

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3.4 Grading - 2025

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	6.8000e-004	4.4000e-004	5.1100e-003	1.0000e-005	1.8500e-003	1.0000e-005	1.8600e-003	4.9000e-004	1.0000e-005	5.0000e-004	0.0000	1.3627	1.3627	5.0000e-005	4.0000e-005	1.3765
Total	**6.8000e-004**	**4.4000e-004**	**5.1100e-003**	**1.0000e-005**	**1.8500e-003**	**1.0000e-005**	**1.8600e-003**	**4.9000e-004**	**1.0000e-005**	**5.0000e-004**	**0.0000**	**1.3627**	**1.3627**	**5.0000e-005**	**4.0000e-005**	**1.3765**

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					0.0385	0.0000	0.0385	0.0197	0.0000	0.0197	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0435	0.4191	0.3950	9.3000e-004		0.0170	0.0170		0.0156	0.0156	0.0000	81.7592	81.7592	0.0264	0.0000	82.4203
Total	**0.0435**	**0.4191**	**0.3950**	**9.3000e-004**	**0.0385**	**0.0170**	**0.0555**	**0.0197**	**0.0156**	**0.0353**	**0.0000**	**81.7592**	**81.7592**	**0.0264**	**0.0000**	**82.4203**

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3.4 Grading - 2025

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	6.8000e-004	4.4000e-004	5.1100e-003	1.0000e-005	1.8500e-003	1.0000e-005	1.8600e-003	4.9000e-004	1.0000e-005	5.0000e-004	0.0000	1.3627	1.3627	5.0000e-005	4.0000e-005	1.3765
Total	**6.8000e-004**	**4.4000e-004**	**5.1100e-003**	**1.0000e-005**	**1.8500e-003**	**1.0000e-005**	**1.8600e-003**	**4.9000e-004**	**1.0000e-005**	**5.0000e-004**	**0.0000**	**1.3627**	**1.3627**	**5.0000e-005**	**4.0000e-005**	**1.3765**

3.5 Building Construction - 2025

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	0.1374	1.2532	1.6165	2.7100e-003		0.0530	0.0530		0.0499	0.0499	0.0000	233.0791	233.0791	0.0548	0.0000	234.4488
Total	**0.1374**	**1.2532**	**1.6165**	**2.7100e-003**		**0.0530**	**0.0530**		**0.0499**	**0.0499**	**0.0000**	**233.0791**	**233.0791**	**0.0548**	**0.0000**	**234.4488**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2025

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	0.0111	0.4441	0.1482	1.6800e-003	0.0556	2.5500e-003	0.0581	0.0160	2.4400e-003	0.0185	0.0000	167.2913	167.2913	7.7000e-003	0.0247	174.8478
Worker	0.0554	0.0359	0.4160	1.1700e-003	0.1508	6.8000e-004	0.1515	0.0401	6.3000e-004	0.0407	0.0000	110.9304	110.9304	3.7100e-003	3.4500e-003	112.0518
Total	**0.0664**	**0.4800**	**0.5642**	**2.8500e-003**	**0.2064**	**3.2300e-003**	**0.2097**	**0.0561**	**3.0700e-003**	**0.0592**	**0.0000**	**278.2217**	**278.2217**	**0.0114**	**0.0282**	**286.8996**

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	0.1374	1.2532	1.6165	2.7100e-003		0.0530	0.0530		0.0499	0.0499	0.0000	233.0788	233.0788	0.0548	0.0000	234.4485
Total	**0.1374**	**1.2532**	**1.6165**	**2.7100e-003**		**0.0530**	**0.0530**		**0.0499**	**0.0499**	**0.0000**	**233.0788**	**233.0788**	**0.0548**	**0.0000**	**234.4485**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2025

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	0.0111	0.4441	0.1482	1.6800e-003	0.0556	2.5500e-003	0.0581	0.0160	2.4400e-003	0.0185	0.0000	167.2913	167.2913	7.7000e-003	0.0247	174.8478
Worker	0.0554	0.0359	0.4160	1.1700e-003	0.1508	6.8000e-004	0.1515	0.0401	6.3000e-004	0.0407	0.0000	110.9304	110.9304	3.7100e-003	3.4500e-003	112.0518
Total	**0.0664**	**0.4800**	**0.5642**	**2.8500e-003**	**0.2064**	**3.2300e-003**	**0.2097**	**0.0561**	**3.0700e-003**	**0.0592**	**0.0000**	**278.2217**	**278.2217**	**0.0114**	**0.0282**	**286.8996**

3.5 Building Construction - 2026

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	0.0677	0.6173	0.7962	1.3300e-003		0.0261	0.0261		0.0246	0.0246	0.0000	114.8001	114.8001	0.0270	0.0000	115.4748
Total	**0.0677**	**0.6173**	**0.7962**	**1.3300e-003**		**0.0261**	**0.0261**		**0.0246**	**0.0246**	**0.0000**	**114.8001**	**114.8001**	**0.0270**	**0.0000**	**115.4748**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2026

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	5.2200e-003	0.2140	0.0715	8.1000e-004	0.0274	1.2200e-003	0.0286	7.9000e-003	1.1700e-003	9.0700e-003	0.0000	80.8925	80.8925	3.9200e-003	0.0120	84.5562
Worker	0.0257	0.0160	0.1897	5.6000e-004	0.0743	3.1000e-004	0.0746	0.0197	2.9000e-004	0.0200	0.0000	53.3074	53.3074	1.6600e-003	1.5900e-003	53.8242
Total	**0.0309**	**0.2300**	**0.2612**	**1.3700e-003**	**0.1017**	**1.5300e-003**	**0.1032**	**0.0276**	**1.4600e-003**	**0.0291**	**0.0000**	**134.1999**	**134.1999**	**5.5800e-003**	**0.0136**	**138.3803**

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	0.0677	0.6173	0.7962	1.3300e-003		0.0261	0.0261		0.0246	0.0246	0.0000	114.8000	114.8000	0.0270	0.0000	115.4746
Total	**0.0677**	**0.6173**	**0.7962**	**1.3300e-003**		**0.0261**	**0.0261**		**0.0246**	**0.0246**	**0.0000**	**114.8000**	**114.8000**	**0.0270**	**0.0000**	**115.4746**

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3.5 Building Construction - 2026

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	5.2200e-003	0.2140	0.0715	8.1000e-004	0.0274	1.2200e-003	0.0286	7.9000e-003	1.1700e-003	9.0700e-003	0.0000	80.8925	80.8925	3.9200e-003	0.0120	84.5562
Worker	0.0257	0.0160	0.1897	5.6000e-004	0.0743	3.1000e-004	0.0746	0.0197	2.9000e-004	0.0200	0.0000	53.3074	53.3074	1.6600e-003	1.5900e-003	53.8242
Total	**0.0309**	**0.2300**	**0.2612**	**1.3700e-003**	**0.1017**	**1.5300e-003**	**0.1032**	**0.0276**	**1.4600e-003**	**0.0291**	**0.0000**	**134.1999**	**134.1999**	**5.5800e-003**	**0.0136**	**138.3803**

3.6 Paving - 2026

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	9.1500e-003	0.0858	0.1458	2.3000e-004		4.1900e-003	4.1900e-003		3.8500e-003	3.8500e-003	0.0000	20.0193	20.0193	6.4700e-003	0.0000	20.1811
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.1500e-003**	**0.0858**	**0.1458**	**2.3000e-004**		**4.1900e-003**	**4.1900e-003**		**3.8500e-003**	**3.8500e-003**	**0.0000**	**20.0193**	**20.0193**	**6.4700e-003**	**0.0000**	**20.1811**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2026

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	3.2000e-004	2.0000e-004	2.3700e-003	1.0000e-005	9.3000e-004	0.0000	9.3000e-004	2.5000e-004	0.0000	2.5000e-004	0.0000	0.6648	0.6648	2.0000e-005	2.0000e-005	0.6712
Total	**3.2000e-004**	**2.0000e-004**	**2.3700e-003**	**1.0000e-005**	**9.3000e-004**	**0.0000**	**9.3000e-004**	**2.5000e-004**	**0.0000**	**2.5000e-004**	**0.0000**	**0.6648**	**0.6648**	**2.0000e-005**	**2.0000e-005**	**0.6712**

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	9.1500e-003	0.0858	0.1458	2.3000e-004		4.1900e-003	4.1900e-003		3.8500e-003	3.8500e-003	0.0000	20.0192	20.0192	6.4700e-003	0.0000	20.1811
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.1500e-003**	**0.0858**	**0.1458**	**2.3000e-004**		**4.1900e-003**	**4.1900e-003**		**3.8500e-003**	**3.8500e-003**	**0.0000**	**20.0192**	**20.0192**	**6.4700e-003**	**0.0000**	**20.1811**

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3.6 Paving - 2026

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	3.2000e-004	2.0000e-004	2.3700e-003	1.0000e-005	9.3000e-004	0.0000	9.3000e-004	2.5000e-004	0.0000	2.5000e-004	0.0000	0.6648	0.6648	2.0000e-005	2.0000e-005	0.6712
Total	**3.2000e-004**	**2.0000e-004**	**2.3700e-003**	**1.0000e-005**	**9.3000e-004**	**0.0000**	**9.3000e-004**	**2.5000e-004**	**0.0000**	**2.5000e-004**	**0.0000**	**0.6648**	**0.6648**	**2.0000e-005**	**2.0000e-005**	**0.6712**

3.7 Architectural Coating - 2026

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					
Archit. Coating	6.6976					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**6.6993**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

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3.7 Architectural Coating - 2026

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	1.0500e-003	6.5000e-004	7.7300e-003	2.0000e-005	3.0300e-003	1.0000e-005	3.0400e-003	8.0000e-004	1.0000e-005	8.2000e-004	0.0000	2.1716	2.1716	7.0000e-005	6.0000e-005	2.1926
Total	**1.0500e-003**	**6.5000e-004**	**7.7300e-003**	**2.0000e-005**	**3.0300e-003**	**1.0000e-005**	**3.0400e-003**	**8.0000e-004**	**1.0000e-005**	**8.2000e-004**	**0.0000**	**2.1716**	**2.1716**	**7.0000e-005**	**6.0000e-005**	**2.1926**

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					
Archit. Coating	6.6976					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**6.6993**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

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3.7 Architectural Coating - 2026

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	1.0500e-003	6.5000e-004	7.7300e-003	2.0000e-005	3.0300e-003	1.0000e-005	3.0400e-003	8.0000e-004	1.0000e-005	8.2000e-004	0.0000	2.1716	2.1716	7.0000e-005	6.0000e-005	2.1926
Total	**1.0500e-003**	**6.5000e-004**	**7.7300e-003**	**2.0000e-005**	**3.0300e-003**	**1.0000e-005**	**3.0400e-003**	**8.0000e-004**	**1.0000e-005**	**8.2000e-004**	**0.0000**	**2.1716**	**2.1716**	**7.0000e-005**	**6.0000e-005**	**2.1926**

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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	1.0594	1.2755	9.1176	0.0178	2.0632	0.0137	2.0769	0.5524	0.0128	0.5652	0.0000	1,703.5576	1,703.5576	0.1192	0.0887	1,732.9577
Unmitigated	1.0594	1.2755	9.1176	0.0178	2.0632	0.0137	2.0769	0.5524	0.0128	0.5652	0.0000	1,703.5576	1,703.5576	0.1192	0.0887	1,732.9577

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	2,271.54	3,710.76	2942.02	5,475,084	5,475,084
Total	2,271.54	3,710.76	2,942.02	5,475,084	5,475,084

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
General Heavy Industry	6.60	5.50	6.40	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Heavy Industry	0.506430	0.055863	0.206798	0.143793	0.025842	0.006469	0.011207	0.006259	0.000953	0.000560	0.028990	0.003362	0.003474

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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	1,129.7280	1,129.7280	0.0701	8.4900e-003	1,134.0114
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,129.7280	1,129.7280	0.0701	8.4900e-003	1,134.0114
NaturalGas Mitigated	0.0816	0.7418	0.6231	4.4500e-003		0.0564	0.0564		0.0564	0.0564	0.0000	807.5033	807.5033	0.0155	0.0148	812.3019
NaturalGas Unmitigated	0.0816	0.7418	0.6231	4.4500e-003		0.0564	0.0564		0.0564	0.0564	0.0000	807.5033	807.5033	0.0155	0.0148	812.3019

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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					
General Heavy Industry	1.5132e+007	0.0816	0.7418	0.6231	4.4500e-003		0.0564	0.0564		0.0564	0.0564	0.0000	807.5033	807.5033	0.0155	0.0148	812.3019
Total		**0.0816**	**0.7418**	**0.6231**	**4.4500e-003**		**0.0564**	**0.0564**		**0.0564**	**0.0564**	**0.0000**	**807.5033**	**807.5033**	**0.0155**	**0.0148**	**812.3019**

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					
General Heavy Industry	1.5132e+007	0.0816	0.7418	0.6231	4.4500e-003		0.0564	0.0564		0.0564	0.0564	0.0000	807.5033	807.5033	0.0155	0.0148	812.3019
Total		**0.0816**	**0.7418**	**0.6231**	**4.4500e-003**		**0.0564**	**0.0564**		**0.0564**	**0.0564**	**0.0000**	**807.5033**	**807.5033**	**0.0155**	**0.0148**	**812.3019**

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5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	4.6818e+006	1,129.7280	0.0701	8.4900e-003	1,134.0114
Total		**1,129.7280**	**0.0701**	**8.4900e-003**	**1,134.0114**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	4.6818e+006	1,129.7280	0.0701	8.4900e-003	1,134.0114
Total		**1,129.7280**	**0.0701**	**8.4900e-003**	**1,134.0114**

6.0 Area Detail

6.1 Mitigation Measures Area

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	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	2.9531	5.0000e-005	5.3000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0103	0.0103	3.0000e-005	0.0000	0.0110
Unmitigated	2.9531	5.0000e-005	5.3000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0103	0.0103	3.0000e-005	0.0000	0.0110

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	0.6953					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.2574					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.9000e-004	5.0000e-005	5.3000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0103	0.0103	3.0000e-005	0.0000	0.0110
Total	**2.9531**	**5.0000e-005**	**5.3000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0103**	**0.0103**	**3.0000e-005**	**0.0000**	**0.0110**

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6.2 Area by SubCategory

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	0.6953					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.2574					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.9000e-004	5.0000e-005	5.3000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0103	0.0103	3.0000e-005	0.0000	0.0110
Total	**2.9531**	**5.0000e-005**	**5.3000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0103**	**0.0103**	**3.0000e-005**	**0.0000**	**0.0110**

7.0 Water Detail

7.1 Mitigation Measures Water

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	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	221.8112	0.1736	0.1042	257.1885
Unmitigated	221.8112	0.1736	0.1042	257.1885

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	133.662 / 0	221.8112	0.1736	0.1042	257.1885
Total		**221.8112**	**0.1736**	**0.1042**	**257.1885**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	133.662 / 0	221.8112	0.1736	0.1042	257.1885
Total		**221.8112**	**0.1736**	**0.1042**	**257.1885**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	148.8365	7.3803	0.0000	333.3446
Unmitigated	148.8365	7.3803	0.0000	333.3446

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	716.72	148.8365	7.3803	0.0000	333.3446
Total		**148.8365**	**7.3803**	**0.0000**	**333.3446**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	716.72	148.8365	7.3803	0.0000	333.3446
Total		**148.8365**	**7.3803**	**0.0000**	**333.3446**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

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10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	-25.8600	0.0000	0.0000	-25.8600

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

11.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Grassland	6 / 0	-25.8600	0.0000	0.0000	-25.8600
Total		**-25.8600**	**0.0000**	**0.0000**	**-25.8600**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Infrastructure for operations of F-15E/EX Testing Alternative 2

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1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Heavy Industry	569.10	1000sqft	13.06	569,100.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.1	**Precipitation Freq (Days)**	37
Climate Zone	4			**Operational Year**	2027
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - New impervious area; alternative 2 project areas

Construction Phase - added paving time to account for access road paving

Demolition -

Grading - logic doc: alternative 2 site preparation, assumes 20% increase over the paving/construction area

Architectural Coating - interior is 123x40x27 four structures, plus one 75x125 AGE structure. parking for age structure is 9240

Area Coating - updated square footage

Water And Wastewater - reduced water usage a lot; only AGE building will use water, very small footprint compared to whole site

Land Use Change -

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Energy Mitigation -

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	284,550.00	300,000.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	853,650.00	900,000.00
tblAreaCoating	Area_Nonresidential_Exterior	284550	300000
tblAreaCoating	Area_Nonresidential_Interior	853650	900000
tblGrading	AcresOfGrading	90.00	15.68
tblGrading	AcresOfGrading	15.00	15.68

2.0 Emissions Summary

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
2025	0.2807	2.4618	2.8561	7.0400e-003	0.4042	0.0871	0.4913	0.1572	0.0814	0.2387	0.0000	637.7852	637.7852	0.1074	0.0277	648.7243
2026	7.0627	0.9405	1.2250	2.9600e-003	0.1038	0.0323	0.1361	0.0282	0.0304	0.0586	0.0000	269.7049	269.7049	0.0392	0.0134	274.6668
Maximum	**7.0627**	**2.4618**	**2.8561**	**7.0400e-003**	**0.4042**	**0.0871**	**0.4913**	**0.1572**	**0.0814**	**0.2387**	**0.0000**	**637.7852**	**637.7852**	**0.1074**	**0.0277**	**648.7243**

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					
2025	0.2807	2.4618	2.8561	7.0400e-003	0.2834	0.0871	0.3705	0.0955	0.0814	0.1769	0.0000	637.7848	637.7848	0.1074	0.0277	648.7239
2026	7.0627	0.9405	1.2250	2.9600e-003	0.1038	0.0323	0.1361	0.0282	0.0304	0.0586	0.0000	269.7047	269.7047	0.0392	0.0134	274.6666
Maximum	**7.0627**	**2.4618**	**2.8561**	**7.0400e-003**	**0.2834**	**0.0871**	**0.3705**	**0.0955**	**0.0814**	**0.1769**	**0.0000**	**637.7848**	**637.7848**	**0.1074**	**0.0277**	**648.7239**

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	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**	**23.78**	**0.00**	**19.25**	**33.30**	**0.00**	**20.77**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2025**	**3-31-2025**	0.8579	0.8579
2	**4-1-2025**	**6-30-2025**	0.6166	0.6166
3	**7-1-2025**	**9-30-2025**	0.6234	0.6234
4	**10-1-2025**	**12-31-2025**	0.6308	0.6308
5	**1-1-2026**	**3-31-2026**	0.6118	0.6118
6	**4-1-2026**	**6-30-2026**	3.9084	3.9084
7	**7-1-2026**	**9-30-2026**	3.4836	3.4836
		Highest	3.9084	3.9084

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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	2.9184	5.0000e-005	5.2200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0102	0.0102	3.0000e-005	0.0000	0.0108
Energy	0.0803	0.7303	0.6135	4.3800e-003		0.0555	0.0555		0.0555	0.0555	0.0000	1,612.5809	1,612.5809	0.0842	0.0229	1,621.5230
Mobile	1.0418	1.2547	8.9260	0.0175	2.0314	0.0134	2.0449	0.5439	0.0126	0.5565	0.0000	1,617.4902	1,617.4902	0.1173	0.0873	1,646.4376
Waste						0.0000	0.0000		0.0000	0.0000	146.5439	0.0000	146.5439	7.2666	0.0000	328.2099
Water						0.0000	0.0000		0.0000	0.0000	46.5618	126.2898	172.8516	0.1709	0.1026	207.6842
Total	**4.0405**	**1.9851**	**9.5447**	**0.0219**	**2.0314**	**0.0690**	**2.1004**	**0.5439**	**0.0681**	**0.6120**	**193.1057**	**3,356.3711**	**3,549.4768**	**7.6392**	**0.2128**	**3,803.8655**

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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	2.9184	5.0000e-005	5.2200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0102	0.0102	3.0000e-005	0.0000	0.0108
Energy	0.0803	0.7303	0.6135	4.3800e-003		0.0555	0.0555		0.0555	0.0555	0.0000	1,612.5809	1,612.5809	0.0842	0.0229	1,621.5230
Mobile	1.0418	1.2547	8.9260	0.0175	2.0314	0.0134	2.0449	0.5439	0.0126	0.5565	0.0000	1,617.4902	1,617.4902	0.1173	0.0873	1,646.4376
Waste						0.0000	0.0000		0.0000	0.0000	146.5439	0.0000	146.5439	7.2666	0.0000	328.2099
Water						0.0000	0.0000		0.0000	0.0000	46.5618	126.2898	172.8516	0.1709	0.1026	207.6842
Total	**4.0405**	**1.9851**	**9.5447**	**0.0219**	**2.0314**	**0.0690**	**2.1004**	**0.5439**	**0.0681**	**0.6120**	**193.1057**	**3,356.3711**	**3,549.4768**	**7.6392**	**0.2128**	**3,803.8655**

	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**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
Vegetation Land Change	-28.0150
Total	**-28.0150**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2025	1/28/2025	5	20	
2	Site Preparation	Site Preparation	1/29/2025	2/11/2025	5	10	
3	Grading	Grading	2/12/2025	3/25/2025	5	30	
4	Building Construction	Building Construction	3/26/2025	5/19/2026	5	300	
5	Paving	Paving	5/20/2026	6/16/2026	5	20	
6	Architectural Coating	Architectural Coating	6/17/2026	7/14/2026	5	20	

Acres of Grading (Site Preparation Phase): 15.68

Acres of Grading (Grading Phase): 15.68

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 900,000; Non-Residential Outdoor: 300,000; Striped Parking Area: 0 (Architectural Coating – sqft)

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OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48
Grading	Scrapers	2	8.00	367	0.48

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
Demolition	6	15.00	0.00	7.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Building Construction	9	239.00	93.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	48.00	0.00	0.00	8.30	6.40	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

3.2 Demolition - 2025

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					7.6000e-004	0.0000	7.6000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0209	0.1920	0.1942	3.9000e-004		8.5300e-003	8.5300e-003		7.9200e-003	7.9200e-003	0.0000	33.9977	33.9977	9.4900e-003	0.0000	34.2350
Total	**0.0209**	**0.1920**	**0.1942**	**3.9000e-004**	**7.6000e-004**	**8.5300e-003**	**9.2900e-003**	**1.2000e-004**	**7.9200e-003**	**8.0400e-003**	**0.0000**	**33.9977**	**33.9977**	**9.4900e-003**	**0.0000**	**34.2350**

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3.2 Demolition - 2025

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	1.0000e-005	5.5000e-004	1.5000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.2102	0.2102	2.0000e-005	3.0000e-005	0.2207
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	3.4000e-004	2.2000e-004	2.5400e-003	1.0000e-005	9.3000e-004	0.0000	9.3000e-004	2.5000e-004	0.0000	2.5000e-004	0.0000	0.6611	0.6611	2.0000e-005	2.0000e-005	0.6680
Total	**3.5000e-004**	**7.7000e-004**	**2.6900e-003**	**1.0000e-005**	**9.9000e-004**	**0.0000**	**9.9000e-004**	**2.7000e-004**	**0.0000**	**2.7000e-004**	**0.0000**	**0.8713**	**0.8713**	**4.0000e-005**	**5.0000e-005**	**0.8887**

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					3.0000e-004	0.0000	3.0000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0209	0.1920	0.1942	3.9000e-004		8.5300e-003	8.5300e-003		7.9200e-003	7.9200e-003	0.0000	33.9976	33.9976	9.4900e-003	0.0000	34.2349
Total	**0.0209**	**0.1920**	**0.1942**	**3.9000e-004**	**3.0000e-004**	**8.5300e-003**	**8.8300e-003**	**4.0000e-005**	**7.9200e-003**	**7.9600e-003**	**0.0000**	**33.9976**	**33.9976**	**9.4900e-003**	**0.0000**	**34.2349**

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3.2 Demolition - 2025

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	1.0000e-005	5.5000e-004	1.5000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.2102	0.2102	2.0000e-005	3.0000e-005	0.2207
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	3.4000e-004	2.2000e-004	2.5400e-003	1.0000e-005	9.3000e-004	0.0000	9.3000e-004	2.5000e-004	0.0000	2.5000e-004	0.0000	0.6611	0.6611	2.0000e-005	2.0000e-005	0.6680
Total	**3.5000e-004**	**7.7000e-004**	**2.6900e-003**	**1.0000e-005**	**9.9000e-004**	**0.0000**	**9.9000e-004**	**2.7000e-004**	**0.0000**	**2.7000e-004**	**0.0000**	**0.8713**	**0.8713**	**4.0000e-005**	**5.0000e-005**	**0.8887**

3.3 Site Preparation - 2025

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					0.0987	0.0000	0.0987	0.0506	0.0000	0.0506	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0124	0.1262	0.0896	1.9000e-004		5.4300e-003	5.4300e-003		5.0000e-003	5.0000e-003	0.0000	16.7335	16.7335	5.4100e-003	0.0000	16.8688
Total	**0.0124**	**0.1262**	**0.0896**	**1.9000e-004**	**0.0987**	**5.4300e-003**	**0.1041**	**0.0506**	**5.0000e-003**	**0.0556**	**0.0000**	**16.7335**	**16.7335**	**5.4100e-003**	**0.0000**	**16.8688**

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3.3 Site Preparation - 2025

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	2.0000e-004	1.3000e-004	1.5200e-003	0.0000	5.6000e-004	0.0000	5.6000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.3966	0.3966	1.0000e-005	1.0000e-005	0.4008
Total	**2.0000e-004**	**1.3000e-004**	**1.5200e-003**	**0.0000**	**5.6000e-004**	**0.0000**	**5.6000e-004**	**1.5000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.3966**	**0.3966**	**1.0000e-005**	**1.0000e-005**	**0.4008**

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					0.0385	0.0000	0.0385	0.0197	0.0000	0.0197	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0124	0.1262	0.0896	1.9000e-004		5.4300e-003	5.4300e-003		5.0000e-003	5.0000e-003	0.0000	16.7335	16.7335	5.4100e-003	0.0000	16.8688
Total	**0.0124**	**0.1262**	**0.0896**	**1.9000e-004**	**0.0385**	**5.4300e-003**	**0.0439**	**0.0197**	**5.0000e-003**	**0.0247**	**0.0000**	**16.7335**	**16.7335**	**5.4100e-003**	**0.0000**	**16.8688**

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3.3 Site Preparation - 2025

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	2.0000e-004	1.3000e-004	1.5200e-003	0.0000	5.6000e-004	0.0000	5.6000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.3966	0.3966	1.0000e-005	1.0000e-005	0.4008
Total	**2.0000e-004**	**1.3000e-004**	**1.5200e-003**	**0.0000**	**5.6000e-004**	**0.0000**	**5.6000e-004**	**1.5000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.3966**	**0.3966**	**1.0000e-005**	**1.0000e-005**	**0.4008**

3.4 Grading - 2025

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					0.0987	0.0000	0.0987	0.0506	0.0000	0.0506	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0435	0.4191	0.3950	9.3000e-004		0.0170	0.0170		0.0156	0.0156	0.0000	81.7593	81.7593	0.0264	0.0000	82.4204
Total	**0.0435**	**0.4191**	**0.3950**	**9.3000e-004**	**0.0987**	**0.0170**	**0.1156**	**0.0506**	**0.0156**	**0.0662**	**0.0000**	**81.7593**	**81.7593**	**0.0264**	**0.0000**	**82.4204**

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3.4 Grading - 2025

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	6.8000e-004	4.4000e-004	5.0800e-003	1.0000e-005	1.8500e-003	1.0000e-005	1.8600e-003	4.9000e-004	1.0000e-005	5.0000e-004	0.0000	1.3221	1.3221	5.0000e-005	4.0000e-005	1.3359
Total	**6.8000e-004**	**4.4000e-004**	**5.0800e-003**	**1.0000e-005**	**1.8500e-003**	**1.0000e-005**	**1.8600e-003**	**4.9000e-004**	**1.0000e-005**	**5.0000e-004**	**0.0000**	**1.3221**	**1.3221**	**5.0000e-005**	**4.0000e-005**	**1.3359**

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					0.0385	0.0000	0.0385	0.0197	0.0000	0.0197	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0435	0.4191	0.3950	9.3000e-004		0.0170	0.0170		0.0156	0.0156	0.0000	81.7592	81.7592	0.0264	0.0000	82.4203
Total	**0.0435**	**0.4191**	**0.3950**	**9.3000e-004**	**0.0385**	**0.0170**	**0.0554**	**0.0197**	**0.0156**	**0.0353**	**0.0000**	**81.7592**	**81.7592**	**0.0264**	**0.0000**	**82.4203**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2025

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	6.8000e-004	4.4000e-004	5.0800e-003	1.0000e-005	1.8500e-003	1.0000e-005	1.8600e-003	4.9000e-004	1.0000e-005	5.0000e-004	0.0000	1.3221	1.3221	5.0000e-005	4.0000e-005	1.3359
Total	**6.8000e-004**	**4.4000e-004**	**5.0800e-003**	**1.0000e-005**	**1.8500e-003**	**1.0000e-005**	**1.8600e-003**	**4.9000e-004**	**1.0000e-005**	**5.0000e-004**	**0.0000**	**1.3221**	**1.3221**	**5.0000e-005**	**4.0000e-005**	**1.3359**

3.5 Building Construction - 2025

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	0.1374	1.2532	1.6165	2.7100e-003		0.0530	0.0530		0.0499	0.0499	0.0000	233.0791	233.0791	0.0548	0.0000	234.4488
Total	**0.1374**	**1.2532**	**1.6165**	**2.7100e-003**		**0.0530**	**0.0530**		**0.0499**	**0.0499**	**0.0000**	**233.0791**	**233.0791**	**0.0548**	**0.0000**	**234.4488**

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3.5 Building Construction - 2025

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	0.0108	0.4347	0.1450	1.6400e-003	0.0544	2.5000e-003	0.0569	0.0157	2.3900e-003	0.0181	0.0000	163.7693	163.7693	7.5400e-003	0.0242	171.1667
Worker	0.0544	0.0353	0.4065	1.1500e-003	0.1484	6.7000e-004	0.1490	0.0394	6.1000e-004	0.0400	0.0000	105.8563	105.8563	3.6500e-003	3.3900e-003	106.9593
Total	**0.0652**	**0.4700**	**0.5516**	**2.7900e-003**	**0.2028**	**3.1700e-003**	**0.2059**	**0.0551**	**3.0000e-003**	**0.0581**	**0.0000**	**269.6257**	**269.6257**	**0.0112**	**0.0276**	**278.1260**

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	0.1374	1.2532	1.6165	2.7100e-003		0.0530	0.0530		0.0499	0.0499	0.0000	233.0788	233.0788	0.0548	0.0000	234.4485
Total	**0.1374**	**1.2532**	**1.6165**	**2.7100e-003**		**0.0530**	**0.0530**		**0.0499**	**0.0499**	**0.0000**	**233.0788**	**233.0788**	**0.0548**	**0.0000**	**234.4485**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2025

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	0.0108	0.4347	0.1450	1.6400e-003	0.0544	2.5000e-003	0.0569	0.0157	2.3900e-003	0.0181	0.0000	163.7693	163.7693	7.5400e-003	0.0242	171.1667
Worker	0.0544	0.0353	0.4065	1.1500e-003	0.1484	6.7000e-004	0.1490	0.0394	6.1000e-004	0.0400	0.0000	105.8563	105.8563	3.6500e-003	3.3900e-003	106.9593
Total	**0.0652**	**0.4700**	**0.5516**	**2.7900e-003**	**0.2028**	**3.1700e-003**	**0.2059**	**0.0551**	**3.0000e-003**	**0.0581**	**0.0000**	**269.6257**	**269.6257**	**0.0112**	**0.0276**	**278.1260**

3.5 Building Construction - 2026

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	0.0677	0.6173	0.7962	1.3300e-003		0.0261	0.0261		0.0246	0.0246	0.0000	114.8001	114.8001	0.0270	0.0000	115.4748
Total	**0.0677**	**0.6173**	**0.7962**	**1.3300e-003**		**0.0261**	**0.0261**		**0.0246**	**0.0246**	**0.0000**	**114.8001**	**114.8001**	**0.0270**	**0.0000**	**115.4748**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2026

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	5.1100e-003	0.2095	0.0700	7.9000e-004	0.0268	1.2000e-003	0.0280	7.7300e-003	1.1500e-003	8.8800e-003	0.0000	79.1895	79.1895	3.8300e-003	0.0117	82.7760
Worker	0.0252	0.0157	0.1850	5.5000e-004	0.0731	3.1000e-004	0.0734	0.0194	2.8000e-004	0.0197	0.0000	50.4559	50.4559	1.6300e-003	1.5700e-003	50.9641
Total	**0.0303**	**0.2252**	**0.2551**	**1.3400e-003**	**0.0999**	**1.5100e-003**	**0.1014**	**0.0272**	**1.4300e-003**	**0.0286**	**0.0000**	**129.6454**	**129.6454**	**5.4600e-003**	**0.0133**	**133.7402**

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	0.0677	0.6173	0.7962	1.3300e-003		0.0261	0.0261		0.0246	0.0246	0.0000	114.8000	114.8000	0.0270	0.0000	115.4746
Total	**0.0677**	**0.6173**	**0.7962**	**1.3300e-003**		**0.0261**	**0.0261**		**0.0246**	**0.0246**	**0.0000**	**114.8000**	**114.8000**	**0.0270**	**0.0000**	**115.4746**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2026

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	5.1100e-003	0.2095	0.0700	7.9000e-004	0.0268	1.2000e-003	0.0280	7.7300e-003	1.1500e-003	8.8800e-003	0.0000	79.1895	79.1895	3.8300e-003	0.0117	82.7760
Worker	0.0252	0.0157	0.1850	5.5000e-004	0.0731	3.1000e-004	0.0734	0.0194	2.8000e-004	0.0197	0.0000	50.4559	50.4559	1.6300e-003	1.5700e-003	50.9641
Total	**0.0303**	**0.2252**	**0.2551**	**1.3400e-003**	**0.0999**	**1.5100e-003**	**0.1014**	**0.0272**	**1.4300e-003**	**0.0286**	**0.0000**	**129.6454**	**129.6454**	**5.4600e-003**	**0.0133**	**133.7402**

3.6 Paving - 2026

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	9.1500e-003	0.0858	0.1458	2.3000e-004		4.1900e-003	4.1900e-003		3.8500e-003	3.8500e-003	0.0000	20.0193	20.0193	6.4700e-003	0.0000	20.1811
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.1500e-003**	**0.0858**	**0.1458**	**2.3000e-004**		**4.1900e-003**	**4.1900e-003**		**3.8500e-003**	**3.8500e-003**	**0.0000**	**20.0193**	**20.0193**	**6.4700e-003**	**0.0000**	**20.1811**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2026

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	3.2000e-004	2.0000e-004	2.3500e-003	1.0000e-005	9.3000e-004	0.0000	9.3000e-004	2.5000e-004	0.0000	2.5000e-004	0.0000	0.6397	0.6397	2.0000e-005	2.0000e-005	0.6462
Total	**3.2000e-004**	**2.0000e-004**	**2.3500e-003**	**1.0000e-005**	**9.3000e-004**	**0.0000**	**9.3000e-004**	**2.5000e-004**	**0.0000**	**2.5000e-004**	**0.0000**	**0.6397**	**0.6397**	**2.0000e-005**	**2.0000e-005**	**0.6462**

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	9.1500e-003	0.0858	0.1458	2.3000e-004		4.1900e-003	4.1900e-003		3.8500e-003	3.8500e-003	0.0000	20.0192	20.0192	6.4700e-003	0.0000	20.1811
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.1500e-003**	**0.0858**	**0.1458**	**2.3000e-004**		**4.1900e-003**	**4.1900e-003**		**3.8500e-003**	**3.8500e-003**	**0.0000**	**20.0192**	**20.0192**	**6.4700e-003**	**0.0000**	**20.1811**

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3.6 Paving - 2026

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	3.2000e-004	2.0000e-004	2.3500e-003	1.0000e-005	9.3000e-004	0.0000	9.3000e-004	2.5000e-004	0.0000	2.5000e-004	0.0000	0.6397	0.6397	2.0000e-005	2.0000e-005	0.6462
Total	**3.2000e-004**	**2.0000e-004**	**2.3500e-003**	**1.0000e-005**	**9.3000e-004**	**0.0000**	**9.3000e-004**	**2.5000e-004**	**0.0000**	**2.5000e-004**	**0.0000**	**0.6397**	**0.6397**	**2.0000e-005**	**2.0000e-005**	**0.6462**

3.7 Architectural Coating - 2026

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					
Archit. Coating	6.9525					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**6.9542**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2026

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	1.0200e-003	6.4000e-004	7.5100e-003	2.0000e-005	2.9600e-003	1.0000e-005	2.9800e-003	7.9000e-004	1.0000e-005	8.0000e-004	0.0000	2.0472	2.0472	7.0000e-005	6.0000e-005	2.0678
Total	**1.0200e-003**	**6.4000e-004**	**7.5100e-003**	**2.0000e-005**	**2.9600e-003**	**1.0000e-005**	**2.9800e-003**	**7.9000e-004**	**1.0000e-005**	**8.0000e-004**	**0.0000**	**2.0472**	**2.0472**	**7.0000e-005**	**6.0000e-005**	**2.0678**

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					
Archit. Coating	6.9525					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**6.9542**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

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3.7 Architectural Coating - 2026

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	1.0200e-003	6.4000e-004	7.5100e-003	2.0000e-005	2.9600e-003	1.0000e-005	2.9800e-003	7.9000e-004	1.0000e-005	8.0000e-004	0.0000	2.0472	2.0472	7.0000e-005	6.0000e-005	2.0678
Total	**1.0200e-003**	**6.4000e-004**	**7.5100e-003**	**2.0000e-005**	**2.9600e-003**	**1.0000e-005**	**2.9800e-003**	**7.9000e-004**	**1.0000e-005**	**8.0000e-004**	**0.0000**	**2.0472**	**2.0472**	**7.0000e-005**	**6.0000e-005**	**2.0678**

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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	1.0418	1.2547	8.9260	0.0175	2.0314	0.0134	2.0449	0.5439	0.0126	0.5565	0.0000	1,617.4902	1,617.4902	0.1173	0.0873	1,646.4376
Unmitigated	1.0418	1.2547	8.9260	0.0175	2.0314	0.0134	2.0449	0.5439	0.0126	0.5565	0.0000	1,617.4902	1,617.4902	0.1173	0.0873	1,646.4376

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	2,236.56	3,653.62	2896.72	5,390,779	5,390,779
Total	2,236.56	3,653.62	2,896.72	5,390,779	5,390,779

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
General Heavy Industry	6.60	5.50	6.40	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Heavy Industry	0.506430	0.055863	0.206798	0.143793	0.025842	0.006469	0.011207	0.006259	0.000953	0.000560	0.028990	0.003362	0.003474

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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	817.5115	817.5115	0.0690	8.3600e-003	821.7289
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	817.5115	817.5115	0.0690	8.3600e-003	821.7289
NaturalGas Mitigated	0.0803	0.7303	0.6135	4.3800e-003		0.0555	0.0555		0.0555	0.0555	0.0000	795.0694	795.0694	0.0152	0.0146	799.7941
NaturalGas Unmitigated	0.0803	0.7303	0.6135	4.3800e-003		0.0555	0.0555		0.0555	0.0555	0.0000	795.0694	795.0694	0.0152	0.0146	799.7941

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
General Heavy Industry	1.4899e+007	0.0803	0.7303	0.6135	4.3800e-003		0.0555	0.0555		0.0555	0.0555	0.0000	795.0694	795.0694	0.0152	0.0146	799.7941
Total		**0.0803**	**0.7303**	**0.6135**	**4.3800e-003**		**0.0555**	**0.0555**		**0.0555**	**0.0555**	**0.0000**	**795.0694**	**795.0694**	**0.0152**	**0.0146**	**799.7941**

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					
General Heavy Industry	1.4899e+007	0.0803	0.7303	0.6135	4.3800e-003		0.0555	0.0555		0.0555	0.0555	0.0000	795.0694	795.0694	0.0152	0.0146	799.7941
Total		**0.0803**	**0.7303**	**0.6135**	**4.3800e-003**		**0.0555**	**0.0555**		**0.0555**	**0.0555**	**0.0000**	**795.0694**	**795.0694**	**0.0152**	**0.0146**	**799.7941**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	4.60971e+006	817.5115	0.0690	8.3600e-003	821.7289
Total		**817.5115**	**0.0690**	**8.3600e-003**	**821.7289**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	4.60971e+006	817.5115	0.0690	8.3600e-003	821.7289
Total		**817.5115**	**0.0690**	**8.3600e-003**	**821.7289**

6.0 Area Detail

6.1 Mitigation Measures Area

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	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	2.9184	5.0000e-005	5.2200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0102	0.0102	3.0000e-005	0.0000	0.0108
Unmitigated	2.9184	5.0000e-005	5.2200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0102	0.0102	3.0000e-005	0.0000	0.0108

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	0.6953					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.2226					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.8000e-004	5.0000e-005	5.2200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0102	0.0102	3.0000e-005	0.0000	0.0108
Total	**2.9184**	**5.0000e-005**	**5.2200e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0102**	**0.0102**	**3.0000e-005**	**0.0000**	**0.0108**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

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	0.6953					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.2226					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.8000e-004	5.0000e-005	5.2200e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0102	0.0102	3.0000e-005	0.0000	0.0108
Total	**2.9184**	**5.0000e-005**	**5.2200e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0102**	**0.0102**	**3.0000e-005**	**0.0000**	**0.0108**

7.0 Water Detail

7.1 Mitigation Measures Water

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	172.8516	0.1709	0.1026	207.6842
Unmitigated	172.8516	0.1709	0.1026	207.6842

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	131.604 / 0	172.8516	0.1709	0.1026	207.6842
Total		**172.8516**	**0.1709**	**0.1026**	**207.6842**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	131.604 / 0	172.8516	0.1709	0.1026	207.6842
Total		**172.8516**	**0.1709**	**0.1026**	**207.6842**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	146.5439	7.2666	0.0000	328.2099
Unmitigated	146.5439	7.2666	0.0000	328.2099

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	705.68	146.5439	7.2666	0.0000	328.2099
Total		**146.5439**	**7.2666**	**0.0000**	**328.2099**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	705.68	146.5439	7.2666	0.0000	328.2099
Total		**146.5439**	**7.2666**	**0.0000**	**328.2099**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

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10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	-28.0150	0.0000	0.0000	-28.0150

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

11.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Grassland	6.5 / 0	-28.0150	0.0000	0.0000	-28.0150
Total		**-28.0150**	**0.0000**	**0.0000**	**-28.0150**

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: VANDENBERG AFB
State: California
County(s): Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Periodic Operations of F-15E/EX Testing at Vandenberg SFB

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2025

- Action Purpose and Need:

The purpose of the Proposed Action is to provide a suitable location for testing and training of a new generation of weapons and payloads with the F-15E and F-15EX fighter jets that can be performed with minimal conflict with other ongoing DAF operations.

The DAF continues to develop new weapons and payload systems to fulfill its mission to defend the US. The Proposed Action is needed to test the weapons and payloads and to train DAF personnel in the handling, use, and deployment of the new weapon systems.

- Action Description:

Flight operations under the Proposed Action would include the periodic operation of 12 F-15E or F-15EX aircraft. The aircraft would operate for approximately 1 week during each deployment, assuming no delays in either flight or ground operations from weather or other VSFB operations during the deployment time. During the first year of the Proposed Action, approximately 176 sorties (one takeoff and landing) would be flown annually over the course of two deployments. In subsequent years, approximately 88 sorties per year would be flown during one deployment. While at VSFB, the F-15 aircraft would perform both ground and flight tests and training events. Up to 250 Air Force personnel would deploy to VSFB to support each deployment.

The operational and training flights would potentially use special use airspace and would be flown over the Pacific Ocean at altitudes from 10,000 to 50,000 feet above sea level. Each sortie would be approximately 90 minutes in duration. The estimated total overwater flight time during the first year of the Proposed Action would be approximately 264 hours (176 sorties times 90 minutes) or 132 hours per deployment. In subsequent years, the total flight time would be about 132 hours during the one-week deployment. No sonic booms would be caused by operating aircraft, and flight elevation at the coastline on takeoff and landing would be no lower than 1,900 feet above ground level. Some night operations may occur with up to 50 percent of the sorties potentially being flown at night (Night operations refers to flights after sunset and before sunrise). The time of night operations could vary based on the month

- Point of Contact

Name: J. Michael Nied, PE (WI)
Title: Project Manager / Environmental Engineer
Organization: Environmental Assessment Services, LLC
Email: mnied@easbio.com
Phone Number: (608) 797-1326

- Activity List:

	Activity Type	Activity Title
2.	Aircraft	Year 1 periodic operation of aircraft
3.	Aircraft	Annual deployment
4.	Personnel	Personnel added

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Year 1 periodic operation of aircraft

- Activity Description:
The operational and training flights would potentially use special use airspace and would be flown over the Pacific Ocean at altitudes from 10,000 to 50,000 feet above sea level. Each sortie would be approximately 90 minutes in duration. The estimated total overwater flight time during the first year of the Proposed Action would be approximately 264 hours (176 sorties times 90 minutes)

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: No
End Month: 12
End Year: 2025

- Activity Emissions of Criteria Pollutants:

Pollutant	Total Emissions (TONs)
VOC	1.403911
SO_x	1.042386
NO_x	17.117885
CO	5.691394

Pollutant	Total Emissions (TONs)
PM 10	0.731249
PM 2.5	0.665751
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH_4	39.337667
N_2O	39.238119

Pollutant	Total Emissions (TONs)
CO_2	2982.568870
CO_2e	2992.856078

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Total Emissions (TONs)
VOC	1.092253
SO_x	0.979600
NO_x	16.221121
CO	5.144545

Pollutant	Total Emissions (TONs)
PM 10	0.638794
PM 2.5	0.576086
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Pollutant	Total Emissions (TONs)
CH_4	39.335656
N_2O	39.237718

Pollutant	Total Emissions (TONs)
CO_2	2932.930877
CO_2e	2943.048011

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Total Emissions (TONs)
VOC	0.311657
SO_x	0.062786
NO_x	0.896764
CO	0.546849

Pollutant	Total Emissions (TONs)
PM 10	0.092456
PM 2.5	0.089665
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Total Emissions (TONs)
CH_4	0.002011
N_2O	0.000401

Pollutant	Total Emissions (TONs)
CO_2	49.637993
CO_2e	49.808068

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: F-15E
Engine Model: F100-PW-229
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	1087.00	0.45	1.07	3.80	10.17	0.67	0.60
Approach	3098.00	0.24	1.07	15.08	1.17	0.70	0.63
Intermediate	5838.00	0.35	1.07	17.54	0.15	0.70	0.63
Military	11490.00	0.31	1.07	29.29	0.33	0.91	0.82
After Burn	20793.00	5.26	1.07	14.30	21.51	0.38	0.35

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	1087.00	0.13	0.03	3203.44	3214.64
Approach	3098.00	0.13	0.03	3203.44	3214.64
Intermediate	5838.00	0.13	0.03	3203.44	3214.64
Military	11490.00	0.13	0.03	3203.44	3214.64
After Burn	20793.00	0.13	0.03	3203.44	3214.64

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft:		12
Flight Operation Cycle Type:	LTO (Landing and Takeoff)	
Number of Annual Flight Operation Cycles for all Aircraft:		176
Number of Annual Trim Test(s) per Aircraft:		12

- Default Settings Used: Yes

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	29.8 (default)
Approach [Approach] (mins):	3.5 (default)
Climb Out [Intermediate] (mins):	0.8 (default)
Takeoff [Military] (mins):	0.2 (default)
Takeoff [After Burn] (mins):	0.2 (default)

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12 (default)
Approach (mins):	27 (default)
Intermediate (mins):	9 (default)
Military (mins):	9 (default)
AfterBurn (mins):	3 (default)

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)

TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

2.4 Auxiliary Power Unit (APU)

2.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

2.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e

2.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

2.5 Aerospace Ground Equipment (AGE)

2.5.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 176

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.33	No	Air Compressor	MC-1A - 18.4hp
1	1	No	Bomb Lift	MJ-1B
1	0.33	No	Generator Set	A/M32A-86D
1	0.5	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-2/TTU-228 - 130hp
1	8	No	Light Cart	NF-2
1	0.33	No	Start Cart	A/M32A-60A

2.5.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
MJ-1B	0.0	3.040	0.219	4.780	3.040	0.800	0.776
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-2/TTU-228 - 130hp	7.4	0.195	0.053	3.396	0.794	0.089	0.086
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
MJ-1B	0.0	0.0	0.0	151.7	152.2
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-2/TTU-228 - 130hp	7.4	0.0	0.0	167.2	167.8
NF-2	0.0	0.0	0.0	23.7	23.8
A/M32A-60A	0.0	0.0	0.0	237.4	238.2

2.5.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

3. Aircraft

3.1 General Information & Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Annual deployment

- Activity Description:
132 hours of flight time per one-week deployment. No sonic booms would be caused by operating aircraft, and flight elevation at the coastline on takeoff and landing would be no lower than 1,900 feet above ground level. Some night operations may occur with up to 50 percent of the sorties potentially being flown at night (Night operations refers to flights after sunset and before sunrise). The time of night operations could vary based on the month.

- Activity Start Date
Start Month: 1
Start Year: 2026

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	1.187362
SO_x	0.925680
NO_x	15.943063
CO	4.782860

Pollutant	Emissions Per Year (TONs)
PM 10	0.631879
PM 2.5	0.573180
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	19.719753
N_2O	19.628994

Pollutant	Emissions Per Year (TONs)
CO_2	2702.265482
CO_2e	2711.642968

- Activity Emissions of Criteria Pollutants [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	1.031533
SO_x	0.894287
NO_x	15.494681
CO	4.509435

Pollutant	Emissions Per Year (TONs)
PM 10	0.585651
PM 2.5	0.528347
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [LTO Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
CH_4	19.718748
N_2O	19.628794

Pollutant	Emissions Per Year (TONs)
CO_2	2677.446485
CO_2e	2686.738934

- Activity Emissions of Criteria Pollutants [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.155829
SO_x	0.031393
NO_x	0.448382

Pollutant	Emissions Per Year (TONs)
PM 10	0.046228
PM 2.5	0.044833
Pb	0.000000

CO	0.273425	NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [Aerospace Ground Equipment (AGE) part]:

Pollutant	Emissions Per Year (TONs)	Pollutant	Emissions Per Year (TONs)
CH_4	0.001006	CO_2	24.818996
N_2O	0.000201	CO_2e	24.904034

3.2 Aircraft & Engines

3.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: F-15E
Engine Model: F100-PW-229
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	1087.00	0.45	1.07	3.80	10.17	0.67	0.60
Approach	3098.00	0.24	1.07	15.08	1.17	0.70	0.63
Intermediate	5838.00	0.35	1.07	17.54	0.15	0.70	0.63
Military	11490.00	0.31	1.07	29.29	0.33	0.91	0.82
After Burn	20793.00	5.26	1.07	14.30	21.51	0.38	0.35

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	1087.00	0.13	0.03	3203.44	3214.64
Approach	3098.00	0.13	0.03	3203.44	3214.64
Intermediate	5838.00	0.13	0.03	3203.44	3214.64
Military	11490.00	0.13	0.03	3203.44	3214.64
After Burn	20793.00	0.13	0.03	3203.44	3214.64

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 12
Flight Operation Cycle Type: LTO (Landing and Takeoff)
Number of Annual Flight Operation Cycles for all Aircraft: 88
Number of Annual Trim Test(s) per Aircraft: 12

- Default Settings Used: Yes

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins):	29.8 (default)
Approach [Approach] (mins):	3.5 (default)
Climb Out [Intermediate] (mins):	0.8 (default)
Takeoff [Military] (mins):	0.2 (default)
Takeoff [After Burn] (mins):	0.2 (default)

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12 (default)
Approach (mins):	27 (default)
Intermediate (mins):	9 (default)
Military (mins):	9 (default)
AfterBurn (mins):	3 (default)

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

3.4 Auxiliary Power Unit (APU)

3.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer

3.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Criteria Pollutant Emission Factors (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5

- Auxiliary Power Unit (APU) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e

3.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs)
APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

3.5 Aerospace Ground Equipment (AGE)

3.5.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 88

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.33	No	Air Compressor	MC-1A - 18.4hp

1	1	No	Bomb Lift	MJ-1B
1	0.33	No	Generator Set	A/M32A-86D
1	0.5	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-2/TTU-228 - 130hp
1	8	No	Light Cart	NF-2
1	0.33	No	Start Cart	A/M32A-60A

3.5.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068
MJ-1B	0.0	3.040	0.219	4.780	3.040	0.800	0.776
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089
H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006
MJ-2/TTU-228 - 130hp	7.4	0.195	0.053	3.396	0.794	0.089	0.086
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205

- Aerospace Ground Equipment (AGE) Greenhouse Gasses Emission Factors (lb/hr)

Designation	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
MC-1A - 18.4hp	1.1	0.0	0.0	24.5	24.6
MJ-1B	0.0	0.0	0.0	151.7	152.2
A/M32A-86D	6.5	0.0	0.0	145.6	146.1
H1	0.4	0.0	0.0	8.8	8.8
MJ-2/TTU-228 - 130hp	7.4	0.0	0.0	167.2	167.8
NF-2	0.0	0.0	0.0	23.7	23.8
A/M32A-60A	0.0	0.0	0.0	237.4	238.2

3.5.3 Aerospace Ground Equipment (AGE) Formula(s)

- Aerospace Ground Equipment (AGE) Emissions per Year

$AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000$

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs)
AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

4. Personnel

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Personnel added

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Description:

Basing of up to 35 permanent support staff; as well as up to 250 Air Force personnel would deploy to Vandenberg SFB to support each 1-week deployment.

Adding 250 for 1 week only is not supported by the model, however this can be equated to 250*7days = 1750 work days/(365days/year) =~5 fulltime people.

Therefore 40 permanent support staff will be added to the air analysis.

- Activity Start Date

Start Month: 1
Start Year: 2025

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.064600
SO_x	0.000712
NO_x	0.031597
CO	0.396139

Pollutant	Emissions Per Year (TONs)
PM 10	0.004003
PM 2.5	0.001436
Pb	0.000000
NH_3	0.008106

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.004439
N_2O	0.002830

Pollutant	Emissions Per Year (TONs)
CO_2	72.079186
CO_2e	73.033608

4.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 40
Civilian Personnel: 0
Support Contractor Personnel: 0
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)
Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

4.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9

GOVs	54.49	37.73	4.67	0	0	3.11	0

4.4 Personnel Emission Factor(s)

- On Road Vehicle Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.15014	0.00272	0.08183	1.15414	0.01648	0.00579	0.03482
LDGT	0.19850	0.00338	0.15423	1.58574	0.01798	0.00647	0.03664
HDGV	0.25262	0.00518	0.25160	1.83327	0.02830	0.01002	0.03696
LDDV	0.02453	0.00212	0.21377	0.31526	0.03028	0.01896	0.00310
LDDT	0.01608	0.00283	0.07126	0.15320	0.02417	0.01248	0.00310
HDDV	0.10482	0.01080	2.21934	0.52071	0.11665	0.05708	0.18048
MC	5.55535	0.00206	0.72741	17.74481	0.01913	0.00815	0.00862

- On Road Vehicle Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01196	0.00928	275.34289	278.40759
LDGT	0.01652	0.01302	342.02606	346.32025
HDGV	0.02149	0.01816	523.58650	529.53564
LDDV	0.00114	0.03522	223.57891	234.10442
LDDT	0.00075	0.04708	298.82532	312.87385
HDDV	0.00487	0.17970	1140.57202	1194.24362
MC	0.25786	0.04719	207.94492	228.45331

4.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)
NP: Number of Personnel
WD: Work Days per Year
AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)
VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)
VMT_C: Civilian Personnel Vehicle Miles Travel (miles)
VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)
VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)
VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{Total}: Total Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Personnel On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

APPENDIX C. FINAL JURISDICTIONAL DELINEATION REPORT PERIODIC OPERATIONS OF F-15E/EX TESTING AT VANDENBERG SPACE FORCE BASE, SANTA BARBARA COUNTY, CALIFORNIA

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Revised Final

Jurisdictional Delineation Report in Support of Periodic Operations of F-15E/EX Testing at Vandenberg Space Force Base

Santa Barbara County
California

Prepared for:

United States Army Corps of Engineers
Los Angeles District

and

United States Space Force
30th Civil Engineer Squadron

November 2024

Acronyms and Abbreviations

CFR	Code of Federal Regulations
CWA	Clean Water Act
DAF	Department of the Air Force
MSA	Munitions Storage Area
NEPA	National Environmental Policy Act
PEM	palustrine emergent
U.S.	United States
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VSFB	Vandenberg Space Force Base

REVISED FINAL
JURISDICTIONAL DELINEATION REPORT
Periodic Operations of F-15E/EX Testing at
Vandenberg Space Force Base,
Santa Barbara County
California

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1.0 INTRODUCTION

This Jurisdictional Delineation Report details the results of a delineation of waters of the United States (U.S.) in support of a National Environmental Policy Act (NEPA) Environmental Assessment for the periodic operation of F-15E and/or F-15EX fighter jets at Vandenberg Space Force Base (VSFB), California (Figure 1). The periodic operations would include a temporary deployment of up to 12 F-15E and/or F-15EX aircraft with test operations of approximately 1 week in duration occurring a maximum of two times per year. The periodic operations would require munitions storage and permanent change of station for up to 35 individuals.

The Proposed Action could necessitate future work within or otherwise affecting Clean Water Act (CWA) Section 404 waters of the U.S. This report will support the NEPA evaluation of the project as well as any potential associated CWA Section 401/404 permitting.

Stantec GS Inc. (Stantec) wetland biologists conducted jurisdictional delineation field investigations within the project survey area between 12 June 2023 and 14 June 2023, with two additional site visits on 24 October 2023 and 18 June 2024.

2.0 OVERVIEW

The purpose of the Proposed Action is to provide a suitable location for testing and training of a new generation of weapons and payloads with the F-15E and F-15EX fighter jets that can be performed with minimal conflict with other ongoing U.S. Department of the Air Force (DAF) operations. The DAF continues to develop new weapons and payload systems to fulfill its mission to defend the US. The Proposed Action is needed to test the weapons and payloads and to train DAF personnel in the handling, use, and deployment of the new weapon systems.

2.1 PROJECT LOCATION

VSFB is located in Santa Barbara County, approximately 45 miles northwest of the City of Santa Barbara (Figure 1). The Installation is surrounded by the Santa Ynez mountains and the communities and ranch land of northern Santa Barbara and San Luis Obispo counties, extending to the Pacific Ocean shoreline. The communities of Lompoc and Santa Maria are east and north of the Base, respectively. The Installation comprises the North Range and South Range, separated by the Santa Ynez River and public access road to Surf Beach.

Project area components that were evaluated during field investigations include the following areas, as identified on Figure 2:

1) Flight Line Munitions Storage Igloos and Access Roads
2) Live Ordnance Loading Area
3) Temporary AGE Storage Pad
4) Munitions Storage Area (MSA) Munitions Storage Igloo Complex and Access Roads
5) 980 Igloo (and access road)

As noted on Figure 2, for the purpose of the jurisdictional delineation, project area components were buffered by 100 feet to assess the potential for aquatic habitats to occur in and in the vicinity of the project components. The project components and the associated 100-foot buffers comprise the survey area for this report.

Figure 1. Vandenberg Space Force Base Regional Location

Figure 2. Survey Area

2.2 PROPOSED ACTION

The Proposed Action at VSFB consists of the periodic operation of F-15E and/or F-15EX aircraft, basing of up to 35 permanent support staff, and implementing facility construction projects. For the purpose of this jurisdictional delineation report, only the facility construction portion of the Proposed Action is analyzed, as it is the construction aspect of the Proposed Action that may necessitate work within or otherwise affect jurisdictional aquatic habitats. In addition, certain construction portions of the Proposed Action would occur on paved surfaces within the VSFB Airfield fence line and would not impact natural habitats or aquatic habitats. Those construction portions of the Proposed Action are not analyzed in this report. Only those construction projects that have the potential to affect natural habitats and/or aquatic habitats are analyzed in this report. Table 1 describes the potential construction projects that could occur under the Proposed Action that have the potential to impact aquatic habitats. Project component locations are shown on Figure 2, with 100-foot buffers around each location.

Table 1 Proposed Action Construction Projects Analyzed in this Report

Project	Project Description
Temporary aircraft ground equipment (AGE) storage pad	Construct small (approximately 1,500 square-foot) AGE pad for use during flight operations.
Live ordnance loading area (LOLA)	Construct new entry/exit ramps and apron to use as a LOLA with a capacity of four F-15 aircraft. Move airfield fence and mow vegetation.
Complex of three or four earth-covered munitions storage igloos – Flightline Alternative	Construct three or four earth-covered 7-bar Type C box magazine storage structures northeast of the flightline with an access road to the airfield and upgrade a gravel access road to a paved road for delivery of munitions and emergency access. Connect igloos to electrical and communications utilities.
Complex of three earth-covered munitions storage igloos – MSA Alternative	Construct three earth-covered 7-bar Type C box magazine storage structures south of 35th Street near the VSFB munition storage area with access roads and electrical and communications utilities.
Single earth-covered munitions storage igloo and access road	Construct a single earth-covered 7-bar Type C box magazine storage structure near Building 980.

3.0 REGULATORY BACKGROUND

3.1 SECTION 404 OF THE CLEAN WATER ACT

Under Section 404 of the CWA, the U.S. Army Corps of Engineers (USACE) has jurisdiction over waters of the U.S. and has the authority to issue permits for the discharge of dredged or fill material into waters of the U.S. The term "waters of the U.S*."* is defined by Title 40, Code of Federal Regulations (CFR), Section 120(2).a as:

1. Waters which are:
    a. Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
    b. The territorial seas; or
    c. Interstate waters;
2. Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (5) of this section;
3. Tributaries of waters identified in paragraph (1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;

4. Wetlands adjacent to the following waters:
    a. Waters identified in paragraph (1) of this section; or
    b. Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (2) or (3) of this section and with a continuous surface connection to those waters;
5. Intrastate lakes and ponds, streams, or wetlands not identified in paragraphs (1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (1) or (3) of this section.

Under 40 CFR 120.2(a), eight exclusions from the definition of "waters of the United States" are codified at paragraph (b), and key terms are defined at paragraph (c). "Adjacent" is defined at (c)(2) as "having a continuous surface connection."

Per federal regulatory policy (33 CFR Part 328), wetland areas are defined as *"those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."*

3.2 SACKETT VS UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

On 8 September 2023, the USACE and U.S. Environmental Protection Agency (USEPA) published a final rule amending the 2023 definition of "waters of the United States" (88 Federal Register 61964). The amendments conform with the U.S. Supreme Court's 25 May 2023 decision in the case of *Sackett v. USEPA.* While the USACE's and USEPA's 2023 rule defining "waters of the United States" was not directly before the Supreme Court, the decision in *Sackett v. USEPA* made clear that certain aspects of the 2023 rule are invalid. Therefore, the USACE and USEPA have amended key components of the regulatory text to conform to the Supreme Court decision. Per the USACE and USEPA, "the final rule provides clarity for protecting our nation's waters consistent with the Supreme Court's decision while advancing infrastructure projects, economic opportunities, and agricultural activities." The two major changes are as follows:

1. Revised definition of adjacent to mean "having a continuous surface connection."
2. The rule removes the significant nexus test from consideration when identifying tributaries and other waters as federally protected.

3.3 SECTION 401 OF THE CLEAN WATER ACT

Section 401 of the CWA requires that any person or agency applying for a federal permit or license for any activity, which may result in a discharge to a water body, must obtain a state water quality certification that the activity complies with all applicable water quality standards, limitations, and restrictions. No license or permit may be issued by a federal agency until certification required by Section 401 has been granted. Further, no license or permit may be issued if certification has been denied. Most Section 401 certifications are issued in connection with USACE CWA Section 404 permits for dredge and fill discharges.

4.0 METHODS

4.1 DELINEATION PROCEDURES

Procedures and standards used for delineating and classifying aquatic habitats in the project area are described below.

4.1.1 Wetlands

Potential wetlands were surveyed for in accordance with the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008). Per USACE requirements, evidence of a minimum of one positive wetland indicator from each parameter (hydrophytic vegetation, hydric soil, and hydrology) needs to be met in order to make a positive wetland determination. Data collected at sample points was recorded on *Wetland Determination Data Forms – Arid West Region (Version 2.0)* (USACE 2008).

Field surveys were conducted between 12 June 2023 and 14 June 2023, with two additional site visits on 24 October 2023 and 18 June 2024, to identify the approximate extent of wetlands and other waters based on dominant vegetation type, hydrology, topography, and landscape/geomorphic position. In portions of the project area deemed to contain possible wetlands, the soil, vegetation, and hydrology were evaluated in detail at representative sample points. The completed wetland determination forms are included in Appendix A. All water bodies and drainage features were mapped in the field using a global positioning system unit with a sub-meter level accuracy receiver.

4.1.1.1 Determination of Hydrophytic Vegetation

Hydrophytic vegetation is defined as the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present (USACE 1987). Such areas are characterized by the dominance of plant species that typically occur in wetlands. Hydrophytic vegetation determinations are based on the wetland indicator status of dominant plant species. For wetland delineation purposes, an area is considered to be vegetated if it has 5 percent or more total plant cover at the peak of the growing season (USACE 2008).

Sample points were evaluated to determine the dominant plant species in the following strata as defined by USACE (2008).

- Tree stratum – woody plants 3 inches (7.6 centimeters) or more in diameter at breast height, regardless of height.
- Sapling/shrub stratum – woody plants less than 3 inches (7.6 centimeters) in diameter at breast height, regardless of height.
- Herb stratum – all herbaceous plants, including herbaceous vines, regardless of size.
- Woody vines – consists of all woody vines, regardless of height.

Hydrophytic vegetation determinations were based on the wetland indicator status (USACE 2020) of species that composed the plant communities. Wetland indicator status is a relative measure of a plant species' potential to occur in wetlands. Hydrophytic vegetation indicator status categories are defined as follows (USACE 2020):

- Obligate Wetland – almost always occurs in wetlands, rarely in uplands.
- Facultative Wetland – usually occurs in wetlands but occasionally found in uplands.
- Facultative – commonly occurs in wetlands or uplands.
- Facultative Upland – occasionally occurs in wetlands but usually occurs in uplands.
- Obligate Upland – rarely occurs in wetlands, almost always in uplands.

Hydrophytic vegetation determinations followed the standard procedures set forth in USACE (2008). Plant wetland indicator statuses used in this report are consistent with the National Wetland Plant List (USACE 2020).

4.1.1.2 Determination of Hydric Soils

Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Hydric soil indicators are formed predominantly by the accumulation or loss of iron, manganese, sulfur, or carbon compounds in a saturated and anaerobic environment (USACE 2008).

Wetland biologists evaluated and documented the morphological characteristics of all visible soil horizons observed in excavated soil profiles at each sample point. Soil pits were excavated to depths of up to 20 inches (51 centimeters), except in instances where positive hydric soil indicators were obtained above that depth or digging was met with refusal (e.g., rock, gravel).

Soil profile analyses included descriptions of horizon thickness (depth); matrix color; texture; and type, location, abundance, and color of redoximorphic features (if present). These characteristics were used as the basis for determining the presence or absence of hydric soil indicators as set forth in USACE (2008).

4.1.1.3 Determination of Wetland Hydrology

Wetland hydrology encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season (USACE 1987). Areas with evident wetland hydrology characteristics are those where the presence of water has an overriding influence on characteristics of vegetation and soils due to anaerobic and reducing conditions, respectively. In general, this can only occur in areas inundated or saturated within 12 inches (30.5 centimeters) of the surface continuously for at least 5 percent of the growing season in most years (50 percent probability of recurrence) (USACE 1987).

Field verification of wetland hydrology involved positive field observation of at least one primary indicator, or two secondary indicators as defined in USACE (2008).

4.2 AQUATIC HABITAT CLASSIFICATION

Aquatic habitats in the project survey area were classified according to the U.S. Fish and Wildlife Service Cowardin et al. (1979) classification system (Cowardin system). This classification system is used to hierarchically define wetland and deepwater habitat types by system, subsystem, class, and subclass for the purposes of inventory, evaluation, and management. The Cowardin system applies to all aquatic habitats less than 6.6 feet (2.0 meters) deep, including unvegetated water bodies, as wetlands. Although the CWA does not consider naturally unvegetated areas to be wetlands except in problematic and/or atypical situations (USACE 1987), the Cowardin system is the most widely used classification system for wetlands and other waters of the U.S., and it provides the federal standard for wetland classification adopted by the

Federal Geographic Data Committee (2009). The Cowardin system can be applied to non-jurisdictional aquatic habitats that lack a significant nexus to a traditional navigable water as described above.

5.0 RESULTS

5.1 DELINEATION OF WETLANDS

This section describes the wetland habitats that were identified and delineated in the project area. No riverine or other non-wetland aquatic habitats were mapped within the project area. Table 2 summarizes the data points analyzed in the field, which wetland criteria they did or did not meet, and whether the data points established upland boundaries or met the criteria for wetland classification. Table 3 summarizes the delineation and mapping of wetland habitats within the survey area. Figures 3 through 6 depict the results of the wetland delineation, including data point locations and wetland boundaries. Note that results figures are only provided for those areas where wetlands were identified (e.g., no wetland indicators occur in the 980 Igloo footprint). Indicators of hydrophytic vegetation, wetland hydrology, and hydric soil for the wetland habitats that were delineated in the project area are provided on data sheets in Appendix A.

Table 2 Wetland Data Point Results

Data Point #	Associated Wetland #*	Hydrophytic Vegetation Criterion Met?	Hydric Soil Criterion Met?	Hydrology Criterion Met?	3-Parameter USACE Wetland (Y/N)
1	1	Yes	Yes	Yes	Yes
2	1 (upland)	No	No	No	No
3	1 (upland)	No	No	No	No
4	1	Yes	Yes	Yes	Yes
5	3	Yes	Yes	Yes	Yes
6	3	Yes	Yes	Yes	Yes
7	3 (upland)	No	No	No	No
8	2	Yes	Yes	Yes	Yes
9	2 (upland)	No	No	No	No
10	4	Yes	Yes	Yes	Yes
11	4,5,6 (upland)	No	No	No	No
12	5	Yes	Yes	Yes	Yes
13	9	Yes	Yes	Yes	Yes
14	9 (upland)	No	No	No	No
15	10	Yes	Yes	Yes	Yes
16	10 (upland)	No	No	No	No
17	11	Yes	Yes	Yes	Yes
18	11 (upland)	No	No	No	No
19	14	Yes	Yes	Yes	Yes
20	14 (upland)	No	No	No	No
21	16	Yes	Yes	Yes	Yes
22	17	Yes	Yes	Yes	Yes
23	17 (upland)	No	No	No	No

Note: *Data points that established upland boundaries are noted as "(upland)."

Table 3 Jurisdictional Delineation Results

Wetland ID #	Cowardin Classification	Project Area Component (Including 100-foot Buffer)	Acres
1	PEM1A	Flightline Munitions Storage Access Road (Alternative 2)	0.2361
2	PEM1A	Access Road to Airfield	0.2740
3	PEM1A	Access Road to Airfield	0.5306
4	PEM1A	MSA Munitions Storage Igloos	0.0198
5	PEM1A	MSA Munitions Storage Igloos	0.0798
6	PEM1A	MSA Munitions Storage Igloos	0.0170
7	PEM1A	MSA Munitions Storage Igloos	0.0002
8	PEM1A	MSA Munitions Storage Igloos	0.0018
9	PEM1A	MSA Munitions Storage Igloos	0.1065
10	PEM1A	MSA Munitions Storage Igloos	0.0812
11	PEM1A	MSA Munitions Storage Igloos	0.1779
12	PEM1A	MSA Munitions Storage Igloos	0.0217
13	PEM1A	MSA Munitions Storage Igloos	0.0303
14	PEM1A	MSA Munitions Storage Igloos	0.0006
15	PEM1A	MSA Munitions Storage Igloos	0.0019
16	PEM1A	MSA Munitions Storage Igloos	0.0059
17	PEM1A	Flightline Munitions Storage Access Road (Alternative 1)	1.0554
		TOTAL	**2.6407**

Note: *PEM1A = Palustrine, emergent, persistent, temporarily flooded.

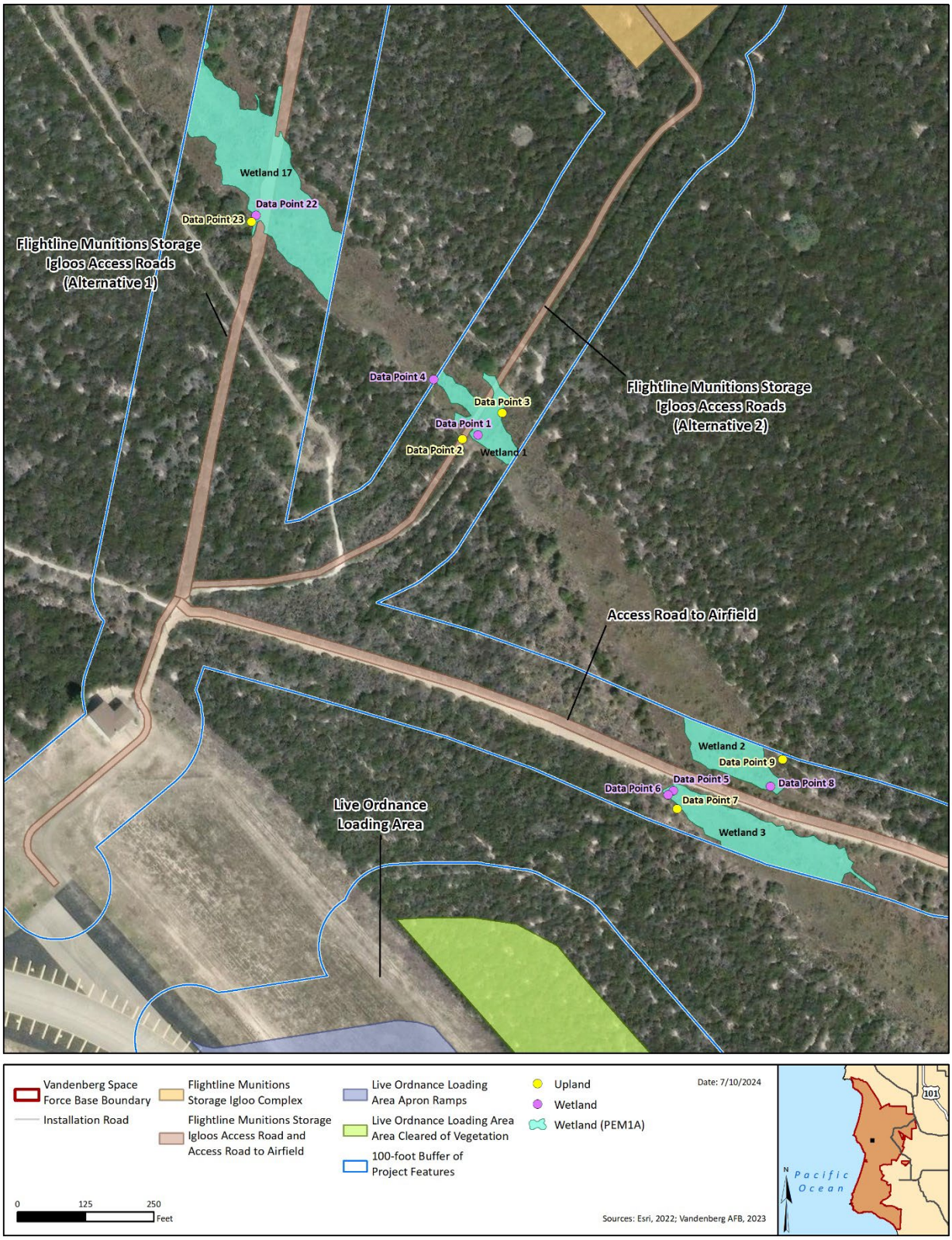

Figure 3. Delineation Results - Flight Line Munitions Storage Igloos and Access Roads

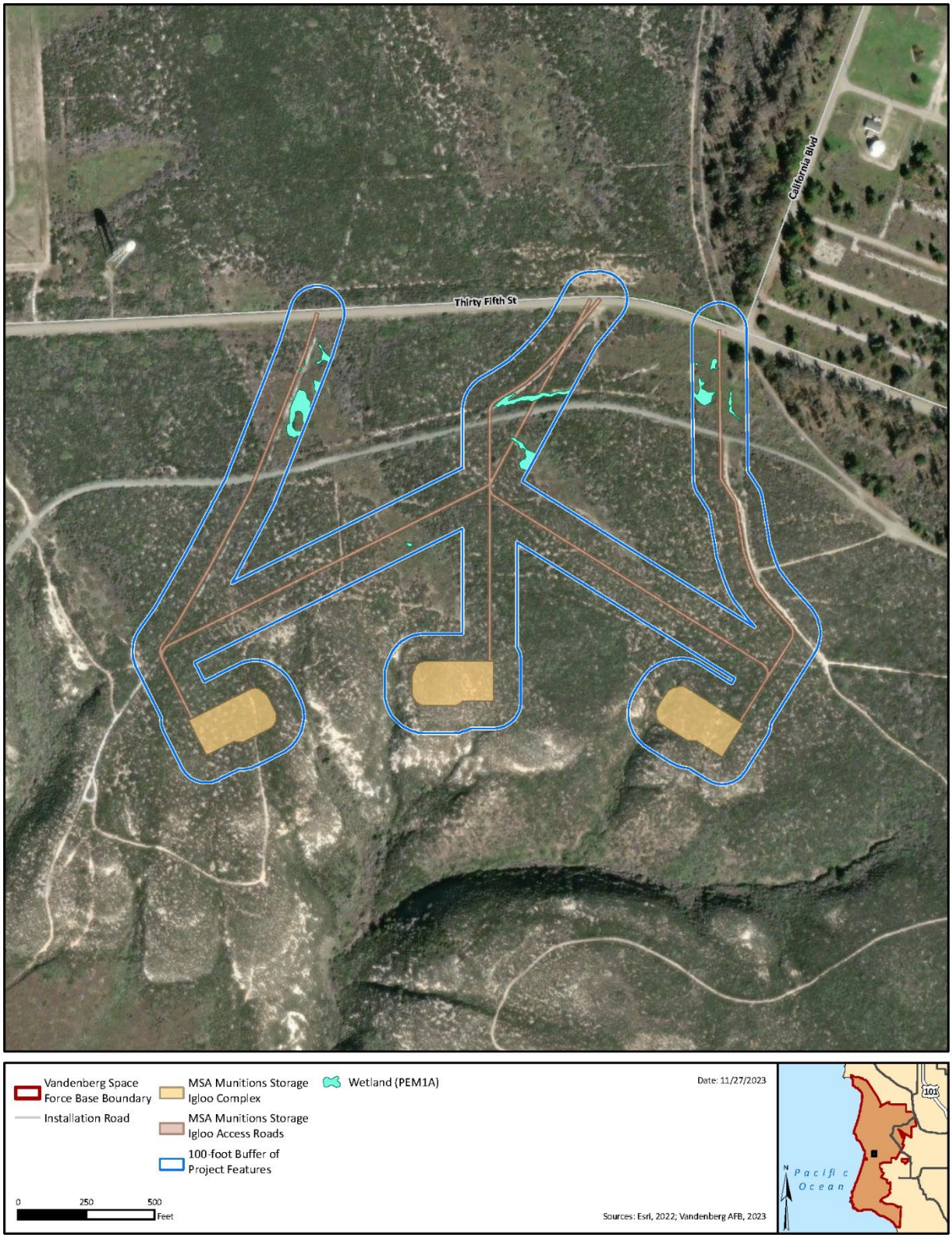

Figure 4. Delineation Results - MSA Munitions Storage Igloos and Access Roads Overview

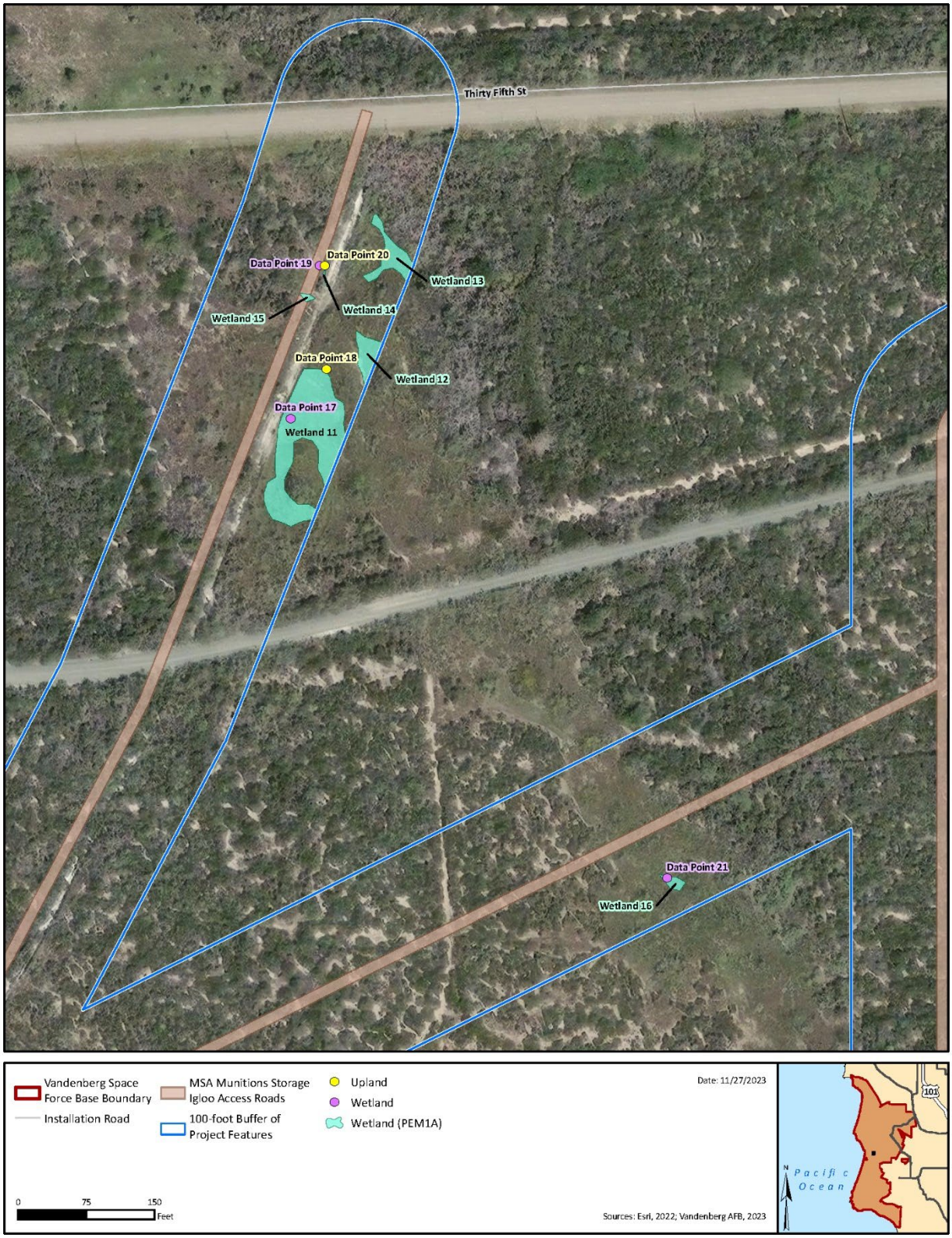

Figure 5. Delineation Results - MSA Munitions Storage Igloos and Access Roads, West

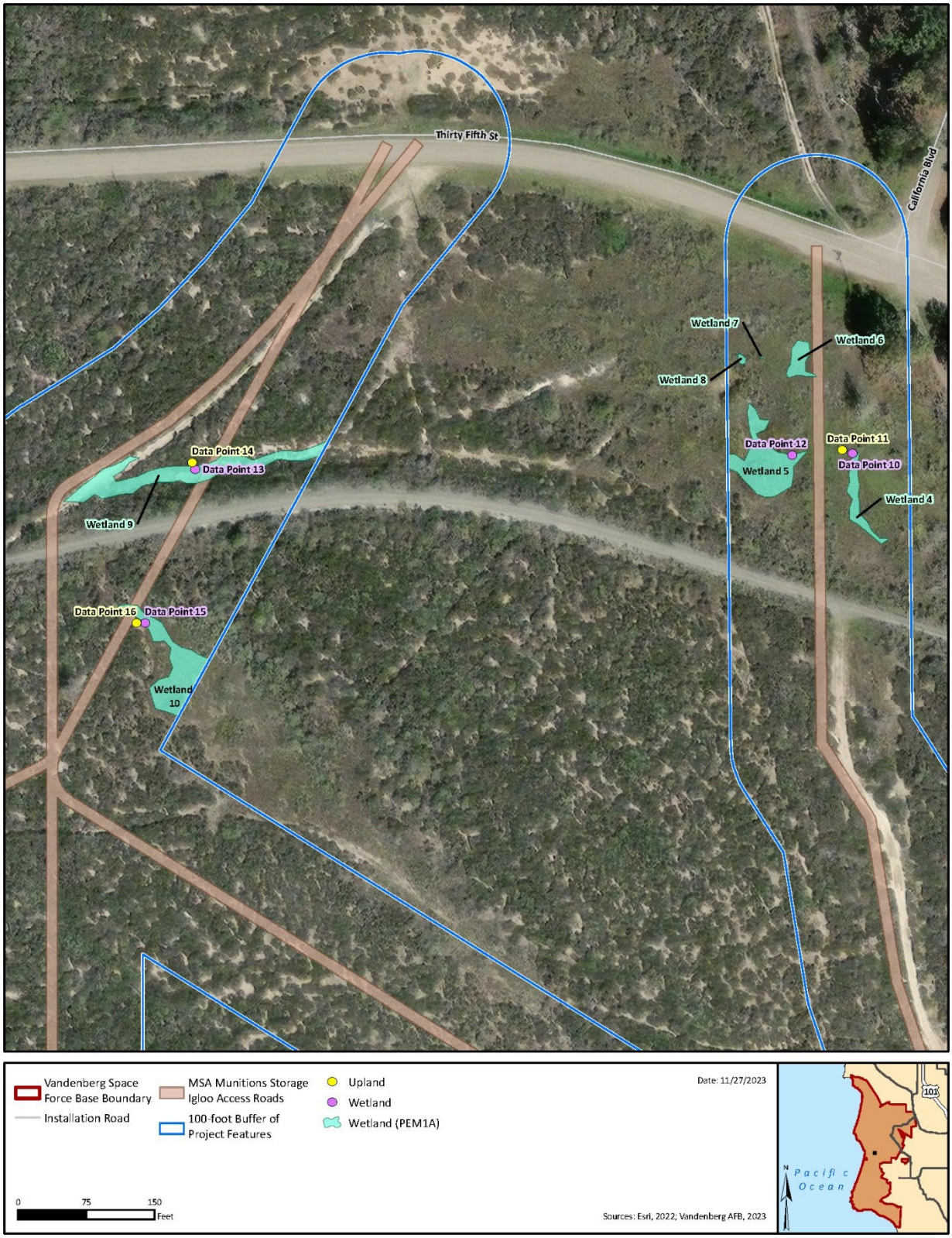

Figure 6. Delineation Results - MSA Munitions Storage Igloos and Access Roads, East

5.1.1 Palustrine Emergent Wetlands

Palustrine emergent (PEM) wetlands are characterized by erect, rooted, herbaceous hydrophytic vegetation (Cowardin et al. 1979). All wetlands mapped within the survey area are considered PEM1A under the Cowardin classification system, meaning they are palustrine emergent, with persistent vegetation, and have a temporarily flooded water regime. The dominant plant species in all the wetlands mapped in the survey area was brown headed rush (*Juncus phaeocephalus*), with a mixture of other less dominant herbaceous species. The upland boundary of the majority of the wetlands mapped in the survey area was dominated by Diego bent grass (*Agrostis pallens*). All plant species observed at wetland and upland data points are listed on the data sheets in Appendix A. A total of 2.64 acres of PEM1A wetlands were mapped within the project survey area.

Photo 1. PEM1A Wetland Dominated by Brown Headed Rush in Survey Area

Photo 2. PEM1A Wetland with Upland Boundary Dominated by Diego Bent Grass

5.2 POTENTIAL IMPACTS

Potential impacts to wetlands from implementation of the Proposed Action was assessed by overlaying the proposed project component footprints on the delineation results (see Figures 3 through 6). Acreages of potential impacts to wetlands from implementation of the Proposed Action are provided in Table 4.

Table 4 Potential Impacts to Wetlands

Wetland ID #	Cowardin Classification	Project Area Component	Acres
1	PEM1A	Flightline Munitions Storage Access Road (Alternative 2)	0.0191
6	PEM1A	MSA Munitions Storage Igloos	0.0002
9	PEM1A	MSA Munitions Storage Igloos	0.0074
10	PEM1A	MSA Munitions Storage Igloos	0.0029
15	PEM1A	MSA Munitions Storage Igloos	0.0013
17	PEM1A	Flightline Munitions Storage Access Road (Alternative 1)	0.0945
		TOTAL	**0.1254**

Note: *PEM1A = Palustrine, emergent, persistent, temporarily flooded

6.0 DISCUSSION

Per the USACE/USEPA 8 September 2023 final rule amending the definition of waters of the U.S. (88 Federal Register 61964), the wetlands mapped in the survey area would not be considered jurisdictional wetlands, as they are all isolated wetlands that do not maintain a "continuous surface connection" to any other bodies of water that could definitively be considered waters of the U.S. under the current rule. For example, the wetlands in the flightline munitions storage igloos access roads portion of the project survey area (Figure 3) occur within an unnamed, non-riverine drainage that terminates at an unnamed pond with no surface connection to the Pacific Ocean (Figure 7). Therefore, it is expected that the USACE would not assert jurisdiction over the wetlands mapped in the survey area. It is recommended that this finding and report be discussed with the USACE prior to commencing with any construction that may impact wetlands, whether jurisdictional or not.

Pending finalization of a preferred alternative for the Proposed Action, it is expected that impacts to wetlands will likely be less than what is presented in Table 4, as certain project components may not be included in the final action alternative and/or project components may be able to avoid wetland impacts in certain areas.

Figure 7. Surface Drainage in the Vicinity of the Flightline Munitions Storage Igloos

7.0 REFERENCES

Cowardin, L.M., Carter, V., Golet, F.C., and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31. USFWS, Office of Biological Services, Washington, DC. December.

Federal Geographic Data Committee. 2009. Wetlands Mapping Standard, FGDC –STD-015-2009. July.

USACE. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. NTIS No. AD A176 912.

USACE. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). September.

USACE. 2020. National Wetland Plant List, Version 3.5. Available online at: http://wetland-plants.usace.army.mil/.

8.0 LIST OF PREPARERS

Stantec prepared this Jurisdictional Delineation Report. Members of the professional staff include:

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APPENDIX A

Wetland Determination Data Forms

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WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 1

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): channel Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C Lat: 34.742667 Long: -120.578911 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Channelized swale that has areas of ponded water during the wet season.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Juncus phaeocephalus	40	Yes	FACW
2. Juncus bufonius	30	Yes	FACW
3. Lotus corniculatus	15	No	
4. Plantago coronopus	5	No	
5. Briza minor	2	No	
6. Festuca arundinaceae	3	No	
7.			
8.			
	95 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: 1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/3	100					SaLo	
6-18	10YR 3/2	100					SaLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ **No** _____

Remarks:

Hydrogen sulfide odor strong in top 6 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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): 4

Wetland Hydrology Present? Yes ✓ **No** _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 2

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): LRR C Lat: 34.742643 Long: -120.579005 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Upland terrace adjacent to channelized swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3x1 m)			
1. Salvia mellifera	7	Yes	UPL
2. Arctostaphylos purissima	7	Yes	UPL
3.			
4.			
5.			
	14 = Total Cover		
Herb Stratum (Plot size: 1x1m)			
1. Plantago coronopus	8	Yes	FAC
2. Anagallis arvensis	7	No	
3. Horkelia cuneata	7	No	
4. Juncus bufonius	9	Yes	FACW
5. Agrostis pallens	10	Yes	FACU
6. Chorizanthe angustifolia	4	No	
7.			
8.			
	45 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ✓

Remarks:

SOIL

Sampling Point: 2

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/2	100					SaClLo	
3-7	7.5YR 4/2	100					SaLo	
7-16	7.5YR 2.5/2	100					SaClLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

No indicators of hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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:

Soil is moist in areas, but not saturated.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/23

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 3

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): LRR C Lat: 34.742781 Long: -120.578767 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Upland terrace adjacent to wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3x1 m)			
1. Baccharis pilularis	10	Yes	UPL
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Avena barbata	15	No	
2. Anagallis arvensis	5	No	
3. Horkelia cuneata	5	No	
4. Silene gallica	6	No	
5. Agrostis pallens	65	Yes	FACU
6.			
7.			
8.			
	96 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 2 (B)

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

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ✓

Remarks:

SOIL

Sampling Point: 3

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 2.5/2	100					SaClLo	
5-16	7.5YR 4/2	100					SaLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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:

Soil is slightly moist, but no saturation.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/23

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 4

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): channel Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C Lat: 34.742940 Long: -120.579190 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any 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:

Channelized swale that holds water during the wet season.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Juncus phaeocephalus	60	Yes	FACW
2. Lotus corniculatus	10	No	
3. Avena barbata	6	No	
4. Bromus diandrus	5	No	
5.			
6.			
7.			
8.			
	81 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: 4

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100					SaLo	
5-16	10YR 2/2	95	10YR 3/6	5	C	M	SaClLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ **No** _____

Remarks:

Strong hydrogen sulfide odor.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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): 5

Wetland Hydrology Present? Yes ✓ **No** _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/23

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 5

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): channel Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C Lat: 34.740907 Long: -120.577666 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Channelized swale that holds water during the wet season.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Juncus phaeocephalus	60	Yes	FACW
2. Lotus corniculatus	20	Yes	FAC
3. Juncus mexicanus	10	No	
4. Plantago coronopus	5	No	
5. Deschampsia danthonioides	2	No	
6.			
7.			
8.			
	97 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: 5

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100					SaClLo	
5-10	10YR 4/2	100					SaLo	
10-18	10YR 5/2	100					Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

No redox concentrations, but strong hydrogen sulfide odor

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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): 10

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/23

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 6

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): channel Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C Lat: 34.740885 Long: -120.577697 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Channlized swale that holds water during the wet season.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Polypogon monspeliensis	30	Yes	FACW
2. Anagallis arvensis	5	No	
3. Juncus mexicanus	3	No	
4. Chorizanthe angustifolia	5	No	
5.			
6.			
7.			
8.			
	43 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: 6

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					SaClLo	
6-16	10YR 5/2	80	7.5YR 5/6	20	C	M	SaLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ **No** _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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): 10

Wetland Hydrology Present? Yes ✓ **No** _____

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

Remarks:

Saturated soil at 10 inches

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 7

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): LRR C Lat: 34.740815 Long: -120.577639 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Upland terrace adjacent to wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3x1 m)			
1. Ceanothus impressus	35	Yes	UPL
2. Baccharis pilularis	25	Yes	UPL
3.			
4.			
5.			
	60 = Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Lysimachia arvensis	10	Yes	FAC
2. Agrostis pallens	12	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	22 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 80 % Cover of Biotic Crust

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ✓

Remarks:

SOIL

Sampling Point: 7

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 4/2	100					SaLo	
10-18	10YR 5/3	100					SaLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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:

Soil not moist and no indicators present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 8

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): channel Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C Lat: 34.740940 Long: -120.577074 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any 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:

Channelized swale that holds water during the wet season.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Juncus phaeocephalus	60	Yes	FACW
2. Lotus corniculatus	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	80 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: 8

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

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ **No** _____

Remarks:

Strong hydrogen sulfide odor in upper 10 inches of soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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): 3

Wetland Hydrology Present? Yes ✓ **No** _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 9

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): LRR C Lat: 34.741076 Long: -120.577004 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Terrace adjacent to channelized swale that holds water during the wet season.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3x1 m)			
1. Arctostaphylos rudis	35	Yes	UPL
2. Baccharis pilularis	10	Yes	UPL
3.			
4.			
5.			
	45 = Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Agrostis palens	10	Yes	FACU
2. Deschampsia danthonioides	5	No	
3. Lysimachia arvensis	15	Yes	FAC
4. Erigeron foliosus	15	Yes	UPL
5.			
6.			
7.			
8.			
	45 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ✓

Remarks:

SOIL

Sampling Point: 9

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	100					SaLo	
8-16	10YR 4/2	100					SaLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 10

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C Lat: 34.704098 Long: -120.569574 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Isolated, vernal marsh.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Plantago coronopus	50	Yes	FAC
2. Juncus phaeocephalus	35	Yes	FACW
3. Juncus bufonius	10	No	
4. Carpobrotus edulis	10	No	
5.			
6.			
7.			
8.			
	105 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

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

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: 10

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 4/2	100					SaClLo	
6-10	7.5YR 3/2	100					SaClLo	hardpan at 10 inches

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: hardpan

Depth (inches): 10

Hydric Soil Present? Yes ✓ No ___

Remarks:

Due to presence of hardpan at 10 inches and hydrology/plant indicators, hydric soil is assumed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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): 6

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 1

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 11

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): LRR C Lat: 34.704107 Long: -120.569610 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Upland adjacent to pocket PEM wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1 m radius)			
1. Avena fatua	20	No	
2. Avena barbata	25	Yes	UPL
3. Carpobrotus chilensis	30	Yes	FACU
4. Medicago polymorpha	20	No	
5. Sonchus asper	8	No	
6.			
7.			
8.			
	103 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 0 % 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: 2 (B)

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

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ✓

Remarks:

SOIL

Sampling Point: 11

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					Loam	
2-16	10YR 4/2	100					SaClLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 12

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C Lat: 34.704089 Long: -120.569794 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Pocket PEM wetland, consistent with other small wetlands in the area.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1 m radius)			
1. Juncus phaeocephalus	30	Yes	FACW
2. Festuca perennis	30	Yes	FAC
3. Plantago coronopus	10	No	
4. Frankenia salina	5	No	
5. Rumex crispus	10	No	
6.			
7.			
8.			
	85 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: 12

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	100					SaClLo	
4-16	7.5YR 3/2	80	7.5YR 5/6	20	C	M	ClLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ **No** _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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:

Areas that are dry have surface soil cracks.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: _____

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 13

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): channel/swale Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C Lat: 34.704000 Long: -120.571975 Datum: NAD83

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any 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:

Channelized/swale PEM wetland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Juncus phaeocephalus	55	Yes	FACW
2. Logfia gallica	5	No	
3. Calandrinia menziesii	10	No	
4. Chorizanthe angustifolia	7	No	
5.			
6.			
7.			
8.			
	77 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
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: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 13

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
1-3	10YR 3/2	100					SaLo	
3-16	10YR 5/2	75	10YR 5/6	25	C	M	Sand	prominent redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ **No** _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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): 15

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 10

Wetland Hydrology Present? Yes ✓ **No** _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 14

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): LRR C Lat: 34.704020 Long: -120.571985 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Upland adjacent to channelized/swale wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3x1 meter)			
1. Ceanothus cuneatus	10	No	
2. Arctostaphylos rudis	80	Yes	UPL
3.			
4.			
5.			
	90 = Total Cover		
Herb Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum % Cover of Biotic Crust

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

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

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ✓

Remarks:

SOIL

Sampling Point: 14

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	100					SaClLo	
4-16	10YR 5/2	100					SaLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 15

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C Lat: 34.703531 Long: -120.572142 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Depressional, isolated PEM wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1 m radius)			
1. Eryngium armatum	20	Yes	FACW
2. Juncus bufonius	10	No	
3. Chorizanthe angustifolia	10	No	
4. Juncus phaeocephalus	15	Yes	FACW
5. Lysimachia arvensis	5	No	
6.			
7.			
8.			
	60 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum % Cover of Biotic Crust

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: 15

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
1-7	10YR 4/2	95	10YR 5/4	5	C	M	SaClLo	
7-16	10YR 3/2	95	10YR 5/4	5	C	M	ClLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ **No** _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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:

Surface soil cracks evident in drier portions of depression.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/12/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 16

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): LRR C Lat: 34.703532 Long: -120.572174 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Upland adjacent to depressional wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3x1 meter)			
1. Adenostoma fasciculatum	55	Yes	UPL
2.			
3.			
4.			
5.			
	55 = Total Cover		
Herb Stratum (Plot size: 1x1 meter)			
1. Lysimachia arvensis	3	Yes	FAC
2. Sanicula crassicaulis	3	Yes	UPL
3. Chorizanthe angustifolia	3	Yes	UPL
4.			
5.			
6.			
7.			
8.			
	9 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
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: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ✓

Remarks:

SOIL

Sampling Point: 16

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/2	100					Loam	
6-16	10YR 3/2	100					ClLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/13/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 17

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C Lat: 34.703854 Long: -120.574878 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any 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:

Depressional wetland with areas of ponded water.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1 m radius)			
1. Juncus phaeocephalus	40	Yes	FACW
2. Polypogon monspeliensis	15	No	
3. Cotula coronopifolia	15	No	
4. Lythrum hyssopifolia	25	Yes	OBL
5.			
6.			
7.			
8.			
	95 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: 17

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6								mucky/dark

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ **No** _____

Remarks:

Mucky layer on top of soil. No colors taken as hydrogen sulfide odor was evident.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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): 8

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 2

Wetland Hydrology Present? Yes ✓ **No** _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/13/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 18

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): LRR C Lat: 34.704005 Long: -120.574751 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Upland adjacent to depressional wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Agrostis pallens	65	Yes	FACU
2. Lysimachia arvensis	5	No	
3. Sisyrinchium bellum	10	No	
4.			
5.			
6.			
7.			
8.			
	80 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 20 % 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: 1 (B)

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

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ✓

Remarks:

SOIL

Sampling Point: 18

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	100					SaLo	
4-16	10YR 3/2	100					SaClLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/13/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 19

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C Lat: 34.704317 Long: -120.574784 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Small, depressional PEM wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Plantago coronopus	25	Yes	FAC
2. Polypogon monspeliensis	20	Yes	FACW
3. Juncus phaeocephalus	15	Yes	FACW
4.			
5.			
6.			
7.			
8.			
	60 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: 19

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	100					SaClLo	
5-16	Gley1 4/5gy	97	10YR 5/4	3	C	M	Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ **No** _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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): 6

Wetland Hydrology Present? Yes ✓ **No** _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/13/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 20

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): LRR C Lat: 34.704318 Long: -120.574766313 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Upland adjacent to depressional wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 3x1 m)			
1. Baccharis pilularis	15	Yes	UPL
2. Adenostoma fasciculatum	15	Yes	UPL
3.			
4.			
5.			
	30 = Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Horkelia cuneata	15	Yes	UPL
2. Plantago coronopus	15	Yes	FAC
3. Agrostis pallens	7	No	
4. Sonchus asper	10	No	
5. Logfia gallica	5	No	
6.			
7.			
8.			
	52 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 50 % 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: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ✓

Remarks:

SOIL

Sampling Point: 20

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/1	100					SaLo	
3-16	10YR 3/2	100					SaClLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/13/2023

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 21

Investigator(s): Clint Scheuerman, Josh De Guzman Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C Lat: 34.702497 Long: -120.573459 Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Small, depressional wetland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 1 m radius)			
1. Juncus phaeocephalus	40	Yes	FACW
2. Eleocharis macrostachya	30	Yes	OBL
3. Lotus corniculatus	15	No	
4. Juncus bufonius	25	Yes	FACW
5.			
6.			
7.			
8.			
	110 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

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

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: 21

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					SaClLo	
2-16	10YR 3/2	75	10YR 5/6	25	C	M	ClLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ **No** _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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): 14

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 6

Wetland Hydrology Present? Yes ✓ **No** _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/18/2024

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 22

Investigator(s): Clint Scheuerman, Kristian McDonald Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR C Lat: Long: Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any 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:

Wetland swale that has an unpaved road (dirt/gravel tire tracks) that cuts through it.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Juncus phaeocephalus	70	Yes	FACW
2. Polypogon monspeliensis	10	No	
3. Lotus corniculatus	5	No	
4.			
5.			
6.			
7.			
8.			
	85 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust ____

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = ____

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks:

SOIL

Sampling Point: 22

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 3/2	100					SaLo	Hydrogen sulfide odor

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

Hydrogen sulfide odor in upper 6 inches of soil, so no complete profile taken.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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): 10

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 5

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Vandenberg SFB - F-15E Testing City/County: VSFB/Santa Barbara County Sampling Date: 6/18/024

Applicant/Owner: Vandenberg Space Force Base State: CA Sampling Point: 23

Investigator(s): Clint Scheuerman, Kristian McDonald Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 0

Subregion (LRR): LRR C Lat: Long: Datum: NAD83

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any 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:

Upland terrace adjacent to wetland swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5x2 m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus agrifolia	30	Yes	UPL
2.			
3.			
4.			
	30 = Total Cover		
Sapling/Shrub Stratum (Plot size: 3x1 m)			
1. Acmispon glaber	20	Yes	UPL
2. Salvia mellifera	10	Yes	UPL
3. Arctostaphylos purissima	20	Yes	UPL
4.			
5.			
	50 = Total Cover		
Herb Stratum (Plot size: 1x1 m)			
1. Agrostis pallens	40	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	40 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

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

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 5 (B)

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

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ✓

Remarks:

SOIL

Sampling Point: 23

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR 3/3	100					SaLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, 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, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ 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 Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ 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)
- ___ 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:

APPENDIX D. FINAL NOISE STUDY PERIODIC OPERATIONS OF F-15E/EX TESTING AT VANDENBERG SPACE FORCE BASE SANTA BARBARA COUNTY, CALIFORNIA

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Final Noise Study Periodic Operations of F-15E/EX Testing at Vandenberg Space Force Base Santa Barbara County California

MARCH 2024

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ACRONYMS AND ABBREVIATIONS

AAD	Average Annual Day
AFB	Air Force Base
ANSI	American National Standards Institute
ASA	Acoustical Society of America
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	A-weighted decibel
DNL	Day-Night Average Sound Level
DNWG	Department of Defense Noise Working Group
DoD	Department of Defense
IFR	Instrument Flight Rules
$kPa\text{-}s/m^2$	kilopascal-seconds per square meter
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
MSL	mean sea level
NED	National Elevation Data set
PA	Probability of Awakening
PHL	Potential for Hearing Loss
POI	Point of Interest
SPL	Sound Pressure Level
SEL	Sound Exposure Level
USGS	United States Geological Survey
VFR	Visual Flight Rules
VSFB	Vandenberg Space Force Base

1.0 INTRODUCTION

1.1 BACKGROUND

The United States Department of the Air Force and Headquarters Air Combat Command (ACC), Langley Air Force Base (AFB), Virginia, proposes to periodically operate F-15E and/or F-15EX fighter jets at Vandenberg Space Force Base (VSFB), California, for the purposes of testing and developing new-generation weapons and payloads (Figure 1-1). As analyzed in this noise study, the periodic operations would include a temporary deployment of up to 12 F-15E or F-15EX aircraft with test operations approximately one week in duration occurring a maximum of two times per year.

For this analysis, the baseline reflects existing operational data and noise modeling prepared in support of the 2020 *Environmental Impact Statement for F-35A Beddown at Tyndall AFB and MQ-9 Beddown at Tyndall AFB or Vandenberg AFB.* Further flight operations were refined based on review from personnel at VSFB and updated as needed to reflect current operational data.

1.2 DOCUMENT STRUCTURE

Section 1.0 introduced this study; while Section 2.0 describes the methodology used in the analysis. Section 3.0 provides the modeling data used and the noise exposure for the current operations (baseline). Section 4.0 provides the modeling data used and the noise exposure for the proposed F-15E/EX. Section 5.0 presents conclusions, and Section 6.0 presents the references.

Figure 1-1 Location of VSFB

2.0 METHODOLOGY

The Department of Defense (DoD) and the Federal Interagency Committee on Noise (1978), outline the types of metrics to describe noise exposure for environmental impact assessment, while the Defense Noise Working Group (DNWG) provides guidance on military noise modeling methodology. The following subsections describe these noise metrics and noise modeling methodology.

2.1 NOISE MODELING AND PRIMARY NOISE METRICS

The DoD prescribes use of the Noisemap suite of computer programs (Wyle 1998; Wasmer Consulting 2006) containing the core computational programs called "NMAP," version 7.3, and "MRNMap," version 3.0 and the Federal Aviation Administration's Aviation Environmental Design Tool (AEDT) 3e for environmental analysis of aircraft noise. For this noise study, the Noisemap suite of programs refers to BASEOPS as the input module and Noisemap as the noise model for predicting noise exposure in the installation environment. Further, the Advanced Acoustic Model (AAM) version 3.0 was utilized to determine unweighted sound pressure levels. Table 2-1 presents noise modeling parameters used in this analysis.

Table 2-1 Noise Modeling Parameters

Software	***Analysis***	***Version***
NMAP	Airfield noise – military aircraft	7.3
AAM	Specific Aircraft noise – military aircraft	3.0
Parameter	***Description***	
Receiver Grid Spacing	500 ft in x and y	
Metrics	CNEL (primary) SEL, L_{max}, L_{eq}, NA, SPL	
Basis	AAD Operations (NMAP)	
Topography		
Elevation Data Source	USGS 30m NED	
Elevation Grid Spacing	500 ft in x and y	
Impedance Data Source	USGS Hydrography DLG	
Impedance Grid spacing	500 ft in x and y	
Flow Resistivity of Ground (soft/hard)	225 kPa-s/m^2 / 100,000 kPa-s/m^2	
Modeled Weather (2018; May selected)		
Temperature	58 °F	
Relative Humidity	78%	
Barometric Pressure	29.9212 in Hg	

Legend: °F = degrees Fahrenheit; % = percent; AAD = Average Annual Day; CNEL = Community Noise Equivalent Level; DLG = Digital Line Graph; ft = feet; in Hg = inches Mercury; kPa-s/m^2 = kilopascal-seconds per square meter; L_{eq} = Equivalent Sound Level; L_{max} = maximum sound level; m = meters; NED = National Elevation Data Set; SEL = Sound Exposure Level; SPL = Sound Pressure Level; USGS = United States Geological Survey

Human hearing sensitivity to differing sound pitch, measured in cycles per second or hertz, varies by frequency. To account for this effect, sound measured for environmental analysis utilizes A-weighting, which emphasizes sound roughly within the range of typical speech and de-emphasizes very low and very high frequency sounds. All decibels (dB) presented in this study utilize A-weighted (dBA or dB[A]) but are presented as dB for brevity, unless otherwise noted.

The primary noise metric utilized in the United States for noise impacts is the Day-Night Average Sound Level (L_{dn}, also written as DNL), which is A-weighted applicable for subsonic aircraft operations. DNL is

a cumulative metric that includes all noise events occurring in a 24-hour period with a nighttime noise penalty applied to events occurring after 10 p.m. (2200) and before 7 a.m. (0700). The daytime period is defined as 7 a.m. (0700) to 10 p.m. (2200). An adjustment (penalty) of 10 dB is added to events occurring during the nighttime period to account for the added intrusiveness while people are most likely to be relaxing at home or sleeping. The Community Noise Equivalent Level (CNEL) noise metric, specified by the State of California for environmental noise like airport operations, mirrors DNL with the same energy-averaged sound level measured over a 24-hour period and 10 dB penalty for events occurring between 10 p.m. and 7 a.m. (2200 and 0700). However, CNEL adds an evening penalty by multiplying evening events by 3 (equivalent to 4.77 dB penalty) if occurring between 7 p.m. and 10 p.m. (1900 and 2200). Note that these periods of the day are often different from the "day" and "night" used commonly in military aviation, which are directly related to the times of sunrise and sunset applicable for military training in dark conditions. These times vary latitudinally and throughout the year with the seasonal changes.

DoD Noise Program Policy (DoD Instruction 4715.13, 28 January 2020) requires the use of the DNL noise metric (or CNEL if the activity occurs within the State of California) to describe aircraft noise exposure levels at airfields based on average annual day averaged over 365 days for purpose of long-term compatible land use planning. Consistent with that standard, this study analyzed both military and civil operations at the airfield on an average annual basis.

Assessment of noise associated with a Proposed Action requires prediction of future conditions that cannot be easily measured until after implementation or would require excessive cost or time to measure. The solution to this includes the use of computer software to simulate the future conditions, as detailed in the following sections. A recent congressionally-mandated study compared the accuracy of noise modeling methods described in this section to real-world field measurements. The report found that DoD-approved noise models operate as intended providing accurate prediction of noise exposure levels from aircraft operations for use in impact assessments and long-term land use planning (Department of the Navy 2021). The study also determined that the largest variable in any aircraft noise-modeling effort is the expected operational flight parameter data, such as runway and flight track utilization, altitudes at various points in the flight track, engine power settings, and other parameters.

2.1.1 Vandenberg Space Force Base

Modeling of noise, using the Noisemap software suite was accomplished by determining and building each aircraft's flight tracks (paths over the ground) and profiles, which includes altitude, airspeed, power settings, and other flight conditions. This information was developed iteratively with a team primarily made up of representatives from the flying squadrons and air traffic controllers as well as the *2019 Environmental Impact Statement Final F-35A Wing Beddown at Tyndall Air Force Base and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB*. The data was compiled in a data validation package, reviewed by the team, and approved for use by the VSFB team prior to modeling (Department of the Air Force 2023). This data has been combined with the numbers of each type of operation by aircraft/track/profile, local climate, terrain surrounding the airfield, and similar data related to aircraft engine runs that occur at specific locations on the ground (e.g., pre- and post-flight and maintenance activities). Appendix A shows summary flight tracks, as well as representative flight profiles for the aircraft operations modeled.

Noisemap's ability to account for the effects of sound propagation includes consideration of varying terrain elevation, taken from the United States Geological Survey (USGS) National Elevation Data set (NED), and ground impedance conditions, taken from USGS Hydrography data. In this case, "soft ground" (e.g., grass-covered ground) is modeled with a flow resistivity of 225 kilopascal-seconds per square meter (kPa-s/m^2) and "hard ground" (in this case, water) is modeled with a flow resistivity of 100,000 kPa-s/m^2. For ambient

temperature, humidity, and pressure, each month was assigned a temperature, relative humidity, and barometric pressure from data available for that month for the years 2015 through 2020. Noisemap then determined and used the month with the weather values that produced the median results in terms of noise propagation effect, which in this case was the month of May (with the values noted in Table 2-1).

CNEL contours of 65 to 85 dB, presented in 5-dB increments, provide a graphical depiction of the aircraft noise environment in the vicinity of the airfield. In addition to the CNEL plots, specific noise sensitive locations (schools, biologically sensitive, hospitals, places of worship, and residential neighborhoods) were identified through the *2019 Environmental Impact Statement Final F-35A Wing Beddown at Tyndall Air Force Base and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB* and discussion with Vandenberg SFB and referred to as representative Points of Interest (POIs). Table 2-2 lists, and Figure 2-1 presents, the selected representative POIs used for this study. Section 2.2 provides a discussion on the supplemental metric noise calculations performed for each POI.

Table 2-2 POIs in the Vicinity of VSFB

Map ID	*Point Type*	*Named POI*
CES	School	Crestview Elementary School
HOP	Biological	Honda Point
JAB	Biological	Jalama Beach
LFP	Services	Lompoc Federal Prison
LRA	Residential Area	Lompoc Residential Area
MCS	School	Manzanita Charter School
MHS	School	Maple High School
MMB	Biological	Minuteman Beach
PPE	Biological	Point Pedernales
PSA	Biological	Point Sal
PUP	Biological	Purisima Point
SUB	Biological	Surf Beach
VMF	Residential Area	VSFB Multiple Family
VMS	School	Vandenberg Middle School
VPG	Public Assembly	VSFB Parade Ground
VSF	Residential Area	VSFB Single Family
WAB	Biological	Wall Beach

Legend: BMF=Base Multiple Family; BSF=Base Single Family; CES = Crestview Elementary School; ID = Identification; LFP=Lompoc Federal Prison; LRA = Lompoc Residential Area; MCS=Manzanita Charter School; MHS = Maple High School; PG = Parade Ground; POI = Point of Interest; VMS=Vandenberg Middle School; VSFB = Vandenberg Space Force Base

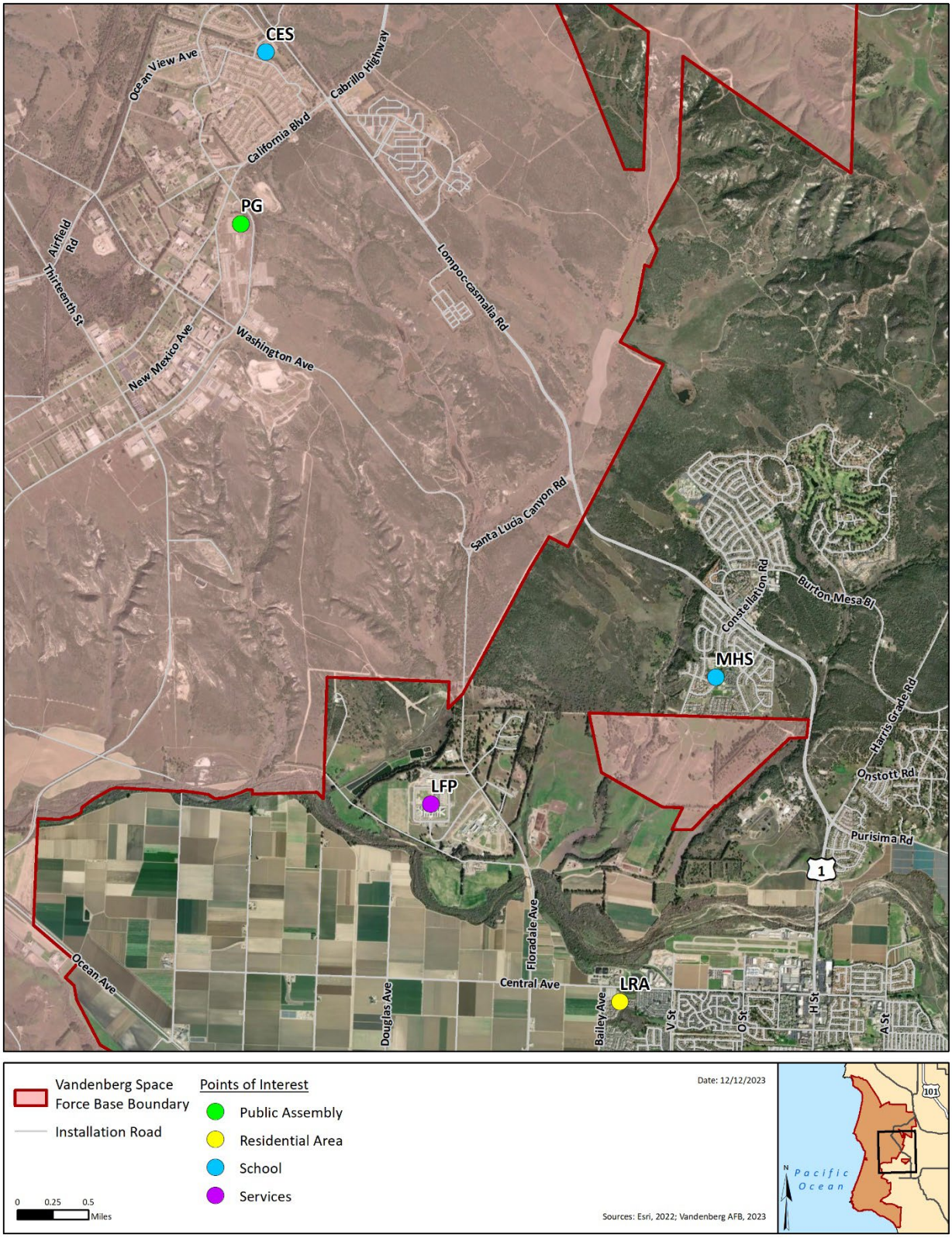

Figure 2-1 Representative POIs in the Vicinity of VSFB

2.2 ADDITIONAL (SUPPLEMENTAL) NOISE METRICS

While a cumulative metric, such as CNEL, is appropriate to predict the overall noise environment at airfields, a full description of noise impacts to noise sensitive locations requires additional metrics. The DoD expands upon CNEL with the following supplemental metrics described in the DNWG guidelines (DNWG 2009a):

- A measure of the greatest A-weighted sound level generated by single aircraft events: Maximum Sound Level (L_{max})A combination of the sound level and duration: Sound Exposure Level (SEL)
- Number of Events at or above a specified threshold
- Equivalent Sound Level (L_{eq})
- Time Above a specified level
- Probability of Awakening (PA)

Number of Events at or above a specified threshold, Time Above a specified level, and L_{eq} use a specified period of time that can include an average 24-hour day, acoustic daytime, acoustic nighttime, school day, or other time period appropriate for the analysis. Additionally, the determination of unweighted sound pressure level (SPL) generated by aircraft at the 120 dB and 100 dB levels will be included and used for analysis of cultural and biological resources, respectively. Details on the use of these supplemental metrics in this study are described in the following sections.

2.2.1 Maximum Sound Level

The highest A-weighted sound level measured during a single event in which the sound changes with time is called the maximum A-weighted sound level or L_{max}. L_{max} is the maximum level that occurs over one-eighth of a second and denoted as "fast" response on a sound level meter (American National Standards Institute [ANSI] 1988). Although useful in determining when a noise event may interfere with conversation, TV or radio listening, or other common activities, L_{max} does not fully describe the noise because it does not account for how long the sound is heard.

2.2.2 Sound Exposure Level

Sound exposure level (SEL) combines both the intensity of a sound and its duration by providing the sound level that would contain the same sound energy of an event if occurring over a one second period. This means that SEL does not represent a sound level that is heard directly at any given time. However, SEL provides a much better metric for comparison of aircraft flyovers than L_{max} because it allows normalization of disparate events to their one second energy average. SEL values are larger than those for L_{max} for the same event because aircraft noise events last more than a few seconds.

2.2.3 Equivalent Sound Level

The L_{eq} is a "cumulative" metric that combines a series of noise events over a period of time by averaging the sound energy. The time period specified for L_{eq} is typically provided along with the value and relates to a type of activity and presented in parenthesis (e.g., $L_{eq(24)}$ for 24 hours). An $L_{eq(8)}$ is used in this study to represent a typical school day occurring from 7 a.m. (0700) to 3 p.m. (1500).

2.2.4 Potential for Hearing Loss

People exposed to high noise environments over a long period of time are at an increased risk of experiencing permanent hearing loss. Hearing loss is generally interpreted as a decrease in the ear's

sensitivity to perceived sound, which can be either temporary or permanent. Various governmental organizations, including the Occupational Safety and Health Administration, have identified noise thresholds varying from 70 to 85 dB L_{eq} to protect workers with the exposure assumption of 40 hours per week over a 40-year work lifetime.

Exposure to noise for people residing in areas adjacent to airfields is quite different from a work environment. When people are indoors, the sound levels experienced decrease due to building attenuation. Additionally, when people spend time away from home, the exposure to noise from the airfield in question is removed so the Occupational Safety and Health Administration standards would tend to overpredict the hearing loss risk. By definition, CNEL is equal to or greater than L_{eq}, so the DoD selected a screening threshold of 80 dB CNEL of residences to ensure a conservative approach to assessing the potential for hearing loss (DNWG 2012). If residences are identified within the 80 dB CNEL, or greater, additional analysis of L_{eq} should be performed.

2.2.5 Residential Speech Interference

Aircraft noise events can disrupt activities like conversation or watching television when indoor L_{max} exceeds 50 dB because word intelligibility decreases at that level (DNWG 2013a). This study determines the number of potential speech interfering events at residential POIs during a 15-hour day (from 7 a.m. [0700] until 10 p.m. [2200]) and presents the average hourly number of events.

2.2.6 Classroom Learning Interference

A noisy environment can adversely affect and interfere with classroom learning. Various governmental organizations have identified both L_{eq} and number of interfering events as suitable criteria for classroom impacts. Consistent with DoD recommendations, this study used an exterior L_{eq} of 60 dB (equivalent to 45 dB interior L_{eq} with windows open) as a screening criterion to determine schools at risk of classroom learning effects (DNWG 2009a). Locations that exceed this threshold have been further analyzed by counting the number of events per hour above an interior L_{max} of 50 dB, which equates to the highest permissible classroom level for speech intelligibility. The standard noise level reduction due to building attenuation of 15 dB for windows open and 25 dB for windows closed have been utilized to convert between exterior and interior sound levels. The duration, in minutes, that interior sound levels would exceed 50 dB has also been computed to provide an assessment of the relative time per day that students and teachers may be impacted.

2.2.7 Residential Sleep Disturbance

Sleep disturbance can be caused by excessive noise, which can hinder people's ability to fall asleep or to cause people to wake from sleep. A method for calculation of the possibility of awakening (PA) from at least one event per night is described in ANSI/Acoustical Society of America (ASA) S12.9-2008/Part 6. The standard utilizes the estimated interior SEL caused by aircraft events along with the number of occurrences per night to calculate the PA from that event. The resulting PA estimates the percentage of the population that would be awakened at least once per night under the noise conditions assessed. For instance, 1 percent PA estimates that 1 percent of the population would be awakened. Multiple events can be combined to determine the PA for all events during a single night. ANSI recommends that only nighttime events occurring during the CNEL nighttime with SELs between 50 and 100 dB should be used for this PA calculation. Data suggests that events below 50 dB do not contribute significantly to PA and the formula under-predicts PA for events over 100 dB. The DNWG for environmental impact analysis has endorsed this ANSI/ASA 2008 methodology (DNWG 2009b).

In addition to the ANSI/ASA 2008 methodology, the DNWG guidance identifies outdoor numbers of events above an SEL of 90 dB as an additional criterion for sleep disturbance analysis:

> *Currently, there are no established criteria for evaluating sleep disturbance from aircraft noise, although recent studies have suggested a benchmark of an outdoor SEL of 90 dB as an appropriate tentative criterion when comparing the effects of different operational alternatives. The corresponding indoor SEL would be approximately 25 dB lower (at 65 dB) with doors and windows closed, and approximately 15 dB lower (at 75 dB) with doors or windows open.*

As described in DNWG (2009b), comparison of exterior number of events above 90 dB SEL across multiple study scenarios allows for sleep disturbance impacts to be considered. This does make use of the same PA formula identified in ANSI/ASA 2008 but groups all events as either equal to 90 dB exterior SEL or below the threshold for consideration.

As of July 2018, the ANSI and ASA have withdrawn the 2008 standard, which formed the basis of much of the DNWG 2009b guidance:

> *The decision of Working Group S12/WG 15 to withdraw ANSI/ASA S12.9-2008/Part 6 implies that the method for calculating "at least one behavioral awakening per night" contained in the former Standard should no longer be relied upon for environmental impact assessment purposes. The Working Group believes that continued reliance on the 2008 Standard would lead to unreliable and difficult-to-interpret predictions of transportation-noise-induced sleep disturbance. (ANSI/ASA 2018)*

Without a reliable and standardized method to compute PA, or updated guidance from DNWG, this study presents the sleep impact analysis utilizing the previous standard (ANSI/ASA 2008; DNWG 2009b) for environmental impact disclosure purposes. The reader is cautioned that the PA metric provides only a crude estimate because it cannot truly account for all variables that could affect a person's sleep. A comparison of the baseline and various Proposed Action scenario awakening percentages showing large changes to PA could provide some insight on whether a particular action would be likely to increase or decrease sleep impacts. However, any additional conclusions may not be supportable.

2.2.8 Sound Pressure Level

The unweighted sound pressure level measured during a single event is called SPL. SPL is the true, unweighted, instantaneous absolute sound pressure level and is used in this analysis for the assessment of sensitive biological and cultural resources. Development of the 100 dB SPL and the 120 dB SPL contours will be used for assessment of sensitive biological and cultural resources, respectively.

3.0 BASELINE

The following subsections detail the modeling data and the resultant noise exposure for the baseline at VSFB.

3.1 VANDENBERG SPACE FORCE BASE

3.1.1 Modeling Data

Existing VSFB flight operations for the baseline taken from the *2020 Environmental Impact Statement for F-35A Beddown at Tyndall AFB and MQ-9 Beddown at Tyndall AFB or Vandenberg AFB* consisted of the following:

- 809 Arrivals/Departures
- 5,715 Closed Patterns
- 7,366 Total Operations

While there are no based squadrons at VSFB, the airfield supports transient military aircraft operations on a regular basis as summarized in Table 3-1. Additionally, materials and personnel supporting the Vandenberg space-launch mission are transported to and from VSFB aboard cargo-type aircraft such as the C-5 and C-21. The airfield is also used by transient aircraft of all types (e.g., T-38 and single-engine, propeller-driven aircraft) as a stopover location during cross-country flights, as an unfamiliar airfield for practice approaches, or as a diverted landing location during severe weather. Also, an MQ-9 detachment trains at Vandenberg on two separate occasions annually.

The day and night periods referenced in Table 3-1 refer to specific 'acoustic periods' applicable to the CNEL metric used for airfield noise impact analysis and correspond to 7 a.m. to 7 p.m. (0700 to 1900) for daytime, 7 p.m. to 10 p.m. (1900 to 2200) and 10 p.m. to 7 a.m. (2200 to 0700) for nighttime.

Typically, maintenance operations for based aircraft operations are included in the noise modeling effort; however, given that no aircraft are based (i.e., all operations are transients) at VSFB, no maintenance (static) operations were included in this modeling effort.

Table 3-1 Baseline Average Annual Operations at VSFB

	Departures				*Arrivals*				*Closed Patterns*[1]					*Total*			
Aircraft	*Day*	*Evening*	*Night*	*Total*	*Day*	*Evening*	*Night*	*Total*	*Day*	*Evening*	*Night*	*Total*	*% IFR/VFR*	*Day*	*Evening*	*Night*	*TOTAL*
C-130	111	1	1	113	111	1	1	113	1,794	18	18	1,830	20/80	2,015	21	21	**2,057**
C-5	35	0	0	35	35	0	0	35	207	2	2	211	50/50	278	3	3	**284**
C-17	41	0	0	41	41	0	0	41	207	2	2	211	50/50	289	3	3	**295**
T-38	63	1	1	65	63	1	1	65	255	3	3	261	30/70	380	4	4	**388**
F-16	12	0	0	12	12	0	0	12	47	0	0	47	50/50	71	1	1	**73**
F-35	6	0	0	6	6	0	0	6	24	0	0	24	50/50	35	0	0	**35**
F-22	6	0	0	6	6	0	0	6	24	0	0	24	50/50	35	0	0	**35**
F-18A/C	14	0	0	14	14	0	0	14	47	0	0	47	50/50	74	1	1	**76**
C-12	125	1	1	127	125	1	1	127	897	9	9	915	50/50	1,148	12	12	**1,172**
C-21	118	1	1	120	118	1	1	120	448	5	5	458	50/50	684	7	7	**698**
E-2 / C-2	12	0	0	12	12	0	0	12	207	2	2	211	60/40	230	2	2	**234**
B-737-500	16	0	0	16	16	0	0	16	69	1	1	71	50/50	100	1	1	**102**
KC-135R	24	0	0	24	24	0	0	24	129	1	1	131	80/20	176	2	2	**180**
P-3	7	0	0	7	7	0	0	7	78	1	1	80	50/50	91	1	1	**93**
Bell-222	28	0	0	28	28	0	0	28	204	2	2	208	0/100	261	3	3	**267**
GASEPF	76	1	1	78	76	1	1	78	652	7	7	666	0/100	805	8	8	**821**
H-60	37	0	0	37	37	0	0	37	0	0	0	0	0/100	74	1	1	**76**
MQ-9	78	1	1	80	78	1	1	80	314	3	3	320	0/100	470	5	5	**480**
Totals	**809**	**6**	**6**	**821**	**809**	**6**	**6**	**821**	**5,603**	**56**	**56**	**5,715**	-	**7,216**	**68**	**68**	**7,356**

Legend: % = percent; IFR = Instrument Flight Rules; VFR= Visual Flight Rules
Note: [1]Closed Patterns counted as two operations.
Day (7 a.m. to 7 p.m.) Evening (7 p.m. to 10 p.m.) Night (10 p.m. to 7 a.m.).

3.1.2 Noise Exposure VSFB Airfield

3.1.2.1 Community Noise Equivalent Level Contours and Point of Interest Levels

Figure 3-1 shows the CNEL noise contours from 65 to 85 dB in 5-dB increments for the baseline at VSFB. Noise levels above 65 dB CNEL generated from aircraft operations at VSFB remains entirely within the base boundary. Noise contours are aligned with the directions of the runway (northwest and southeast headings) with wider and longer areas along the predominant departure end.

Table 3-2 shows the CNEL values at each of the POIs under the baseline. All values are less than 45 dB CNEL, with the exception of Purisima Point.

3.1.2.2 Acreage, Housing, and Population

Table 3-3 shows the acreage within each noise contour band, resulting in a total of approximately 772 acres exposed to 65 dB CNEL or greater for baseline. There is no off-base acreage exposed to a noise level greater than 65 dB CNEL; therefore, a population and household analysis review of census block group within each CNEL contour band was not carried forward.

Table 3-2 Baseline POI Noise Exposure in the Vicinity VSFB

Map ID	*Named Point of Interest*	*Baseline CNEL (dB)*
CES	Crestview Elementary School	<45
HOP	Honda Point	<45
JAB	Jalama Beach	<45
LFP	Lompoc Federal Prison	<45
LRA	Lompoc Residential Area	<45
MCS	Manzanita Charter School	<45
MHS	Maple High School	<45
MMB	Minuteman Beach	<45
PPE	Point Pedernales	<45
PSA	Point Sal	<45
PUP	Purisima Point	49
SUB	Surf Beach	<45
VMF	VSFB Multiple Family	<45
VMS	Vandenberg Middle School	<45
VPG	VSFB Parade Ground	<45
VSF	VSFB Single Family	<45
WAB	Wall Beach	<45

Legend: < = less than; CES=Crestview Elementary School; CNEL = Community Noise Equivalent Level; dB = decibel; HOP=Honda Point; ID = Identification; JAB =Jalama Beach; LFP=Lompoc Federal Prison; LRA=Lompoc Residential Area; MCS=Manzanita Charter School; MHS=Maple High School; MMB=Minuteman Beach; POI = Point of Interest; PPE=Point Pedernales; PSA=Point Sal; PUP=Purisima Point; SUB=Surf Beach; VMF=VSFB Multiple Family; VMS=Vandenberg Middle School; VPG=VSFB Parade Ground; VSF=VSFB Single Family; VSFB = Vandenberg Space Force Base; WAB=Wall Beach

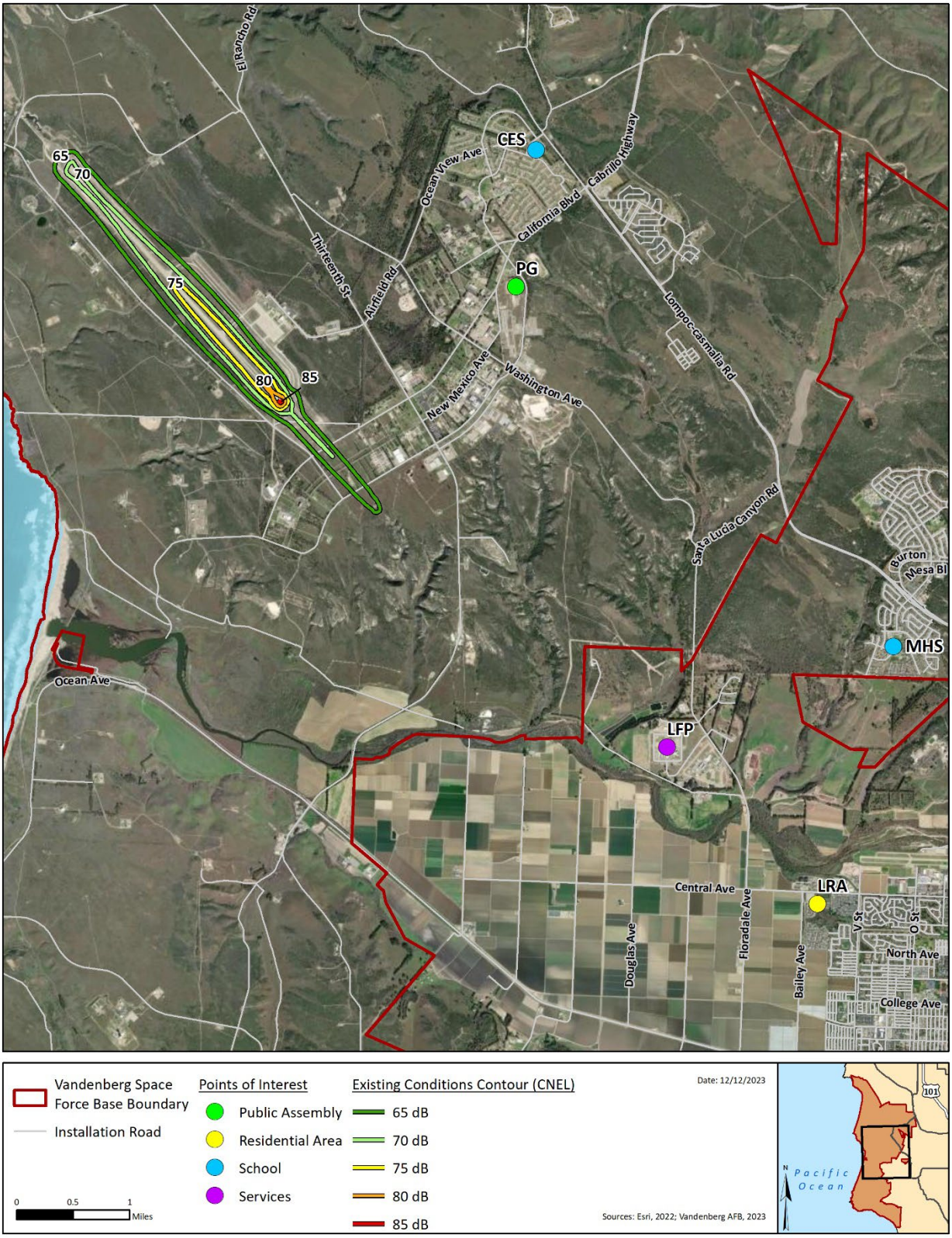

Figure 3-1 Baseline CNEL Contours in the Vicinity of VSFB

Table 3-3 Baseline Noise Exposure Acreage in the Vicinity of VSFB

CNEL (dB)	*Baseline Acreage*		
	On Base	*Off-Base*	*Total*
65–70	435	0	435
70–75	212	0	212
75–80	111	0	111
80–85	14	0	14
85+	0	0	0
Total >65 dB	**772**	**0**	**772**

Legend: > = greater than; dB = decibel; CNEL = Community Noise Equivalent Level

3.1.2.3 Classroom Learning Interference

Table 3-4 presents the baseline classroom learning interference in the vicinity of VSFB. The school screening threshold of 60 dB $L_{eq(8hr)}$ equates to an interior level of 45 dB $L_{eq(8hr)}$ with windows open and represents the point at which studies have found classroom learning impacts (DNWG 2009a, 2013a). Baseline operations at VSFB result in neither school being exposed to exterior $L_{eq(8hr)}$ greater than or equal to 60 dB for windows open condition. All POIs have been included because smaller daycare centers and learning facilities may exist at or near residential areas that may find the information useful. Based on the screening threshold of 60 dB $L_{eq(8hr)}$ not being reached at any POI, additional classroom learning interference assessment categories (number of speech interfering events per School Day Hour and Time above interior 50 dB per 8-hour school day) were not carried forward.

Table 3-4 Baseline Classroom Learning Interference in the Vicinity of VSFB

Map ID	*Named Point of Interest*	*Outdoor $L_{eq(8hr)}$ (dB)*[1]
CES	Crestview Elementary School	<45
HOP	Honda Point	<45
JAB	Jalama Beach	<45
LFP	Lompoc Federal Prison	48
LRA	Lompoc Residential Area	<45
MCS	Manzanita Charter School	<45
MHS	Maple High School	<45
MMB	Minuteman Beach	<45
PPE	Point Pedernales	<45
PSA	Point Sal	<45
PUP	Purisima Point	52
SUB	Surf Beach	<45
VMF	VSFB Multiple Family	47
VMS	Vandenberg Middle School	<45
VPG	VSFB Parade Ground	48
VSF	VSFB Single Family	45
WAB	Wall Beach	47

Legend: < = less than; CES=Crestview Elementary School; CNEL = Community Noise Equivalent Level; dB = decibel; HOP=Honda Point; ID = Identification; JAB=Jalama Beach; $L_{eq(8hr)}$ = 8-hour Equivalent Sound Level; LFP=Lompoc Federal Prison; LRA=Lompoc Residential Area; MCS=Manzanita Charter School; MHS=Maple High School; MMB=Minuteman Beach; POI = Point of Interest; PPE=Point Pedernales; PSA=Point Sal; PUP=Purisima Point; SUB=Surf Beach; VMF=VSFB Multiple Family; VMS=Vandenberg Middle School; VPG=VSFB Parade Ground; VSF=VSFB Single Family; VSFB = Vandenberg Space Force Base; WAB=Wall Beach

3.1.2.4 Non-school Speech Interference

Table 3-5 presents the baseline speech interference (non-school) based upon the number of events per average hour during the CNEL daytime period for both a windows open and windows closed condition. There would be no calculated interfering events occurring with windows open or with the windows closed.

Table 3-5 Baseline Non-school Speech Interference Events per Average Hour in the Vicinity of VSFB

Map ID[1]	*Named Point of Interest*	*Baseline*	
		Windows Open[2]	*Windows Closed*[3]
CES	Crestview Elementary School	0	0
HOP	Honda Point	0	N/A
JAB	Jalama Beach	0	N/A
LFP	Lompoc Federal Prison	0	0
LRA	Lompoc Residential Area	0	0
MCS	Manzanita Charter School	0	0
MHS	Maple High School	0	0
MMB	Minuteman Beach	0	N/A
PPE	Point Pedernales	0	N/A
PSA	Point Sal	0	N/A
PUP	Purisima Point	0	N/A
SUB	Surf Beach	0	N/A
VMF	VSFB Multiple Family	0	0
VMS	Vandenberg Middle School	0	0
VPG	VSFB Parade Ground	0	N/A
VSF	VSFB Single Family	0	0
WAB	Wall Beach	0	N/A

Notes: [1]School POIs included because residential areas or other noise sensitive uses are often located nearby schools for which these results would apply.
[2]Assumes 15 dB Noise Level Reduction.
[3]Assumes 25 dB Noise Level Reduction.

Legend: < = less than; CES=Crestview Elementary School; CNEL = Community Noise Equivalent Level; dB = decibel; HOP=Honda Point; ID = Identification; JAB=Jalama Beach; LFP=Lompoc Federal Prison; LRA=Lompoc Residential Area; MCS=Manzanita Charter School; MHS=Maple High School; MMB=Minuteman Beach; N/A=Not Applicable; POI = Point of Interest; PPE=Point Pedernales; PSA=Point Sal; PUP=Purisima Point; SUB=Surf Beach; VMF=VSFB Multiple Family; VMS=Vandenberg Middle School; VPG=VSFB Parade Ground; VSF=VSFB Single Family; VSFB = Vandenberg Space Force Base; WAB=Wall Beach

3.1.2.5 Probability of Awakening

Analysis of the potential for sleep disturbance involves determining the number and SEL of nighttime aircraft events to estimate the PA metric. As detailed in Table 3-6, PA with windows open is less than 1 percent at all POIs. The probability of awakening analysis is not accurate to this level of precision but fractional percentages are presented in this case because the PA is so low at VSFB due to few night operations. PA with windows closed is also zero percent at all POIs.

Table 3-6 Baseline Estimated Probability of Awakening in the Vicinity of VSFB

Map ID	*Named POI*	*Baseline*	
		Windows Open[2]	*Windows Closed*[3]
CES	Crestview Elementary School	0.0	0.0
HOP	Honda Point	0.0	0.0
JAB	Jalama Beach	0.0	0.0
LFP	Lompoc Federal Prison	0.1	0.0
LRA	Lompoc Residential Area	0.1	0.0
MCS	Manzanita Charter School	0.0	0.0
MHS	Maple High School	0.0	0.0
MMB	Minuteman Beach	0.0	0.0
PPE	Point Pedernales	0.0	0.0
PSA	Point Sal	0.0	0.0
PUP	Purisima Point	0.1	0.0
SUB	Surf Beach	0.0	0.0
VMF	VSFB Multiple Family	0.1	0.0
VMS	Vandenberg Middle School	0.0	0.0
VPG	VSFB Parade Ground	0.1	0.0
VSF	VSFB Single Family	0.1	0.0
WAB	Wall Beach	0.1	0.0

Notes: [1]Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.
[2]Assumes 15 dB Noise Level Reduction.
[3]Assumes 25 dB Noise Level Reduction.

Legend: < = less than; % = percent; CES=Crestview Elementary School; CNEL = Community Noise Equivalent Level; dB = decibel; HOP=Honda Point; ID = Identification; JAB =Jalama Beach; LFP=Lompoc Federal Prison; LRA=Lompoc Residential Area; MCS=Manzanita Charter School; MHS=Maple High School; MMB=Minuteman Beach; POI = Point of Interest; PPE=Point Pedernales; PSA=Point Sal; PUP=Purisima Point; SUB=Surf Beach; VMF=VSFB Multiple Family; VMS=Vandenberg Middle School; VPG=VSFB Parade Ground; VSF=VSFB Single Family; VSFB = Vandenberg Space Force Base; WAB=Wall Beach

3.1.2.6 Potential for Hearing Loss

DoD guidance prescribes analysis of the potential for hearing loss (PHL) resulting from elevated aircraft noise levels. The screening process begins by identifying residential areas exposed to CNEL of 80 dB or greater (DNWG 2013b). No areas outside of the VSFB airfield boundary are exposed to 80 dB CNEL or greater, so no residents both on- or off-base experience the PHL for the baseline.

3.1.2.7 Sound Pressure Level

To determine potential cultural and biological impacts from aircraft activity, the 120 dB and 100 dB SPL contours were developed. Figure 3-2 depicts the 120 dB and 100 dB contours and Table 3-7 presents the acreages within each contour level. One biological resource point of interest, Purisima Point, is within the 100 dB SPL contour and there are no points of interest within the +120 dB SPL contour.

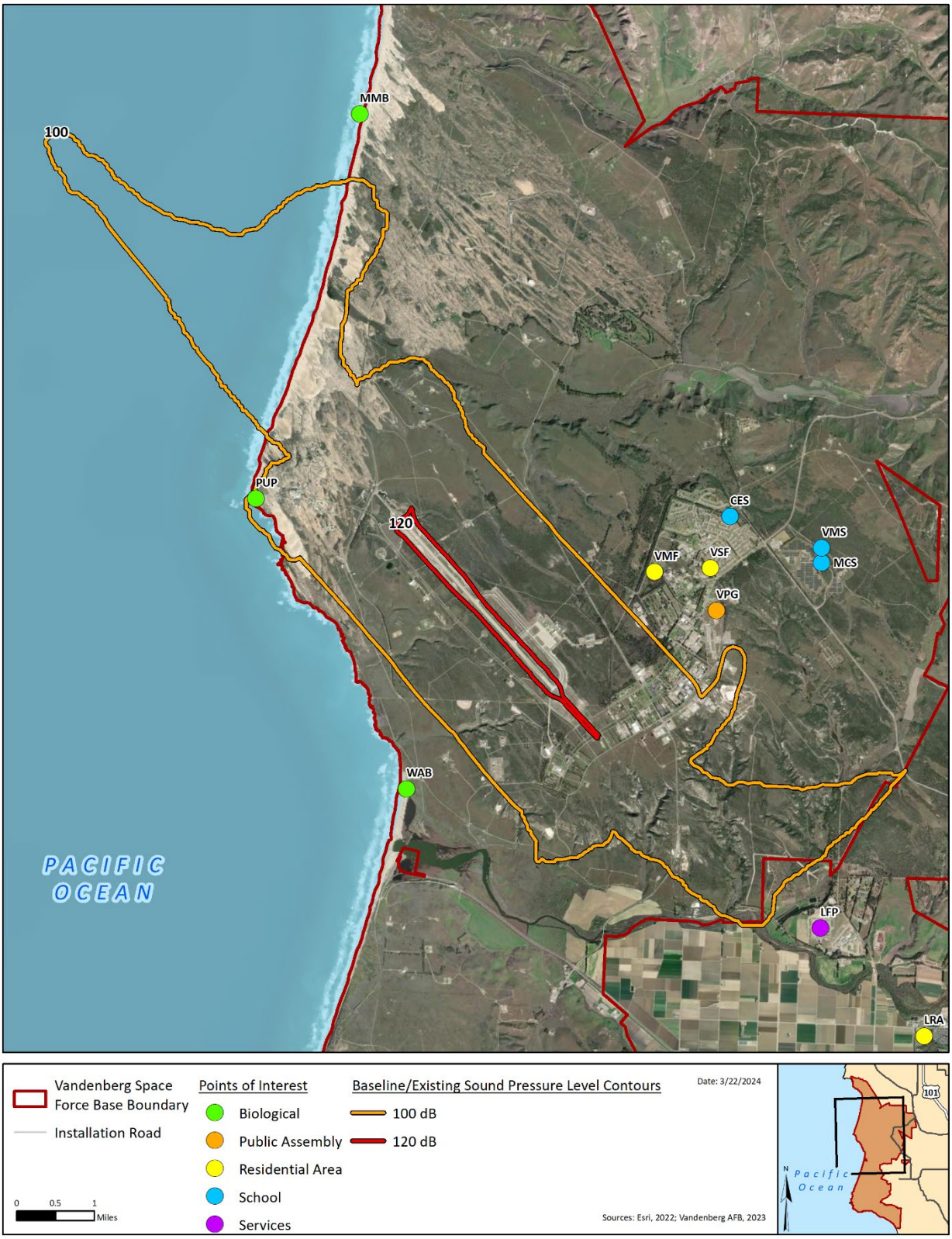

Figure 3-2 Baseline 120 dB and 100 dB Sound Pressure Level Contours

Table 3-7 Baseline 120 dB and 100 dB Sound Pressure Level Acreage

Sound Pressure Level	*Acres*
100 dB	18,228
120 dB	422

Note: dB = decibel.

3.1.3 Airspace

Given that there are no based aircraft at VSFB, regular daily training from VSFB within local training airspace is not tracked; however, training airspace exists and is located off the coast of California and over the Pacific Ocean at altitudes of 10,000 feet mean sea level (MSL) to 50,000 feet MSL. Given that the low level of training would be at 10,000 feet MSL and over water, a noise analysis of aircraft training within airspace was not carried forward. Supersonic training within the Point Mugu Sea Range airspace confines (over water) would likely occur in accordance with published rules governed by that range.

4.0 PROPOSED ACTION

The following section details the modeling data and the resultant noise exposure for F-15E/EX detachment to VSFB as described in Section 1.1. All other aircraft operations are assumed to remain unchanged from those described in Section 3.0, *Baseline* for this analysis.

4.1 VANDENBERG SPACE FORCE BASE

4.1.1 Modeling Data

Under this proposal, F-15E/EX flying squadrons would complete two (2) detachments annually at VSFB. Each detachment would occur over a period of two-weeks for a total of 10 operating days per detachment. Within each operating day, F-15E/EX aircraft would fly on a 4x2 schedule for a total of up to eight (8) sorties daily. Further, each sortie would only include a departure and arrival. All F-15E/EX departures would include the use of afterburner.

Additional operations data is summarized below:

- Annual Sorties = 160
- Annual Operations = 320
  - Departures = 160
  - Arrivals = 160
- Evening Operations (7 p.m. to 10 p.m. [1900 to 2200])
  - Depart at evening = 1 (1 percent)
  - Arrive at evening = 1 (1 percent)
- Night operations (10 p.m. to 7 a.m. [2200 to 0700])
  - Depart at night = 1 (1 percent)
  - Arrive at night = 1 (1 percent)

Table 4-1 details the modeled annual flight operations at VSFB that would occur through implementation of the Proposed Action. Other aircraft operations at VSFB are expected to remain similar to baseline activity.

4.1.1.1 Flight Operations

All proposed F-15E/EX detachment departures would utilize afterburner. The F-15E/EX would follow the same arrival types at similar rates proportional to the existing fighter aircraft.

4.1.1.2 Day (7 a.m.-7 p.m. [0700-1900]), Evening (7 p.m.–10 p.m. [1900–2200]) and Nighttime (10 p.m.–7 a.m. [2200–0700]) Operations

Day operations would make up 99 percent of the total operations. Evening and nighttime operations at VSFB would remain low with only one departure and one arrival annually within each time frame.

4.1.1.3 Runway Use

The proposed F-15E/EX aircraft would utilize VSFB runways at the same proportion as the baseline transient fighter aircraft. Based upon wind, approximately 91 percent of Departures/Arrivals would occur on Runway 30. The remaining approximate 9 percent of operations would continue to occur on Runway 12 as dictated by wind.

4.1.1.4 Maintenance or Static Operations

Given that F-15E/EX operations at VSFB are associated with detachment squadrons, and only routine engine maintenance or static operations at up to 80 percent power would take place, maintenance and static operations were not included in the noise modeling.

Table 4-1 Proposed Aircraft Operations for VSFB

Group	*Departures*			*Arrivals*			*Closed Patterns*[1]			*Totals*			
	Day	***Eve***	***Night***	***Day***	***Eve***	***Night***	***Day***	***Eve***	***Night***	***Day***	***Eve***	***Night***	***Total***
Existing	809	6	6	809	6	6	5,603	56	56	7,216	68	68	7,356
F-15E/EX	158	1	1	158	1	1	-	-	-	316	2	2	320
Total	967	7	7	967	7	7	5,603	56	56	7,564	70	70	7,676

Legend: % = percent; IFR = Instrument Flight Rules; VFR = Visual Flight Rules
Notes: [1]Closed Patterns counted as two operations.
Day (7 a.m. to 7 p.m.) Evening (7 p.m. to 10 p.m.) Night (10 p.m. to 7 a.m.).

4.1.2 Noise Exposure VSFB Airfield

4.1.2.1 Community Noise Equivalent Level Contours and Point of Interest Levels

Figure 4-1 shows a comparison of the CNEL noise contours from 65 to 85 dB in 5-dB increments between the baseline and F-15E/EX detachment at VSFB.As with the baseline, noise exposure generated from aircraft operations at VSFB occurs within the boundaries of the base and noise contours are aligned with the directions of the runway (northwest and southeast headings) with wider and longer areas along the predominant departure end.

Table 4-2 details the calculated CNEL at all POIs for baseline and the proposed F-15E/EX detachment. The CNEL remains below 45 dB CNEL under both the baseline and proposed F-15E/EX scenario. The model outputs calculated differences between the baseline and proposed of up to 0.5 dB which are negligible in terms of perceptible change in noise exposure.

Table 4-2 CNEL at POIs for Proposed F-15E/EX Detachment in the Vicinity of VSFB

Map ID	*Location*	*Baseline*	*F-15E/EX*	*Difference*
CES	Crestview Elementary School	<45	<45	0
HOP	Honda Point	<45	<45	0
JAB	Jalama Beach	<45	<45	0
LFP	Lompoc Federal Prison	<45	<45	0
LRA	Lompoc Residential Area	<45	<45	0
MCS	Manzanita Charter School	<45	<45	0
MHS	Maple High School	<45	<45	0
MMB	Minuteman Beach	<45	<45	0
PPE	Point Pedernales	<45	<45	0
PSA	Point Sal	<45	<45	0
PUP	Purisima Point	49	49	0
SUB	Surf Beach	<45	<45	0
VMF	VSFB Multiple Family	<45	<45	0
VMS	Vandenberg Middle School	<45	<45	0
VPG	VSFB Parade Ground	<45	<45	0
VSF	VSFB Single Family	<45	<45	0
WAB	Wall Beach	<45	<45	0

Legend: <=less than; CES=Crestview Elementary School; CNEL = Community Noise Equivalent Level; dB = decibel; HOP=Honda Point; ID = Identification; JAB=Jalama Beach; LFP=Lompoc Federal Prison; LRA=Lompoc Residential Area; MCS=Manzanita Charter School; MHS=Maple High School; MMB=Minuteman Beach; POI = Point of Interest; PPE=Point Pedernales; PSA=Point Sal; PUP=Purisima Point; SUB=Surf Beach; VMF=VSFB Multiple Family; VMS=Vandenberg Middle School; VPG=VSFB Parade Ground; VSF=VSFB Single Family; VSFB = Vandenberg Space Force Base; WAB=Wall Beach

4.1.2.2 Acreage, Housing, and Population

Table 4-3 shows the acreage within each noise contour band, resulting in a total of 1,167 acres exposed to 65 dB CNEL or greater for implementation of the F-15E/EX detachment. There is no off-base acreage exposed to a noise level greater than 65 dB CNEL; therefore, a population and household analysis review of census block group within each CNEL contour band was not carried forward.

Table 4-3 Proposed F-15E/EX Detachment Noise Exposure Acreage in the Vicinity of VSFB

CNEL (dB)	*Baseline Acreage*			*Proposed Acreage*			*Difference*		
	On Base	*Off-Base*	*Total*	*On Base*	*Off-Base*	*Total*	*On Base*	*Off-Base*	*Total*
65–70	435	0	425	584	0	584	+149	0	+149
70–75	212	0	196	339	0	339	+127	0	+127
75–80	111	0	102	130	0	130	+19	0	+19
80–85	14	0	7	95	0	95	+81	0	+81
85+	0	0	0	19	0	19	+19	0	+19
Total >65 dB	**772**	**0**	**730**	**1,167**	**0**	**1,167**	**+395**	**0**	**+395**

Legend: > = greater than; dB = decibel; CNEL = Community Noise Equivalent Level

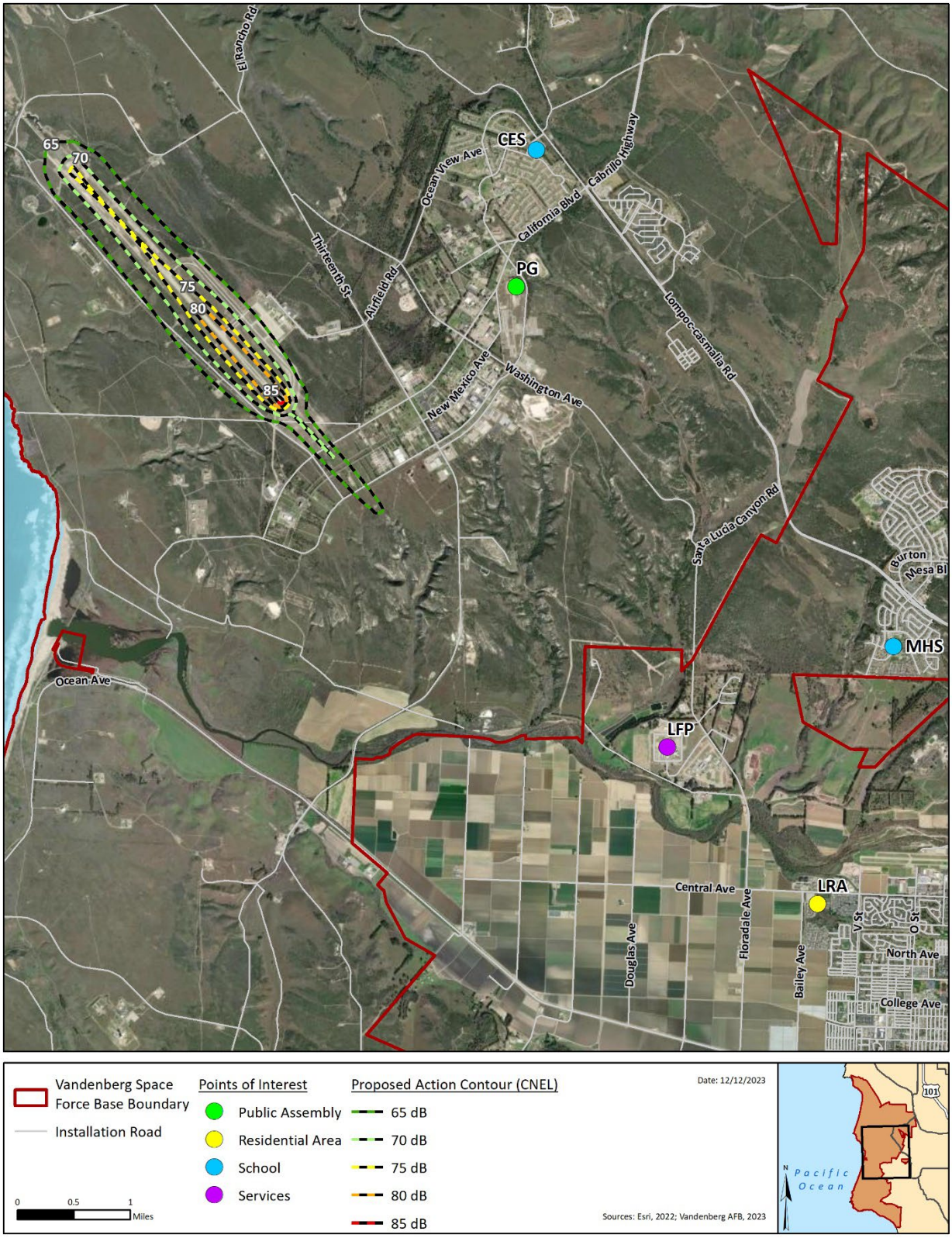

Figure 4-1 Baseline and Proposed CNEL Contours in the Vicinity of VSFB

4.1.2.3 Classroom Learning Interference

Although classroom learning interference analysis only applies to school POIs, Table 4-4 presents $L_{eq(8hr)}$ for all POIs because smaller daycare centers and learning facilities may exist at or near residential areas that may find the information useful. Under the proposed F-15E/EX Detachment, the number of school type POIs exposed to greater than 60 dB $L_{eq(8hr)}$ would be identical to the baseline, where no school types would be exposed to greater than 60 dB $L_{eq(8hr)}$; therefore, assessment of additional classroom learning interferences (i.e., classroom speech interference and classroom time above 50 dB/8-hour day) levels are not caried forward. Two POIs would experience a 1.0 dB increase over existing conditions.

Table 4-4 Classroom Screening Criteria ($L_{eq[8hr]}$) for POIs in the Vicinity of VSFB

ID	*Location*	*Baseline*	*F-15E/EX*	*Difference*
CES	Crestview Elementary School	<45	<45	0
HOP	Honda Point	<45	<45	0
JAB	Jalama Beach	<45	<45	0
LFP	Lompoc Federal Prison	48	48	0
LRA	Lompoc Residential Area	<45	<45	0
MCS	Manzanita Charter School	<45	<45	0
MHS	Maple High School	<45	<45	0
MMB	Minuteman Beach	<45	<45	0
PPE	Point Pedernales	<45	<45	0
PSA	Point Sal	<45	<45	0
PUP	Purisima Point	52	53	1
SUB	Surf Beach	<45	<45	0
VMF	VSFB Multiple Family	47	48	1
VMS	Vandenberg Middle School	<45	<45	0
VPG	VSFB Parade Ground	48	48	0
VSF	VSFB Single Family	45	45	0
WAB	Wall Beach	47	47	0

Note: Global for table: assumes 90 percent of daytime operations occur during the school day; Windows open condition with Noise Level Reduction of 15 dB due to building attenuation.

Legend: <= less than; CES=Crestview Elementary School; CNEL = Community Noise Equivalent Level; dB = decibel; HOP=Honda Point; ID = Identification; JAB=Jalama Beach; $L_{eq(8hr)}$ = 8-hour Equivalent Sound Level; LFP=Lompoc Federal Prison; LRA=Lompoc Residential Area; MCS=Manzanita Charter School; MHS=Maple High School; MMB=Minuteman Beach; POI = Point of Interest; PPE=Point Pedernales; PSA=Point Sal; PUP=Purisima Point; SUB=Surf Beach; VMF=VSFB Multiple Family; VMS=Vandenberg Middle School; VPG=VSFB Parade Ground; VSF=VSFB Single Family; VSFB = Vandenberg Space Force Base; WAB=Wall Beach

4.1.2.4 Non-school Speech Interference

Table 4-5 details the number of speech interfering events during the CNEL daytime (7 a.m. to 7 p.m. [0700 to 1900]) per average hour for both windows open and windows closed conditions. Under the F-15E/EX action, there would not be any non-school speech interfering events per hour with either the windows opened or closed.

Table 4-5 Non-School Speech Interfering Events per Hour During CNEL Daytime in the Vicinity of VSFB

ID	*Location*	*Baseline*	*F-15E/EX*	*Difference*
CES	Crestview Elementary School	0/0	0/0	0/0
HOP	Honda Point	0/N/A	0/N/A	0/N/A
JAB	Jalama Beach	0/N/A	0/N/A	0/N/A
LFP	Lompoc Federal Prison	0/0	0/0	0/0
LRA	Lompoc Residential Area	0/0	0/0	0/0
MCS	Manzanita Charter School	0/0	0/0	0/0
MHS	Maple High School	0/0	0/0	0/0
MMB	Minuteman Beach	0/N/A	0/N/A	0/N/A
PPE	Point Pedernales	0/N/A	0/N/A	0/N/A
PSA	Point Sal	0/N/A	0/N/A	0/N/A
PUP	Purisima Point	0/N/A	0/N/A	0/N/A
SUB	Surf Beach	0/N/A	0/N/A	0/N/A
VMF	VSFB Multiple Family	0/0	0/0	0/0
VMS	Vandenberg Middle School	0/0	0/0	0/0
VPG	VSFB Parade Ground	0/N/A	0/N/A	0/N/A
VSF	VSFB Single Family	0/0	0/0	0/0
WAB	Wall Beach	0/N/A	0/N/A	0/N/A

Note: Values are rounded and represent events for conditions with windows open / windows closed.
Legend: < = less than*;* CES=Crestview Elementary School; CNEL = Community Noise Equivalent Level; dB = decibel; HOP=Honda Point; ID = Identification; JAB=Jalama Beach; LFP=Lompoc Federal Prison; LRA=Lompoc Residential Area; MCS=Manzanita Charter School; MHS=Maple High School; MMB=Minuteman Beach; N/A= Not Applicable; POI = Point of Interest; PPE=Point Pedernales; PSA=Point Sal; PUP=Purisima Point; SUB=Surf Beach; VMF=VSFB Multiple Family; VMS=Vandenberg Middle School; VPG=VSFB Parade Ground; VSF=VSFB Single Family; VSFB = Vandenberg Space Force Base; WAB=Wall Beach

4.1.2.5 Probability of Awakening

Table 4-6 presents the baseline estimated PA and the change that would occur under the proposed F-15E/EX detachments. All POIs would experience less than 1 percent change in PA.

Table 4-6 Estimated Change to Probability of Awakening Relative to Baseline in the Vicinity of VSFB

ID	*Location*	*Baseline (Window Open[2]/ Window Closed[3])*	*F-15E/EX (Window Open[2]/ Window Closed[3])*	*Difference*
CES	Crestview Elementary School	0.0/0.0	0.1/0.0	+0.1/0
HOP	Honda Point	0.0/0.0	0.0/0.0	0/0
JAB	Jalama Beach	0.0/0.0	0.0/0.0	0/0
LFP	Lompoc Federal Prison	0.1/0.0	0.1/0.0	0/0
LRA	Lompoc Residential Area	0.1/0.0	0.1/0.0	0/0
MCS	Manzanita Charter School	0.0/0.0	0.1/0.0	+0.1/0
MHS	Maple High School	0.0/0.0	0.1/0.0	+0.1/0
MMB	Minuteman Beach	0.0/0.0	0.1/0.0	+0.1/0
PPE	Point Pedernales	0.0/0.0	0.0/0.0	0/0
PSA	Point Sal	0.0/0.0	0.0/0.0	0/0
PUP	Purisima Point	0.1/0.0	0.1/0.1	0/0
SUB	Surf Beach	0.0/0.0	0.0/0.0	0/0
VMF	VSFB Multiple Family	0.1/0.0	0.1/0.1	0/+0.1
VMS	Vandenberg Middle School	0.0/0.0	0.1/0.0	+0.1/0
VPG	VSFB Parade Ground	0.1/0.0	0.1/0.0	0/0
VSF	VSFB Single Family	0.1/0.0	0.1/0.0	0/0
WAB	Wall Beach	0.1/0.0	0.1/0.0	0/0

Notes: [1]Non-residential POIs included because residential areas are often located nearby other noise sensitive areas for which these results would apply.
[2]Assumes 15 dB Noise Level Reduction.
[3]Assumes 25 dB Noise Level Reduction.

Legend: %=percent; <=less than; CES=Crestview Elementary School; CNEL = Community Noise Equivalent Level; dB = decibel; HOP=Honda Point; ID = Identification; JAB=Jalama Beach; $L_{eq(8hr)}$ = 8-hour Equivalent Sound Level; LFP=Lompoc Federal Prison; LRA=Lompoc Residential Area; MCS=Manzanita Charter School; MHS=Maple High School; MMB=Minuteman Beach; POI = Point of Interest; PPE=Point Pedernales; PSA=Point Sal; PUP=Purisima Point; SUB=Surf Beach; VMF=VSFB Multiple Family; VMS=Vandenberg Middle School; VPG=VSFB Parade Ground; VSF=VSFB Single Family; VSFB = Vandenberg Space Force Base; WAB=Wall Beach

4.1.2.6 Potential for Hearing Loss

Implementation of the F-15E/EX detachments at VSFB would result in no areas outside of the VSFB airfield boundary being exposed to 80 dB CNEL or greater, so no residents both on- or off-base experience the PHL for the baseline. Therefore, PHL analysis is not carried forward.

4.1.2.7 Sound Pressure Level

With the F-15E/EX detachments taking place at VSFB, the 120 dB SPL contour would expand by 120 acres within the VSFB airfield. The 100 dB SPL contour boundary would remain as described under baseline conditions as other transient aircraft operations contribute to this level of exposure. Figure 4-2 depicts the existing and proposed 120 dB and 100 dB SPL contours, while Table 4-7 identifies the change in acres. Similar to existing conditions, only Purisima Point is within the +100 dB SPL contour and no points of interest have been identified within the +120 dB SPL contour.

Table 4-7 Baseline and Proposed 120 dB and 100 dB Sound Pressure Levels Acreage

SPL	*Baseline Acres*	*Proposed Acres*	*Difference in Acreage*
+100 dB	18,228	18,107	-121
+120 dB	422	542	+120

Notes: dB = decibel; SPL = Sound Pressure Level

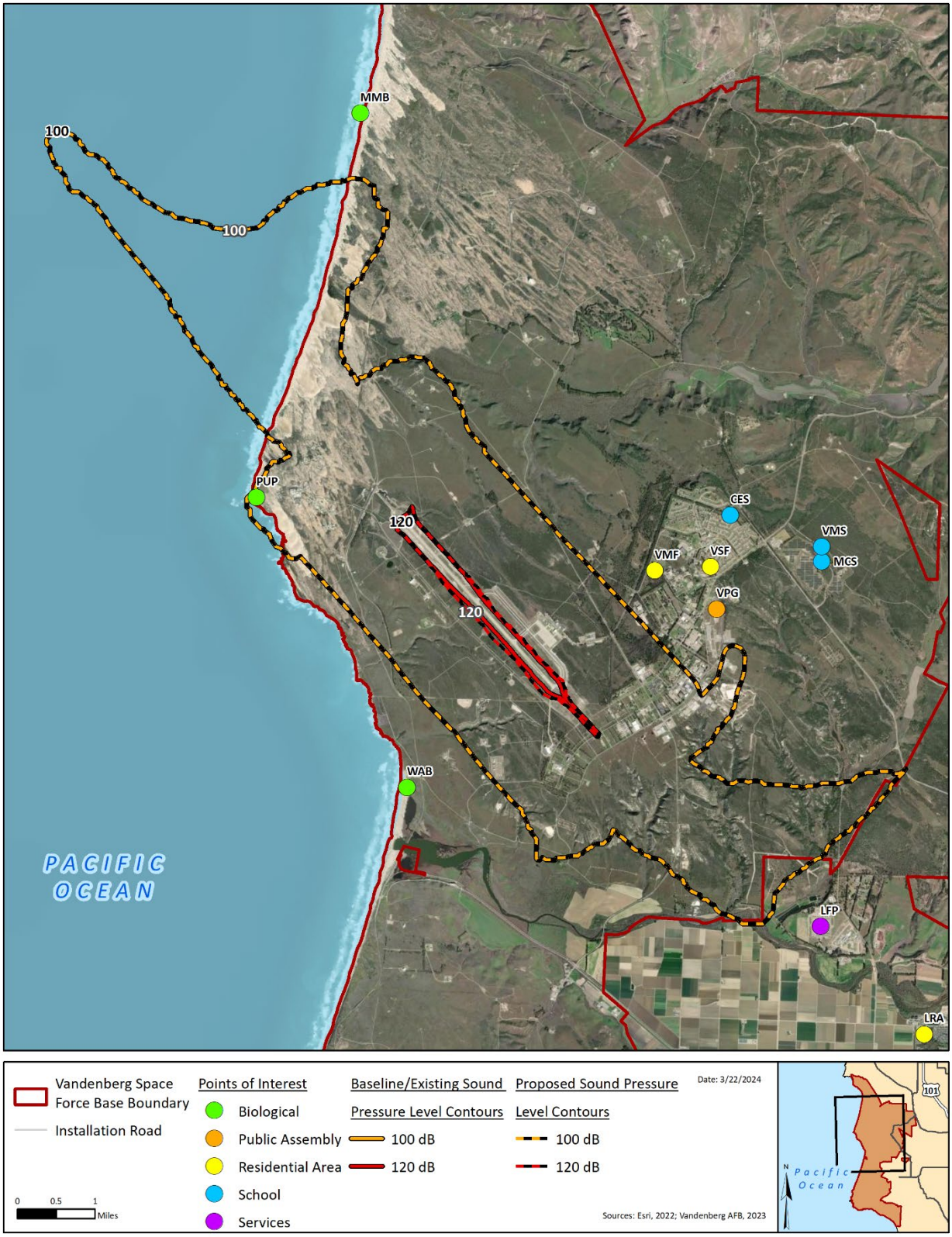

Figure 4-2 Baseline and Proposed 120 dB and 100 dB Sound Pressure Level Contours

4.1.3 Airspace

Under the Proposed Action, F-15E/EX aircraft would train within airspace located off the coast of California and over the Pacific Ocean at altitudes of 10,000 feet mean sea level (MSL) to 50,000 feet MSL. Given that no training would occur over land and the low level of training would be 10,000 feet MSL, a noise analysis of aircraft training within airspace was not carried forward. Supersonic training within the Point Mugu Sea Range airspace confines (over water) would likely occur in accordance with published rules governed by that range.

5.0 CONCLUSION

Table 5-1 presents a quantitative summary of the potential noise impacts associated with the F-15E/EX aircraft detachment as compared to the baseline. The F-15E/EX would produce noise levels consistent with existing fighter aircraft (i.e., F-16, F-18, F-22, and F-35) that operate at VSFB.

Implementation of the Proposed Action would generate approximately 61 percent more fighter aircraft events at VSFB.

Noise analysis results summarized in the table includes acreage and households/population impacted, number of POIs affected, number of school POIs affected, and PA.

Table 5-1 Summary of Potential Noise Impacts Associated with the F-15E/EX Detachments at VSFB

Category	*Condition*	*Baseline*	*F-15E/EX*
CNEL: Number of POIs	Exposed to >65 dB CNEL	0	0
	Exposed to >70 dB CNEL	0	0
	Exposed to >75 dB CNEL	0	0
	Decrease of 1 dB or greater		0
	No change		17
	Increase of 1 dB		0
	Increase of 2 to 4 dB		0
	Increase of 5 dB or greater		0
Off-Base Exposure	Acreage	0	0
	Households	0	0
	Estimated Population	0	0
School, $L_{eq(8hr)}$: Number of School POIs	Greater than 60 dB $L_{eq(8hr)}$	0	0
School, Numbers of Events per Average School Day Hour: Number of School POIs	With No Interfering Events	N/A	N/A
	With 1 to 5 Interfering Events	N/A	N/A
	With >5 Interfering Events	N/A	N/A
School, Time Above Interior 50 dB for 8 Hour School Day: Number of School POIs	Duration of 10 min or less	N/A	N/A
	Duration of >10-30 minutes	N/A	N/A
	Duration of >30 minutes	N/A	N/A
Speech Interfering Events per Average Hour, Windows Open: Number of POIs	With No Events	17	17 (0)
	With 1-2 Events	0	0(0)
	With >2 Events	0	0(0)
Speech Interfering Events per Average Hour, Windows Closed: Number of POIs[1]	With No Events	17	17 (0)
	With 1-2 Events	0	0(0)
	With >2 Events	0	0(0)
Probability of Awakening with Windows Open: Number of POIs	With <5% PA	17	17(0)
	With >5% PA	0	0 (0)
Probability of Awakening with Windows Open: Number of POIs	With <5% PA	17	17 (0)
	With >5% PA	0	0 (0)
Biological Resources POI	Exposed to > 100 dB SPL	Yes	Yes
Other POI	Exposed to > 120 dB SPL	No	No

Notes: Parenthetical represents change from baseline. 1=one POI is an outdoor location and cannot have windows closed

Legend: % = percent; < = less than; > = greater than; dB = decibel; CNEL = Community Noise Equivalent Level; N/A = Not Applicable; POI = Point(s) of Interest; SPL = Sound Pressure Level

6.0 REFERENCES

American National Standards Institute (ANSI). 1988. Quantities and Procedures for Description and Measurement of Environmental Sound. Part 1.

American National Standards Institute (ANSI)/Acoustical Society of America (ASA). 2008. Quantities and Procedures for Description and Measurement of Environmental Sound. S12.9 Part 6.

American National Standards Institute (ANSI)/Acoustical Society of America (ASA). 2018. Rationale for Withdrawing ANSI/ASA S12.9-2008/Part 6 (A Technical Report prepared by ANSI-Accredited Standards Committee S12 and registered with ANSI). July.

Department of the Air Force. 2020. *Environmental Impact Statement for F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB*. November.

Department of the Air Force. 2023. Vandenberg SFB F-15E/EX Environmental Assessment Data Validation Package. June.

Department of the Navy. 2021. Real-Time Aircraft Sound Monitoring Final Report, Report to Congress. November 30. https://www.navfac.navy.mil/Business-Lines/Asset-Management/Products-and-Services/Aircraft-Sound-Monitoring/

Department of Defense Noise Working Group (DNWG). 2009a. *Technical Bulletin, Using Supplemental Noise Metrics and Analysis Tools*. March.

Department of Defense Noise Working Group (DNWG). 2009b. *Technical Bulletin: Sleep Disturbance from Aviation Noise*, December.

Department of Defense Noise Working Group (DNWG). 2012. *Technical Bulletin, Noise-Induced Hearing Impairment, Defense Noise Working Group*. December.

Department of Defense Noise Working Group (DNWG). 2013a. *Technical Bulletin: Speech Interference from Aviation Noise*. December.

Department of Defense Noise Working Group (DNWG). 2013b. *Noise – Induced Hearing Impairment Technical Bulletin.* December.

Federal Interagency Committee on Noise (FICON). 1978. Environmental Protection – Planning the Noise Environment. 15 June.

Wasmer Consulting. 2006. *BaseOps 7.3 User's Guide*, Fred Wasmer and Fiona Maunsell, Wasmer Consulting.

Wyle. 1998. NMAP 7.0 User's Manual. Wyle Research Report WR98-13, Czech and Plotkin. November.

APPENDIX A
AIRCRAFT MODELING DETAILS

1.0 AIRFIELD OPERATIONS

This section contains details of airfield flight operations gathered in support of the 2019 Environmental Impact Statement assessing the beddown of the MQ-9 at Vandenberg SFB. However, given that Vandenberg SFB was not selected to beddown the MQ-9, operations have been adjusted to reflect two (2) annual detachments of the MQ-9. A total of 7,366 annual aircraft operations were calculated and modeled for the MQ-9 beddown year and presented in Table 1.

Table 1. Summary of Existing Condition Aircraft Operations at Vandenberg SFB

Aircraft	Arrivals	Departures	Closed Patterns		Total
			VFR	GCA	
Transients	821	821	3,478	2,246	7,366
Total	821	821	3,1478	2,246	7,366

Notes: 1) A single closed pattern is counted as two (2) operations

The majority of aircraft operations at Vandenberg SFB are a result of transient aircraft operations. Transient aircraft operating at Vandenberg SFB include 19 fixed-wing and 2 rotary-wing aircraft. To note, similar types of aircraft have been grouped together to be modeled with representative surrogates, as described in Table 2.

Table 2. Aircraft and Substitutions for Noise Modeling

Aircraft	Description	Model As	Category
AN-124	4 engine jet airliner	KC-135R	Cargo/Heavy
B-2	4 eng large jet bomber	KC-135R	Bomber/Heavy
B-52	8 eng large jet bomber	KC-135R	Bomber/Heavy
B-747	4 eng large jet transport	KC-135R	Transport/Heavy
C-5A	4 eng large jet transport	C-5A	Cargo/Heavy
C-17	4 eng large jet transport	C-17	Cargo/Heavy
C-21A	Single prop GASEPF	C-21A	Other Fixed-wing
C-40	B737 airliner	737-500	Cargo/Heavy
C-130	4 eng turboprop	C-130H&N&P	Cargo/Heavy
DA-40	Single prop GASEPF	GASEPF	Other Fixed-wing
E-2C	Twin turboprop	E-2C	Cargo/Heavy
E-6	4 engine jet airliner	KC-135R	Cargo/Heavy
F-15C	Fighter	F-18A/C	Fighter/Trainer

Table 2. Aircraft and Substitutions for Noise Modeling

Aircraft	Description	Model As	Category
F-16C	Fighter	F16-C	Fighter/Trainer
F-15E	Fighter	F-15E	Fighter/Trainer
F-15EX	Fighter	F-15EX	Fighter/Trainer
F-18A/C	Fighter	F-18A/C	Fighter/Trainer
F-22	Fighter	F-22	Fighter/Trainer
F-35A	Fighter	F-35A	Fighter/Trainer
H-46	Helo	UH-60A	Rotary-wing
H-53	Helo	UH-60A	Rotary-wing
KC-10	3 eng large jet refueler	KC-135R	Refueler/Heavy
KC-46	2 eng large jet refueler	KC-135R	Refueler/Heavy
KC-135R	4 eng large jet refueler	KC-135R	Refueler/Heavy
L-1001	3 eng large jet transport	KC-135R	Cargo/Heavy
MH-139A	Helo	UH-60A	Rotary-wing
MQ-9	Single prop	T-6	UAS
MV-22	2 engine tilt rotor	UH-60A	Tilt rotor/Cargo
P-3	4 eng turboprop	P-3A	Cargo/Heavy
PC-12	Single prop	C-12	Other Fixed-wing
Small Civilian Helicopter	Helo	Bell-222	Rotary-wing
T-38	Trainer	T-38C	Fighter/Trainer
UH-1	Helo	UH-60A	Rotary-wing
UH-60A	Helo	UH-60A	Rotary-wing

Table 3 details the existing annual operations determined to be 7,366 at Vandenberg SFB based on the following assumptions:

Time of Day Operations

- Day 0700 - 1900: 98%
- Evening 1900 – 2200: 01%
- Night 2200 – 0700: 01%

Departures

- Fighter/Trainer aircraft – 100% Afterburner
- Other aircraft – 100% Military Power

Arrivals

- Fighter/Trainer aircraft – 50% Straight In / 50% Break Arrivals
- MQ-9 – 100% Break Arrivals
- Other aircraft – 100% Straight In

Closed pattern operations

- Fighter/Trainer– 60% Racetrack Touch & Go/Low Approach: 40% GCA Box
- MQ-9 – 100% Racetrack
- Bell-222 and GASEPF 50% Racetrack Touch & Go/Low Approach: 50% GCA Box
- Other aircraft – 60% Racetrack Touch & Go/Low Approach: 40% GCA Box

Table 3. Detailed Existing Conditions

Aircraft	Departure Day	Departure Evening	Departure Night	Total	Arrival Day	Arrival Evening	Arrival Night	Total	Closed Pattern Day	Closed Pattern Evening	Closed Pattern Night	Total Closed Pattern	Total Day	Total Evening	Total Night	TOTAL
C-130	111	1	1	113	111	1	1	113	1794	18	18	1830	2015	21	21	2057
C-5	35	0	0	35	35	0	0	35	207	2	2	211	278	3	3	284
C-17	41	0	0	41	41	0	0	41	207	2	2	211	289	3	3	295
T-38	63	1	1	65	63	1	1	65	255	3	3	261	380	4	4	388
F-16	12	0	0	12	12	0	0	12	47	0	0	47	71	1	1	73
F-35	6	0	0	6	6	0	0	6	24	0	0	24	35	0	0	35
F-22	6	0	0	6	6	0	0	6	24	0	0	24	35	0	0	35
F-18A/C	14	0	0	14	14	0	0	14	47	0	0	47	74	1	1	76
C-12	125	1	1	127	125	1	1	127	897	9	9	915	1148	12	12	1172
C-21	118	1	1	120	118	1	1	120	448	5	5	458	684	7	7	698
E-2 / C-2	12	0	0	12	12	0	0	12	207	2	2	211	230	2	2	234
B-737-500	16	0	0	16	16	0	0	16	69	1	1	71	100	1	1	102
KC-135R	24	0	0	24	24	0	0	24	129	1	1	131	176	2	2	180
P-3	7	0	0	7	7	0	0	7	78	1	1	80	91	1	1	93
Bell-222	28	0	0	28	28	0	0	28	204	2	2	208	261	3	3	267
GASEPF	76	1	1	78	76	1	1	78	652	7	7	666	805	8	8	821
H-60	37	0	0	37	37	0	0	37	0	0	0	0	74	1	1	76
MQ-9	78	1	1	80	78	1	1	80	314	3	3	320	470	5	5	480
Totals	809	6	6	821	809	6	6	821	5603	56	56	5715	7216	68	68	7356

Notes: 1) A single closed pattern is counted as two (2) operations; 2) Day 0700-1900, Evening 1900-2200, Night 2200-0700

Table 4 provides a projection of foreseeable changes expected to occur through implementation of the proposed F-15E and/or F-15EX detachment program, which would add 320 operations to result in a total of 7,686 annual operations at Vandenberg based on the following assumptions:

- F-15E and/or F-15EX units would complete two (2) detachments annually at Vandenberg SFB
- F-15E and/or F-15EX detachments would occur over a period of two-weeks for a total of 10 operating days per detachment
- F-15E and/or F-15EX would operate on a 4x2 schedule, for a total of eight (8) sorties daily
- Other aircraft operations expected to remain similar to existing activity

Table 4. Proposed Operations: FY2026

Aircraft	Departure Day	Departure Evening	Departure Night	Total	Arrival Day	Arrival Evening	Arrival Night	Total	Closed Pattern Day	Closed Pattern Evening	Closed Pattern Night	Total Closed Pattern	Total Day	Total Evening	Total Night	TOTAL
Existing Transients	809	6	6	821	809	6	6	821	5602	56	56	5714	7220	68	68	7356
F15E/F-15EX	158	1	1	160	158	1	1	160	0	0	0	0	316	1	1	320
Totals	967	7	7	981	967	7	7	981	5603	56	56	5715	7537	69	69	7676

Notes: 1) A single closed pattern is counted as two (2) operations; 2) Day 0700-1900, Evening 1900-2200, Night 2200-0700

2.0 RUNWAY AND FLIGHT UTILIZATION

Table 5 presents runway utilization obtained from a previous modeling effort, most recently the 2019 MQ-9 EIS at Vandenberg SFB. Unique runway use was available for each aircraft type but with minimal deviation between each, similar aircraft types were grouped for simplicity. Runway 30 handles the majority of traffic varying at approximately 91%. For the purpose of modeling proposed F-15E/EX detachment operations at Vandenberg SFB, the new aircraft are assumed to operate at the same runway utilization as existing transient fighters (e.g., F-18A/C, F-35A, etc.).

Similar to runway utilization, Table 6 provides flight track use for fixed-wing and rotary-wing aircraft based off the 2019 MQ-9 EIS at Vandenberg SFB. The proposed F-15E/EX flight track utilization is assumed the same as existing transient fighter (e.g., F-18A/C, F-35A, etc.) operations at Vandenberg SFB.

Table 5. Existing Runway Utilization

Operation Type	Runway	Fighter/Trainer	MQ-9	Refueler/Cargo/Heavy Other Fixed-Wing	Rotary-wing/Tilt-rotor
Departure	12	9%		9%	
	12A		9%		
	12H				9%
	30	91%		91%	
	30D		91%		
	30H				91%
Straight In Arrival	12	9%		9%	
	12A				
	12H				9%
	30	91%		91%	
	30D				
	30H				91%
Break Arrival	12	9%			
	12A		9%		
	12H				
	30	91%			
	30D		91%		
	30H				
T&G	12	10%	9%	9%	

Table 5. Existing Runway Utilization

Operation Type	Runway	Fighter/Trainer	MQ-9	Refueler/Cargo/Heavy Other Fixed-Wing	Rotary-wing/Tilt-rotor
	30	90%	91%	91%	
	30H				100%
GCA	12	8%		9%	
	30	92%		91%	
	30H				100%

Notes: 1) 12H and 30H represent the helipad on Taxiway A modeled at the same heading as Runway 12 and 30 configuration; 2) 30D is a displaced threshold modeled on Runway 30 starting at Taxiway D, 3) 12A represents the intersection of Runway 12 and Taxiway A for utilization by the MQ-9 aircraft.

Table 6. Existing Aircraft Flight Track Usage

Operation	Runway	Flight Track	Flight Track Name/Description	Fighter/ Trainer	MQ-9	Refueler/Cargo/ Heavy Other Fixed-Wing	Rotary Wing/ Tilt Rotor
Departure	12	12D1	Gaviota Three Departure - Full Rwy	100%		100%	
	30	30D1	Vandenberg Three Departure - Full Rwy	100%		100%	
	12A	12AD1	Gaviota Three Departure – Txy A Intersection		100%		
	12H	12HD3	Surf Departure				100%
	30D	30DD1_MQ9	MQ9 Departure		100%		
	30H	30HD2	Casmalia Departure				100%
Straight In Arrival	12	12A1	ILS to Rwy 12	100%		100%	
	12H	12HA1	San Antonio Arrival				100%
	30	30A1	ILS to Rwy 30	100%		100%	
	30H	30HA4	Prison Arrival				100%
Overhead Arrival	12	12A2-F22	Overhead Arrival to Rwy 12	100%			
	12A	12A2-MQ9	Overhead Arrival to Rwy 12	100%	100%		
	30	30A2	Overhead Arrival	88%			
		30A2-F22	Overhead Arrival	12%			
	30D	30A2-MQ9	Overhead Arrival to Rwy 30		100%		

Table 6. Existing Aircraft Flight Track Usage (continued)

Operation	Runway	Flight Track	Flight Track Name/Description	Fighter/ Trainer	MQ-9	Refueler/Cargo/ Heavy Other Fixed-Wing	Rotary Wing/ Tilt Rotor
Closed Pattern VFR	12	12C3NE	NE Rectangular VFR Pattern for Heavys			4%	
		12C3SW	SW Rectangular VFR Pattern for Heavys			6%	
		12C4NE	NE Racetrack Closed - Fighter	50%		2%	
		12C4SW	SW Racetrack Closed – Fighter	50%		2%	
		12C5NE	NE Racetrack Closed – Cargo			20%	
		12C5SW	SW Racetrack Closed – Cargo			20%	
		12C6NE	NE Rectangular VFR Pattern for Cargo			23%	
		12C6SW	SW Rectangular VFR Pattern for Cargo			23%	
		12EMQ9	MQ9 Pattern East		50%		
		12WMQ9	MQ9 Pattern West		50%		
	30	30C3NE	NE Rectangular VFR Pattern for Heavys			4%	
		30C3SW	SW Rectangular VFR Pattern for Heavys			4%	
		30C4NE	NE Racetrack Closed – Fighter	50%		2%	
		30C4SW	SW Racetrack Closed – Fighter	50%		2%	
		30C5NE	NE Racetrack Closed – Cargo			21%	
		30C5SW	SW Racetrack Closed – Cargo			21%	

Table 6. Existing Aircraft Flight Track Usage (continued)

Operation	Runway	Flight Track	Flight Track Name/Description	Fighter/ Trainer	MQ-9	Refueler/Cargo/ Heavy Other Fixed-Wing	Rotary Wing/ Tilt Rotor
		30C6NE	NE Rectangular VFR Pattern for Cargo			23%	
		30C6SW	SW Rectangular VFR Pattern for Cargo			23%	
		30EMQ9	MQ9 Pattern East		33%		
		30WMQ9	MQ9 Pattern West – crosswind before end of runway per bio restriction		33%		
		HELOSC1	Helo VFR Pattern				100%
Closed Pattern GCA	12	12C1	Radar Pattern to Rwy 12	100%			100%
	30	30C1	5 Mile Radar	50%		50%	
		30C2	4 Mile Radar	50%		50%	
		UHC1	Helicopter IFR				100%

3.0 FLIGHT TRACK FIGURES

The following figures depict flight tracks to be modeled for the airfield noise analysis. Refer to Section 2.0 for details on the usage rate by aircraft type.

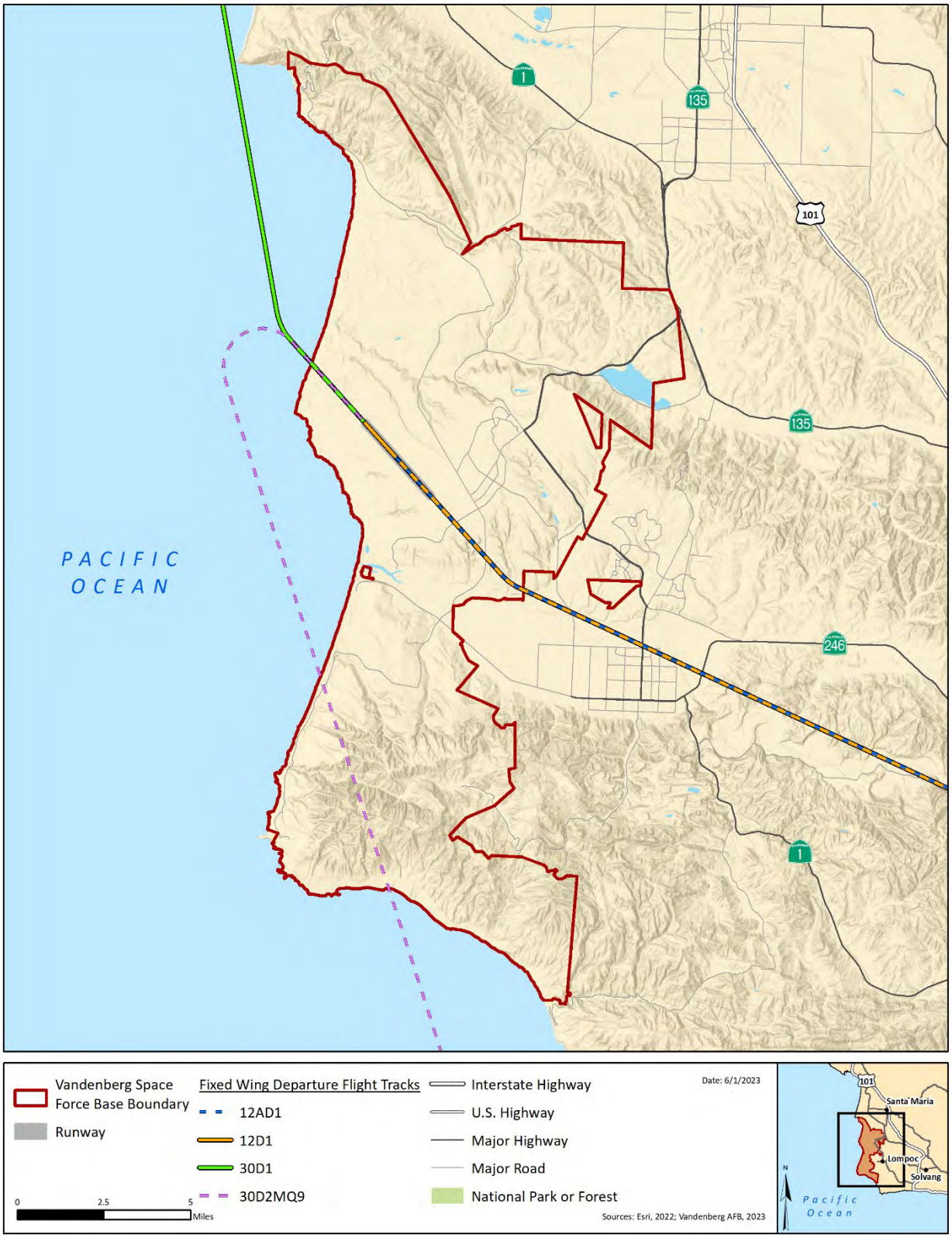

Figure 1 Fixed Wing Departure Flight Tracks

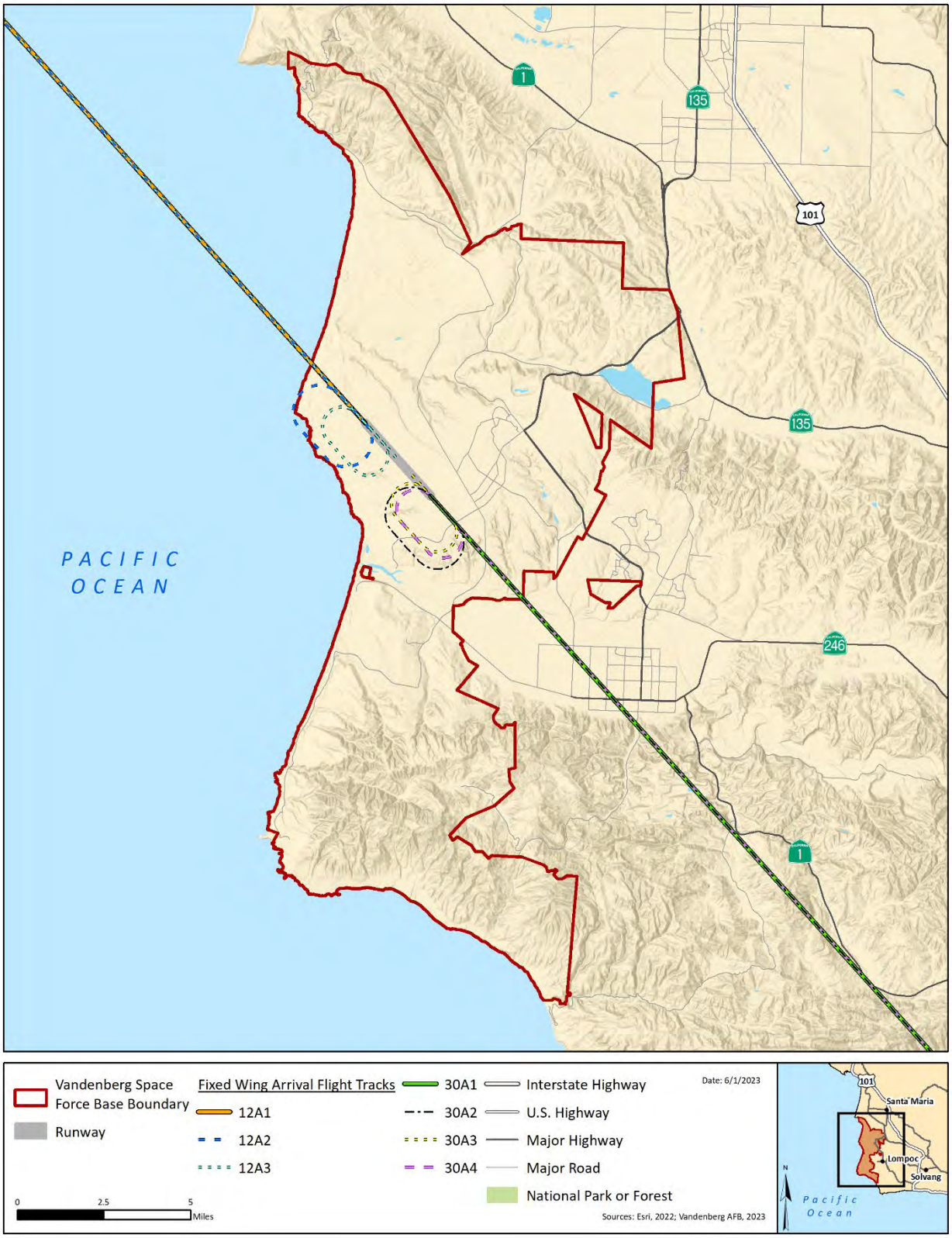

Figure 2 Fixed Wing Arrival Flight Tracks

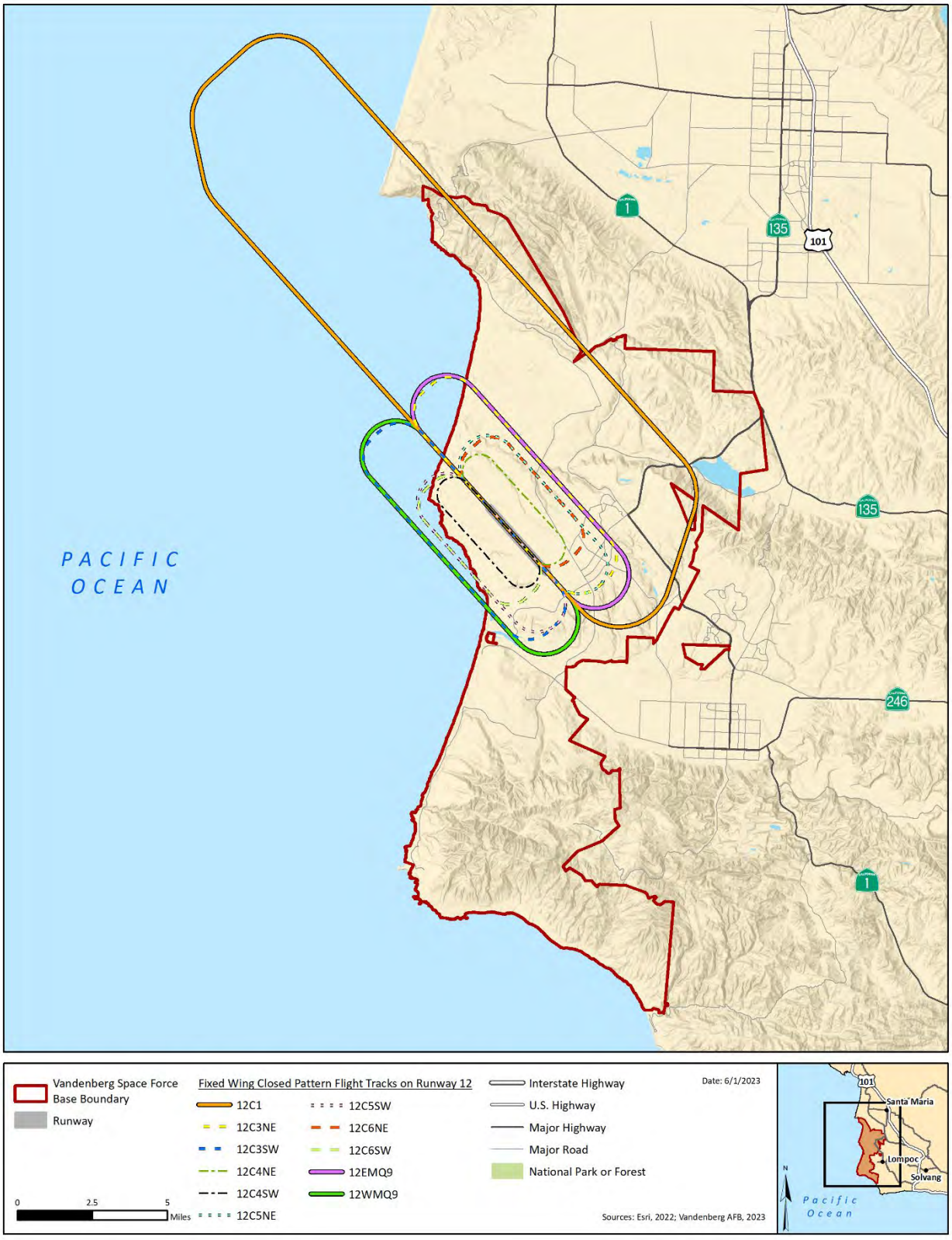

Figure 3 Fixed Wing Closed Pattern Flight Tracks on Runway 12

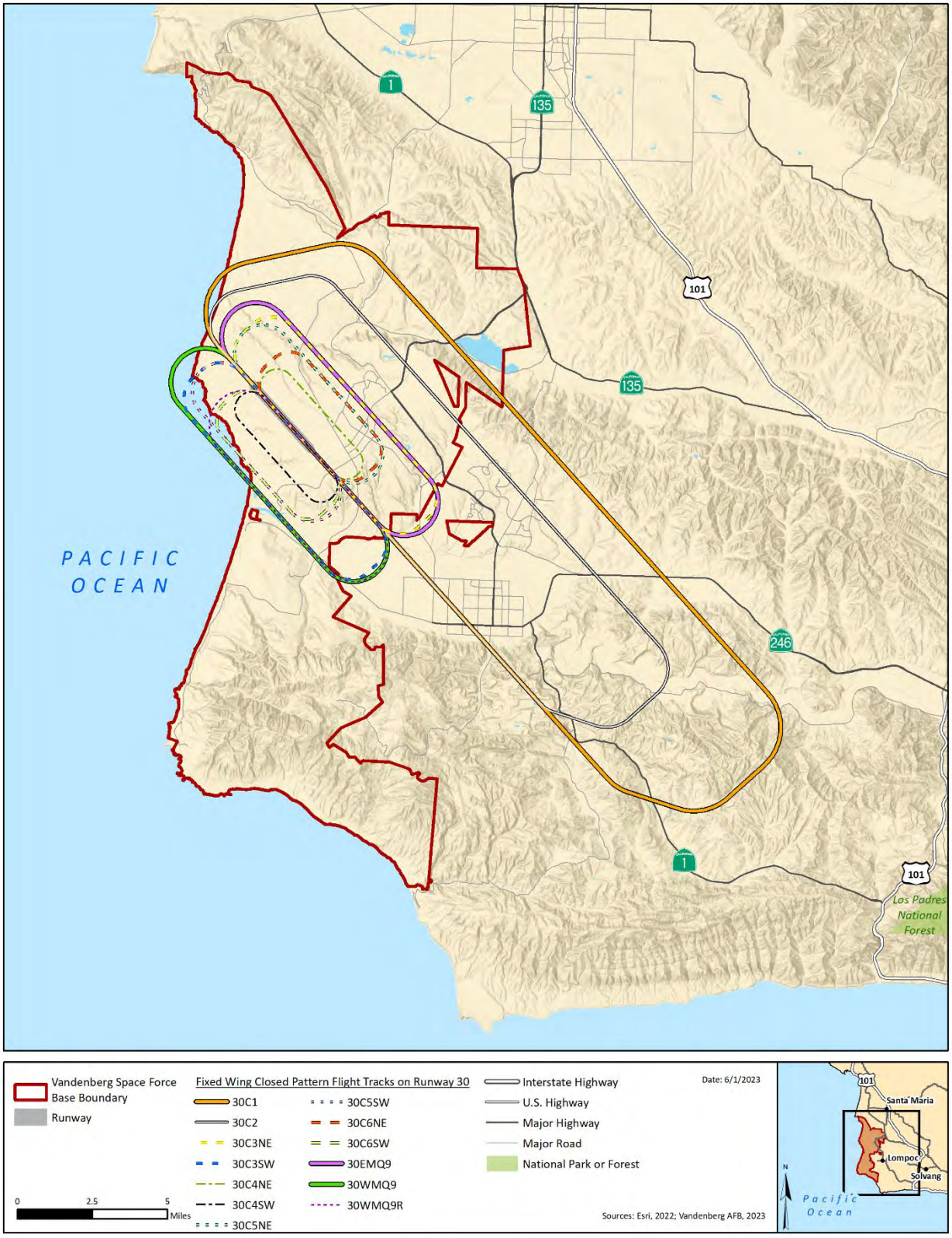

Figure 4 Fixed Wing Closed Pattern Flight Tracks on Runway 30

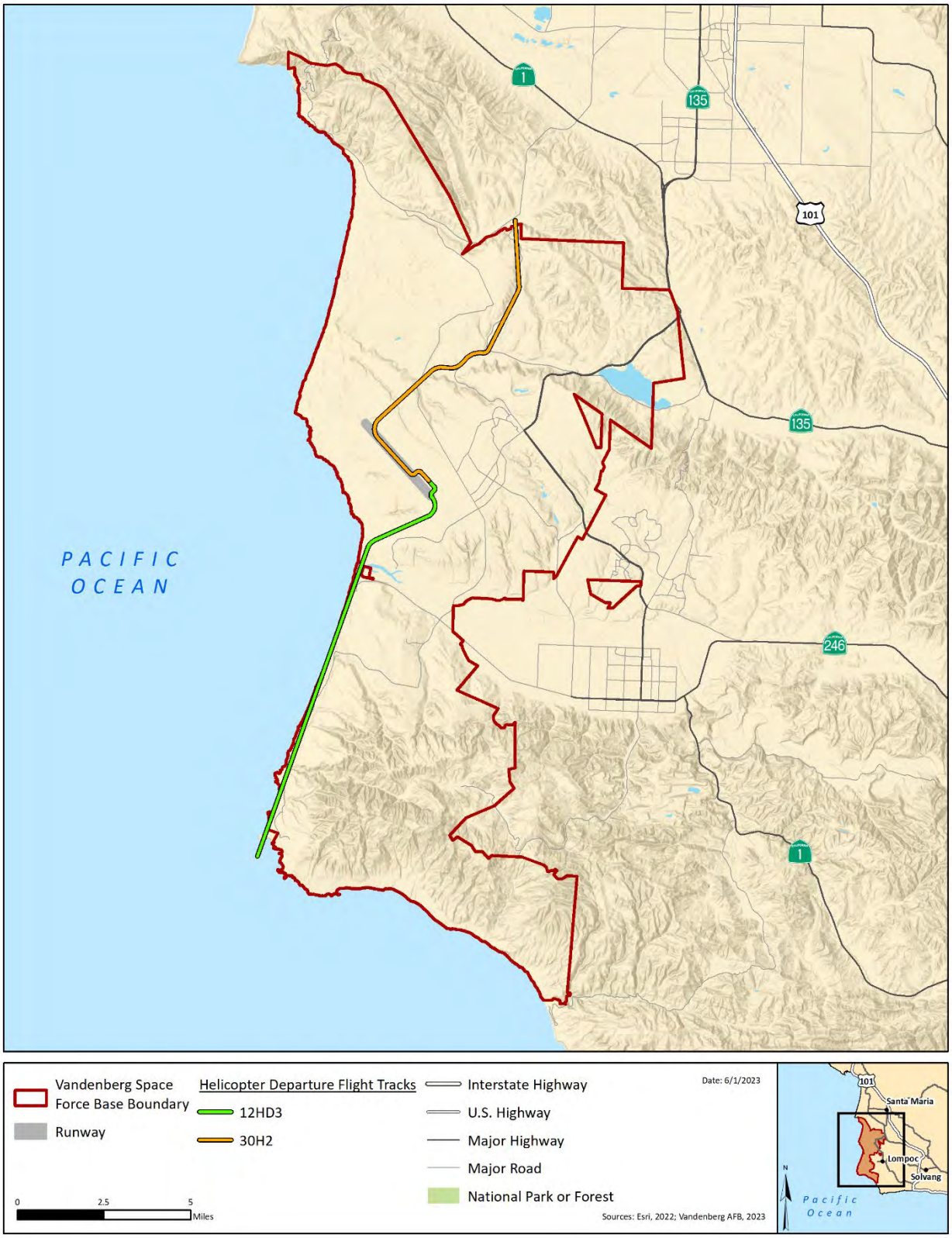

Figure 5 Helicopter Departure Flight Tracks

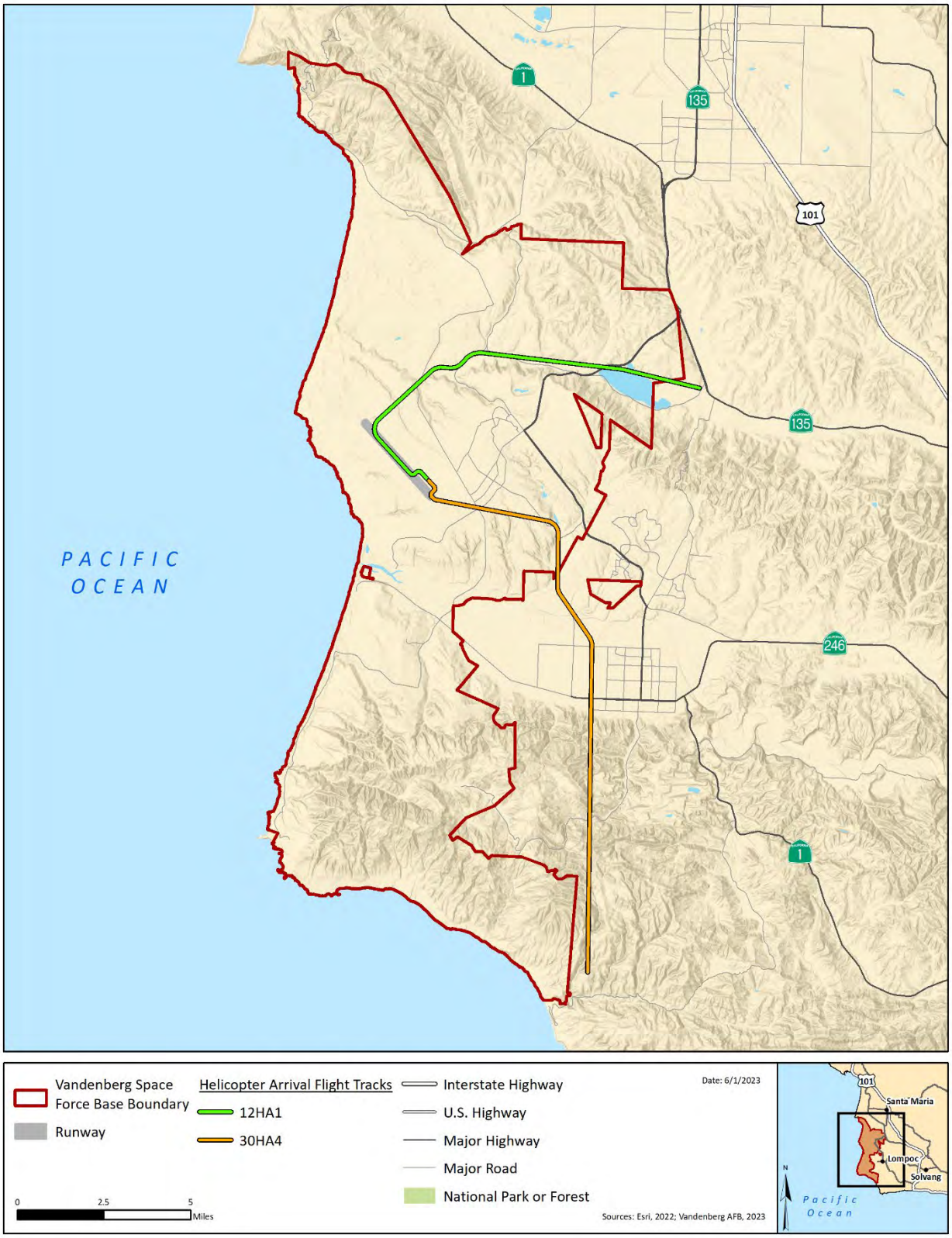

Figure 6 Helicopter Arrival Flight Tracks

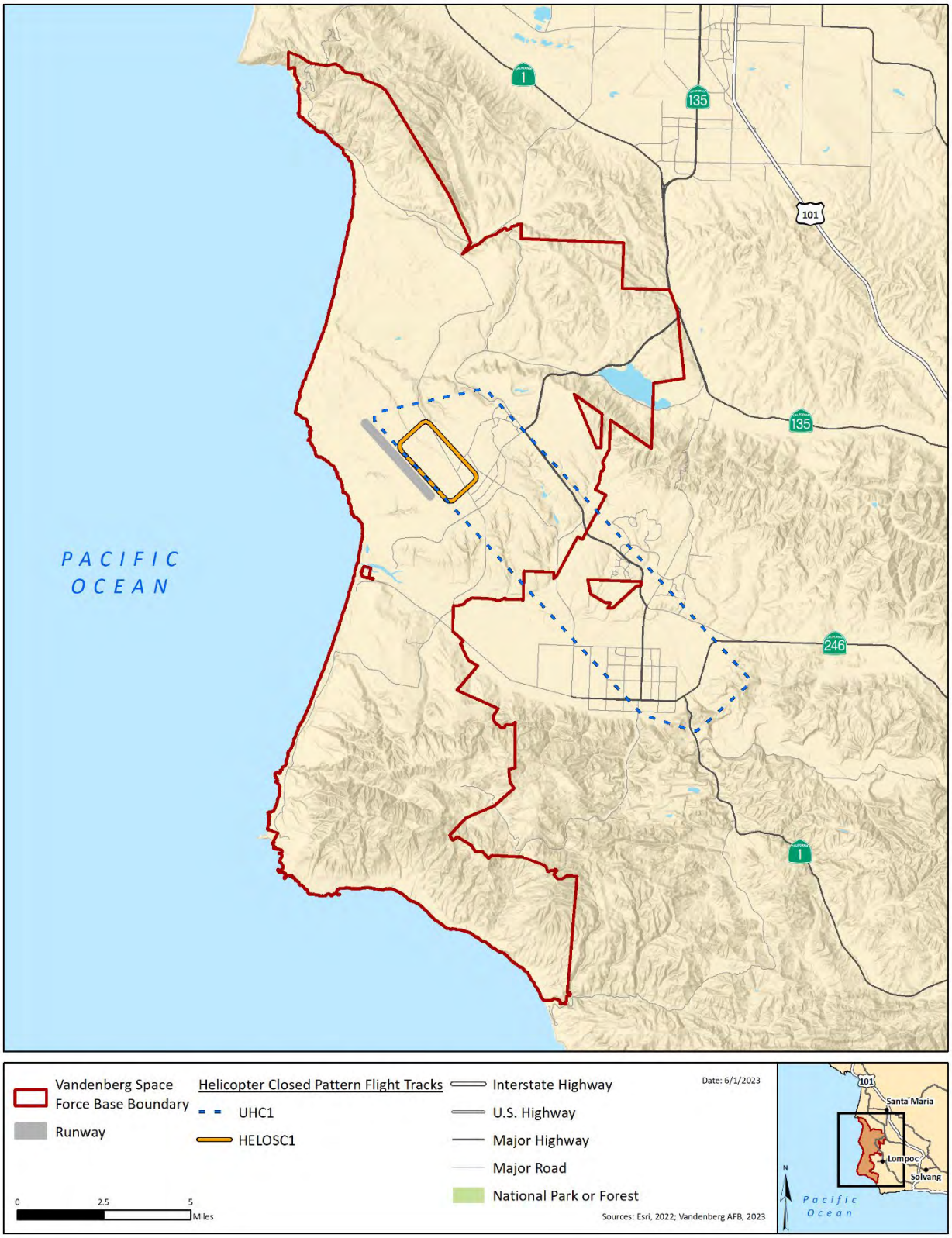

Figure 7 Helicopter Closed Pattern Flight Tracks

4.0 WEATHER DATA

Updated weather data has not yet been provided but Table 8 presents data used in previous 2019 MQ-9C EIS.

Table 8. Average Monthly Weather at Vandenberg SFB (2016-2019

Month	Temperature (F)	Humidity (%RH)	Pressure (in Hg)
January	53	66.5	29.9212
February	53	72.5	29.9212
March	54	72	29.9212
April	55	74.5	29.9212
May	56	78	29.9212
June	58	80	29.9212
July	60	80.5	29.9212
August	61	80.5	29.9212
September	62	73.5	29.9212
October	60	73	29.9212
November	57	68	29.9212
December	53	67	29.9212

APPENDIX E. FEDERAL CONSISTENCY DETERMINATION

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FEDERAL CONSISTENCY DETERMINATION
for
Periodic Operations of F-15E/EX Testing at Vandenberg Space Force Base, Santa Barbara County California

Prepared for

US Department of the Air Force
United States Space Force
Vandenberg Space Force Base
30th Civil Engineer Squadron

Prepared by

Environmental Assessment Services, LLC
350 Hills St, Suite 112
Richland, Washington 99354
(509) 375-4212

December 2024

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ACRONYMS AND ABBREVIATIONS

ACC	Air Combat Command
AGE	Aerospace ground equipment
AMSL	Above mean sea level
CCA	California Coastal Act of 1976
CCC	California Coastal Commission
CCMP	California Coastal Management Program
CZMA	Coastal Zone Management Act of 1972
DAF	Department of the Air Force
dB	Decibel
EA	Environmental Assessment
ESA	Endangered Species Act
LOA	Letter of authorization
LOLA	Live ordnance loading area
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Place
PBO	Programmatic biological opinion
PEM	palustrine emergent
QD	quantity-distance
SHPO	State Historic Preservation Officer
SLD 30	Space Launch Delta 30
USFWS	United States Fish and Wildlife Service
VSFB	Vandenberg Space Force Base

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1 INTRODUCTION

The Air Combat Command (ACC) of the United States Department of the Air Force (DAF) has submitted this Federal Coastal Consistency Determination (CD) for the California Coastal Commission's review. The Proposed Action would periodically operate F-15E or F-15EX aircraft at Vandenberg Space Force Base (VSFB), Santa Barbara County, California. The purpose of the Proposed Action is to provide a suitable location for testing of and training for a homeland defense mission with the F-15E and F-15EX fighter jets that can be performed with minimal conflict with other ongoing DAF operations. The Proposed Action is needed to test homeland defense systems and to train DAF personnel.

1.1 AUTHORITY

The DAF is submitting the CD in compliance with the NOAA Federal Consistency Regulations (15 Code of Federal Regulations [CFR] Part 930). The DAF prepared this CD per Section 307(c)(1)(A) of the *Coastal Zone Management Act*, as amended (16 USC 1456(c)(1)(A)) CZMA; 15 CFR Part 930; and the federally approved California Coastal Management Plan (CCMP) pursuant to the California Coastal Act (CCA) (California Public Resources Code, Division 20).

1.2 DETERMINATION

The Proposed Action would be located on VSFB that is owned by the United States under the administrative control and management of the Department of the Air Force (DAF). Although the CZMA excludes federal lands from the definition of coastal zone, actions that may affect the coastal zone off federal lands, are to be consistent, or if not consistent, then to the maximum extent practicable with the enforceable policies[1] of the CCMP. The DAF has designed activities under the Proposed Action to minimize and/or offset potential effects to coastal uses and/or resources to comply with the enforceable policies of the CCMP. Based on review of the Proposed Action's compliance with the CZMA, the DAF has determined that the Proposed Action is consistent with the CCMP, pursuant to the requirements of the CZMA.

1.3 AGENCY CONSULTATIONS

The DAF consulted with the California State Historic Preservation Officer (SHPO) under Section 106 of the *National Historic Preservation Act of 1966*, as amended (54 USC § 300101 et seq.) (NHPA) and its implementing regulations at 36 CFR Part 800 regarding potential effects of the Proposed Action on historic properties. Based on an evaluation of known archaeological sites, the DAF determined that none of the sites in proximity to proposed project areas meets the eligibility requirements of the National Register of Historic Places (NRHP). Upon review of the DAF determination, the SHPO concurred with the DAF finding of no historic properties affected (refer to "Archaeological or Paleontological Resources" in Section 3.3.2).

The DAF has prepared and submitted an informal consultation to the US Fish and Wildlife Service (USFWS) for a *may affect, not likely to adversely affect* determination for the federally listed threatened California red-legged frog and a *no effect* determination for other federally listed species. This consultation was submitted on 13 December 2024. The DAF expects to receive concurrence on this determination from the USFWS within 30 days of the submittal (see **Section 3.3.2**).

1.4 ORGANIZATION OF THE CONSISTENCY DETERMINATION

Section 2 of this CD describes the ACC's Proposed Action. Section 3 presents an analysis of the Proposed Action with respect to the enforceable policies in Chapter 3 of the *California Coastal Act* (CCA). Section 4 provides a summary of the consistency determination based on the analysis in Section 3. Section 5 lists the cited references used in preparing this determination. The Proposed Action is being evaluated in an Environmental Assessment (EA) prepared in accordance with *National Environmental Policy Act of 1969*, as amended (42 USC § 4321 et seq.) (NEPA), and the Council on Environmental Quality NEPA regulations (40 CFR Parts 1500–1508). Space Launch Delta 30 (SLD 30) at VSFB is responsible for complying with NEPA. The ACC and SLD 30 operate under the DAF; therefore, the Proposed Action would be implemented under DAF regulations at 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*.

[1] DAF is using the term "enforceable policies" within the meaning contemplated in 15 CFR 930.36. DAF does not concede that all aspects of California's coastal program are enforceable against the federal government.

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2 DESCRIPTION OF THE PROPOSED ACTION

DAF Headquarters ACC, Langley Air Force Base, Virginia, proposes to periodically operate F-15E and/or F-15EX fighter jets at VSFB, California. As defined in Section 304 of the CZMA, the term "coastal zone" does not include "lands the use of which is by law subject solely to the discretion of or which is held in trust by the Federal Government." VSFB is owned by the United States and controlled and operated by the DAF and, therefore, is excluded from the coastal zone. The periodic operations would include a temporary deployment of up to 12 F-15E or F-15EX aircraft with test and training operations of approximately 1 week in duration occurring a maximum of two times per year. The periodic operations require munitions storage and permanent change of station for up to 35 individuals on VSFB. These personnel would be integrated into the existing VSFB infrastructure and would support a homeland defense mission, including flight operations and maintenance of the infrastructure developed as part of the Proposed Action. The purpose of the Proposed Action is to provide a suitable location for testing of and training for a homeland defense mission with the F-15E and F-15EX fighter jets that can be performed with minimal conflict with other ongoing DAF operations. The Proposed Action is needed to test homeland defense systems and to train DAF personnel.

2.1 FLIGHT OPERATIONS

The F-15 aircraft would operate for approximately two 1-week deployments. During the first year of the Proposed Action, approximately 176 sorties (one take-off and landing) would be flown annually over the course of two 1-week deployments; approximately 12–13 sorties per day each week. In subsequent years, approximately 88 sorties would be flown annually over the course of one 1-week deployment; approximately 12–13 sorties per day. While at VSFB, the F-15 aircraft would perform both ground and flight tests and training events. Up to 250 Air Force personnel would deploy to VSFB to support each deployment.

The operational and training flights would potentially use special use airspace and would be flown over the Pacific Ocean, over both state and federal waters, at altitudes from 10,000 to 50,000 feet above mean sea level (AMSL). Each sortie would be approximately 1.5 hours in duration. The estimated total overwater flight time during the first year of the Proposed Action would be approximately 264 hours (176 sorties times 1.5 hours) or 132 hours per each of the two 1-week deployments. In subsequent years, the total flight time would be about 132 hours during the 1-week deployment. No sonic booms would be generated by operating aircraft, and flight elevation at the coastline on take-off and landing would be no lower than 1,900 feet above ground level. Some night operations may occur, with up to 50 percent of the sorties potentially being flown at night (night operations refers to flights after sunset and before sunrise). The time of night operations could vary based on the month.

2.2 FACILITY CONSTRUCTION

Several facilities would be constructed on VSFB to support the flight operations (**Table 1**). The ramp space on the VSFB airfield would be configured with new paint markings and aircraft tie-downs to define parking spaces for the 12 F-15 aircraft. The existing tie-downs would be removed. A small cement or paved pad (approximately 1,000 to 1,500 square feet) adjacent to the aircraft parking area may be constructed to temporarily store aerospace ground equipment (AGE) during flight operations. The construction activities described under this section are confined to VSFB property. Therefore, DAF has also concluded that there will be no reasonably foreseeable effects on off-Base coastal uses or resources in the coastal zone from these construction projects. Regardless, Section 3 describes how the DAF is managing the ecological resources that might be affected in the project areas on VSFB.

2.2.1 AGE STORAGE/ADMINISTRATION BUILDING

A new permanent AGE storage/administration building, 75 feet by 125 feet (9,375 ft^2), would be constructed on VSFB and include storage space for AGE, administrative space (offices and conference room), and support spaces (restrooms; janitor's room; and communications, electrical, and mechanical room) to support the F-15 operations. The building would consist of a pre-engineered metal structure with insulated panels and a metal roof. Water, communications, and electrical lines would be connected to existing, nearby utilities. Two alternative locations are being considered within the existing airfield on previously disturbed land (**Figure 1**; Project 2a and Project 2b).

Table 1. On Base Construction Project Descriptions

Project #	Project	Project Description	New Impervious Surface (ft^2)
1	F-15 ramp space and tie-downs/grounding points and temporary aerospace ground equipment (AGE) storage pad	Demolish existing and install new ramp tie-downs/grounding points and mark F-15 parking space with new lines. Construct small (approximately 1,500 ft^2) AGE pad for use during flight operations.	1,500
2a	AGE storage/administration building – Hangar Building Alternative	Construct a new AGE storage/administration building to support F-15 operations southeast of the drive-through Hangar Building including a new all-weather access road from Airfield Road and from the AGE building to the F-15 ramp space with tie-in to the temporary AGE storage pad.	4,000
2b	AGE storage /administration building – Building 1754 Alternative	Demolish Building 1754 and replace with new AGE storage/administration building to support F-15 operations.	0
3	Aircraft arresting system	Install an aircraft arresting system on each end of the runway.	4,000
4	Live ordnance loading area (LOLA)	Construct new entry/exit ramps and apron to use as a LOLA with a capacity of four F-15 aircraft.	292,000
5	Complex of four earth-covered munitions storage igloos – Flightline Alternative	Construct four earth-covered 7-bar Navy Containerized Long Weapons Storage Magazine structures northeast of the flightline with an access road to the airfield and upgrade a gravel access road to a paved road for delivery of munitions and emergency access. Connect igloos to electrical and communications utilities.	251,576
6	Single earth-covered munitions storage igloo and access road	Construct a single earth-covered 7-bar Navy Containerized Long Weapons Storage Magazine structure near Building 980.	19,994

AGE = aerospace ground equipment; ft^2 = square feet; LOLA = live ordnance loading area.

2.2.2 AIRCRAFT ARRESTING SYSTEM

An aircraft arresting system would be installed in previously disturbed areas on VSFB on each end of the VSFB runway as an emergency landing system (**Figure 1**; Project 3). The aircraft arresting system contains several components, including catch tape, Fairlead Beam Assembly, foundation, and an energy absorber system. The catch tape stretches across the runway and is connected to the Fairlead Beam Assembly, which guides the tape from the tape reel and is located about 10 feet from the edge of the runway. The assembly is anchored to a 4.5-foot-deep foundation approximately 17 feet long by 10 feet wide. A rotary friction energy absorber (e.g., BAK-12) with an engine for recoiling the cable if the system is deployed would be located 275 feet from the center of the runway. Generator engines would be enclosed with internal fuel tanks and would not require utility lines.

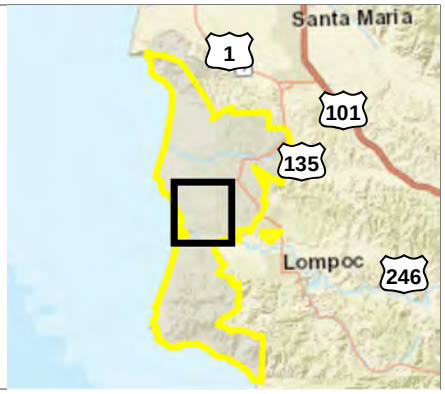
FIGURE 1
Project Locations (Project Descriptions in Table 1)

Installation Boundary

N

0 ½ Miles

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N



2.2.3 LIVE ORDNANCE LOADING AREA

A new LOLA would be constructed on the northeast side of the airfield on VSFB along the existing taxiway (**Figure 1**; Project 4). The LOLA would include a new apron with shoulders and entry/exit ramps on which the F-15 aircraft would be parked and loaded with weapons and ordnance. The entry/exit ramps to the LOLA would be built over an existing drainage channel along the taxiway using culverts; the apron would be constructed between the drainage channel and the existing airfield fence. The length of the LOLA from the centerline of the entry/exit ramps would be approximately 1,500 feet and would provide parking for four F-15 aircraft with a minimum spacing of 200 feet between aircraft. New taxiway and parking stall paintings and ground lighting would be installed on the new apron and ramps. Electrical power would be acquired from an existing 5,000-volt ring located near the taxiway.

2.2.4 EARTH-COVERED MUNITIONS STORAGE IGLOOS

The Proposed Action would include the construction of four earth-covered munitions storage igloos (**Figure 1**; Project 5) and a single storage igloo (Project 6). The munitions storage igloos would be a 7-bar Navy Containerized Long Weapons Storage Magazine design, each measuring approximately 40 feet wide by 123 feet deep (4,760 ft^2) and approximately 27 feet high. The headwall of each igloo would be about 158 feet wide with a door opening of 32 feet and a minimum of 14 feet high. The igloos would be constructed of reinforced concrete with an earth layer covering the roof and sides and would be blast and corrosion resistant.

The four munitions storage igloos would be located northeast of the flightline on VSFB. Multiple alternative locations were evaluated; the location near the airfield was the only site that met the criteria for the homeland defense mission (i.e., capability to load four F-15 aircraft with munitions in 2 hours or less). An existing gravel access road for delivering munitions to the igloos for storage would be upgraded to a paved road. Two alternative access roads from the munitions storage igloos to the airfield are being considered. Both alternatives would cross a short segment of wetland habitat. Approximately 0.02–0.09 acre of non-jurisdictional wetland would be affected only within VSFB property. Communications and electrical lines to the igloos would be installed along access roads. Approximately 3.4–3.8 acres of Burton Mesa Chaparral (*Arctostaphylos* [*Purisima, rudis*] Shrubland Special Stands) vegetation would be cleared for the construction of the four storage igloos depending on which access route is selected.

A single munitions storage igloo would be constructed near Building 980 to support testing and training (**Figure 1**; Project 6). An existing, deteriorated paved road would be upgraded to provide access. Communications and electrical lines would be installed along the access roads from near Building 980. Approximately 1 acre of coastal sage shrub vegetation would be cleared for the construction of the single storage igloo. The location of the single munitions storage igloo was determined to be the only reasonable alternative. The site is located on the north end of the South Base, adjacent to where testing and training activities would occur. Any location on the North Base would require transportation of munitions on public roads for over 7 miles. Locations south of Building 980 are used to support the space launch mission and potentially would create land use conflicts because of required explosives safety distances. The proposed location was selected by accounting for the explosives safety distance setbacks from inhabited buildings and public transportation routes. The selected location also minimizes transportation distance.

3 CONSISTENCY ANALYSIS

For a consistency analysis, the project proponent determines whether the Proposed Action is consistent with the federal agency activity requirements of CZMA Section 307 (16 USC § 1456(c)(1)(A)) and its implementing regulations for federal consistency determinations (15 CFR Part 930). As defined in Section 304 of the CZMA, the term "coastal zone" does not include "lands the use of which is by law subject solely to the discretion of or which is held in trust by the Federal Government." However, since the proposed activities may have a potential to affect the land, water, or natural resource of a coastal zone off such federal property, in accordance with Department of Air Force Manual (DAFMAN) 32-7003, *Environmental Conservation*, Section 3.26.2, *Federal Consistency Determination,* the DAF undertakes federal actions in a manner consistent, or if not consistent then consistent to the maximum extent practicable with the enforceable policies of the approved CCMP through the federal consistency process under the CZMA.

The DAF analyzed the effects of the Proposed Action by looking at reasonably foreseeable direct and indirect effects on any coastal use or resource, and by reviewing relevant management program enforceable policies (15 CFR § 930.33(a)(1)) of the CCMP relevant to this Proposed Action. The DAF determined the potentially enforceable policies include the following: Article 4, *Marine Environment*, Sections 30230 and 30231; Article 5, *Land Resources,* Sections 30240 and 30244. No other polices of the CCMP are relevant or applicable to this federal agency action.

The Proposed Action at VSFB could potentially affect coastal resources from noise associated with aircraft and construction activities. Potential effects to the marine environment and land resources include:

- Noise – Periodic operation of F-15E/EX aircraft would produce noise levels consistent with existing aircraft that use VSFB for training, flight testing, delivery of rocket and missile components, and emergency landings that may have the potential to impact marine mammals.
- Construction Activities – Periodic operation of F-15E/EX aircraft may affect, but is not likely to adversely affect the federally listed threatened California red-legged frog. Surveys for federally listed threatened and endangered species within project sites found no suitable California red-legged frog breeding habitat. There would be no effect to any other threatened or endangered species in project areas.

3.1 ENFORCEABLE POLICIES OF THE CALIFORNIA COASTAL MANAGEMENT PROGRAM

The DAF reviewed the CCMP to identify the potentially enforceable policies relevant to the Proposed Action according to Division 20 of the California Public Resources Code, approved as part of the coastal program and analyzed them under Section 3.3. Section 3.2 of this determination identifies the CCMP policies that are not applicable to the Proposed Action.

3.2 ENFORCEABLE POLICIES NOT RELEVANT TO THE PROPOSED ACTION

Table 2 summarizes the CCMP policies that are not applicable to the Proposed Action.

Table 2. Enforceable Policies of the CCMP Not Relevant to the Proposed Action

Article	Section	State Enforceable Policy	Explanation of Non-Applicability
Article 2: Public Access	30211	Development not to interfere with access	The Proposed Action does not include any construction or ground disturbance that would block the public's right of access to the sea.
	30212	New development projects	The Proposed Action does not include any new development that would block or impede public access.
	30212.5	Public facilities; distribution	The Proposed Action does not include any public facilities.

Article	Section	State Enforceable Policy	Explanation of Non-Applicability
	30213	Lower cost visitor and recreational facilities; encouragement and provision; overnight room rentals	The Proposed Action does not include any visitor or recreational facilities.
	30214	Implementation of public access policies; legislative intent	This section explains the legislative intent applicable to the foregoing public access policies and does not constitute a separate public access policy.
Article 3: Recreation	30220	Protection of certain water-oriented activities	The Proposed Action does not affect any water-oriented activities.
	30221	Oceanfront land; protection for recreational use and development	The Proposed Action does not include any development of oceanfront land that would reduce available areas for public use.
	30222	Private lands; priority of development purposes	The Proposed Action does not include any development of private lands within the Action Area.
	30222.5	Oceanfront lands; aquaculture facilities; priority	The Proposed Action does not affect coastal zone lands suitable for aquaculture.
	30223	Upland areas	The Proposed Action does not affect the availability of upland areas necessary to support coastal recreational uses.
	30224	Recreational boating use; encouragement; facilities	The Proposed Action does not include the development of any recreational boating facilities.
Article 4: Marine Environment	30232	Oil and hazardous substance spills	The Proposed Action does not include the transportation of or development for crude oil, gas, or petroleum products in the marine environment.
	30233	Diking, filling, or dredging; continued movement of sediment and nutrients	The Proposed Action does not include diking, filling, dredging, or the continued movement of sediments.
	30234	Commercial fishing and recreation boating facilities	The Proposed Action does not affect any commercial fishing and recreational boating industries or facilities.
	30235	Construction altering natural shoreline	The Proposed Action does not include construction or ground disturbance that would alter natural shorelines processes.
	30236	Water supply and flood control	The Proposed Action does not include any channelization, dams, or other substantial alterations of rivers or streams.
	30237	Repealed	Not applicable
Article 5: Land Resources	30241	Prime agricultural land; maintenance in agricultural production	The Proposed Action does not include any prime agricultural lands.
	30241.5	Agricultural lands; determination of viability of uses; economic feasibility evaluation	The Proposed Action does not include any agricultural lands.
	30242	Lands suitable for agricultural use; conversion	The Proposed Action does not include any agricultural lands.

Article	Section	State Enforceable Policy	Explanation of Non-Applicability
	30243	Productivity of soils and timberlands; conversion	The Proposed Action does not include any timberlands.
Article 6: Development	30250	Development location; existing developed areas	This policy only applies to actions that require permitting, which cannot be enforced against the DAF.
	30251	Scenic and visual qualities	The Proposed Action does not include any new permanent development that would affect public scenic or visual qualities within the coastal zone.
	30252	Maintenance and enhancement of public areas	The Proposed Action does not include any new development that would require maintenance or enhanced public access to the coast.
	30253	Minimization of adverse impacts	The Proposed Action does not include any development within the coastal zone.
	30254	Public works facilities	The Proposed Action does not include any new or expanded public works facilities.
	30254.5	Terms or conditions on sewage treatment plant development; prohibition	The Proposed Action does not include the development of a sewage treatment plant.
	30255	Priority of coastal-dependent developments	The Proposed Action does not include any development within the coastal zone.
Article 7: Industrial Development	30260	Location or expansion	The Proposed Action does not include the development of coastal-dependent industrial facilities.
	30261	Tanker facilities; use and design	The Proposed Action does not include the use of existing or new tanker facilities.
	30262	Oil and gas development	The Proposed Action does not include any oil and gas development.
	30263	Refineries or petrochemical facilities	The Proposed Action does not include new or expanded refineries or petrochemical facilities.
	30264	Thermal electric generating plants	The Proposed Action does not include new or expanded thermal electric generating plants.
	30265	Legislative findings and declarations; offshore oil transport	This section explains the legislative findings applicable to offshore oil transportation and does not constitute a separate public access policy.
	30265.5	Governor or designee; co-ordination of activities concerning offshore oil transport and refining; duties	The Proposed Action does not include activities concerning offshore oil transport and refining.
Article 8: Sea Level Rise	30270	Sea level rise	The Proposed Action does not include activities at risk of sea level rise.

3.3 ENFORCEABLE POLICES RELEVANT TO THE PROPOSED ACTION

The CCMP potentially enforceable policies that may apply to the Proposed Action are those in which one or more of the Proposed Action components may affect a coastal zone resource or use outside the boundary of VSFB property. **Table 3** summarizes these CCMP policies.

Table 3. Enforceable Policies of the CCMP Relevant to the Proposed Action

Article	Section	State Enforceable Policy
Article 4: Marine Environment	30230	Marine resources; maintenance
	30231	Biological productivity; water quality
Article 5: Land Resources	30240	Environmentally sensitive habitat areas; adjacent developments
	30244	Archaeological or paleontological resources

3.3.1 ARTICLE 4: MARINE ENVIRONMENT

Policies

CCA Section 30230 – "Marine Resources; maintenance" states:

> *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

CCA Section 30231 – "Biological productivity: water quality" states

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

Consistency Review

The proposed periodic operation of F-15 aircraft at VSFB would be a transient use, with operations occurring only 1 to 2 weeks per year. The potential noise effects of the Proposed Action have been evaluated. The unweighted 100-decibel (dB) sound level contour would be mostly confined to VSFB but would extend beyond the Pacific Ocean shoreline near Purisima Point (**Figure 2**). The periodic operation of F-15E/EX aircraft would produce noise levels consistent with existing aircraft that use VSFB for training, flight testing, delivery of rocket and missile components, and emergency landings. Aircraft using VSFB already include the following: A-10, F-15, F-18, F-35, B-52, C-130, C-5, C-17, AN-124, KC-135, and KC-10. The Proposed Action would not change existing sound levels in the coastal zone outside of VSFB. The F-15 operations would not create sonic booms.

The National Marine Fisheries Services issued a renewal Letter of Authorization (LOA) (dated 10 April 2024) to SLD 30 for the incidental take of marine mammals related to ongoing missile and rocket launches and aircraft operations at VSFB (**Appendix A**). The LOA includes the proposed periodic operation of F-15E/EX aircraft (i.e., the Proposed Action). The authorized incidental take is only for Level B harassment and limited to the following species: Pacific harbor seals (*Phoca vitulina richardsi*), California sea lions (*Zalophus californianus*), northern elephant seals (*Mirounga angustirostris*), northern fur seals (*Callorhinus*

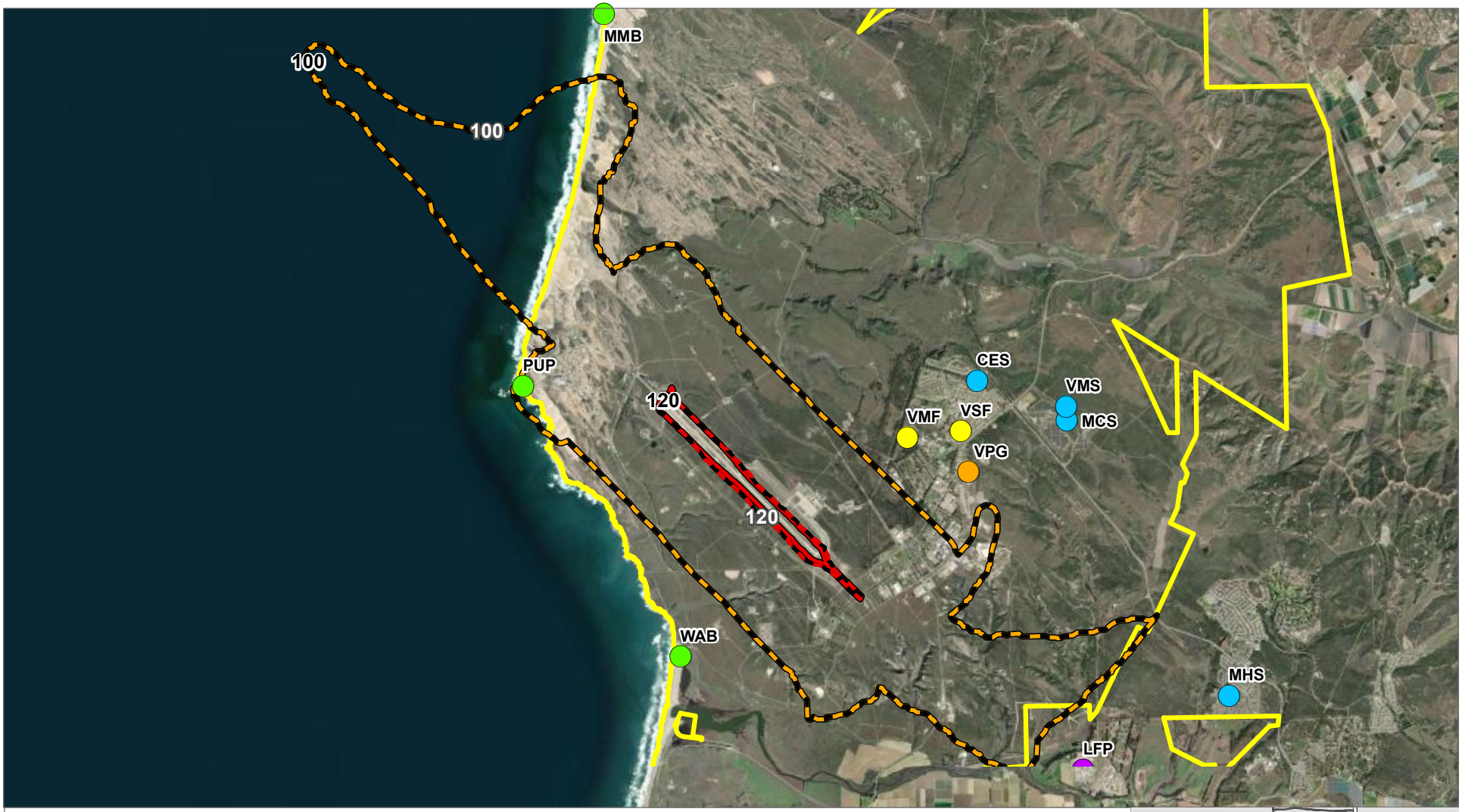


FIGURE 2

Baseline/Existing and Proposed Sound Pressure Level Contours and Noise Points of Interests

Installation Boundary

Points of Interest
- Biological
- Public Assembly
- Residential Area
- School
- Services

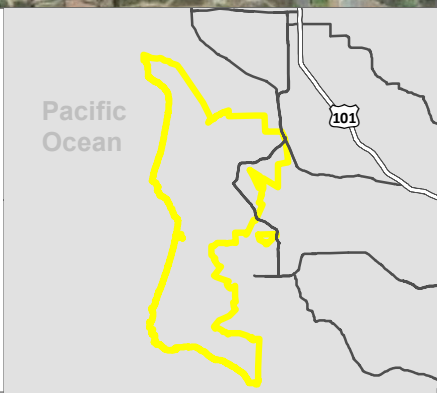
Baseline/Existing Sound Pressure Level Contours
- 100 dB
- 120 dB

Proposed Sound Pressure Level Contours
- 100 dB
- 120 dB

N

0 1 Miles

Imagery: ESRI, 2021.
Coordinate System: WGS 1984 UTM Zone 10N



ursinus), Guadalupe fur seals (*Arctocephalus philippii townsendi*), and Steller sea lions (*Eumetopias jubatus*). Level B harassment refers to acts that have the potential to disturb (but not injure) a marine mammal or marine mammal stock in the wild by disrupting behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering. Upon take-off and landing, VSFB aircraft maintain a minimum elevation of 1,900 feet above ground level when crossing the coastline near Purisima Point to minimize disturbance to marine mammals hauled out on shore or California sea lions rafting (i.e., floating and resting as a group) in the near-shore environment. As per the LOA, aircraft are required to maintain a 1,000 foot "bubble" around other pinniped haul-out areas (e.g., Point Sal/Lion Rock and Point Pedernales) except in emergency circumstances such as search and rescue. A small, resident breeding colony of the federally listed threatened southern sea otters has inhabited the kelp beds near Purisima Point since 1991 (VSFB, 2021). Another population of southern sea otters occurs off the coastline near Sudden Flats on south VSFB and is the predominant population near the Installation. VSFB has completed Section 7 consultation with the USFWS for VSFB activities and maintains a PBO (USFWS 2015) that includes potential effects to the southern sea otter. The elevational flight restrictions in the PBO prevents disturbance of the southern sea otter. No impacts to marine mammals from aircraft noise created by the Proposed Action are expected under these existing flight restrictions. The F-15 aircraft would train in airspace off the coast of California and over the Pacific Ocean at altitudes of 10,000 to 50,000 feet AMSL. Therefore, the Proposed Action would have no effect on marine mammals in the vicinity of the Channel Islands. Under the terms of the LOA and the PBO, SLD 30 will continue to implement the avoidance and minimization measures and conduct marine mammal surveys.

The Proposed Action construction sites are on land within the boundaries of VSFB. All sites are 1.75 miles or farther from the Pacific Ocean except for one munitions storage igloo (Project 6) near Building 980, which is about 0.5 mile from the ocean but located on an upland site (see **Figure 1**). Distance from marine resources and implementation of environmental protective measures would prevent any potential effects of facility construction or operations on the marine environment in the coastal zone adjacent to VSFB. The temporarily flooded wetlands that would be crossed by an access road near the four munitions storage igloos are isolated freshwater areas that have no direct connection to the marine environment or waters of the US and would have no impact on water quality and biological productivity of the marine environment.

Conclusion

With the implementation of minimization and avoidance measures, the DAF has determined that the Proposed Action is consistent with Sections 30230 and 30231 of the CCA.

3.3.2 ARTICLE 5: LAND RESOURCES

Policies

CCA Section 30240 – "Environmentally sensitive habitat areas; adjacent developments" states

> *(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*
>
> *(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas and shall be compatible with the continuance of those habitat and recreation areas.*

CCA Section 30244 – "Archaeological or paleontological resources" states:

> *Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.*

It is the position of the DAF that the environmentally sensitive habitat area policy, in particular Section 30240(a) of the CCA, is not applicable to the activities impacting VSFB, as the periodic operation of F-15E/EX, the Proposed Action, would be sited on federal property except for the sorties off-base flight

time. While the CZMA allows the CCC to review federal agency activities and actions that occur within or outside of California's coastal zone that affect any land or water use or natural resource of the coastal zone, Section 304 of the CZMA defines coastal zone to exclude "lands the use of which is by law subject solely to the discretion of or which is held in trust by the Federal Government, its officers or agents."

Although no environmentally sensitive habitat areas exist on federal property under the CZMA, DAF analyzed the Proposed Action's potential impacts within California's coastal zone of federally listed threatened and endangered species that may migrate or travel off VSFB property into the coastal zone, wetlands, and floodplains that connect or flow off VSFB into the coastal zone; state wildlife species of concern that may migrate or travel off VSFB property into the coastal zone; and sensitive habitat in the coastal zone.

Consistency Review

Federally Listed Threatened or Endangered Species. Sixteen federally listed threatened or endangered species occur on VSFB. These species include 5 plants and 11 fish or wildlife species (VSFB, 2021). Only 7 of these 16 species were considered as potentially occurring in the project construction areas or under the flight path of the F-15 aircraft (**Table 4**). SLD 30 manages federally listed threatened and endangered species in accordance with the PBO and the VSFB *Integrated Natural Resource Management Plan* (VSFB INRMP). The *Endangered Species Act of 1973*, as amended (16 USC § 1531 et seq.) (ESA) does not protect species listed as threatened or endangered at the state level. However, DAFMAN 32-7003 directs DAF installations to provide similar protection to state-listed species where practicable and where protections are not in conflict with the military mission. The DAF accomplishes this at VSFB under the VSFB

Table 4. Federally Listed Threatened or Endangered Species That May Occur in the Proposed Project Area

Common Name	Scientific Name	Federal Status	State Status	Potential to Impact (yes/no)
Plants				
Lompoc yerba santa	*Eriodictyon capitatum*	Endangered	Rare	No
Vandenberg monkeyflower	*Diplacus vandenbergensis*	Endangered	N/A	No
Invertebrates				
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	N/A	No
Amphibian				
California red-legged frog	*Rana draytonii*	Threatened	N/A	Yes
Birds				
Western snowy plover	*Charadrius nivosus nivosus*	Threatened	N/A	No
California least tern	*Sterna antillarum browni*	Endangered	Endangered	No
Mammals				
Southern sea otter	*Enhydra lutris nereis*	Threatened	California fully protected species	No

N/A = not applicable

INRMP. All state-listed species on VSFB are also federally listed except for three plant species, none of which occurs in the proposed project area. SLD 30 implements the PBO through an environmental review process and a variety of general and species-specific avoidance and minimization measures.

The Proposed Action would not occur in snowy plover, California least tern, or southern sea otter habitat. As summarized in the PBO and *Biological Opinion on the Beach Management Plan and Water Rescue Training at Vandenberg Air Force Base* (USFWS, 2015a), restrictions to airfield and field test operations include measures to avoid potential flight operation impacts to the western snowy plover, California least tern, and southern sea otter. These include maintaining a minimum flight elevation of 1,900 feet AMSL near

Purisima Point during the western snowy plover and California least tern breeding seasons (March 1 through September 30) and a year-round, minimum 500-foot altitude from Minuteman Beach to Purisima Point, Wall/Surf Beach, and Jalama Beach to avoid western snowy plover habitat. Noise modeling of the Proposed Action indicate that no change would occur in the existing unweighted 100 dB contour line associated with the existing flight operations at the VSFB airfield. Therefore, the Proposed Action would not affect the western plover, California least tern, or the southern sea otter.

Field surveys for federally listed threatened and endangered plant and wildlife species were conducted in 2023 and 2024 at proposed project construction areas where disturbance of previously undisturbed vegetation could occur. The survey area included a 100-foot buffer surrounding each project area. Populations of Lompoc yerba santa (*Eriodictyon capitatum*) are known to occur on VSFB in chaparral vegetation. The Vandenberg monkeyflower (*Diplacus vandenbergensis*) also potentially occurs in chaparral vegetation. The Lompoc yerba santa and Vandenberg monkeyflower individuals were not found in any of the survey areas. No vernal pools occur within the proposed project construction areas. There would be no effects to Lompoc yerba santa, Vandenberg monkeyflower, or vernal pool fairy shrimp for this project.

SLD 30 evaluated the potential effects of the Proposed Action on the federally listed threatened California red-legged frog (*Rana draytonii*). This species was not found in any of the survey areas. The nearest recorded occurrence of this species is approximately 1,800 feet southwest of Runway 30. There are no permanent or semi-permanent aquatic habitats in the project areas. While the ephemeral swale areas in the project area with *Juncus* (*effusus, patens*) - *Carex* (*pansa, praegracilis*) vegetation temporarily pond during the wet season, this area is not breeding habitat for the California red-legged frog. According to the *Recovery Plan for the California Red-Legged Frog*, breeding sites typically retain water for approximately 20 weeks and have areas of open water (USFWS, 2022).

Initial ground disturbance would be coordinated to occur when it would be least impactful to the special-status species. In addition, 30 CES/CEIE would determine if any pre-activity biological surveys would be required and whether a qualified biologist would need to be present during site preparation (e.g., clearing/grubbing, discing, mowing) to monitor for special-status species. Based on the absence of red-legged frog habitat in the project area, distance from known red-legged frog habitat, and the implementation of the environmental protection measures to minimize potential impacts to special status species (Appendix D), SLD 30 has determined that the project *may affect, not likely adversely affect* the California red-legged frog. The DAF has documented this finding in the informal Section 7 consultation it submitted to the USFWS on 13 December 2024 for concurrence on this determination.

Wetlands and Floodplains. The Proposed Action would occur within the San Antonio Creek watershed and the Santa Ynez River watershed (Hydrologic Unit Codes 8-18060009 and 8-18060010, respectively). However, the project areas do not occur within the 100-year floodplains of San Antonio Creek or the Santa Ynez River.

A delineation of potential waters of the US, including wetlands, was conducted within a 100-foot boundary of all project areas in 2023 and 2024. No permanent waterbodies or riverine features occur within the project area. Wetlands that occur within the project areas are classified as palustrine emergent (PEM) wetlands, which are characterized by herbaceous hydrophytic vegetation (Cowardin et al., 1979). All wetlands mapped within the project areas are considered PEM1A under the Cowardin classification system, meaning they are palustrine emergent, with persistent vegetation, and have a temporarily flooded water regime. Based on wetland delineation surveys, none of the wetlands mapped in the project areas are jurisdictional waters of the US. Per the US Army Corps of Engineers/US Environmental Protection Agency final rule amending the definition of waters of the US (88 *Federal Register* 61964, 8 September 2023), the wetlands mapped in the survey area would not be considered jurisdictional wetlands, as they are all isolated wetlands that do not maintain a “continuous surface connection” to any other bodies of water that could definitively be considered waters of the US under the current rule. They are also confined to VSFB property.

The main access road to the four munitions storage igloos is an existing gravel road that crosses a wetland area and would be paved but would have no impact on adjacent wetlands. Based on the location of the four munitions storage igloos, the access road to the igloos must cross a wetland in a swale area that collects seasonal precipitation. Two alternative crossing locations are being evaluated in the EA. Alternative 1 for the access road would use an existing powerline road that would be paved and minimize effects on Burton Mesa Chaparral. In the wetland area, the road is a 2-track road. The road grade would be raised, and

culverts would be installed to maintain the hydrologic connections between wetland areas on either side of the access road. Approximately 0.09 acre (3,920 ft^2) of the wetlands may be affected (**Table 5**). Alternative 2 for the access road would follow a former road that is now overgrown with Burton Mesa Chaparral. The access road would disturb approximately 0.02 acre (871 ft^2) of wetlands (**Table 5**). The four munitions storage igloos would create an area of restricted land use in the surrounding area that would prevent future development and disturbance of any wetland area within the explosives safety zone. **Figure 3** illustrates this proposed arrangement.

Table 5. Potential Impacts to Wetlands under Alternative 1 and 2

Cowardin Classification	Access Road to Project 5	Acres
PEM1A	Alternative 1	0.09
PEM1A	Alternative 2	0.02

PEM1A = palustrine, emergent, persistent, temporarily flooded

The access road (whether Alternative 1 or 2) would be paved, which would prevent erosion and sedimentation. The munitions storage igloos are approximately 500 feet or more from the wetland area on a nearly level ground surface. Sedimentation from stormwater runoff would not occur in the wetland area from construction of the igloos.

The impacts to the wetland from the access road, whether under either Alternative 1 or Alternative 2, would be confined to VSFB with no discernible impacts or connections to wetlands or other aquatic bodies of water off Base. Land use in the area surrounding the four munitions storage igloos would be restricted, providing protection from future development, including the wetland areas.

State Sensitive Habitats. Burton Mesa Chaparral is considered a unique form of chaparral that occurs on aeolian sands. It is classified as a sensitive habitat in California by the California Department of Fish and Wildlife but is not a federal listed threatened or endangered vegetation community. The Proposed Action would disturb approximately 3.4 acres of Burton Mesa Chaparral under Alternative 1 and approximately 3.8 acres under Alternative 2 for the construction of the munitions storage igloos and access road. As described in Section 2.2.4, multiple alternative sites for the complex of four munitions storage igloos were evaluated to identify sites that would not disturb chaparral vegetation. However, all sites except the location near the VSFB airfield did not meet the standard operating procedures for homeland defense alert missions. The munitions storage igloos would restrict future development in the surrounding area, protecting any Burton Mesa Chaparral within the explosives safety QD arcs from future disturbance. The estimate of remaining Burton Mesa Chaparral is highly variable, ranging from 13,061 acres (Schmalzer and Hinkle, 1987) to 8,645 acres (Davis, Hickson, and Odion, 1988, as referenced in Gevirtz et al., 2007). Using a conservative estimate of 8,500 acres, the approximately 3.4–3.8 acres of chaparral that would be disturbed by the Proposed Action represents approximately 0.04 percent of the remaining chaparral vegetation. As such, the Proposed Action would disturb an extremely small portion of the remaining Burton Mesa Chaparral. There are no reasonable connections, ecological or otherwise, between this slight reduction of chaparral vegetation on VSFB to areas off VSFB in the coastal zone. The disturbance of the Burton Mesa Chaparral on VSFB would have no discernible impact on coastal resources in the coastal zone off Base.

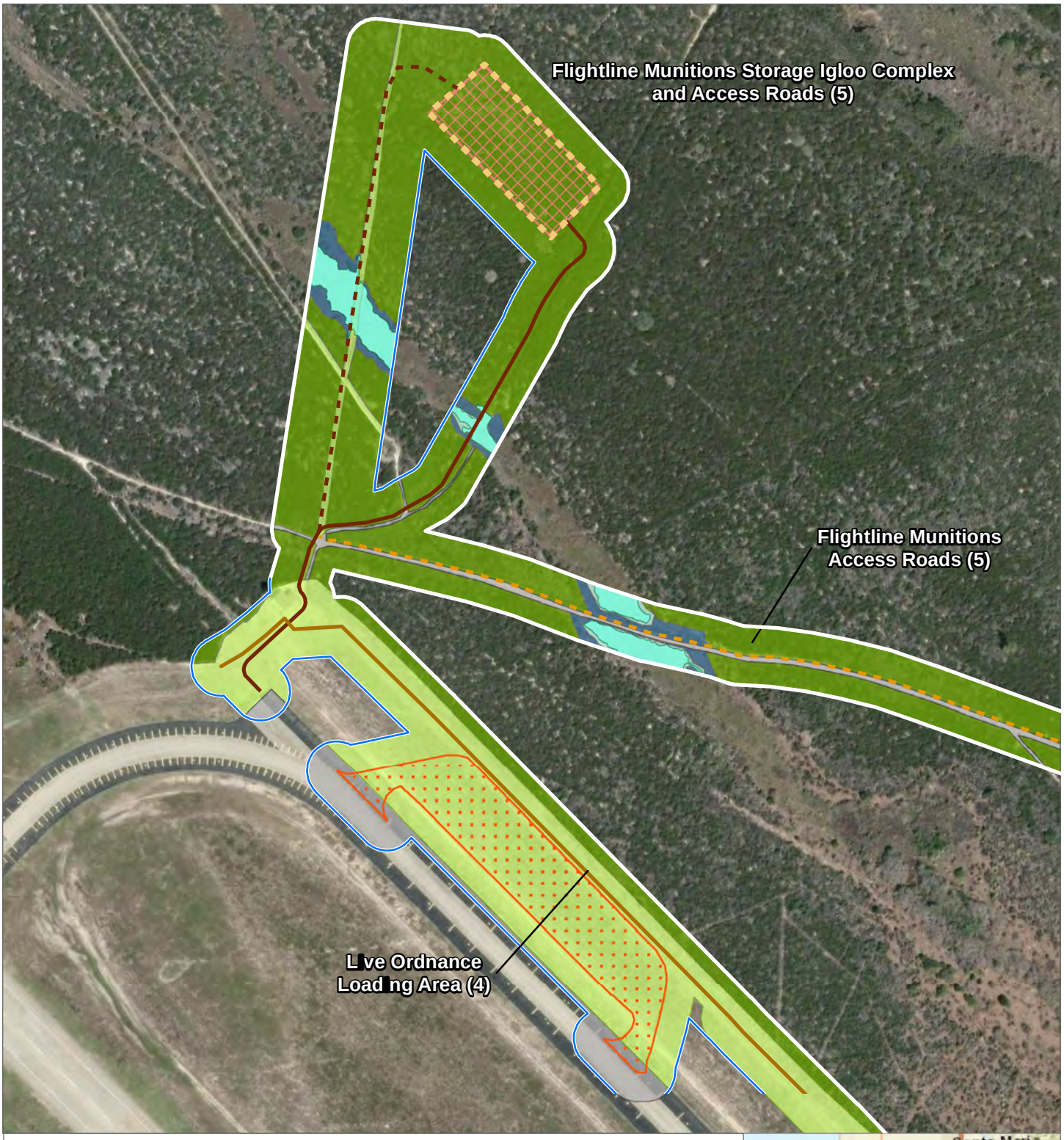


FIGURE 3

Vegetation and Wetlands Near Flightline Munitions Storage Complex (Project #s)

- Installation Boundary
- Existing Airfield Fence
- New Access Road to Airfield
- New Access Road to Project 5 (Alt 1)
- New Access Road to Project 5 (Alt 2)
- New Security Fence
- LOLA Apron Ramps
- Munitions Igloo
- 100-foot Buffer of Project Features
- Wetland (PEM1A)

Vegetation Habitat Type

- Arctostaphylos (purissima, rudis) Shrubland Special Stands
- Baccharis pilularis Shrubland Alliance
- Developed
- Juncus (effusus, patens) - Carex (pansa, praegracilis) Herbaceous Alliance
- Mowed/maintained

N

0 200 Feet

Imagery: ESRI, 2021.
Coordinate System:
WGS 1984 UTM Zone 10N

Special State Wildlife Species. Wildlife species that may occur in the project areas predominantly include those associated with the central California coast's coastal scrub and chaparral habitats. VSFB contains a wide variety of wildlife species, including many that are delisted or not federally listed as threatened or endangered but are afforded other federal and/or state protections, such as birds protected under the *Migratory Bird Treaty Act* (MBTA), species classified as species of special concern by the California Department of Fish and Wildlife, or birds considered birds of conservation concern by the USFWS. A list of species of concern with the potential to occur on the Installation is provided in **Appendix B**. The Proposed Action would disturb less than 5 acres of native vegetation (**Tables 6** and **7**). Because the amount of potential habitat that would be disturbed is extremely small, no significant impacts are expected to state wildlife species of concern on VSFB property. There would be no impacts to state wildlife species of concern in the coastal zone because no reasonable connections, ecological or otherwise, exist between the small area of disturbance on VSFB property and the coastal zone. Implementation of flight restrictions in the LOA and the PBO would minimize impacts to birds and wildlife, and impacts would not extend to the coastal zone.

Archaeological or Paleontological Resources. Previous cultural resource surveys have determined that the VSFB Airfield District and the individual resources therewithin on VSFB property are not eligible for listing in the NRHP. Therefore, Projects 1–4 would have no impacts to historic properties under Alternative 1 or 2. Approximately 8.9 and 1.8 acres were surveyed for the presence of cultural resource materials, respectively, surrounding Project 5 and 6. The surveys included the munitions storage igloo site(s) and access road(s). No cultural resources were observed during the surface surveys or found in excavated units. The DAF evaluated known archaeological sites near Projects 5 and 6 and determined that none of the sites meets the eligibility requirements of the NRHP. The DAF consulted with the SHPO under NHPA Section 106. The SHPO reviewed the DAF determination and concurred with the DAF's finding that the Proposed Action would not affect historic properties (**Appendix C**).

Table 6. Estimated Vegetation Removal Under Alternative 1

Plant Alliance/Habitat	Acreage by Project Componenta				
	Project 1	Project 4	Project 5	Project 6	TOTAL
Shrubs and Chaparral					
Arctostaphylos (*purissima, rudis*) Shrubland Special Stands	N/A	N/A	3.36	N/A	3.36
Artemisia californica – Salvia mellifera Shrubland Alliance	N/A	N/A	N/A	1.06	1.06
Baccharis pilularis Shrubland Alliance	N/A	N/A	0.01	N/A	0.01
Herbaceous					
Juncus (*effusus, patens*) – Carex (*pansa, praegracilis*) Herbaceous Alliance	N/A	N/A	0.03	N/A	0.03
Land Use and Non-Vegetated Classes					
Mowed/Maintained	0.03	6.23	0.36	N/A	6.62
TOTALS	**0.03**	**6.23**	**3.76**	**1.06**	**11.08**

Note:
a Only project components that would impact vegetation are listed. Project components occurring on developed land are not included.
N/A = not applicable

Table 7. Estimated Vegetation Removal Under Alternative 2

Plant Alliance/Habitat	Acreage by Project Componenta				
	Project 1	Project 4	Project 5	Project 6	TOTAL
Shrubs and Chaparral					
Arctostaphylos (purissima, rudis) Shrubland Special Stands	N/A	N/A	3.78	N/A	3.78
Artemisia californica – Salvia mellifera Shrubland Alliance	N/A	N/A	N/A	1.06	1.06
Baccharis pilularis Shrubland Alliance	N/A	N/A	0.01	N/A	0.01
Herbaceous					
Juncus (effusus, patens) – Carex (pansa, praegracilis) Herbaceous Alliance	N/A	N/A	0.02	N/A	0.02
Land Use and Non-vegetated Classes					
Mowed/Maintained	0.03	6.23	0.15	N/A	6.41
TOTAL	**0.03**	**6.23**	**3.96**	**1.06**	**11.28**

Note:
a Only project components that would impact vegetation are listed. Project components occurring on developed land are not included.
N/A = not applicable

Conclusion

The DAF has determined that the parts of the Proposed Action that may have an effect on coastal land resources in the coastal zone of VSFB property are consistent with Sections 30240 and 30244 of the CCA with the implementation of minimization and avoidance measures provided for in the PBO and the VSFB INRMP for such resources that migrate or travel off VSFB and into the coastal zone.

4 STATEMENT OF CONSISTENCY

After review of the Proposed Action, the DAF has determined that the Proposed Action that may have an effect off VSFB in the coastal zone is consistent with the relevant enforceable policies under Articles 4 and 5 of the CCA identified in **Table 3**, with DAF's implementation of minimization and avoidance measures (see **Appendices A, D** and the PBO [USFWS, 2015b]).

The DAF requests that the CCC concur that implementing the periodic operation of F-15 aircraft by ACC at VSFB is consistent with the relevant CCA policies applicable to this Proposed Action.

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5 REFERENCES

Cowardin, L.M., Carter, V., Golet, F.C., and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. USFWS, Office of Biological Services, Washington, DC. December.

Davis, F.W. and Hickson, D.E. and Odion, D.C. (undated). *Spatial and Temporal Dynamics of Maritime Chaparral on the Burton Mesa, California*. Unpublished Report.

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 Service, Inc., Prepared for California Department of Fish and Game, State of California.

Schmalzer, P.A., and C.R. Hinkle. 1987. *Monitoring Biological Impacts of Space Shuttle Launches from Vandenberg Space Force Base: Establishment of Baseline Conditions*. NASA Technical Memorandum 100982. Prepared by Bionetics Corporation, John F. Kennedy Space Center, FL.

US Fish and Wildlife Service (USFWS), *2015a. Biological opinion on the beach management plan and water rescue training at Vandenberg Air Force Base (2014–2018) (8-8-12-F-11R)*. Ventura Fish and Wildlife Office, Ventura, California.

USFWS, 2015b. *Programmatic Biological Opinion on Routine Mission Operations and Maintenance Activities, Vandenberg Air Force Base, Santa Barbara County, California (8-8-13-F-49R)*. Ventura Fish and Wildlife Office, Ventura, California.

USFWS, 2018. *Reinitiation of Programmatic Biological Opinion on Routine Mission Operations and Maintenance Activities, Vandenberg Air Force Base, Santa Barbara County, California*. Ventura Fish and Wildlife Office, Ventura, California.

USFWS, 2022. *Recovery Plan for the California Red-Legged Frog* (Rana aurora draytonii). Region 1, U.S. Fish and Wildlife Service, Portland, Oregon. https://ecos.fws.gov/docs/recovery_plan/020528.pdf

Vandenberg Space Force Base (VSFB), 2021. *Integrated Natural Resources Management Plan*. Department of the Air Force. September.

VSFB, 2022. *Wetlands and Riparian Habitats Management Plan.* Department of the Air Force. January.

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APPENDIX A. LETTER OF AUTHORIZATION

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, Maryland 20910

DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL MARINE FISHERIES SERVICE

Letter of Authorization

The U.S. Space Force (USSF), is hereby authorized to take marine mammals incidental to those activities at Vandenberg Space Force Base (VSFB), California, in accordance with 50 CFR 217, Subpart G--Taking Marine Mammals Incidental to U.S. Space Force Launches and Operations at Vandenberg Space Force Base (VSFB), California subject to the provisions of the Marine Mammal Protection Act (16 U.S.C. 1361 *et seq.*; MMPA) and the following conditions:

1. This Letter of Authorization (LOA) is valid April 10, 2024, through April 9, 2029.

2. This Authorization is valid only for the unintentional taking of the species and stocks of marine mammals identified in Condition 4 incidental to rocket and missile launches and supporting operations originating at VSFB.

3. This Authorization is valid only if USSF or any person(s) operating under its authority implements the mitigation, monitoring, and reporting required pursuant to 50 CFR §§ 217.64 and 217.65 and implements the Terms and Conditions of this Authorization.

4. General Conditions

   (a) A copy of this LOA must be in the possession of USSF, its designees, and personnel operating under the authority of this LOA.

   (b) The incidental take of marine mammals under the activities identified in Condition 2 and 50 CFR § 217.60 of the regulations, by Level B harassment only, is limited to the species and stocks and number of takes shown in Table 1.

Species	**Stock**	**Annual Take by Level B harassment**	**5-Year Total Take by Level B harassment**
Harbor seal	California	11,135	38,591
California sea lion	United States	84,870	281,021
Northern elephant seal	California Breeding	9,438	29,590
Steller sea lion	Eastern	550	1,900
Northern fur seal	California	5,909	18,383
Guadalupe fur seal	Mexico	23	71

(c) The taking by injury (Level A harassment), serious injury, or death of any of the species listed in condition 3(b) of the Authorization or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this LOA.

5. Mitigation

USSF, and any persons operating under its authority, must implement the following mitigation measures when conducting the activities identified in Condition 2 of this Authorization.

(a) USSF must provide pupping information to launch proponents at the earliest possible stage in the launch planning process and direct launch proponents to, if practicable, avoid scheduling launches during pupping seasons on VSFB from 1 March to 30 April and on the Northern Channel Islands from 1 June- 31 July. If practicable, rocket launches predicted to produce a sonic boom on the Northern Channel Islands >3 pounds per square foot (psf) from 1 June – 31 July will be scheduled to coincide with tides in excess of +1.0 ft (0.3 m), with an objective to do so at least 50 percent of the time.

(b) For manned flight operations, aircraft must use approved routes for testing and evaluation. Manned aircraft must also remain outside of a 1,000-ft (305 m) buffer around pinniped rookeries and haul-out sites (except in emergencies such as law enforcement response or Search and Rescue operations, and with a reduced, 500-ft (152 m) buffer at Small Haul-out 1).

(c) UAS classes 0-2 must maintain a minimum altitude of 300 ft (91 m) over all known marine mammal haulouts when marine mammals are present, except at take-off and landing. Class 3 must maintain a minimum altitude of 500 ft (152 m), except at take-off and landing. UAS classes 4 and 5 only operate from the VSFB airfield and must maintain a minimum altitude of 1,000 ft (305 m) over marine mammal haulouts except at take-off and landing. USSF must not fly class 4 or 5 UAS below 1,000 ft (305 m) over haulouts.

6. Monitoring

USSF is required to conduct marine mammal and acoustic monitoring as described below:

(a) Monitoring at VSFB and NCI must be conducted by at least one NMFS-approved Protected Species Observer (PSO) trained in marine mammal science. PSOs must have demonstrated proficiency in the identification of all age and sex classes of all marine mammal species that occur at VSFB and on NCI. They must be knowledgeable of approved count methodology and have experience in observing pinniped behavior, especially that due to human disturbances.

(b) In the event that the PSO requirements described in paragraph (a) of this section cannot be met (*e.g.*, access is prohibited due to safety concerns), daylight or nighttime video monitoring must be used in lieu of PSO monitoring. In certain circumstances where the daylight or nighttime video monitoring is also not possible (*e.g.*, USSF is unable to access a monitoring site due to road conditions or human safety concerns), USSF must notify NMFS.

(c) At VSFB, USSF must conduct marine mammal monitoring and take acoustic measurements for all new rockets, for rockets (existing and new) launched from new facilities, and for larger or louder rockets (including those with new launch proponents) than those that have been previously launched from VSFB during their first three launches and for the first three launches from any new facilities during March through July.

i. For launches that occur during the harbor seal pupping season (March 1 through June 30) or when higher numbers of California sea lions are present (June 1 through July 31), monitoring must be conducted. At least one NMFS-approved PSO trained in marine mammal science must conduct the monitoring.

ii. When launch monitoring is required, monitoring must begin at least 72 hours prior to the launch and continue through at least 48 hours after the launch. Monitoring must include multiple surveys each day, with a minimum of four surveys per day.

iii. For launches within the harbor seal pupping season, USSF must conduct a follow-up survey of pups.

iv. For launches that occur during daylight, USSF must make time-lapse video recordings to capture the reactions of pinnipeds to each launch. For launches that occur at night, USSF must employ night video monitoring, when feasible.

v. When possible, PSOs must record: species, number, general behavior, presence and number of pups, age class, gender, and reaction to launch noise, or to natural or other human-caused disturbances. PSOs must also record environmental conditions, including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction.

(d) USSF must conduct sonic boom modeling prior to the first three small or medium rocket launches from new launch proponents or at new launch facilities, and all heavy or super-heavy rocket launches.

(e) USSF must conduct marine mammal monitoring and take acoustic measurements at the NCI if the sonic boom model indicates that pressures from a boom will reach or exceed 7 psf from 1 January through 28 February, 5 psf from 1 March through 31

July, or 7 psf from 1 August through 30 September. No monitoring is required on NCI from 1 October through 31 December.

i. The monitoring site must be selected based upon the model results, prioritizing a significant haulout site on one of the islands where the maximum sound pressures are expected to occur.

ii. USSF must estimate the number of animals on the monitored beach and record their reactions to the launch noise and conduct more focused monitoring on a smaller subset or focal group.

iii. Monitoring must commence at least 72 hours prior to the launch, during the launch and at least 48 hours after the launch, unless no sonic boom is detected by the monitors and/or by the acoustic recording equipment, at which time monitoring may be stopped.

iv. For launches that occur in darkness, USSF must use night vision equipment.

v. Monitoring for each launch must include multiple surveys each day that record, when possible: species, number, general behavior, presence of pups, age class, gender, and reaction to sonic booms or natural or human-caused disturbances.

vi. USSF must collect photo and/or video recordings for daylight launches when feasible, and if the launch occurs in darkness night vision equipment will be used.

vii. USSF must record environmental conditions, including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction.

(f) USSF must continue to test equipment and emerging technologies, including but not limited to night vision cameras, newer models of remote video cameras and other means of remote monitoring at both VSFB and on the NCI.

(g) USSF must evaluate UAS based or space-based technologies that become available for suitability, practicability, and for any advantage that remote sensing may provide to existing monitoring approaches.

(h) USSF must monitor marine mammals during the first three launches of the missiles for the new Ground Based Strategic Defense program during the months of March through July across the 5-year duration of this LOA.

i. When launch monitoring is required, monitoring must include multiple surveys each day, with a minimum of four surveys per day.

ii. When possible, PSOs must record: species, number, general behavior, presence and number of pups, age class, gender, and reaction to launch noise, or to natural or other human-caused disturbances. PSOs must also record environmental conditions, including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction.

(i) USSF must conduct semi-monthly surveys (two surveys per month) to monitor the abundance, distribution, and status of pinnipeds at VSFB. Whenever possible, these surveys will be timed to coincide with the lowest afternoon tides of each month when the greatest numbers of animals are usually hauled out. If a VSFB or area closure precludes monitoring on a given day, USSF must monitor on the next best day.

i. PSOs must gather the following data at each site: species, number, general behavior, presence and number of pups, age class, gender, and any reactions to natural or human-caused disturbances. PSOs must also record environmental conditions, including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction.

7. Reporting

(a) USSF must submit an annual report each year to NMFS Office of Protected Resources and West Coast Region on March 1st of each year that describes all activities and monitoring for the specified activities during that year. This includes launch monitoring information in Condition 7(a)(i) through (iii) for each launch where monitoring is required or conducted. The annual reports must also include a summary of the documented numbers of instances of harassment incidental to the specified activities, including non-launch activities (*e.g.*, takes incidental to aircraft or helicopter operations observed during the semi-monthly surveys). Annual reports must also include the results of the semi-monthly sentinel marine mammal monitoring described in Condition 6(i), results of tests of equipment and emerging technologies described in condition 6(f), and results of evaluation of UAS based or space-based technologies described in condition 6(g).

i. Launch information, including:

1) Date(s) and time(s) of the launch (and sonic boom, if applicable);

2) Number(s), type(s), and location(s) of rockets or missiles launched;

ii. Monitoring program design; and

iii. Results of the launch-specific monitoring program, including:

1) Date(s) and location(s) of marine mammal monitoring;

2) Number of animals observed, by species, on the haulout prior to commencement of the launch or recovery;

3) General behavior and, if possible, age (including presence and number of pups) and sex class of pinnipeds hauled out prior to the launch or recovery;

4) Number of animals, by species, age, and sex class that responded at a level indicative of harassment. Harassment is characterized by:

A. Movements in response to the source of disturbance, ranging from short withdrawals at least twice the animal's body length to longer retreats over the beach, or if already moving a change of direction of greater than 90 degrees; or

B. All retreats (flushes) to the water.

5) Number of animals, by species, age, and sex class that entered the water, the length of time the animal(s) remained off the haulout, and any behavioral responses by pinnipeds that were likely in response to the specified activities, including in response to launch noise or a sonic boom;

6) Environmental conditions including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction; and

7) Results of acoustic monitoring, including the following:

A. Recorded sound levels associated with the launch (in SEL, SPL_{peak}, and SPL_{rms});

B. Recorded sound levels associated with the sonic boom (if applicable), in psf; and

C. The estimated distance of the recorder to the launch site and the distance of the closest animals to the launch site.

iv. Results of the semi-monthly sentinel marine mammal monitoring described in Condition 6(i), including:

1) Number of animals observed, by species;

2) General behavior and, if possible, age (including presence and number of pups) and sex class of pinnipeds hauled out;

3) Any reactions to natural or human-caused disturbances;

4) Environmental conditions including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction.

(b) USSF must submit a final, comprehensive 5-year report to NMFS Office of Protected Resources within 90 days of the expiration of this LOA. This report must:

i. Summarize the activities undertaken and the results reported in all annual reports;

ii. Assess the impacts at each of the major rookeries; and

iii. Assess the cumulative impacts on pinnipeds and other marine mammals from the activities specified in Condition 2.

(c) If the activity identified in Condition 2 likely resulted in the take of marine mammals not identified in Condition 4(b), then the USSF must notify the NMFS Office of Protected Resources and the NMFS West Coast Region stranding coordinator within 24 hours of the discovery of the take.

(d) In the event that personnel involved in the activities discover an injured or dead marine mammal, USSF must report the incident to the Office of Protected Resources (OPR), NMFS (PR.ITP.MonitoringReports@noaa.gov and itp.davis@noaa.gov) and to the West Coast regional stranding network (866-767-6114) as soon as feasible.

The report must include the following information:

i. Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);

ii. Species identification (if known) or description of the animal(s) involved;

iii. Condition of the animal(s) (including carcass condition if the animal is dead);

iv. Observed behaviors of the animal(s), if alive;

v. If available, photographs or video footage of the animal(s); and

vi. General circumstances under which the animal was discovered.

(e) If real-time monitoring during a launch shows that the activity identified in Condition 2 is reasonably likely to have resulted in the mortality or injury of any marine mammal, USSF must notify NMFS within 24 hours (or next business day). NMFS and USSF must then jointly review the launch procedure and the mitigation

requirements and make appropriate changes through the adaptive management process, as necessary and before any subsequent launches of rockets and missiles with similar or greater sound fields and/or sonic boom pressure levels.

8. This Authorization may be modified, suspended or withdrawn if USSF fails to abide by the conditions prescribed herein or if the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

9. Renewals and Modifications of Letter of Authorization

(a) A LOA issued under 50 CFR §§ 216.106 and § 217.66 for the activity identified in Condition 2 of this Authorization and 50 CFR § 217.60(a) and (b) shall be modified upon request by USSF, provided that:

i. The specified activity and mitigation, monitoring, and reporting measures, as well as the anticipated impacts, are the same as those described and analyzed for this subpart (excluding changes made pursuant to the adaptive management provision in paragraph (c) of this section); and

ii. NMFS determines that the mitigation, monitoring, and reporting measures required by the previous LOA under these regulations were implemented.

(b) For LOA modification or renewal requests by the applicant that include changes to the activity or the mitigation, monitoring, or reporting measures (excluding changes made pursuant to the adaptive management provision in paragraph (c) of this section) that do not change the findings made for the regulations or that result in no more than a minor change in the total estimated number of takes (or distribution by species or stock or years), NMFS may publish a notice of proposed changes to the LOA in the *Federal Register*, including the associated analysis of the change, and solicit public comment before issuing the LOA.

(c) An LOA issued under 50 CFR §§ 216.106 and 217.66 for the activity identified in Condition 2 of this Authorization and 50 CFR § 217.60(a) and (b) may be modified by NMFS under the following circumstances:

i. After consulting with the USSF regarding the practicability of the modifications, NMFS, through adaptive management, may modify (including adding or removing measures) the existing mitigation, monitoring, or reporting measures if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring.

ii. Possible sources of data that could contribute to the decision to modify the mitigation, monitoring, or reporting measures in an LOA include:

1) Results from the USSF's monitoring from the previous year(s);

2) Results from other marine mammal and/or sound research or studies; or

3) Any information that reveals marine mammals may have been taken in a manner, extent or number not authorized by these regulations or a subsequent LOA.

iii. If, through adaptive management, the modifications to the mitigation, monitoring, or reporting measures are more than minor, NMFS will publish a notice of the proposed changes to the LOA in the *Federal Register* and solicit public comment.

(d) If NMFS determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals specified in the regulations and this Authorization, an LOA may be modified without prior notice or opportunity for public comment. Notice would be published in the *Federal Register* within 30 days of the action.

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For Kimberly Damon-Randall, Director
Office of Protected Resources

APPENDIX B. STATE SPECIAL-STATUS SPECIES WITH THE POTENTIAL TO OCCUR IN THE PROPOSED ACTION AREA

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State Special Status Wildlife Species with the Potential to Occur in the Proposed Action Area

Common Name	Scientific Name	Relevant Status
Birds		
Allen's hummingbird	*Selasphorus sasin*	BCC, MBTA
Belding's savannah sparrow	*Passerculus sandwichensis beldingi*	BCC, MBTA, SE
Black-chinned sparrow	*Spizella atrogularis*	BCC, MBTA
Bullock's oriole	*Icterus bullockii*	BCC, MBTA
California thrasher	*Toxostoma redivivum*	BCC, MBTA
Grasshopper sparrow	*Ammodramus savannarum*	MBTA, SSC
Lawrence's goldfinch	*Carduelis lawrencei*	BCC, MBTA
Little willow flycatcher	*Empidonax traillii brewsteri*	MBTA, SE
Loggerhead shrike	*Lanius ludovicianus*	MBTA, SSC
Long-eared owl	*Asio otus*	BCC, MBTA, SSC
Mountain plover	*Charadrius montanus*	BCC, MBTA, SSC
Olive-sided flycatcher	*Contopus cooperi*	BCC, MBTA, SSC
Short-eared owl	*Asio flammeus*	BCC, MBTA, SSC
Tricolored blackbird	*Agelaius tricolor*	BCC, MBTA, SSC, ST
Western burrowing owl	*Athene cunicularia*	BCC, MBTA, SSC
Wrentit	*Chamaea fasciata*	BCC, MBTA
Yellow-breasted chat	*Icteria virens*	MBTA, SSC
Yellow warbler	*Setophaga petechia*	MBTA, SSC
Mammals		
American badger	*Taxidea taxus*	SSC
California sea lion	*Zalophus californianus*	MMPA
Northern elephant seal	*Mirounga angustirostris*	MMPA
Northern fur seal	*Callorhinus ursinus*	MMPA
Pacific harbor seal	*Phoca vitulina*	MMPA
Pallid bat	*Antrozous pallidus*	SSC
San Diego desert woodrat	*Neotoma lepida intermedia*	SSC
Townsend's big-eared bat	*Corynorhinus townsendii*	SSC
Western mastiff bat	*Eumops perotis californicus*	SSC
Reptiles		
California legless lizard	*Anniella pulchra*	SSC
Blainville's horned lizard	*Phrynosoma blainvilli*	SSC
Southwestern pond turtle	*Actinemys pallida*	SSC
Two-striped garter snake	*Thamnophis hammondii*	SSC

Source: USFWS, 2021; VSFB, 2021; CDFW, 2024

BCC = Bird of Conservation Concern; MBTA = Migratory Bird Treaty Act; MMPA = Marine Mammal Protection Act; SE = State Endangered; SFP = State Fully Protected; SSC = (California) Species of Special Concern; ST = State Threatened

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APPENDIX C. SECTION 106 CONSULTATION FOR F-15E AND F-15EX BEDDOWN, VANDENBERG SPACE FORCE BASE, SANTA BARBARA COUNTY

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State of California • Natural Resources Agency
Gavin Newsom, *Governor*

DEPARTMENT OF PARKS AND RECREATION
OFFICE OF HISTORIC PRESERVATION
Armando Quintero, *Director*

Julianne Polanco, State Historic Preservation Officer
1725 23rd Street, Suite 100, Sacramento, CA 95816-7100
Telephone: (916) 445-7000 FAX: (916) 445-7053
calshpo.ohp@parks.ca.gov www.ohp.parks.ca.gov

September 3, 2024

Reply in Reference to: USAF_2024_0823_001

Ms. Laura L. Miz
Deputy Base Civil Engineer, 30th Civil Engineer Squadron
1172 Iceland Avenue
Vandenberg AFB, CA 93437-6011

VIA ELECTRONIC MAIL

Re: Section 106 Consultation for F-15E and F-15EX Beddown, Vandenberg Space Force Base, Santa Barbara County

Dear Ms. Miz:

The United States Air Force (USAF) is initiating consultation with the State Historic Preservation Officer (SHPO) regarding its effort to comply with Section 106 of the National Historic Preservation Act of 1966 (54 U.S.C. 306108), as amended, and its implementing regulation found at 36 CFR Part 800.

To facilitate the testing and development of new-generation weapons, payloads, and propulsion systems, the USAF is proposing to construct an F-15E and F-15EX Beddown Facility at VSFB in Santa Barbara County, California. A complete project description may be found in the USAF's supporting documentation.

Historic property identification efforts found that Sites CA-SBA-964, CA-SBA-1130, CA-SBA-3407, identified as lithic scatters and Building 1754, a late-1960s prefabricated mobile office, are within the Undertaking's APE. Having evaluated these resources using NRHP criteria, the USAF determined they do not meet NRHP eligibility requirements.

The USAF are requesting concurrence with their APE definition, NRHP eligibility determinations and a finding of no historic properties affected. Upon review of the information provided, the SHPO has the following comments:

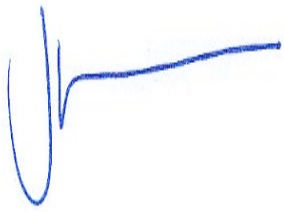
1. The SHPO has no objection to the USAF's area of potential effects definition.

2. The SHPO concurs that Sites CA-SBA-964, CA-SBA-1130, CA-SBA-3407 and Building 1754 do not meet NRHP eligibility requirements.

3. The SHPO concurs with the USAF's finding of no historic properties affected. Be advised that under certain circumstances, such as an unanticipated discovery or a change in project description, the USAF may have future responsibilities for this undertaking under 36 CFR Part 800.

This letter is being sent in electronic format only. Please confirm receipt of this letter and notify Ed Carroll, Historian II, at Ed.Carroll@parks.ca.gov or 916-503-8466 if there are any questions or to request a hard copy of this letter.

Sincerely,



Julianne Polanco
State Historic Preservation Officer

APPENDIX D. ENVIRONMENTAL PROTECTION MEASURES THAT WOULD BE IMPLEMENTED FOR THE PROPOSED ACTION

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Environmental Protection Measures That Would Be Implemented for the Proposed Action

Measure	Description/Purpose
Land Use Control Measures	
Create a GIS layer for each of the QD arcs for inhabited building and public road traffic distances for the munitions storage igloos that are constructed and enter into the VSFB GIS database.	The QD arc GIS layers will identify the restricted area for specific uses surrounding each igloo site. The purpose is to identify restricted land use areas for future installation planning.
Air Quality Dust Control Measures	
Water—preferably reclaimed—shall be applied at least twice daily to dirt roads, graded areas, and dirt stockpiles created during construction and demolition activities.	Prevents excessive dust. Watering frequency would be increased when wind speed exceeds 15 miles per hour.
After completing construction/demolition activities, disturbed soil shall be treated by watering, revegetating, or applying soil binders.	Prevents wind erosion of the soil.
All fine material transported off-site shall be either sufficiently watered or securely covered.	Prevents excessive dust.
On-Base vehicle speeds shall be limited.	Speed limit of 15 miles per hour.
Ground disturbance shall be limited to the smallest practicable area.	Minimizes the exposure of bare soil to wind.
Designated personnel shall monitor project activities.	Meant to ensure that excessive dust is not generated at construction or demolition sites.
Any portable equipment powered by an internal combustion engine with a rated horsepower of 50 bhp or greater used for this project shall be registered in the California State-wide Portable Equipment Registration Program or have a valid APCD Permit to Operate.	Comply with state and local regulations.
Comply with APCD Rule 345, Control of Fugitive Dust from Construction and Demolition Activities.	Construction, demolition, or earth-moving activities are prohibited from causing discharge of visible dust beyond the property line. Use standard BMPs (water, tarps) to minimize dust from truck hauling, track-out/carry-out from active construction sites, and demolition activities.
Off-road construction equipment shall comply with all federal, state, and local regulations.	Comply with federal, state, and local regulations.
Water Resources and Stormwater Measures	
The Proposed Action shall comply with SWPPPs, including best management practices.	To prevent water pollution and comply with the NPDES Construction and Industrial General Permits.
Preserve existing vegetation to the extent feasible.	Minimizes the exposure of bare soil to water to prevent erosion and soil runoff.
Stockpile mulched native vegetation for use in temporary and permanent erosion control. Use erosion control devices made from biodegradable materials and/or mulched native vegetation produced from vegetation clearing at the site.	Prevent soil runoff and sedimentation.
After construction is complete, vegetation cover shall be established in exposed soil areas. De-compact the soil to a sufficient depth and amend soil as needed to sustain plant life and allow for seed germination. Apply hydroseed with a certified weed-free wood fiber mulch covering 80% of the soil surface. The seed mix will include a sterile annual grass to serve as a cover crop and native vegetation as approved by the 30 CES/CEI botanist.	Establish vegetation cover on exposed soil areas to prevent soil erosion and meet Construction General Permit requirements.

Measure	Description/Purpose
Maintain seeded/planted areas and repair any erosion until vegetation is established and Construction General Permit requirements are met. Inspect seeded areas weekly. Water, reseed and mulch as needed to prevent bare soil spots. Protect seeded areas from traffic.	Establish vegetation cover on exposed soil areas to prevent soil erosion and meet Construction General Permit requirements.
Sediment control devices will be used for the storm drain near the project areas during construction.	Prevent soil runoff and sedimentation.
All equipment would be properly maintained and free of leaks during operation, and all necessary repairs carried out with proper spill containment.	Prevent the release of equipment fluids during operation and repairs. Prevent pollution in water runoff or soil contamination.
Fueling equipment would only occur in pre-designated areas with spill containment materials placed around the equipment before refueling. Stationary equipment would be outfitted with drip pans and hydrocarbon absorbent pads.	Prevent the release of hydrocarbon fluids.
Adequate spill response supplies would be maintained at the site during construction and operation for immediate response and cleanup of any fuel spills.	Allow quick response to potential fuel spills.
Hazardous materials would be stored in proper containers, placed in proper containment facilities covered prior to rain events.	Prevent the release of hazardous materials during rain events.
Properly secure portable toilets to prevent tipping in windy conditions.	Prevent spills.
Concrete curing compounds, concrete waste, and washout water would be properly managed to prevent pollution. Concrete washout water would be contained for evaporation.	Prevent the discharge of concrete compounds and washout water.
install multiple open bottom culverts or span wetlands or with a bridge to maximize water flow under the munitions storage igloo access road in the wetland area.	Maintain hydrologic connection between wetland areas on either site of the road.
Mitigation for disturbances in wetland areas would follow guidance in the VSFB Wetlands and Riparian Habitats Management Plan (VSFB, 2022).	Mitigate any loss of wetland area.
Biological Resource Measures	
Prior to initial site preparation 30 CES/CEIE shall determine if any pre-activity biological surveys would be required and whether a qualified biologist needs to be present during site preparation (e.g., clearing/grubbing, discing, mowing) to monitor for special status species. If needed, pre-activity surveys for specific special-status species would be performed to determine presence or absence. These surveys are performed to avoid or minimize incidental take.	
General Measures for Protecting Biological Resources	
Project footprints shall be kept to the minimum extent necessary to minimize disturbances of plant and wildlife habitat. Prior to conducting any project activities, a qualified biologist will clearly mark special status species habitats within the project site and the immediate area to prevent workers or equipment from adversely affecting species or habitats that are not expected to be damaged during the project.	
Remove and transport all excess materials excavated to a designated waste or fill site.	
Implement best management practices that are appropriate to the site and situation to reduce soil erosion, sedimentation, and adverse effects to water quality. All erosion control materials used would be from weed-free sources and, if left in place following project completion, constructed from 100% biodegradable erosion control materials (e.g., erosion blankets, wattles).	
Dispose of all human-generated trash at the project site in proper containers and remove from the work site and dispose of properly at the end of each workday with specific attention concerning food waste. Proper waste disposal is deposition of material into a trash receptacle with a lid that will not blow open in the wind. Trash receptacles shall not be overfilled to the point that the lids do not fit properly. Large dumpsters can be maintained	

Measure	Description/Purpose
at staging areas for this purpose. All construction debris and trash shall be removed from the work areas upon completion of the project and disposed of at a designated waste or fill site.	
Thoroughly clean (i.e., power washed) equipment vehicles (e.g., dozers, mowers) of weed seeds prior to use in the project area to prevent the introduction of weeds and be inspected by a qualified biological monitor to verify weed-free status prior to use. Prior to site transport, any skid plates shall be removed and cleaned. Equipment should be cleaned of weed seeds daily especially wheels, undercarriages, and bumpers. Prior to leaving the project area, vehicles with caked-on soil or mud shall be cleaned with hand tools such as bristle brushes and brooms at a designated exit area; vehicles may subsequently be washed at an approved wash area. Vehicles with dry dusted soil (not caked-on soil or mud), prior to leaving a site at a designated exit area, shall be thoroughly brushed; vehicles may alternatively be air blasted on site.	
A qualified biological monitor shall inspect any equipment left overnight prior to the start of work. Equipment would be checked for presence of special status species in the vicinity and for fluid leaks.	
Do not leave holes and trenches open overnight. Plywood sheets or steel plates may be used to cover holes or trenches or an escape ramp for wildlife would be installed if left open overnight. The biological monitor would inspect these locations before the resumption of work.	
Vegetation clearing would occur during daylight hours during periods where there is no rainfall.	
During the design and construction of the LOLA, the design will consider appropriate distances to avoid impacts to the Burton Mesa Chaparral outside the airfield fence from jet blast (temperature and air velocity). Blast diverters would be installed as needed according to design configurations to minimize potential impacts.	
For sites to be revegetated, a seeding, planting, and monitoring plan would be submitted for approval by 30 CES/CEIEA. The planting/seed mix would be similar to surrounding native vegetation. Weed control would be conducted for one-year post-construction to achieve at least the same amount or more of pre-construction native plant cover.	
Fuel vehicles and equipment on impervious surfaces and at least 250 feet away from riparian habitats and wetlands. Spill containment equipment will be present at all project sites where fuels or other hazardous substances are brought to the site. In addition, qualified personnel will conduct daily inspections of the equipment and the staging and maintenance areas for leaks of hazardous substances.	
When it is not practical to stage or operate project vehicles or equipment on paved or existing roadways and trails, vehicles and equipment will be staged and operated on nonnative vegetation to the maximum extent practicable.	
Special-Status-Species Measures	
Conduct equipment maintenance and refueling at least 250 feet away from riparian habitats and wetlands.	
30 CES/CEIEA staff, project personnel, and contractors will coordinate to schedule initial ground disturbance during the season least impactful for special status species. For the California red-legged frogs this time is outside of the peak breeding period season (November 15 through March 30).	
Post-project restoration activities will consider potential benefits to California red-legged frogs. The restoration of areas may occur during the rainy season; however, if seeding must occur in the dry season, extra thick hydromulch or watering is recommended. In unimproved areas, 30 CES/CEI will approve the seed mix. It may also be desirable to set aside the first four inches of topsoil as a seed base.	
A GIS database will be maintained of all California red-legged frog localities and occupied habitat.	
Pre-Project Surveys for California red-legged frogs (these apply to implementation of an approved project): a. From 15 November to 31 March, a Service-approved biologist will conduct a pre-construction survey of project areas within suitable aquatic, adjacent upland, or dispersal habitat (210 meters from aquatic habitat or other distance as determined by a Service-approved biologist following adaptive habitat assessment procedures described in your June 14, 2018, reinitiation request letter) immediately before the onset of all work activities. b. From 1 April to 14 November, conduct a pre-project survey of project areas within suitable aquatic or upland habitat [43 meters from aquatic habitat or other distance as determined by a Service-approved biologist following adaptive habitat assessment procedures described in your June 14, 2018, reinitiation request letter to identify potential artificial water or shelter resources that may contain sheltering California red-legged frogs. c. Repeat surveys following any precipitation event greater than 0.5 centimeter (0.2 inch) during a 24-hour period.	

Measure	Description/Purpose
d. A Service-approved biologist will monitor any initial ground disturbance or vegetation removal within suitable aquatic, adjacent upland, or dispersal habitat identified following the adaptive habitat assessment procedures described in your June 14, 2018, reinitiation request letter. However, after the initial ground disturbance/vegetation removal is complete, no further monitoring would be required within these bare-dirt areas.	
If California red-legged frogs are found within the project area during pre-project surveys, daily monitoring where required, or at any other time, all construction activity within the vicinity of the California red-legged frog occurrence (if any) would cease and the DAF would notify the USFWS immediately.	
Construction activities with potential to impact special-status species would not occur until 24 hours after an actual precipitation event that accumulates greater than 0.5 centimeter (0.2 inch) within a 24-hour period.	
A qualified biologist(s) shall brief all project personnel prior to participating in construction activities. At a minimum, the training would include a description of special-status biological resources occurring in the area, the general and specific measures, and restrictions necessary to protect these resources during project implementation.	
If vegetation clearing occurs during the nesting period for non-raptor species (15 February through 15 August), a qualified biologist would survey the area for nesting birds and delineate 100-foot buffers (or other size sufficient to prevent disturbance) around any nests that are found to reduce risk of nest abandonment.	
Earthen igloo shall include early successional Burton Mesa Chaparral herbaceous plant species as part of mitigation restoration in coordination with SLD 30 CES/CEI staff to ensure project personnel and contractors plan and implement mitigation requirement at the igloo site. Weed control would be conducted for one-year post-construction to achieve at least the same amount or more of pre-construction native plant cover.	
Cultural Resources	
SLD 30/CEIEA requires archaeological and Native American monitoring during construction through any known archaeological site or within 60 meters of the recorded boundary of any known site, regardless of a site's National Register of Historic Places eligibility. Archaeological and Native American monitors would therefore be present during construction disturbance and vegetation clearing activities in or within 60 meters of known archaeological sites.	
If previously undocumented cultural resources are discovered during construction activities, work would stop, and the procedures established in 36 CFR Part 800.13 and the VSFB Integrated Cultural Resources Management Plan shall be followed.	
Infrastructure, Transportation, and Utilities Measures	
Warning signs, cones, and flaggers would be provided when necessary to warn roadway users of construction activity near Airfield Road and to control traffic flow if necessary.	
Disposal of construction debris off Base would be reported to the SLD 30, Installation Management Flight (SLD 30/CEI) Solid Waste Manager.	
Solid waste disposal would be coordinated with SLD 30, Installation Management Flight (SLD 30/CEI) Solid Waste Manager and the recycling center to divert any recyclable material from landfill disposal.	
The installation of utility infrastructure would be done in accordance with any applicable codes and regulations.	
Hazardous Materials and Waste Measures	
Proper disposal of hazardous waste would be accomplished through identification, characterization, sampling (if necessary), and analysis of wastes generated. Demolitions would be coordinated with the VSFB Toxics Manager as well as all disposals of hazardous waste.	
All hazardous materials would be properly identified and used in accordance with manufacturer's specifications to avoid accidental exposure to or release of hazardous materials required to operate and maintain construction equipment.	
Hazardous materials would be procured through or approved by the Vandenberg Hazardous Materials Pharmacy (HazMart). Monthly usage of hazardous materials would be reported to the HazMart to meet legal reporting requirements.	
Safety Measures	
All project activities would comply with Occupational Safety and Health Administration, Air Force Occupational Safety and Health, California Division of Occupational Safety and Health regulations, and other recognized standards and applicable DAF regulations or instructions.	
Restrict general access to the proposed construction site through use of signs and fencing if feasible.	
Comply with all provisions and procedures prescribed for the control and safety of personnel and visitors to the job site.	

Measure	Description/Purpose
Provide for the health and safety of workers and all subcontractors who may be exposed to operations or services. Submit a health and safety plan to VSFB and appoint a formally trained individual to act as safety officer. The appointed individual would be the point of contact on all problems involving job site safety.	
Coordinate with the weapons safety specialist regarding the explosives safety standards for marking and establishing access control to the Munitions Storage Igloo sites.	

APCD = Air Pollution Control District; BMP = best management practice; BO = Biological Opinion; CEIEA = Civil Engineering Group, Environmental Assets Division; CES = Civil Engineer Squadron; CFR = Code of Federal Regulations; GIS = geographical information system; DAF = Department of the Air Force; ESA = Endangered Species Act; HazMart = Hazardous Materials Pharmacy; LOLA = Live ordnance loading area; QD = quantity-distance; SLD 30 = Space Launch Delta 30; USFWS = US Fish and Wildlife Service; VSFB = Vandenberg Space Force Base