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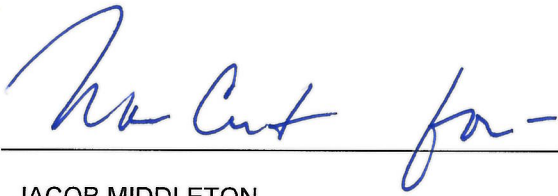
**Environmental Assessment for
Aerospace Data Facility Colorado
Implementation of the Electrical
Infrastructure Master Plan
Buckley Air Force Base, Colorado**

National Reconnaissance Office –
Aerospace Data Facility Colorado
U.S. Air Force – Buckley Air Force Base

June 2020

ENVIRONMENTAL ASSESSMENT
PROJECT Aerospace Data Facility Colorado Implementation of the
Electrical Infrastructure Master Plan
Buckley Air Force Base, Colorado

PROPONENT:

A handwritten signature in blue ink, appearing to read "Jacob Middleton", written over a horizontal line.

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Colonel, USAF
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A handwritten date in blue ink, "June 2020", written over a horizontal line.

DATE

Cover Sheet
Draft Environmental Assessment
Aerospace Data Facility Colorado
Implementation of the Electrical Infrastructure Master Plan
Buckley Air Force Base, Colorado

Responsible Agency: National Reconnaissance Office (NRO)/Aerospace Data Facility Colorado (ADF-C).

Coordinating Agency: U.S. Air Force, 460th Space Wing and Air Force Space Command at Buckley Air Force Base (AFB)

Report Designation: Environmental Assessment (EA)

Proposed Action: The NRO/ADF-C proposes to provide a resilient and reliable 13.2-kilovolt backup power generation plant and associated power distribution infrastructure at the NRO/ADF-C at Buckley AFB. The new power and distribution infrastructure would replace the existing Central Power Plant (CPP) and associated electrical distribution infrastructure to allow it to meet modern mission standards and current U.S. Environmental Protection Agency New Source Performance Standards for stationary sources of air emissions.

Abstract: The NRO/ADF-C has prepared this EA to assess the potential environmental effects that may result from modernizing the existing onsite backup power generation and distribution systems, including replacing the CPP. The new power plant would have lower operating emissions than the existing plant. Construction would be phased to meet funding requirements and prevent interruption in backup power generation capacity.

This EA analyzes and documents potential environmental consequences associated with the Proposed Action and the No Action Alternative. The EA examines potential effects of the Proposed Action and the No Action Alternative on eight resource areas: cultural resources, water resources, biological resources, transportation and infrastructure, geologic resources, air quality, hazardous materials and solid waste, and noise.

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Acronyms and Abbreviations

460 SW	460 th Space Wing
µg/m ³	microgram(s) per cubic meter
AAA	Armament and Automotive Area
ACAM	Air Conformity Applicability Model
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
ADF-C	Aerospace Data Facility Colorado
AFB	Air Force Base
AFI	Air Force Instruction
AGES	aerospace ground equipment shop
APE	Area of Potential Effect
AQCR	air quality control region
ARPA	Archaeological Resources Protection Act
AST	aboveground storage tank
BCC	Bird of Conservation Concern
BCR	Bird Conservation Region
BMP	best management practice
CAA	Clean Air Act
CABI	certified asbestos building inspector
CCR	<i>Colorado Code of Regulations</i>
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	<i>Code of Federal Regulations</i>
CO	carbon monoxide
CO ₂	carbon dioxide
CO _{2e}	carbon dioxide equivalent
CPP	Central Power Plant
CWA	Clean Water Act
dB	decibel(s)
dBA	A-weighted decibel(s)
DNL	day-night sound level
DoD	U.S. Department of Defense
EA	environmental assessment
EIS	environmental impact statement
EISA	Energy Independence and Security Act
EO	Executive Order
EPA	U.S. Environmental Protection Agency

Acronyms and Abbreviations

ESA	Endangered Species Act
FHWA	Federal Highway Administration
FONPA	finding of no practicable alternative
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
GIS	Geographic Information System
HAP	hazardous air pollutant
I-	interstate
ICRMP	Integrated Cultural Resources Management Plan
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
kg	kilogram(s)
kV	kilovolt(s)
kWh/yr	kilowatt-hour(s) per year
lb	pound(s)
LRT	light rail transit
LUC	land use control
MBTA	Migratory Bird Treaty Act
MBtu/hr	million British thermal units per hour
MS4	municipal separate storm sewer system
MW	megawatt(s)
MWRD	Metro Wastewater Reclamation District
N/A	not applicable
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NO ₂	nitrogen dioxide
NO _x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
NRHP	National Register of Historic Places
NRO	National Reconnaissance Office
O ₃	ozone
Pb	lead
PM ₁₀	particulate matter equal to or less than 10 microns in diameter
PM _{2.5}	particulate matter equal to or less than 2.5 microns in diameter
ppb	part(s) per billion, by volume
PPE	personal protective equipment
ppm	part(s) per million, by volume

PSD	prevention of significant deterioration
RACS	regulated asbestos contaminated soils
RCRA	Resource Conservation and Recovery Act of 1976
ROI	region of influence
SHPO	State Historic Preservation Office
SIP	state implementation plan
SO ₂	sulfur dioxide
SPCC	spill prevention, control, and countermeasures
SWMP	stormwater management program plan
SWPPP	stormwater pollution prevention plan
TCE	trichloroethene
TCP	traditional cultural property
tpy	ton(s) per year
U.S.C	<i>United States Code</i>
USAF	U.S. Air Force
USFWS	U.S. Fish Wildlife Service
UST	underground storage tank
VOC	volatile organic compound

1. Purpose and Need for Action

The NRO/ADF-C is a multi-mission ground station responsible for supporting worldwide defense operations and multi-agency collection, analysis, reporting, and dissemination of intelligence information. It provides data to defense, intelligence, and civil agencies supporting the U.S. government and its allies. The facility requires a redundant power supply, and the existing power plant and associated electrical distribution infrastructure requires replacement due to its age and in order to meet modern mission standards and current U.S. Environmental Protection Agency (EPA) New Source Performance Standards (NSPS) for stationary sources of air emissions. To accomplish its mission, the NRO/ADF-C requires a resilient and reliable source of power. This need is the focus of the Proposed Action and this environmental assessment (EA).

This EA has been prepared in accordance with U.S. Air Force (USAF) obligations under the National Environmental Policy Act of 1969 (NEPA) (42 *United States Code* [U.S.C.] Sections 4321 et seq.), the Council on Environmental Quality's (CEQ's) NEPA-implementing regulations (Title 40 *Code of Federal Regulations* [CFR] Parts 1500 to 1508), USAF's NEPA-implementing regulations (32 CFR Part 989), and U.S. Department of Defense (DoD) Instruction 4715.9, *Environmental Planning and Analysis*.

This section of the EA describes the purpose of and need for the Proposed Action, summarizes the scope of the EA, and explains the applicable regulatory requirements.

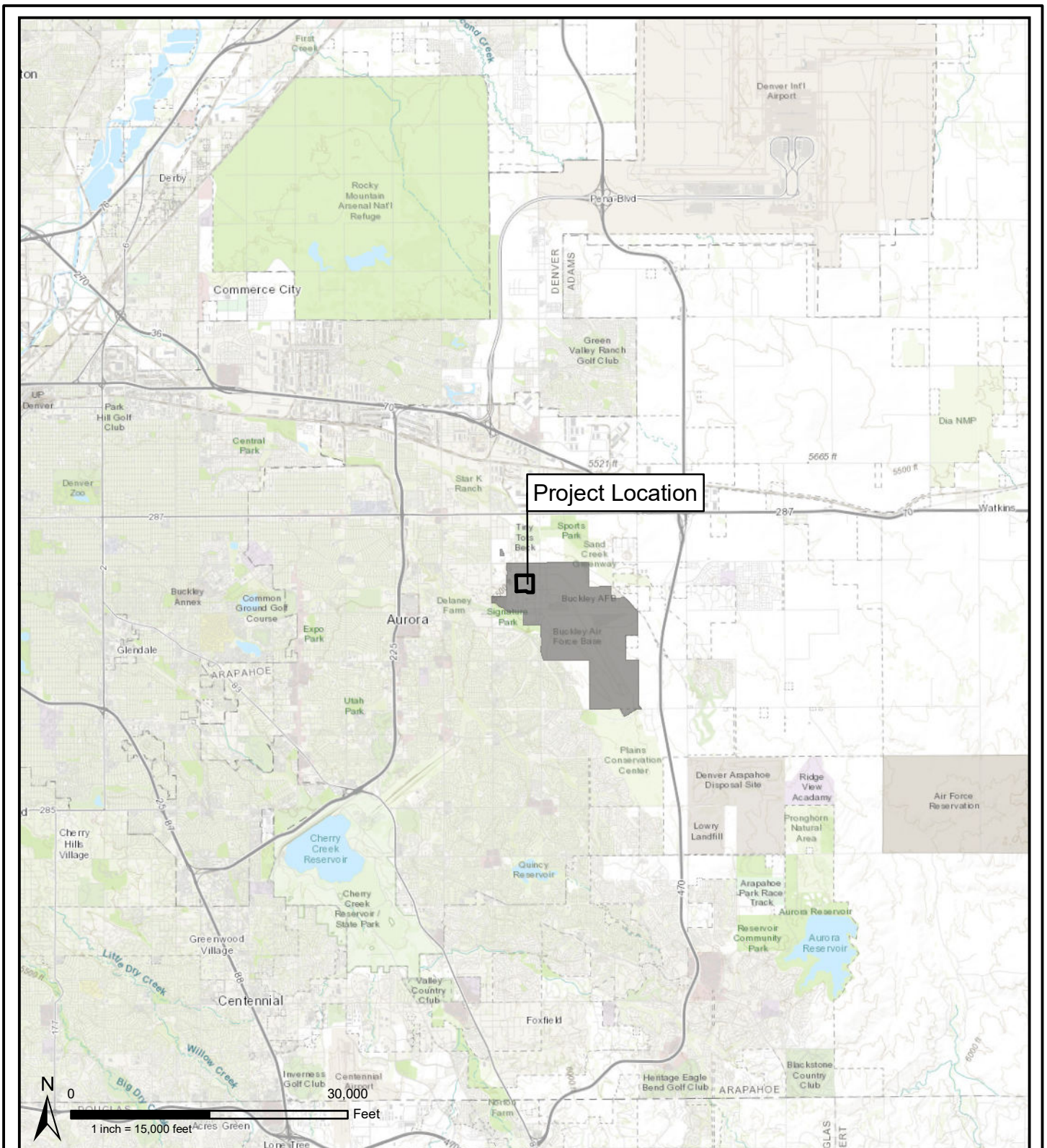
1.1 Introduction

Buckley AFB is located on 3,288 acres on the eastern edge of urbanized portions of the City of Aurora, Colorado (**Figure 1-1**) (Buckley AFB 2016a). The 460th Space Wing (460 SW) operates Buckley AFB and hosts a variety of tenants with a range of missions, such as NRO/ADF-C, Headquarters Air Reserve Personnel Center, the 140th Wing of the Colorado Air National Guard, the Colorado Army National Guard, and the Navy Operational Support Center. The NRO/ADF-C is located inside a secure boundary within Buckley AFB. The Proposed Action will take place within the NRO/ADF-C.

1.2 Purpose and Need

The purpose of the Proposed Action is to support the present and future backup power supply needs for the NRO/ADF-C at Buckley AFB by providing a resilient and reliable 13.2-kilovolt (kV) power generation plant and associated distribution infrastructure. The new power and distribution infrastructure would replace the existing Central Power Plant (CPP) and associated electrical distribution infrastructure to allow it to meet modern mission standards and current EPA NSPS for stationary sources of air emissions. The existing CPP provides a redundant power system for the NRO/ADF-C. The original engines located in the CPP were installed in the late 1980s and early 1990s and are designed to run continuously as primary source power. However, the NRO/ADF-C only requires a redundant power supply, so the engines are only used when backup power is required. Because the engines are not operating continuously, the engines do not meet their design efficiency, require additional maintenance, and, therefore, do not meet the expected equipment lifespan (Simmons 2019). Furthermore, the engines cannot be upgraded with control technologies to Tier 4 standards without replacement. Therefore, the engines located in the CPP require replacement because they are not able to meet modern mission standards or the current NSPS emission standards with retrofit upgrades.

The NRO/ADF-C operates 24/7 and requires a reliable backup power source capable of providing continuous power in the event of local utility outage. The Proposed Action should provide a holistic solution that updates the power infrastructure of the existing power generation and distribution system serving the NRO/ADF-C and provides the expanded backup generation capacity necessary to meet future peak power requirements of the Base.



Base Map Source: ESRI World Topographic Map

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Legend

- NEPA Boundary
- Buckley AFB



Figure 1-1 Regional Vicinity Map

Buckley AFB and the ADF-C
Aurora, Colorado

Date: 7/15/2019

1.3 Relevant Plans, Laws, and Regulations

A decision on whether to proceed with the Proposed Action depends on numerous factors, including mission requirements, regulatory requirements, and environmental considerations. In addressing environmental consideration, the NRO/ADF-C and Buckley AFB Environmental Wing were guided by relevant statutes and their implementing regulations, as well as Executive Orders (EOs), that establish standards and provide guidance on environmental and natural resources management and planning.

The following regulations and EOs were considered as part of this EA and the NRO/ADF-C Electrical Master Plan:

- NEPA
- 32 CFR Part 989 (USAF NEPA-implementing regulations)
- Noise Control Act
- Clean Air Act (CAA)
- Occupational Safety and Health Act
- Energy Independence and Security Act (EISA), Section 438
- Resource Conservation and Recovery Act of 1976 (RCRA) (42 U.S.C. Sections 6901 to 6992k) and its associated hazardous and solid waste amendments (40 CFR Parts 239 to 282)
- Comprehensive Environmental Response, Compensation, Liability Act (CERCLA) (42 U.S.C. Sections 9601 to 9675), as amended by Emergency Planning and Community Right-to-Know Act (42 U.S.C. Sections 11001 et seq.)
- Federal Air Quality Conformity Applicability (40 CFR Section 93.153)
- Clean Water Act (CWA)
- Water Quality Act
- Endangered Species Act (ESA)
- The Sikes Act
- Migratory Bird Treaty Act (MBTA)
- National Historic Preservation Act (NHPA)
- Intergovernmental Cooperation Act of 1968
- Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C. Section 303)
- EO 11990, *Protection of Wetlands*
- EO 11988, as amended by EO 13690, *Floodplain Management* (30 January 2015)
- EO 11593, *Protection and Enhancement of the Cultural Environment*
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*
- EO 12372, *Intergovernmental Review of Federal Programs*
- EO 13045, *Protection of Children from Environmental Health and Safety Risks*
- EO 13834, *Efficient Federal Operations*
- Air Force Instruction (AFI) 32-7042, *Waste Management*
- AFI 32-7064, *Integrated Natural Resources Management*
- AFI 32-7065, *Cultural Resources Management*
- AFI 32-7086, *Hazardous Materials Management*
- DoD Instruction 2000.16, *Anti-terrorism Standards*
- Colorado Revised Statutes, Title 25, Article 7; Air Quality Control NEPA

1. Purpose and Need for Action

1.3.1 National Environmental Policy Act

NEPA (42 U.S.C. Sections 4321 to 4347) is a federal statute requiring the identification and analysis of potential environmental impacts associated with proposed federal actions before those actions are taken. The intent of NEPA is to help decision makers make well-informed decisions based on understanding of the potential; environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the CEQ, which was charged with developing of implementing regulations and ensuring federal agency compliance with NEPA. The CEQ regulations mandate that all federal agencies use a prescribed structured approach to environmental impact analyses. This approach also requires federal agencies to use an interdisciplinary and systematic approach in their decision-making process. The process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action.

The process for implementing NEPA is codified in Title 40 CFR Parts 1500 to 1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. The CEQ was established to implement and oversee federal policy in this process. The CEQ regulations specify that an EA be prepared to briefly provide evidence and analysis for determining whether to prepare Finding of No Significant Impact or a finding of no practicable alternative (FONPA), where a FONPA is appropriate, or whether the preparation of an Environmental Impact Statement (EIS) is necessary. The EA can aid in an agency's compliance with NEPA when an EIS is unnecessary and facilitate preparation of an EIS when one is necessary.

Air Force Policy Directive 32-70, *Environmental Quality*, states that the USAF will comply with applicable federal, state, and local environmental laws and regulations, including NEPA. The USAF's implementing regulation for NEPA is AFI 32-7061, *The Environmental Impact Analysis Process*, which incorporates 32 CFR Part 989, as amended.

1.3.2 Interagency and Intergovernmental Coordination for Environmental Planning

Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) is a USAF process to inform and coordinate with other governmental agencies regarding proposed actions. When a proposed action is analyzed in an EA, the IICEP provides for scoping, helps refine the alternatives that will be considered, and identifies potential environmental impacts and those resources that may be affected.

Through the IICEP process, the USAF solicits comments regarding its proposed action from other federal, state, and local agencies that have jurisdiction by law or special expertise with respect to a pertinent environmental issue, as well as from other entities such as non-governmental organizations. A copy of the IICEP letters and attachments will be submitted concurrent with the public comment period, together with the list of the agencies and/or individuals contacted and the responses received, and are provided in **Appendix A**, IICEP Documentation.

1.3.3 Required Consultations

Table 1-1 provides a list of agencies or entities for which coordination or consultations have already been conducted or will be initiated.

Table 1-1. Agencies or Entities for which Coordination or Consultation is Required

Consultation Process	Agencies/ Entities Consulted	Agreement Responsibilities	Location of Consultation Documents
NHPA Section 106	Colorado SHPO	Buckley AFB Environmental Wing	Appendix B
ESA Section 7	USFWS	Buckley AFB Environmental Wing	Per 1 March 2017 Memorandum, USFWS concurred: No Threatened and Endangered Species at Buckley AFB (Appendix E)
Title V Air Permit ^a	CDPHE	Buckley AFB Environmental Wing NRO/ADF-C Environmental	Appendix B

^a Buckley AFB Environmental Wing is in the process of disaggregating the Title V permit. Stationary sources at the NRO/ADF-C facility will be held under a separate Title V permit with CDPHE.

CDPHE = Colorado Department of Public Health and Environment

SHPO = State Historic Preservation Office

USFWS = U.S. Fish and Wildlife Service

1.4 Public Outreach and Involvement

A copy of the draft EA will be made available at the Aurora Public Library, 14949 E Alameda Pkwy, Aurora, Colorado 80012, and on the Buckley AFB website during the 30-day review period. The Notice of Availability will be published in the Aurora Sentinel and posted on the Buckley AFB website (<https://www.buckley.af.mil/>).

1.5 Document Organization

The EA is composed of the following sections:

- **Section 1, Purpose and Need for Action**, provides background information about the Proposed Action, the purpose and need for the Proposed Action, applicable regulatory requirements, and a brief description of how the document is organized.
- **Section 2, Description of the Proposed Action and Alternatives**, presents the considered alternatives, screening criteria, and detailed descriptions of the No Action Alternative and Action Alternatives. It also includes a discussion of resources eliminated from further analysis.
- **Section 3, Affected Environment**, provides a description of the existing conditions of the environmental resources potentially affected by the No Action Alternative and Action Alternatives.
- **Section 4, Environmental Consequences**, presents an analysis of potential direct, indirect, and cumulative impacts to environmental resources resulting from the No Action Alternative and Action Alternatives. A summary table comparing the potential impacts of each alternative is provided in **Table 4-1**.
- **Section 5, List of Preparers, Agencies Contacted, and Distribution**, provides a list of individuals who contributed to the preparation of this EA.
- **Section 6, References**, presents the references used in preparing this EA.

2. Description of the Proposed Action and Alternatives

The following section provides a detailed explanation of the Proposed Action, along with the selection standards used to determine which alternatives are carried forward for full analysis.

2.1 Selection Standards and Screening of Alternatives

Several options for supplying power to the NRO/ADF-C are available. Per 32 CFR § 989.8(c), the USAF may develop written selection standards to narrow the range of alternatives analyzed to those that meet the operational, technical, or environmental standards applicable to this Proposed Action. The following provides an explanation of how the selection standards were applied to the potential alternatives.

2.1.1 Range of Alternatives Considered

- **Alternative 1: Power Generation using Onsite Generators (Proposed Action)** – Update the existing onsite backup power generation and distribution systems, including replacing the CPP. The new power plant would have lower emissions when operating than the current plant does. Construction would be phased to meet funding requirements and prevent interruption in backup power generation capacity.
- **Alternative 2: Power Generation Using Renewable Energy**
 - **Alternative 2a:** Construct a wind farm to produce backup power. A battery bank also would be required so a continuous supply of electricity would be available.
 - **Alternative 2b:** Construct a solar farm to produce backup power. A battery bank also would be required so a continuous supply of electricity would be available.
- **Alternative 3: Obtain Power from Offsite Sources**
 - **Alternative 3a:** Supply electrical power directly to the NRO/ADF-C from the local utility, Xcel Energy.
 - **Alternative 3b:** Supply power to the backup generators with natural gas from the local utility, Xcel Energy.
- **Alternative 4: Upgrade the Existing CPP** – Replace the existing generators in the CPP with newer, more efficient generators that generate lower emissions.

2.1.2 Selection Standards

The selection standards for the technological solution and the underlying principal for incorporating each selection standard is presented in **Table 2-1**.

Table 2-1. Selection Standards and Underlying Principal

Selection Standard	Underlying Principal
1. Must locate power generation equipment within the secure boundary of the NRO/ADF-C.	The NRO/ADF-C is a high security facility. The backup power generation and fuel supply must be located within the secure boundary of the NRO/ADF-C to ensure its security.
2. Must meet height restrictions of the NRO/ADF-C.	The NRO/ADF-C has structural height restrictions within the secure boundary.
3. Must provide reliable power with backup that will not result in any outages at the NRO/ADF-C.	The NRO/ADF-C requires backup power generation. While public utilities are fairly reliable, they do experience outages due to severe weather, equipment failure, or overloading of the grid. The data facility operates on the Uptime Institute Tier III redundancy requirements for data facilities.

2.1.3 Screening of Alternatives

For the purpose of screening the alternatives, selection standards were given a weighted score between 1 and 2 based on the importance of the standard, with 1 being less important and 2 being more important. In screening each alternative against the three selection standards, a rating of High, Medium, or Low was

2. Description of the Proposed Action and Alternatives

assigned. A High rating received the full weighted score for that given standard, a Medium rating received 50% of the weighted score, and a Low rating received 0% of the weighted score (**Table 2-2**).

Table 2-2. Summary of Alternatives Screening

Alternative Description	Standard 1: Must locate power generation equipment and fuel supply within the secure boundary of the NRO/ADF-C. (2)	Standard 2: Must meet height restrictions of the NRO/ADF-C. (2)	Standard 3: Must provide reliable power with backup that will not result in any outages at the NRO/ADF-C. (2)
Alternative 1: Power generation using onsite generators. Score = 6	High (2)	High (2)	High (2)
Alternative 2a: Power generation using renewable energy: wind farm with batteries. Score = 1.5	Low (0)	Low (0)	High (1.5)
Alternative 2b: Power generation using renewable energy: solar farm with batteries. Score = 3.5	Low (0)	High (2)	High (1.5)
Alternative 3a: Obtain electrical power from offsite sources. Score = 2	Low (0)	High (2)	Low (0)
Alternative 3b: Supply power to the backup generators with natural gas from offsite sources. Score = 2	Low (0)	High (2)	Low (0)
Alternative 4: Upgrade the existing CPP. Score = 4	High (2)	High (2)	Low (0)

2.2 Alternatives Considered but Eliminated from Detailed Study

Under NEPA, an EA requires considerations and analysis of reasonable alternatives to the Proposed Action. Considering alternatives helps to avoid unnecessary impacts and allows for an analysis of reasonable ways to achieve the stated purpose. To warrant detailed evaluation, an alternative must be reasonable. To be considered reasonable, an alternative must be suitable for decision making (that is, any necessary preceding events have taken place), capable of implementation, and satisfactory with respect to meeting the purpose and need for the action. The following alternatives were considered and eliminated from detailed analysis based on the results of the screening matrix presented in **Table 2-2**.

2.2.1 Alternative 2a: Power Generation Using Renewable Energy – Wind Farm

This alternative involves power generation using renewable energy by constructing a wind farm with a battery bank to supply backup power to the NRO/ADF-C. As a result of the screening analysis, this alternative was eliminated from further consideration. The following summary explains the rationale for the Low scoring standards under this alternative:

- **Standard 1: Must locate power generation equipment and fuel supply within the secure boundary of the NRO/ADF-C.** Standard wind farms place large wind turbines with several acres between them. The battery farm would also require several acres. This amount of land is not available within the NRO/ADF-C's secure boundary. Therefore, this alternative scored Low for this standard.

- **Standard 2: Must meet height restrictions of the NRO/ADF-C.** The NRO/ADF-C has height restrictions for its buildings. The average height of a wind turbine is 280 feet (U.S. Energy Information Administration 2017) and would exceed this height. Therefore, this alternative scored Low for this standard.

2.2.2 Alternative 2b: Power Generation Using Renewable Energy – Solar Farm

This alternative involves power generation using renewable energy by constructing a solar farm with a battery bank to supply backup power to the NRO/ADF-C. As a result of the screening analysis, this alternative was eliminated from further consideration. The following summary explains the rationale for the Low scoring standards under this alternative:

- **Standard 1: Must locate power generation equipment and fuel supply within the secure boundary of the NRO/ADF-C.** Standard solar farms include an array of solar panels. To meet the electrical requirements of this project, a solar farm would have to be approximately 250 acres in size. The battery farm would also require several acres. This amount of land is not available within the NRO/ADF-C's secure boundary. Therefore, this alternative scored Low for this standard.

2.2.3 Alternative 3a: Supply Electrical Power Directly to the NRO/ADF-C from the Local Utility

Alternative 3a involves obtaining power from offsite sources. The following summary explains the rationale for the Low scoring standards under this alternative:

- **Standard 1: Must locate power generation equipment and fuel supply within the secure boundary of the NRO/ADF-C.** Electrical power would be obtained from the local electric utility, Xcel Energy. The power would not be generated within the secure boundary of the NRO/ADF-C. Therefore, this alternative scored Low for this standard.
- **Standard 3: Must provide reliable power with backup that will not result in any outages at the NRO/ADF-C.** The local utility occasionally experiences power outages due to severe weather, equipment failure, equipment maintenance, and extreme demand. There would be no backup provisions. Therefore, this alternative scored Low for this standard.

2.2.4 Alternative 3b: Supply Electrical Power Directly to the NRO/ADF-C from the Local Utility. Supply power to the Backup Generators with Natural Gas from the Local Utility

Alternative 3b involves obtaining power from offsite sources. The following summary explains the rationale for the Low scoring standards under this alternative:

- **Standard 1: Must locate power generation equipment and fuel supply within the secure boundary of the NRO/ADF-C.** Natural gas would be obtained from the local utility, Xcel Energy, to power the backup generators. Although backup power would be generated within the secure boundary of the NRO/ADF-C, the fuel supply for the backup generators (natural gas) would not be located within the secure boundary. Therefore, this alternative scored Low for this standard.
- **Standard 3: Must provide reliable power with backup that will not result in any outages at the NRO/ADF-C.** The local utility occasionally experiences natural gas supply interruptions due to equipment failure, equipment maintenance, and accidents. Although the backup generators would provide a backup provision, there is a chance that the natural gas supply could be interrupted. Therefore, this alternative scored Low for this standard.

2.2.5 Alternative 4: Upgrade the Existing Central Power Plant

Alternative 4 involves upgrading the existing CPP with newer, more efficient generators. The following summary explains the rationale for the Low scoring standards under this alternative:

- **Standard 3: Must provide reliable power with backup that will not result in any outages at the NRO/ADF-C.** Upgrading the existing CPP would be difficult and time-consuming, poses an increased risk for reducing power reliability during construction, and poses additional safety hazards. The voltages of the existing engines are not the same as replacement engines; therefore, new engines would not be able to be "plugged in" to replace the existing engines. This makes replacement far more difficult and time-consuming. The engines would need to be replaced one at a time while the facility would still be reliant upon the CPP for backup power, posing an increased risk for reduced

2. Description of the Proposed Action and Alternatives

power reliability during construction. The work to replace engines and associated infrastructure to accommodate different voltages would need to be completed in small phases with considerable temporary equipment and components to reduce the risk that reliable backup power fails. However, this level of risk does not meet the mission's reliability standards. Additionally, to maintain a reliable backup power, there could be a chance that the existing generators that may be required to operate would need to be run while construction is taking place. This scenario presents a safety hazard to both the plant operators and construction workers. If construction workers are installing new generators next to existing operating generators, there is increased potential for health and safety hazards. Therefore, this alternative scored Low for this standard.

2.3 Description of Alternatives Carried Forward for Analysis

2.3.1 Alternative 1: Power Generation using Onsite Generators (Preferred Alternative)

Alternative 1 is the preferred alternative. For Alternative 1, the Proposed Action is to recapitalize the existing onsite backup power generation and distribution systems and replace the CPP with a new power plant with lower emissions and improved reliability. Construction would be phased to meet funding requirements and prevent interruption in backup power generation capacity.

All proposed ground-disturbing activities would take place within the NEPA boundary, as shown on **Figure 2-1**. The Colorado Powerhouse is a 30,000-square-foot building addition that will be added to the existing Building E Power Plant. It would match the height and width of the existing Building E Power Plant structure and would contain six 2.5-megawatt (MW) prime-rated diesel generators to match the five existing generators in the Building E Power Plant. The diesel generators would share a common wall. Four 50,000-gallon double-walled underground fuel tanks with leak detection would be installed adjacent to the Building E Power Plant.

Underground duct banks connecting the Colorado Powerhouse to the existing central chiller plant, Buildings A through D, and Building 201 would be constructed to provide 13.2-kV electrical service to the existing load centers throughout the existing facility. These new power services would replace the existing 4,160-kV service provided from the CPP.

The Colorado Powerhouse and distribution system would be constructed over several phases based on available funding. The current construction start date estimate is August 2021 and the project is estimated to take 4 years to complete. Once construction of the Colorado Powerhouse is complete, the existing CPP and some of the aboveground fuel tanks that currently serve the CPP would be demolished. Two of the existing 20,000-gallon diesel aboveground storage tanks (ASTs) would be preserved and used to supply the generators.

A final component of the project would be the construction of a second addition to the Building E Power Plant, referred to as the Colorado Powerhouse Expansion Project. This project would include a 20,000-square-foot addition to the Colorado Powerhouse at the same width and height as the existing building. It would add four 2.5-MW prime rated diesel generators and two additional 50,000-gallon underground fuel tanks (for a total of six) to allow the facility to meet the future peak electrical demand requirements of the facility. This project is estimated to take place after 2025; however, the actual schedule would be determined by available funding.

In addition, some small outbuildings and utility structures may also be constructed as part of the project. Within the NEPA boundary, up to 10 small outbuildings and utility structures would be constructed, consisting of less than 5,000 square feet. None of the outbuilding and utility structure heights would be taller than the existing Building E Power Plant. A temporary parking lot for construction workers may also be constructed adjacent to the secure NRO/ADF-C boundary (**Figure 2-1**).

2.3.2 No Action Alternative

The onsite power generation at the NRO/ADF-C would not be upgraded. There would be no changes to the facilities within the NRO/ADF-C and the redundant power supply needs would not be met.

2.4 Resources Analyzed

This EA identifies the potential impacts to all relevant resource areas that would be required to implement the Proposed Action and alternatives. 40 CFR Section 1508.27 specifies that a determination of significance requires consideration of context and intensity. Impacts described in this section are evaluated in terms of type (beneficial or negative), context (setting or location), intensity (none, negligible, minor, moderate, or significant), and duration (short-term/temporary or long-term/permanent). The type, context, and intensity of an impact on a resource are explained under each resource area. Unless otherwise noted, short-term impacts are those that would result from the activities associated with a project's construction/demolition phase and that would end upon the completion of those phases. Long-term impacts are generally those resulting from the operation of the proposed facility or activity. Impact intensities are further defined as follows:

- A **negligible** impact is defined as an environmental effect that is so small, it would be difficult to observe, and is trivial enough to be disregarded.
- A **minor** impact is defined as an environmental effect that is observable, yet is unlikely to noticeably affect human health, cultural resources, or the environment.
- A **moderate** impact is an environmental effect that is observable and may affect human health, cultural resources, or the environment.
- A **significant** impact is observable and could cause a major impact to human health, cultural resources, or the environment.

Resources have been divided into two groups: (1) resources studied in detail and (2) resources eliminated from further study.

2.4.1 Resource Areas Analyzed

This EA evaluates the potential impacts to the following environmental resources:

- Cultural Resources
- Water Resources
- Biological Resources
- Transportation and Infrastructure
- Geologic Resources
- Air Quality
- Hazardous Materials and Solid Wastes
- Noise

2.4.2 Resource Areas Eliminated from Further Analysis

In accordance with the CEQ and USAF directives to focus analyses on environmental resource areas where there is a potential for significant impact and where the analyses are expected to provide useful information to the decision maker in choosing between alternatives, some resource areas have been eliminated from further study. The rationale for their elimination is summarized as follows:

- **Recreational Resources:** The Proposed Action site is located within a restricted access area where recreation is not allowed. There would be no disproportionate impacts to recreational resources.
- **Socioeconomics:** The Proposed Action would have no appreciable effect on the socioeconomic conditions of Arapahoe County. No additional onsite personnel would be hired to implement the Proposed Action and no population growth would be expected. Therefore, there would be no effects to socioeconomics under the Proposed Action.
- **Environmental Justice:** EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-income Populations*, requires federal agencies to consider disproportionate risk to minority and low-income communities. Using EPA's Environmental Justice Screening and Mapping Tool (EPA 2019), Buckley AFB does not contain a disproportionate percentage of minority or low-income populations. Although minority and low-income individuals are within the buffer area, the Proposed Action will not disproportionately impact these individuals; consequently, there is no likelihood for a disproportionately high and adverse effect on minority and low-income populations resulting from the Proposed Action.

- Protection of Children:** EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, directs federal agencies to identify and assess environmental health risks and safety risks that may disproportionately affect children. The nearest concentrations of children are two Buckley AFB child development centers located in Building 725 (located 2,220 feet east of the NEPA Boundary) and Building 351 (located 2,300 feet south of the NEPA Boundary), and Buckley AFB housing (located 2,000 feet southwest of the NEPA Boundary). Off-Base, the Aurora Quest school (2,230 feet west of the NEPA Boundary) and an off-Base residential neighborhood (located 3,850 feet southwest of the NEPA Boundary). These facilities are not immediately adjacent to the project area. Moreover, the preferred alternative results in an overall decrease in emissions of regulated air pollutants (**Tables 4-2 and 4-3**). Therefore, the effects of the preferred alternative on children lowers health or safety risks of substances children are likely to come into contact with (that is, exposure to constituents contained in air). Therefore, the Proposed Action would not disproportionately affect children.
- Airspace:** The Proposed Action would not involve any changes to the current flying missions or the associated airspace at Buckley AFB. The construction of new buildings would be restricted by the height of existing adjacent buildings. Therefore, there would be no effect on airspace.
- Floodplains:** EO 11988, *Floodplain Management*, requires federal agencies to avoid to the extent possible the adverse impacts associated with the occupancy and modifications of floodplains. A review of the Federal Emergency Management Agency Flood Insurance Rate Maps 08005C0182K and 08005C0184K indicated that the NRO/ADF-C is not within a 100- or 500-year floodplain and is in an area with minimal flood hazard (FEMA 2019). Therefore, there would be no impacts to floodplains.
- Wetlands:** EO 119900, *Protection of Wetlands*, requires federal agencies to avoid the adverse impacts associated with the destruction or modification of wetlands. There are no wetlands in the NRO/ADF-C area and construction would not take place within wetland areas (USFWS 2019b). Therefore, there would be no impacts to wetlands.
- Safety and Occupational Health:** Safety and occupational health is the promotion and maintenance of the physical, mental, and social well-being of workers by controlling risk to the highest degree to protect the safety, health, and welfare of people engaged in work or employment. The Proposed Action involves routine construction and workers would comply with all applicable health and safety regulations. The workers would follow a health and safety plan that includes health and safety training and the use of personal protective equipment (PPE). The Proposed Action does not involve any special health and safety concerns; therefore, health and safety impacts are not discussed further.
- Visual Resources:** The visual impacts of a proposed project on the surrounding environment is often considered for NEPA projects where there are resources or important viewsheds that could be diminished by project actions. Within the NRO/ADF-C, there are no sensitive viewsheds; however, four satellite communications ground terminals (radomes) onsite are eligible for the National Register of Historic Places (NRHP) based on their architectural significance. The Proposed Action would result in changes to the visual setting within the NRO/ADF-C, including the construction of two new additions to the Building E Power Plant, demolition of the CPP, and removal of all but two 20,000-gallon aboveground fuel tanks of the existing vertical aboveground fuel tanks that serve the existing CPP. The proposed additions to Building E would be constructed to match the existing height and width of the structure, resulting in minimal change to the viewsheds within the NRO/ADF-C and no affects to the prominence of the radomes. Additionally, the removal of the existing CPP and a portion of the aboveground fuel tanks, which would be replaced with underground tanks, would improve the visibility of the radomes from certain areas within the NRO/ADF-C. The changes in the visual environment in the NRO/ADF-C would be minimal because the design of the Proposed Action would remain consistent with the existing visual environment; therefore, visual resources are not evaluated further in this EA.

3. Affected Environment

This section presents specific information about the environment that could be impacted from implementation of the Proposed Action. Potential impacts resulting from the Proposed Action are detailed in **Section 4**, Environmental Consequences.

3.1 Cultural Resources

3.1.1 Definition of Resource

“Cultural resources” is an umbrella term for heritage-related resources defined in various laws and EOs. Federal cultural resources laws and regulations include the NHPA of 1966, as amended (54 U.S.C. § 300101), the Archeological and Historic Preservation Act of 1974 (Public Law 93-291 and 16 U.S.C. 469 to 469c), the American Indian Religious Freedom Act of 1978 (Public Law 950341, 42 U.S.C. 1996 and 1996a), the Archaeological Resources Protection Act (ARPA) of 1979 (Public Law 96-95 and amendments, 16 U.S.C. 470aa to 470mm), and the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (Public Law 101-601, 25 U.S.C. 3001).

Cultural resources include archaeological resources, architectural resources, and traditional cultural properties (TCPs). Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (such as projectile points and bottles) and are places where past peoples left physical evidence of their occupation. Archaeological resources may include structural ruins or deposits of prehistoric occupation debris such as artifacts and food remains (seed, shells, and bones). Architectural resources are buildings or other structures or groups of structures, or designed landscapes that are of historic, aesthetic, or scientific significance. Generally, architectural resources must be more than 50 years old to be considered for listing in the NRHP. More recent structures, such as Cold War-era resources, might be significant if they are of exceptional importance or if they have the potential to gain significance in the future. TCPs are resources of traditional, religious, or cultural significance to Native American tribes or other groups. Federal land managers must consult with tribes that attach religious and cultural significance to cultural properties that could be affected by an undertaking, per 36 CFR 800.2(c)(2)(ii).

USAF installations are mandated to comply with Sections 106 and 110 of the NHPA, NAGPRA, and other legal mandates for each action, project, or activity (undertaking) for which an installation is directly or indirectly responsible. AFI 32-7065, paragraph 1.4.8 directs installation commanders to establish government-to-government relationships with federally recognized Native American tribes and to consult with tribes on undertakings. DoD facilities are required to comply with DoD Instruction 4715.5 and DoD Instruction 4715.05-G, which direct commanders to *“manage and maintain cultural resources under DoD control in a sustainable manner through a comprehensive program that considers the preservation of historic, archaeological, architectural, and cultural values; is mission supporting; and results in sound and responsible stewardship.”*

Resources judged important under the NHPA are eligible for listing in the NRHP. These are termed “historic properties” and are provided protection under the NHPA. Under NHPA, a property is significant if it meets the NRHP criteria listed in 36 CFR Section 60.4. These criteria include the following:

- **Criterion A:** Association with events that have made a significant contribution to the broad patterns of our history
- **Criterion B:** Association with the lives of persons significant in our past
- **Criterion C:** Embodiment of the distinctive characteristics of a type, period, or method of construction or representative of the work of a master or possessing high artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction.
- **Criterion D:** Yielding, or likely to yield, information important in prehistory or history

Section 106 of the NHPA requires federal agencies to consider the effects of proposed undertakings on historic properties and to provide the Advisory Council on Historic Preservation (ACHP) and SHPO with an opportunity to comment. The consultation process prescribed in Section 106 of the NHPA requires a determination of the effect of a federal undertaking on historic properties within the proposed Area of

3. Affected Environment

Potential Effect (APE). The proposed APE is defined as the geographic areas “*within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.*” The federal agency evaluates the NRHP eligibility and assesses potential effects of an undertaking on historic properties in consultation with the SHPO, consulting parties, and relevant federally-recognized Native American tribes. If historic properties could be affected by the undertaking, the federal agency is required to comply with requirements outlined in 36 CFR Part 800 and with the directives in AFI 32-7065.

The proposed APE for cultural resources for this undertaking is shown on **Figure 3-1**. The proposed APE encompasses the areas of the Proposed Action, including temporary construction staging areas, laydown sites, and proposed demolition sites. The proposed APE was provided to the Colorado SHPO for review and comment as part of the NHPA Section 106 consultation process. Refer to **Appendix B**, Public Involvement, for more detailed information on the Section 106 consultation

The Buckley Integrated Cultural Resources Management Plan (ICRMP) (Buckley AFB 2019a) summarizes the archaeological and architectural inventories conducted at Buckley AFB between 1983 and 2018. The following sections discuss the identified cultural resources within the proposed APE.

3.1.2 Archaeological Resources

According to the ICRMP, approximately 3,100 acres at Buckley AFB have been surveyed for archaeological resources. No archaeological sites listed, or eligible for listing, in the NRHP have been identified within the proposed APE. Limited surveys of the land and resources within the NRO/ADF-C were conducted in 2004 and 2018. The 2004 survey concluded that the potential for intact archaeological resources within the NRO/ADF-C is low because of past construction activities and bioturbation (Buckley AFB 2019a). Because surveys have been conducted within the proposed APE and because the probability of finding intact archaeological resources was found to be low, no additional archaeological surveys were conducted as a part of this undertaking.

3.1.3 Architectural Resources

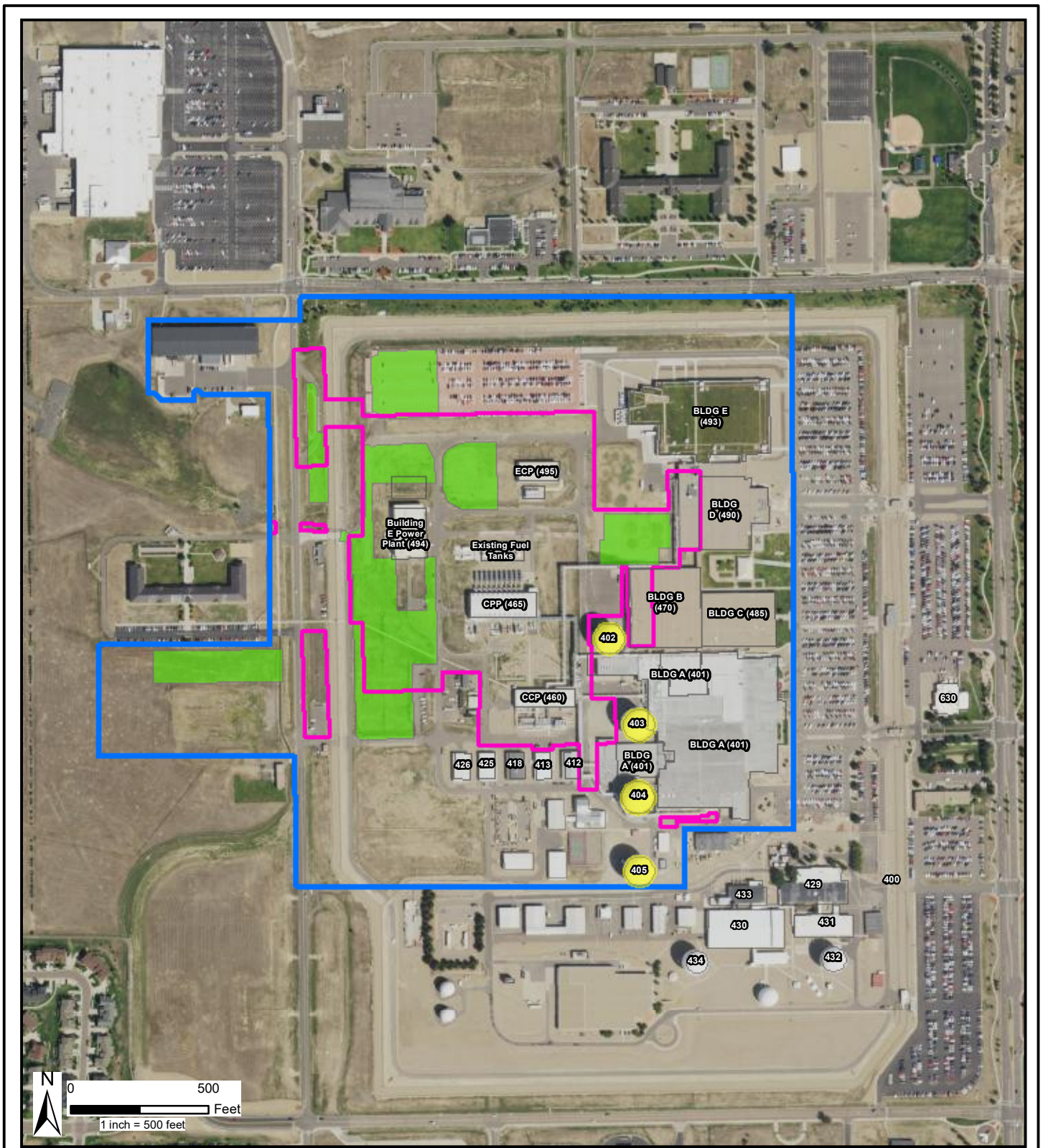
Architectural resources are defined in this EA as structures, objects, landscapes, and buildings. According to the 2019 ICRMP, all real property features, landscapes, and viewsheds at Buckley AFB have been evaluated under NRHP criteria, including Criterion G, which applies to resources that are less than 50 years of age. Most cultural resources with historic significance at Buckley AFB are less than 50 years old because the Base’s developmental history took place during the latter half of the 20th century (Buckley AFB 2019a). Because all the architectural resources at Buckley AFB have been previously evaluated for NRHP eligibility, no additional field surveys were conducted as a part of this project and no re-evaluations of NRHP eligibility were completed. The following information is from the Buckley AFB ICRMP, which was updated in 2019.

Eight NRHP-eligible architectural resources are located at Buckley AFB. Of these eight properties, four are located within the proposed APE (Buckley AFB 2019a):

- Building 402 - Satellite Communications Ground Terminal (5AH2332, NRHP-eligible)
- Building 403 - Satellite Communications Ground Terminal (5AH2288, NRHP-eligible)
- Building 404 - Satellite Communications Ground Terminal (5AH2289, NRHP-eligible)
- Building 405 – Satellite Communications Ground Terminal (5AH.2333, NRHP-eligible)

Located within the NRO/ADF-C, these three structures are satellite communications ground terminals known as radomes. Each radome consists of a concrete base supporting a geodesic dome. The concrete base has one roll-up door and one small door, as well as exhaust fans and vents. The geodesic dome is constructed of white Masonite (Buckley AFB 2019a). These four properties are eligible for listing in the NRHP under Criterion C for architectural significance as excellent examples of radome construction, and under Criterion A for their association with Cold War-era history (Buckley AFB 2019a).

Building 402 (5AH.2332) is the closest to the Proposed Action, approximately 665 feet from the existing Building E Power Plant. There are no NRHP-eligible landscapes or NRHP-eligible historic districts within Buckley AFB (Buckley AFB 2019a).



Legend

- APE
- Proposed Construction Outline
- Staging and Parking Areas
- NRHP Eligible Resource
- Building

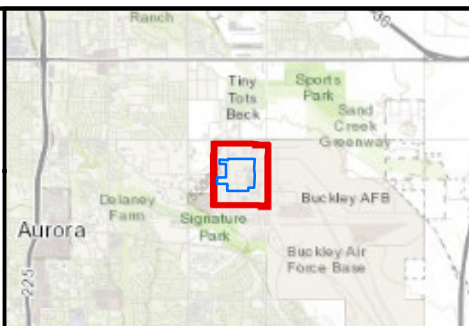


Figure 3-1
Proposed Area of Potential Effect

Environmental Assessment
Aerospace Data Facility Colorado
Implementation of the
Electrical Infrastructure Master Plan
Buckley Air Force Base, Colorado

Buckley AFB
Aurora, Colorado

3. Affected Environment

3.1.4 Traditional Cultural Properties

A TCP is a property that is eligible for inclusion in the NRHP based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, to social institutions of a living community. There are no known TCPs at Buckley AFB as of December 2019. No Native American human remains, or objects of patrimony have been reported or discovered at Buckley AFB. Therefore, TCPs are not discussed further in this document. Government-to-government consultation between the installation and federally recognized Native American Tribes has been initiated. Refer to **Appendix B**, Public Involvement, for more detailed information on the Section 106 consultation process and tribal consultation.

3.2 Water Resources

3.2.1 Definition of Resource

Water resources include both groundwater and surface water. Groundwater includes subsurface hydrologic resources. Groundwater properties are often described in terms of depth to aquifer or water table, water quality, and surrounding geologic composition. Stormwater flows, defined as runoff from precipitation that are increased by impervious surfaces, may introduce sediments and other contaminants into the water resource environment. Surface water resources include lakes, rivers, streams, and wetlands. These resources can be important to economic, ecological, recreational, and human health resources.

3.2.2 Existing Environment

3.2.2.1 Groundwater

Buckley AFB is located within the Denver Basin aquifer system, which contains four major aquifer systems. These four systems, from youngest (shallowest) to oldest (deepest), are as follows: the Dawson aquifer, the Denver aquifer, the Arapahoe aquifer, and the Laramie-Fox Hills aquifer (USGS 2014a).

The surficial aquifer at Buckley AFB varies from 20 to 100 feet in thickness and was created by alluvial deposition. Groundwater recharges the surficial aquifer through infiltration of precipitation and irrigation water and upward seepage from underlying aquifers. Groundwater is discharged from the alluvial aquifer through seepage to streams, evapotranspiration, downward seepage to underlying aquifers and extraction through groundwater wells (Buckley AFB 2018a). A recent remediation feasibility study adjacent to the Proposed Action found the groundwater table varies between 28 and 45 feet below ground surface (RMA-Insight Joint Venture 2017).

3.2.2.2 Surface Water

The Proposed Action is entirely within the East Toll Gate Creek drainage subbasin. (USGS 2019). East Toll Gate Creek flows in a northwesterly direction and drains into Sand Creek just north of University of Colorado Anschutz Medical Campus. Sand Creek continues to flow west another 7 miles and then drains into the South Platte River north of Denver and southeast of the intersections of Interstate 76 (I-76) and I-270. Section 303(d) of the CWA requires states to list water bodies that do not meet water quality standards and designated uses (impaired waters). East Toll Gate Creek is no longer listed as an impaired waterbody by EPA (CDPHE 2018).

3.3 Biological Resources

3.3.1 Definition of the Resource

Biological resources consist of plants and animals and their habitats. This section describes plant and animal species that occur, or are likely to occur, in the project area.

3.3.2 Existing Environment

3.3.2.1 Vegetation and Wildlife

Buckley AFB is located on 3,288 acres of flat, rolling uplands on the eastern edge of urbanized portions of the City of Aurora. The majority of the installation's land is unimproved (2,771 acres). Approximately 1,588 acres of the unimproved acres are occupied by the airfield. The remaining 1,020 acres are

available for conservation, restoration, and wildlife management that does not conflict with mission and safety requirements.

Buckley AFB is classified as Great Plains-Palouse Dry Steppe Province and Great Plains Shortgrass Prairie Ecoregions. The native fauna in shortgrass prairie ecoregions is frequently dominated by grasses such as blue grama (*Bouteloua gracilis*) and buffalo grass (*Buchloe dactyloides*). Other less common species include needle and thread grass (*Hesperostipa comata*), prairie Junegrass (*Koeleria macrantha*), western wheatgrass (*Pascopyrum smithii*), sand dropseed (*Sporobolus cryptandrus*), sideoats grama (*Bouteloua gracilis*), and salt grass (*Distichlis spicata*). There are a number of exotic species present in this system, including crested wheatgrass (*Agropyron cristatum*), smooth brome (*Bromus inermis*), cheatgrass (*Bromus tectorum*), Kentucky bluegrass (*Poa pratensis*), allysum (*Allysum parviflorum*), and rye grass (*Secale cereal*). Other vegetated areas include cottonwood (*Populus deltoides*) and willow (*Salix*) vegetation communities in riparian corridors, weedy disturbed areas, and landscaped areas (Buckley AFB 2016a). The distribution of ecological systems on Buckley AFB is defined by the drainages of the installation and limited by the developed and disturbed portions of the installation (Buckley AFB 2011).

EO 13112, *Invasive Species*, requires federal agencies to provide for restoration of native species and habitat conditions in ecosystems that have been invaded by invasive species. Surveys indicated that 18 invasive species occur at Buckley AFB. Non-native noxious and invasive weeds occur primarily in open fields, fence lines, riparian areas, and roads and construction staging areas (Buckley AFB 2016a).

The shortgrass prairie ecosystem supports a variety of wildlife species, including mammals, birds, amphibians, and reptiles. Avian species occupy the Base year-round. Raptor species also are commonly observed on the installation, especially during winter months. Several amphibian and reptilian species occur at Buckley AFB; however, these species were found to occur in aquatic habitats at Buckley AFB, including Williams Lake and East Toll Gate Creek (Buckley AFB 2016a).

The NRO/ADF-C complex has been disturbed overtime with the establishment of facilities, infrastructure, and roadways, and includes non-native landscaped grasses comprised primarily of crested wheatgrass, which is used to revegetate disturbed ground from construction and demolition. The majority of NRO/ADF-C has been developed and contains impervious surfaces that do not support vegetation or wildlife.

3.3.2.2 Threatened and Endangered Species

The ESA requires federal agencies to ensure their actions do not jeopardize the continued existence of any federally listed endangered or threatened species or adversely modify any critical habitat of such species. Critical habitat is defined as a specific geographic area that contains features for the conservation of an endangered species and may require special management and protection. Federal agencies must consult with USFWS under Section 7 of the ESA regarding any action that may affect a listed species. Other sensitive species are protected by Colorado state law under the Colorado Division of Wildlife State Wildlife Act.

The USFWS indicates that there are currently three endangered and four threatened species present in Arapahoe County, Colorado (USFWS 2019a). There are five state species of special concern, and one state threatened species. In 2017, a Sensitive Species Survey was conducted at Buckley AFB. Seventy animal species and 205 plant species were observed and documented; however, as shown in **Table 3-1**, no federally threatened or endangered animals or plants were observed at Buckley AFB (Buckley AFB 2018b). There is currently no critical habitat for any federally threatened or endangered species on Buckley AFB (USFWS 2019a).

3. Affected Environment

Table 3-1. Threatened, Endangered, or Special Concern Species Potentially Occurring at Buckley AFB

Species Group	Common Name	Scientific Name	Federal Status	State Status	Species Presence on Buckley AFB
Amphibians	Northern Leopard Frog	<i>Rana pipiens</i>	N/A	Special Concern ^a	Unknown
Birds	Least Tern	<i>Sterna antillarum</i>	Endangered	N/A	None
	Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Threatened	N/A	None
	Piping Plover	<i>Charadrius melodus</i>	Threatened	N/A	None
	Whooping Crane	<i>Grus Americana</i>	Endangered	N/A	None
	Bald Eagle	<i>Haliaeetus leucocephalus</i>	N/A	Special Concern ^a	Present
	Ferruginous Hawk	<i>Buteo regalis</i>	N/A	Special Concern ^a	Present
	Western Burrowing Owl	<i>Antene cucicularia</i>	N/A	Threatened	Present
Fish	Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Endangered	N/A	None
Flowering Plants	Ute Ladies'-tresses	<i>Spiranthes diluvialis</i>	Threatened	N/A	None
	Western Prairie Fringed Orchid	<i>Platanthera praeclara</i>	Threatened	N/A	None
Mammals	Preble's Meadow Jumping Mouse	<i>Zapus hudsonius preblei</i>	Threatened	N/A	None
	Black-tailed Prairie Dog	<i>Cynomys ludovicianus</i>	N/A	Special Concern ^a	Present
Reptiles	Common Garter Snake	<i>Thamnophis sirtalis</i>	N/A	Special Concern ^a	Present

Source: USFWS 2019; Buckley AFB 2019a

^a State Species of Special Concern not protected under Colorado Revised Statute 33

N/A = not applicable

3.3.2.3 Migratory Birds

The MBTA establishes federal responsibilities to protect migratory birds. Under the MBTA, nearly all species of birds occurring the United States are protected. The MBTA makes it illegal to take (to hunt, pursue, wound, kill, possess, or transport by any means) listed bird species or their eggs, feathers, or nests unless otherwise authorized. The Bald and Golden Eagle Protection Act provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specific conditions, the taking, possession, and commerce of such birds.

The USFWS has identified birds of conservation concern for the Bird Conservation Region (BCR) to which Buckley AFB belongs. Buckley AFB has conducted seasonal avian surveys to identify bird species within the installation (Buckley AFB 2018b). **Table 3-2** identifies the migratory bird species at Buckley AFB.

Table 3-2. Migratory Bird Species on Buckley AFB

Common Name	Scientific Name	Status	Species Presence on Buckley AFB
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Non-BCC-vulnerable ^a	Observed
Burrowing Owl	<i>Athene cunicularia</i>	BCC-BCR ^b	Observed
Golden Eagle	<i>Aquila chrysaetos</i>	BCC-BCR ^b	Observed
Lark Bunting	<i>Calamospiza melanocorys</i>	BCC-BCR ^b	Observed
Lesser Yellowlegs	<i>Tringa favipes</i>	BCC ^c	None
McCown's Longspur	<i>Calcarius mccownii</i>	BCC ^c	None
Willet	<i>Tringa semipalmata</i>	BCC ^c	None
Willow Flycatcher	<i>Empidonax trailii</i>	BCC-BCR ^b	None

Source USFWS 2019; Buckley AFB 2019a

^a Non-BCC-vulnerable birds are not BCC species in the project area, but are included in this list because of the Bald and Golden Eagle Protection Act requirements

^b BCC-BCR birds are Birds of Conservation Concern that are of concern only in particular BCRs in the continental United States.

^c BCC designates Birds of Conservation Concern that are of concern throughout their range anywhere within the United States.

BCC = Birds of Conservation Concern

BCR = Bird Conservation Region

3.4 Transportation and Infrastructure

3.4.1 Definition of Resource

Transportation includes roadway and transit systems in the existing environment. Infrastructure consists of physical, organizational, and facilities that support a population. These systems include heating and cooling, power supply, natural gas supply, communications, liquid fuel supply, water supply, sanitary sewer and wastewater treatment, stormwater, and solid waste.

3.4.2 Existing Environment

3.4.2.1 Transportation

Major highways surrounding Buckley AFB include I-70 north of the Base, I-225 west of the Base, and E-470 east of the Base. Major arterial roadways running east-west and providing access to the Base include 6th Avenue and Mississippi Avenue. Buckley AFB also can be accessed via the Regional Transportation District bus system and Light Rail Transit (LRT). The two nearest LRT stations are within 5 miles of the Base: 13th Avenue Station and 40th Avenue and Airport Boulevard Gateway Park (RTD 2019). Buckley AFB has two active security gates: Mississippi Avenue and 6th Avenue. The Telluride gate is closed. For construction projects, there is currently one security gate for the NRO/ADF-C facility.

3.4.2.2 Heating and Cooling

The operations building within NRO/ADF-C is heated using a natural gas-fired hot water boiler system. The chiller plant contains four, electronically driven, 500-ton chillers that provide chilled water to cool equipment and the interior of the operations building. The chiller plant and Building E Power Plant is heated and cooled using electric, split-system heat pumps (NSA 2011). There will be no changes to the heating and cooling systems under the Proposed Action; therefore, these impacts are not discussed further.

3.4.2.3 Power Supply

Xcel Energy provides electrical power to Buckley AFB through a 13.2-kV feeder system north of the Base. The Buckley AFB electrical distribution system consists primarily of an underground duct bank and most of the Base transformers are pad-mount types installed adjacent to buildings (Buckley AFB 2019b). The existing Building E Power Plant contains five 2.5-MW generators for backup power generation. The CPP contains 10 generators.

3. Affected Environment

3.4.2.4 Natural Gas Supply

Natural gas for Buckley AFB is provided by Xcel Energy. There will be no changes to the natural gas supply within the NRO/ADF-C; therefore, these impacts are not discussed further.

3.4.2.5 Communications

Communication systems for facilities within Buckley AFB include mandatory systems such as mass notification, telephone, cable television, and local area network. Non-mandatory systems include but are not limited to closed-circuit television, intercom, and public address. There will be no changes to the communication systems within the NRO/ADF-C; therefore, these impacts are not discussed further.

3.4.2.6 Liquid Fuel Supply

The 2.5-MW diesel generators located in the Building E Power Plant are supplied by two 20,000-gallon, double-walled steel ASTs installed on a concrete pad. The CPP is supplied by 12 ASTs.

3.4.2.7 Water Supply

Potable water for the Buckley AFB is provided by the City of Aurora (Buckley AFB 2019b). In 2015, the City of Aurora had a potable water demand of over 15 billion gallons per year or an average of 4.1 million gallons per day (MWH 2017).

3.4.2.8 Sanitary Sewer and Waste Water Treatment

The wastewater collection system for Buckley AFB drains to a sewer trunk near the northwest corner of the property, where it connects to the Metro Wastewater Reclamation District (MWRD) system and is treated at the MWRD Robert W. Hite Treatment Facility, located 11 miles northwest of the Base. The current capacity of the MWRD Robert W. Hite Treatment Facility is 220 million gallons per day (MWRD 2019). There will be no changes to the wastewater collection system; therefore, these impacts are not discussed further.

3.4.2.9 Stormwater

Stormwater is discussed in **Section 3.2**, Water Resources.

3.4.2.10 Solid Waste

Solid waste is discussed in **Section 3.7**, Hazardous Materials and Solid Waste.

3.5 Geologic Resources

3.5.1 Definition of Resource

Geologic resources include geology, topography, and soil. Geology is the science that pertains to the Earth's physical structure, substance, and history. Topography describes the surface features on land. Soil consists of varying amounts of mineral particles and organic matter. It serves as a medium for plant growth and water storage, and as habitat for certain types of organisms.

3.5.2 Existing Environment

3.5.2.1 Geology

Buckley AFB is located within the Denver Basin, which covers an area of approximately 6,700 square miles extending from Greeley to Colorado Springs and is bounded on the western edge by the base of the Colorado Front Range. The Denver Basin consists of several geologic layers. These layers, from oldest (deepest) to youngest (shallowest), are as follows: Fox Hills Sandstone Formation, Laramie Formation, Arapahoe Formation, Denver Formation, and Dawson Formation (Robson 1987).

No major geologic hazards such as landslides or geologic resources, except for economically non-recoverable coal reserves, occur within the NEPA Boundary (Buckley AFB 2018b). The Buckley AFB is within a zone that has an expected number of damaging earthquake shaking from 4 to 10 in 10,000 years (USGS 2014b).

3.5.2.2 Topography

The topography of the Proposed Action within Buckley AFB is relatively flat, with elevations ranging from 5,518 feet to 5,547 feet (Google Earth 2019).

3.5.2.3 Soils

The Soil and Water Resources Conservation Act of 1977 requires federal agencies to consider the conservation and protection of soil resources in planning activities. The only mapped soil unit within the NEPA Boundary is Fondis silt loam (NRCS 2019). This soil series has 1% to 3% slopes and is well drained. The available water capacity is moderately low to moderately high. The frequency of flooding or ponding is none and the depth to water table is more than 80 inches. (NRCS 2019).

3.6 Air Quality

3.6.1 Definition of Resource and Regulatory Setting

In accordance with federal CAA requirements, the air quality in a given region or area is measured by the concentrations of criteria pollutants in ambient air, defined as that portion of the atmosphere to which the public has access. The air quality in a region is a result of not only the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological “air basin,” and the prevailing meteorological conditions.

3.6.1.1 Ambient Air Quality Standards

Under the CAA, EPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to affect human health and the environment. The NAAQS represent the maximum allowable concentrations for ozone (O₃), carbon monoxide (CO), oxides of nitrogen (NO_x) as nitrogen dioxide (NO₂), sulfur oxides, respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [PM₁₀] and particulate matter equal to or less than 2.5 microns in diameter [PM_{2.5}]), and lead (Pb) (40 CFR Part 50). The CAA also gives the authority to states to establish air quality rules and regulations aimed at meeting air quality standards. The State of Colorado has adopted the NAAQS. **Table 3-3** presents the EPA NAAQS and the State of Colorado ambient air quality standards.

Table 3-3. National Ambient Air Quality Standards

Criteria Pollutant	Federal Standard (Averaging Period) ^a
CO	35 ppm (1 hour)
	9 ppm (8 hour)
NO ₂	0.100 ppm (1 hour)
	0.053 ppm (annual arithmetic mean)
O ₃	0.070 ppm (8 hour)
PM _{2.5}	12 µg/m ³ (annual arithmetic mean)
	35 µg/m ³ (24 hour) ^b
PM ₁₀	150 µg/m ³ (24 hour)
SO ₂	0.5 ppm (3-hour, secondary standard)
	0.075 ppm (1 hour) ^b
Pb	0.15 µg/m ³ (rolling 3-month average)

Source: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>, accessed August 2019

^a National standards other than O₃, particulate matter, and those based on annual averages or annual arithmetic means are not to be exceeded more than once a year. The O₃ standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM₁₀, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than 1. For PM_{2.5}, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, is equal to or less than the standard. For NO₂, the 1-hour standard is achieved if the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each monitor in an area does not exceed 0.100 ppm (100 ppb). The Pb standard is not to be exceeded.

^b To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

µg/m³ = microgram(s) per cubic meter

ppb = part(s) per billion, by volume

ppm = part(s) per million, by volume

SO₂ = sulfur dioxide

3.6.1.2 General Conformity

The EPA classifies the air quality in an air quality control region (AQCR), or in subareas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas within each AQCR are therefore designated as either “attainment,” “nonattainment,” “maintenance,” or “unclassified” for each of the six criteria pollutants. Attainment means that the air quality within an AQCR is better than the NAAQS; nonattainment indicates that criteria pollutant levels exceed NAAQS; maintenance indicates that an area was previously designated nonattainment but is now attainment; and an unclassified air quality designation by EPA means that there is not enough information to appropriately classify an AQCR, so the area is considered attainment. EPA has delegated the authority for ensuring compliance with the NAAQS in the State of Colorado to CDPHE. In accordance with the CAA, each state must develop a state implementation plan (SIP), which is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS.

The CAA General Conformity Rule (40 CFR Section 93 Subpart B) requires that federal actions must conform with the requirements of the applicable SIP or federal implementation plan. More specifically, CAA conformity is ensured when a federal action does not cause a new violation of the NAAQS; contribute to an increase in the frequency or severity of violations of NAAQS; or delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS. The General Conformity Rule applies only to federal actions in nonattainment or maintenance areas.

3.6.1.3 Federal Prevention of Significant Deterioration

Federal Prevention of Significant Deterioration (PSD) regulations apply in attainment areas to major stationary sources (that is, sources with the potential to emit 250 tons per year [tpy] of any attainment criteria pollutant or its precursors; for a subset of sources listed in the regulations, this level is 100 tpy). PSD also applies to new source review and permitting of significant modifications to existing major stationary sources (that is, any change that adds 15 to 40 tpy to the facility's potential to emit depending on the pollutant). Additional PSD major source and significant modification thresholds apply for greenhouse gases (GHGs). PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's class designation (40 CFR Section 52.21(c)).

3.6.1.4 Federal Nonattainment New Source Review Requirements

Federal Nonattainment New Source Review regulations apply in nonattainment areas to major stationary sources (that is, sources with the potential to emit 100 tpy of any nonattainment criteria pollutant or its precursors; this level may be lower depending on the severity of nonattainment). Significant modifications to existing major stationary sources (that is, net change that adds 15 to 40 tpy to the facility's potential to emit depending on the pollutant) also trigger federal nonattainment new source review (40 CFR Section 51.165).

3.6.1.5 Title V Requirements

Title V of the CAA Amendments of 1990 requires states and local agencies to issue operating permits to major stationary sources. Under Title V, a major stationary source has the potential to emit more than 100 tpy of any one criteria air pollutant or precursor pollutant, 10 tpy of a hazardous air pollutant (HAP), or 25 tpy of any combination of HAPs. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impacts on air quality. Section 112 of the CAA defines the sources and kinds of HAPs that are to be regulated.

3.6.1.6 Greenhouse Gas Emissions

GHGs are gaseous emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The most common GHGs emitted from natural processes and human activities include carbon dioxide (CO₂), methane, and nitrous oxide. GHGs are primarily produced by the burning of fossil fuels and through industrial and biological processes. The EPA's Mandatory GHG Reporting Rule requires source categories identified in the rule to collect comprehensive and accurate data on CO₂ and other GHG emissions that can be used to inform future policy decisions. In general, the threshold for reporting is 25,000 metric tons or more of CO₂ equivalent (CO₂e) emissions per year from stationary sources. For PSD and Title V permitting and reporting, GHG emissions thresholds of significance for permitting of stationary sources are 75,000 tons CO₂e per year and 100,000 tons CO₂e per year.

3.6.2 Existing Environment

Buckley AFB and the areas to be disturbed under the Proposed Action are within Arapahoe County, Colorado. Arapahoe County is part of the Denver Metro/North Range AQCR. The Denver Metro/North Range AQCR also includes the counties of Adams, Boulder, Broomfield, Denver, Douglas, Jefferson, and parts of Larimer and Weld Counties in Colorado (CDPHE 2020). Arapahoe County is also in the Denver-Boulder-Greeley-Fort Collins-Loveland Colorado air basin.

The area affected by the Proposed Action is designated as attainment/unclassified for all criteria pollutants except CO, PM₁₀, and O₃. Arapahoe County is designated as maintenance for the 1971 CO standard and maintenance of the 1987 PM₁₀ standard. Including Arapahoe County, the Denver Metro/North Front Range is designated as marginal nonattainment for the 2015 8-hour ozone standard, and the Denver-Boulder-Greeley-Fort Collins-Loveland Colorado area is designated as serious nonattainment for the 2008 8-hour ozone standard (EPA 2020). **Table 3-4** summarizes the attainment status for the criteria pollutants in Arapahoe County and the New Source Review major source thresholds and the emissions rates thresholds for significant modifications to existing major sources.

3. Affected Environment

Buckley AFB has a Title V Operating Permit (Permit Number: 95OPAR118) issued by CDPHE that was renewed on 1 November 2009 (CHPHE 2009). Section I, Condition No. 3.1 of the permit states the facility is categorized as a nonattainment major stationary source due to the potential to emit more than 100 tpy of NO_x as an ozone precursor. In addition, the permit states the facility is categorized as a PSD major stationary source due to the potential to emit more than 250 tpy of NO_x as an attainment pollutant. As a result, the threshold for significant modifications to an existing major source in **Table 3-4** would be applicable to NO_x emissions from sources that would undergo new source review and permitting for the proposed federal action at Buckley AFB. Other pollutants from to-be-permitted sources would be subject to the applicable major source thresholds.

Table 3-4. Attainment Status for Arapahoe County

Criteria Pollutant	Arapahoe County Attainment Status	New Source Review Major Source Thresholds (tpy)	New Source Review Significant Emissions Rates for Modifications to Existing Sources (tpy)
CO	Maintenance – (1971)	250	100
Pb	Attainment/Unclassified	250	0.6
NO ₂	Attainment/Unclassified	250	40
PM ₁₀	Maintenance –(1987)	250	15
PM _{2.5}	Attainment/Unclassified	250	15
O ₃	Nonattainment – Serious (2008)	100 (as NO _x or VOC)	40 (as NO _x or VOC)
O ₃	Nonattainment – Marginal (2015)	100 (as NO _x or VOC)	40 (as NO _x or VOC)
SO ₂	Attainment/Unclassified	250	40

VOC = volatile organic compound

3.7 Hazardous Materials and Solid Wastes

3.7.1 Definition of Resource

This section describes the affected environment associated with hazardous materials used or stored at the project site. According to RCRA, also referred to as the Solid Waste Disposal Act, a hazardous waste is “any discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities.” A hazardous waste is “a solid waste which because of its quantity, concentration, or physical, chemical, or infectious characteristics may pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.” Issues associated with hazardous materials typically center around waste streams, underground storage tanks (USTs), ASTs, and the storage, transport, use, and disposal of pesticides, fuels, lubricants, and other industrial substances. When such materials are improperly used, they can threaten the health and well-being of wildlife species, habitats, soil, water systems, and humans.

3.7.2 Existing Environment

The Buckley AFB Hazardous Waste Management Plan provides direction for the management of hazardous wastes in accordance with RCRA, AFI 32-7042, *Waste Management*, and AFI 32-7086 *Hazardous Materials Management*. AFI 32-7042, *Waste Management*, establishes procedures and standards that govern the use of hazardous materials at USAF installations. The Hazardous Waste Management Plan assigns responsibilities and explains procedures for the collection, analysis, transportation, record keeping, and disposal of hazardous wastes (460 SW 2017). Buckley AFB, including the NRO/ADF-C, is considered to be a small quantity generator with hazardous waste production less than 2,200 pounds (lb) (1,000 kilograms [kg]) of hazardous waste per month and is a small universal waste handler with less than 11,000 lb (5,000 kg) of universal waste accumulated at any time. Buckley is also an episodic large quantity generator. The 460 SW maintains a base accumulation point in Building 1025 for the storage of hazardous wastes for 270 days if the treatment, storage, and disposal facility is more than 200 miles from Buckley AFB; 180 days if treatment, storage, and disposal facility is

less than 200 miles away; and 90 days if monthly hazardous waste generation exceeds 1,000 kg or 2,200 lb. Hazardous wastes are initially managed at satellite accumulation points in individual buildings before transporting waste to the base accumulation point.

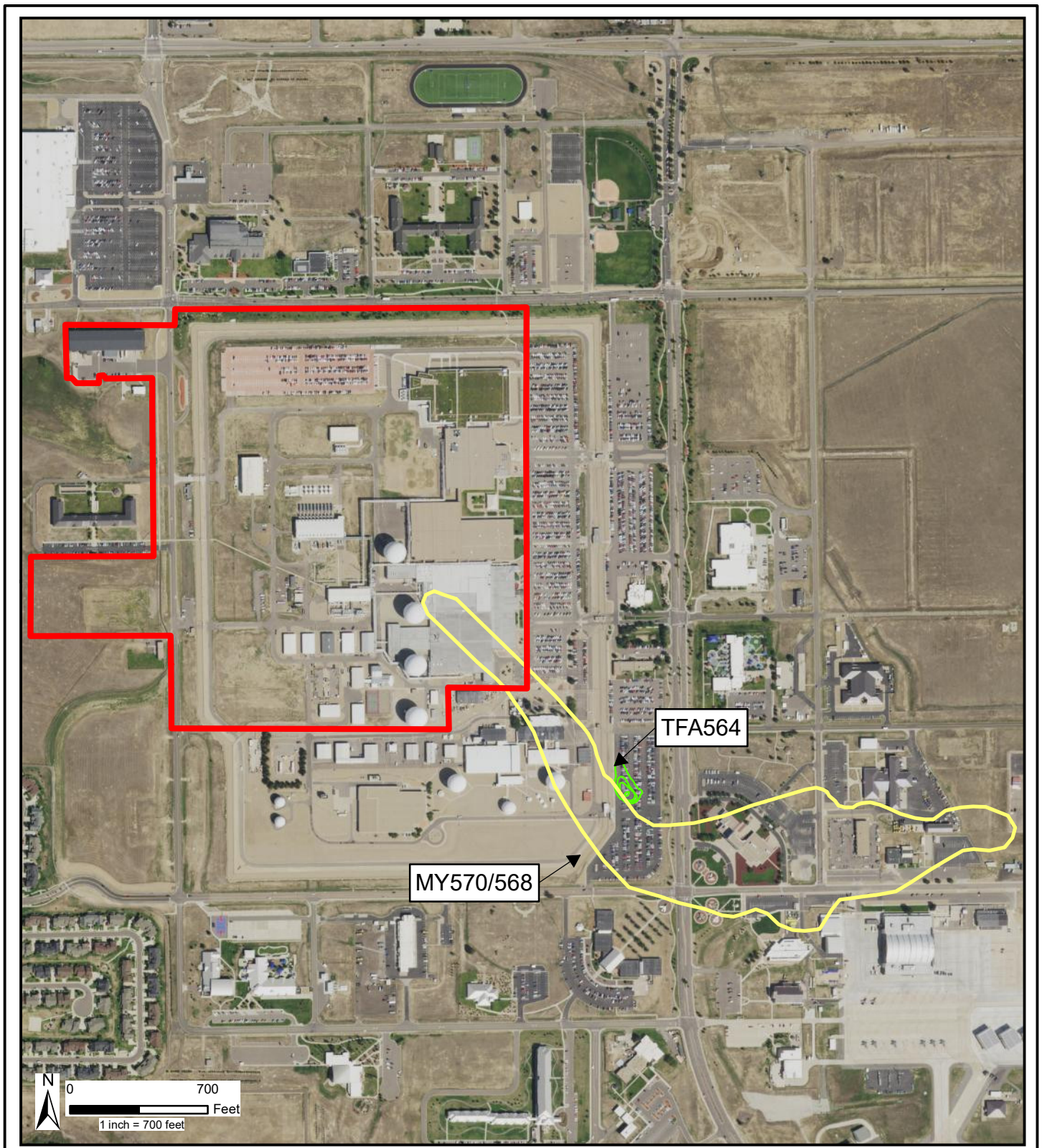
AFI 32-7086 requires that all hazardous materials must be submitted for review and authorization prior to bringing onto Buckley AFB. All hazardous materials usage is required to be tracked once approved for use and reported to the Environmental Flight each month. Types of hazardous materials commonly associated with operations are adhesives, paints, sealants, solvents, lubricants, and similar products.

Hazardous materials used at NRO/ADF-C include liquid fuel supply and storage tanks. NRO/ADF-C stores a variety of petroleum products, including jet fuel, gasoline, diesel fuel, dielectric fluid, and other petroleum-based products. AFI 32-7044, *Storage Tank Compliance*, identifies requirements for ASTs, USTs, and associated piping that store petroleum products or hazardous substances at USAF facilities. Oil products at NRO/ADF-C include ASTs; generators and generator day tanks; portable containers; a gasoline and diesel fueling station; gear boxes; one tank farm at the NRO/ADF-C main facility; and transformers. The NRO/ADF-C storage tanks are managed by a spill prevention, control, and countermeasures (SPCC) plan. The NRO/ADF-C has a total oil storage capacity of approximately 312,939 gallons (Buckley AFB 2019c).

The 460 SW, 460th Civil Engineer Squadron, and Buckley AFB oversee the Environmental Restoration Program, which manages land use control (LUC) sites. LUCs are designated areas to prevent exposure to contaminated soil and groundwater. LUCs include restrictions on the use of groundwater beneath the Base, limitations on construction, and designations of certain areas as restricted open space. Two LUC sites are present within Buckley AFB. One of the LUC sites extend within the boundary of the NRO/ADF-C. The extents of the LUC sites are shown on **Figure 3-2**.

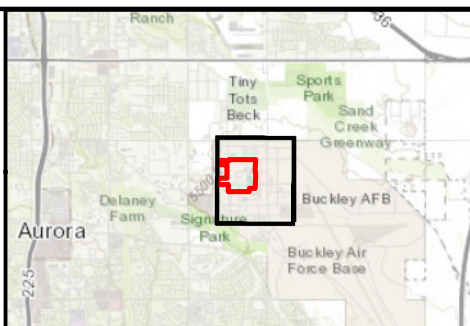
The first LUC site is MY570/MY568 Armament and Automotive Area/Aerospace Ground Equipment Shop (AAA/AGES). The AAA/AGES is located in the Central Industrial Area. In 2005, trichloroethene (TCE) was detected in groundwater above state and federal standards in the AAA. Subsequent investigations determined the nature and extent of the contamination. The only known remaining environmental concerns for the AAA/AGES site that warrant remedial action are the TCE and 1,4-dioxane groundwater plumes (Buckley AFB 2018c). The second LUC site is TFA564 Truck Fueling Area. The truck fueling area is located in the Central Industrial Area and included jet fuel and lubrication oil activities. In 2017, a feasibility study identified three primary contaminants of concern, including petroleum, benzene, and TCE in groundwater. A draft Record of Decision was published in August 2018, and remediation activities are expected to occur (Buckley AFB 2018c).

Asbestos is regulated by EPA under the CAA and Toxic Substances Control Act. The EPA has established that any material containing more than 1% asbestos by weight is considered an asbestos-containing material. AFI 32-1052, *Facilities Asbestos Management*, provides guidance for asbestos management on USAF installations and requires installations to prepare an Asbestos Management Plan (Buckley AFB 2016b). At Buckley AFB, asbestos shall be managed in accordance with the Buckley AFB Management and Operations Plan and/or the Buckley Specific Regulated Asbestos in Contaminated Soils Management Plan. Any visible regulated asbestos-containing material (ACM) in soils will generate regulated asbestos contaminated soil (RACS).



Legend

- NEPA Boundary
- TFA564
- MY570/568



**Figure 3-2
LUC Extents**

**Environmental Assessment
Aerospace Data Facility Colorado
Implementation of the
Electrical Infrastructure Master Plan
Buckley Air Force Base, Colorado**

Buckley Air Force Base
Aurora, Colorado

3.8 Noise

3.8.1 Definition of Resource

Noise is defined as unwanted sound. Public annoyance is the most common impact associated with exposure to elevated noise levels. Sound is created by acoustic energy, which produces pressure waves that travel through air and are sensed by the eardrum. Because the range of sound pressure ratios vary greatly over many orders of magnitude, a base-10 logarithmic scale is used to express sound levels in dimensionless units of decibels (dB). Sound travels in waves, with varying frequencies associated with each sound event. The human ear does not respond equally to all frequencies. To obtain accurate measurements and descriptions of noise, as noise is composed of many frequencies, the noise frequencies are filtering or weighted to most closely approximate the average frequency response of the human ear. This weighting is called the “A” scale on sound-level meters; this is the scale that is used for noise analyses. Decibel units described in this manner are referred to as A-weighted decibels (dBA).

Because sound intensity tends to fluctuate with time, a method is required to describe a noise source, such as a highway or airport, in a steady state condition. The dBA noise metric describes steady noise levels, although very few noises are, in fact, constant; therefore, day-night sound level (DNL), which is defined as the average noise level over a 24-hour period, is used to assess the amount of aircraft noise exposure and act as a metric for community response to various levels of exposure. The DNL metric artificially increases by 10 dB to reflect a greater sensitivity to noise levels between the hours of 2200 hrs and 0700 hrs. This weighting accounts for the decrease in community background noise of 10 dB during this period. Typical sound levels measured are shown in **Table 3-5**.

Table 3-5. Typical Sound Levels Measured in the Environment and Industry

Noise Source at a Given Distance	A-Weighted Sound Level in Decibels (dBA)	Subjective Impression
Rock Band	110	N/A
Jet flyover at 1,000 feet	105	Very loud
Gas lawnmower at 3 feet	95	N/A
Garbage disposal at 3 feet	80	N/A
Vacuum cleaner at 10 feet	70	Moderately loud
Heavy traffic at 300 feet	60	N/A
Quiet urban daytime	50	N/A
Quiet urban nighttime	40	Quiet
Library	30	N/A
Quiet rural nighttime	25	N/A
Recording studio	15	Threshold of hearing

Source: Technical Noise Supplement (Caltrans 2013)

3.8.2 Existing Environment

Noise conditions at Buckley AFB are predominantly military aircraft operations and automobile traffic. The noise from aircraft operations was modeled in 1998 for an air installation compatible use zone study (Buckley Air National Guard Base 1998). The location of the 65-dB DNL noise contour from aircraft operations is roughly centered within the NEPA Boundary, indicating that the average ambient noise condition is louder than heavy traffic at 300 feet (**Table 3-5**).

Workers within the region of influence (ROI) are accustomed to varying, relatively loud noises from the aircraft operations. The Federal Aviation Administration considers a DNL of 65 dB to be the point at which sound levels become a nuisance impact on residential communities (FAA 2019).

The nearest noise-sensitive land use outside the ROI is two Buckley AFB child development centers located in Building 725 (located 2,220 feet east of the NEPA Boundary) and Building 351 (located 2,300 feet south of the NEPA Boundary), as well as Buckley AFB housing (located 2,000 feet southwest of the

3. Affected Environment

NEPA Boundary). Off-Base, the Aurora Quest school (2,230 feet west of the NEPA Boundary) and an off-Base residential neighborhood (located 3,850 feet southwest of the NEPA Boundary).

4. Environmental Consequences

This section evaluates potential impacts resulting from the Action Alternatives. The anticipated direct and indirect impacts, considering both short- and long-term project effects, were assessed for each resource.

4.1 Cultural Resources

4.1.1 Evaluation Criteria

The ACHP has developed guidance for federal agencies on how to assess effects to historic properties. As defined in the NHPA Section 106 regulations, an effect is “*an alteration to the characteristics of an historic property qualifying it for inclusion in or eligibility for the NRHP*” (36 CFR 800.16). Criteria for adverse effects and examples are provided in the regulations (36 CFR 800.5). In this section, the terms project “impacts” and project “effects” are used interchangeably.

The term for impacts under Section 106 of the NHPA are slightly different than terms used for NEPA, as defined in **Section 2.4**. Per NHPA, Effects to cultural resources are defined as follows:

- **No Historic Properties Affected:** Either no historic properties are present, or there is no effect of any kind, neither harmful nor beneficial, on the historic properties.
- **No Adverse Effect:** There is an effect, but the effect is not harmful to those characteristics that qualify the property for inclusion in the NRHP
- **Adverse Effect:** There is an effect, and that effect diminishes the qualities of significance that qualify the property for inclusion in the NRHP.

Impacts to historic properties may be direct or indirect. To evaluate a project's potential direct or indirect effects, the current condition, location, and setting of cultural resources within the project area are evaluated. The planned activities are assessed to determine the likely effect of those activities on the cultural resources and on the qualities that make them eligible for listing in the NRHP.

Impacts described in this section are evaluated in NEPA terms (**Section 2.4**) as well as with the ACHP definitions.

4.1.2 Proposed Action

The following sections detail the potential impacts to cultural resources from the Proposed Action.

4.1.2.1 Archaeological Resources

The limited 2004 cultural resources survey at the NRO/ADF-C concluded that the potential for intact archaeological resources in the area of the Proposed Action is low because of past construction activities and bioturbation (Buckley AFB 2019a). Therefore, there is low potential for the discovery of unidentified archaeological resources during ground-disturbing activities as part of the Proposed Action. In addition, no NRHP-eligible archaeological sites have been identified in the 3,100 acres of survey completed at Buckley AFB, indicating a low probability of finding NRHP-eligible sites at the NRO/ADF-C.

In the unlikely event that previously unidentified cultural resources, including previously undiscovered burial sites, Native American human remains, or archaeological sites, were identified during the ground-disturbing activities, the stipulations set forth in Standard Operating Procedure 7.4 of the Buckley AFB ICRMP, *Discoveries of Archaeological Resources and NAGPRA Cultural Items*, would be followed. These steps would be used to minimize potential adverse effects on the previously unidentified cultural resource, in accordance with the requirements of ARPA and NAGPRA (Buckley AFB 2019a). The procedures for Discoveries of Archaeological Resources and NAGPRA Cultural Items are included in **Appendix C**. The potential impacts to archaeological resources, according to existing data, would be **negligible, negative, and short-term**; because the probability of finding archaeological resources is low because of previous disturbance in the NRO/ADF-C and there are no NRHP-eligible sites within the surveyed areas of Buckley AFB. There would be **No Adverse Effect** on archaeological resources per NHPA.

4. Environmental Consequences

4.1.2.2 Architectural Resources

Buildings 402, 403, and 404 (the radomes) are eligible for listing in the NRHP under Criterion C for architectural significance as excellent examples of radome construction and under Criterion A for their association with Cold War-era history. There would be no direct impacts to the radomes during construction of the Proposed Action.

The construction of the additional generators at the existing Building E Power Plant under the Proposed Action would match its existing height and width. When fully expanded, the new Colorado Power Plant would be approximately 596 feet from the nearest radome (Building 402). This is approximately 70 feet closer to Building 402 than the existing Building E Power Plant. Limited visual impacts on the radomes would be expected related to the expansion of the Building E Power Plant since the expansion under the Proposed Action would be a similar dimension as the existing plant.

A power distribution center will be constructed adjacent to Buildings A and B. The power distribution centers and platforms would be less than 22 feet in height, which would fall below the roofline of Buildings A and B, resulting in minor changes to the visual setting of the NRO/ADF-C. Once construction of the Colorado Powerhouse is complete, the existing CPP and some of the aboveground fuel tanks that currently serve the CPP would be demolished. Two of the existing 20,000-gallon diesel above-ground storage tanks would be preserved and used to supply the generators. Demolition of these facilities would provide slightly better views to and from the radomes.

A final component of the project would be the construction of a second addition to the Building E Power Plant, referred to as the Colorado Powerhouse Expansion Project. This project would include a 20,000-square-foot addition to the Colorado Powerhouse at the same width and height as the existing building. It would add four 2.5-MW prime rated diesel generators and two additional 50,000-gallon underground fuel tanks (for a total of six) to allow the facility to meet the future peak electrical demand requirements of the facility. This project is estimated to take place after 2025; however, the actual schedule would be determined by available funding.

In addition, some small outbuildings and utility structures may also be constructed as part of the project. Within the NEPA boundary, up to 10 small outbuildings and utility structures would be constructed, consisting of less than 5,000 square feet. None of the outbuilding and utility structure heights would be taller than then existing Building E power plant. A temporary parking lot for construction workers may also be constructed adjacent to the secure NRO/ADF-C boundary.

There would be minimal impacts from the Proposed Action on Buildings 402, 403, and 404 (the radomes) because physical destruction of, or damage to, all or part of each resource would not occur. There is no construction or ground-disturbing activity taking place within the footprint of each building. Project implementation would not result in a change to the character of the setting of the buildings. The three resources are located in a developed industrial environment, with existing buildings, structures, and streets on all four sides. Project implementation would not result in a change in the character of the properties' use. Therefore, the potential impacts to architectural resources would be **minor, negative, and short-term**.

A finding of **No Adverse Effect** from the Proposed Action on the three NRHP-eligible buildings under Section 106 of the NHPA was submitted to the Colorado SHPO for review and comment. The SHPO coordination letters are included in **Appendix B**. Section 106 consultation is ongoing.

4.1.3 No Action Alternative

Under the No Action Alternative there would be no changes to the facilities within the NRO/ADF-C and the redundant power supply needs would not be met. No construction or demolition within the NRO/ADF-C would occur. The No Action Alternative would result in **no impact** to cultural resources.

4.2 Water Resources

4.2.1 Evaluation Criteria

The threshold level of significance for groundwater would be a release of contamination that creates concentrations that exceed the federal or state standards or results in drinking water demand that exceeds aquifer capacity. The threshold level of significance for surface water would be an activity that results in violation of state water quality criteria, constitutes a violation of federal or state discharge permits, and/or consists of an unpermitted placement of structures inside of the normal high watermark.

4.2.2 Proposed Action

4.2.2.1 Groundwater

During construction, the Proposed Action is expected to have a **negligible, short-term, negative** impact to groundwater quantity. Groundwater is unlikely to be encountered during construction, given the maximum depth of excavation for the Proposed Action is 18 feet for the underground fuel tanks, which is less than the depth to the groundwater table. In the unlikely event that groundwater is encountered during construction, dewatering would be managed in accordance with all applicable laws and regulations.

Following construction, the Proposed Action is expected to have a **negligible, long-term, negative** impact to groundwater quality because the USTs and fuel delivery piping would be doubled walled with interstitial space monitoring for leakage detection. Additionally, monitoring wells would be installed around the tanks as required by Colorado State Regulation (7 *Colorado Code of Regulations* [CCR] 1101, *Regulation 14 Underground Storage Tanks and Above Ground Storage Tanks* (CDLE 2011)).

4.2.2.2 Surface Water

During construction of the Proposed Action, there would be **minor, negative, short-term** impacts to nearby stormwater collection systems caused by increased erosion from soil disturbances. These negative impacts would be minimized through the implementation of stormwater best management practices (BMPs). BMPs include the use of silt fence, sediment ponds, vehicle tracking controls, good housekeeping, inspection and maintenance schedules, and training. Construction projects disturbing more than 1 acre of land require a construction stormwater permit issued by EPA in accordance with the National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges from Construction Activities (as modified) (EPA 2017). This permit requires the filing of a notice of intent and development of a site-specific stormwater pollution prevention plan (SWPPP) that includes sediment and erosion control measures. Industry reference documents from the Urban Drainage and Flood Control District, City of Aurora, and Colorado Department of Transportation may be used in the development of BMPs for the SWPPP.

Following construction, there will be a net decrease of 0.53 acre (23,043 square feet) of impervious area within the East Toll Gate Creek drainage subbasin. The Proposed Action would result in **minor, beneficial, long-term** impacts to water quality because of the reduction in impervious area. When precipitation encounters impervious areas, it does not infiltrate into the soil but instead travels over the impervious surface and into either an artificial or natural drainage system. While traveling over the impervious surface, the water may mix with sediments and other contaminants, which could degrade water quality. When impervious area is reduced, the amount of sediments and other contaminants entering the water resource environment is reduced.

Post-construction stormwater is managed by Buckley AFB's municipal separate storm sewer system (MS4), which is covered by NPDES Permit No. COR042003 issued by EPA Region 8 on 1 October 2013 and modified 12 January 2015 (EPA 2013). The Buckley AFB MS4 system consists of a series of storm sewers, ditches, culverts, and detention ponds to convey water. Because the system has a greater than 5,000-square-foot footprint, predevelopment hydrology should be maintained per Section 438 of EISA 2007. The NPDES MS4 permit and AFI 32-7041 require Buckley AFB to have a stormwater management program plan (SWMP). The latest SWMP was published in March 2018 and defines the stormwater BMPs that reduce the discharge of pollutants to protect downstream water quality (Buckley AFB 2018a).

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4.2.3 No Action Alternative

Implementation of the No Action Alternative would not result in a change in current conditions. Therefore, **no impacts** to water resources would occur.

4.3 Biological Resources

4.3.1 Evaluation Criteria

The threshold level of significance for natural and biological resources is defined by any of the following: (1) potential “take” of a federal or state threatened or endangered species; (2) loss or impairment of sensitive or other native habitats, including wetlands or riparian corridors, such that the loss or impairment of habitat negatively affects the population of a species; (3) the take of birds in violation of the MBTA that could result in an enforcement action against the installation; or (4) introduction or spread of invasive or otherwise undesirable non-native species.

4.3.2 Proposed Action

4.3.2.1 Vegetation and Wildlife

The majority of the NRO/ADF-C area has been developed and consists of impervious surfaces that do not support vegetation or wildlife. The remaining areas are non-native landscaped grass or revegetated areas that have been previously disturbed.

Buckley would implement BMPs in areas where activities result in ground disturbance (that is, road construction, installation, or removal of facilities). BMPs include implementing a weed management plan following completion of construction, revegetating disturbed areas and maintaining the area after construction. With the implementation of BMPs, the impacts to vegetation would be **minor, negative**, and **short-term**.

Permanent impacts on vegetation would occur from the Proposed Action because of the permanent conversion of undeveloped areas to impervious surfaces and the clearing construction areas. However, the demolition of the CPP and part of the existing AST farm would increase pervious area. Following construction, there will be a net increase of approximately 4,100 square feet of impervious area within the East Toll Gate Creek drainage subbasin. Temporary impacts from construction would occur as a result of converting grass-covered areas into construction staging areas. These areas have been previously used for similar activities and are considered disturbed. Following the completion of the proposed construction activities, the temporary construction staging areas would be returned to previous conditions. The Proposed Action would result in **minor, negative, long-term** impact to vegetation because of the increase in impervious area.

Wildlife may be disturbed by noise and increased human activity during construction activities. Construction activities would temporarily displace wildlife in the vicinity of the construction area. However, because the Proposed Action is located in a currently disturbed military installation, which does not represent high habitat value, wildlife disturbance would be **minor, negative**, and **short-term**.

4.3.2.2 Threatened and Endangered Species

The ground-disturbing activities resulting from the Proposed Action will not remove or damage habitat for any listed species. As shown in **Table 3-1**, no federally protected species has been known to occur at Buckley AFB (Buckley AFB 2018a). The western burrowing owl, a Colorado-listed species, could be present in the NRO/ADF-C area during construction activities; however, Buckley AFB has established mitigation measures to reduce impacts to the western burrowing owl, including pre-construction surveys, buffer zones, and potentially moving birds, as applicable (Buckley AFB 2018a). The Proposed Action would have **no impacts** on federally listed species and **negligible, negative, short-term** impacts on state-listed species.

4.3.2.3 Migratory Birds

The Proposed Action area is primarily within developed areas of the NRO/ADF-C, which has a limited amount of suitable migratory bird habitat. However, the construction areas could include suitable habitat for ground-nesting birds. Ground-nesting birds at Buckley AFB, including the burrowing owl and lark

bunting, typically nest in areas where prairie dog habitat occurs. Killdeer are the most likely ground nesting species to be found in the project area. Raptors, including the golden and bald eagle, usually nest in cliffs or trees in open or semi-open habitat; often they will avoid nesting in developed areas (Cornell Laboratory of Ornithology 2019a, 2019b). Therefore, raptors will likely not be found in the Proposed Action area. If migratory birds are present in the Proposed Action area, the birds would be expected to vacate the area during construction activities and return after construction is completed. With the mitigations explained in Section 4.3.2.2 in place, impacts to ground-nesting migratory birds would be lessened.. Impacts to migratory birds would be **minor, negative, and short-term**.

4.3.3 No Action Alternative

Under the No Action Alternative, the onsite power generation at the NRO/ADF-C facility would not be upgraded. Instead, the NRO/ADF-C would continue to operate with existing power infrastructure. There would be **no impacts** to biological resources.

4.4 Transportation and Infrastructure

4.4.1 Evaluation Criteria

The potential impacts were analyzed against the following criteria to determine the potential for a significant impact:

- Exceed transportation or utility capacity
- Long-term interruption of service
- Violation of permit condition or approved plan

4.4.2 Proposed Action

4.4.2.1 Transportation

The number of NRO/ADF-C personnel would not change under the Proposed Action, resulting in no impact to the capacity of the transportation system. Construction activities may result in traffic delays to Buckley AFB traffic, causing a **minor, negative, short-term** impact. The addition of a second NRO/ADF-C security gate and guard shack would provide a **minor, beneficial, long-term** impact.

4.4.2.2 Power Supply

The Proposed Action would support backup power supply needs for the NRO/ADF-C by providing a resilient and reliable 13.2-kV power generation plant and associated distribution infrastructure in case of the event of a local utility outage. The new Colorado Powerhouse would have six 2.5-MW prime-rated diesel generators and the Colorado Powerhouse expansion would have four 2.5-MW diesel generators. Combined with the existing five 2.5-MW diesel generators in the Building E Power Plant, the 15 generators would support 7 days of full-load operation, resulting in a **major, long-term, beneficial** impact on the reliability of the power supply system. The relocation of buried power lines under the Proposed Action would result in **minor, negative, and short-term** impacts from disruption of power.

4.4.2.3 Liquid Fuel Supply

Under the Proposed Action, the six new 50,000-gallon capacity USTs would provide a total of 300,000 gallons of liquid fuel storage. The new USTs and the two existing 20,000-gallon ASTs would provide a total of 340,000 gallons of liquid fuel storage. This storage capacity would provide enough fuel to run the fifteen 2.5-MW generators for a specific period of time without the 12 ASTs that would be removed under the Proposed Action, resulting in **minor, beneficial, and long-term** impacts to liquid fuel supply.

4.4.2.4 Water Supply

During construction, water usage for dust suppression would be estimated at 500 gallons/acre/day based on previous activities (Buckley AFB 2006). Under the Proposed Action, up to 30 acres of soil could be disturbed; however, because the construction activities would be in phases over many years, the amount of soil disturbed at any one time would likely be less. Using the conservative maximum of 30 acres of disturbed soil, a maximum of 15,000 gallons per day of water may be used for dust suppression. The

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quantity of water used for dust suppression is less than 0.5% of the City of Aurora daily average potable water demand, resulting in **minor, negative, and short-term** impact to the potable water supply. The operation of the new generators does not require significant amounts of water, resulting in **negligible, negative, and long-term** impact to potable water supply.

4.4.2.5 Solid Waste

During the construction phase, approximately 12,200 cubic yards of construction and debris waste will be generated. Recyclable materials and universal wastes would be segregated from the waste stream. The NRO/ADF-C has a 60% recycling goal and a 40% waste diversion goal. The impact to the regional solid waste capacity would be **negligible, negative, and long-term**. Solid waste at Buckley AFB is managed in accordance with AFI 32-7042, *Waste Management*.

4.4.3 No Action Alternative

Implementation of the No Action Alternative would not result in a change of current conditions. Therefore, **no impacts** to transportation or infrastructure would occur.

4.5 Geologic Resources

4.5.1 Evaluation Criteria

The potential impacts were analyzed against the following criteria to determine the potential for a significant impact:

- Cause substantial soil erosion or compaction, thereby seriously threatening biotic communities.
- Degrade soil chemical quality such that humans, plants, or animals have the potential to be substantially adversely affected through chemical uptake.
- Substantially affect the future ability to use geologic resources.
- Cause damage to unique geologic features.

Impacts to geologic resources would be considered significant if the Proposed Alternative increases erosion and sedimentation or geologic hazards.

4.5.2 Proposed Action

4.5.2.1 Geology

Most of the activities under the Proposed Action would include excavation, grading, and other land-disturbing activities that would involve contact with subsurface materials. The depth of these activities and the subsurface materials that would be encountered would depend on the type of construction activity. The maximum depth that would be encountered during construction would be 18 feet below ground surface in the vicinity of the USTs. Subsurface construction activities would be conducted using standard and approved methods; these activities would have a negligible, long-term, negative impact on subsurface geological materials within the construction footprint and no impact on geological materials outside the construction footprint. The project activities are expected to have **no impact** on geological resources considered unique or economically important in the area and have **no impact** on geologic hazards.

4.5.2.2 Topography

The Proposed Action would not substantially change the ground surface elevations; therefore, the Proposed Action would have a **negligible, negative, long-term** impact on topography.

4.5.2.3 Soils

Under the Proposed Action, a maximum of 30 acres of soil would be disturbed over a period of many years. Various, temporary BMPs and engineering controls would be implemented during construction to prevent and minimize erosion and sedimentation, as discussed in **Section 4.3**, Water Resources. A geotechnical study would guide the design of the facilities to offset any construction limitations from the

type of soil. Based on the analysis conducted, the Proposed Action would have a minor, negative, short-term impact on soil.

4.5.3 No Action Alternative

Implementation of the No Action Alternative would result in no change to geology, topography, or soil. Therefore, **no impacts** to geologic resources would occur.

4.6 Air Quality

4.6.1 Evaluation Criteria

The environmental consequences to local and regional air quality conditions that would result from the proposed federal action are evaluated based on the increases in regulated pollutant emissions relative to existing conditions, the no action alternative, and relevant regulatory thresholds. Impacts on air quality in NAAQS nonattainment or maintenance areas are considered to conflict with the plans to achieve standards (the applicable SIP) and result in significant impacts if the net changes in project-related pollutant emissions would result in any of the following:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Increase the frequency or severity of a violation of any ambient air quality standard
- Delay the attainment of any standard or other milestone contained in the SIP or permit limitations

The EPA General Conformity Rule establishes federal *de minimis* thresholds in 40 CFR Section 93.153(b) for individual criteria pollutants and their precursors. The applicable thresholds depend on the EPA-designated attainment status for each NAAQS pollutant in the project area. The thresholds are only applicable to increases of pollutants and their precursors associated with federal actions in nonattainment and maintenance areas. These emissions rates (represented in tons per year) are used to delineate federal actions with the potential to conflict with the applicable SIP or substantially and adversely affect air quality. If the federal action includes sources that require new source review permitting, that portion of the action is not subject to conformity determination (40 CFR Section 93.153(d)).

Table 4-1 presents the *de minimis* thresholds applicable to Buckley AFB. With respect to the General Conformity Rule, effects of the project on air quality would be considered significant if the proposed federal action would result in any emissions increase greater than the applicable *de minimis* threshold in **Table 4-1**.

Table 4-1. General Conformity *de minimis* Emissions Thresholds Applicable to Buckley AFB

Pollutant	Status	General Conformity <i>de minimis</i> Threshold (tpy)
O ₃ (calculated as emissions of the precursor pollutants, NO _x or VOCs)	Serious Nonattainment	50
CO	Maintenance	100
PM ₁₀	Maintenance	100

Source: 40 CFR Section 93.153

4.6.2 Proposed Action

4.6.2.1 Construction and Demolition Emissions

Minor, negative, short-term impacts on local air quality and **negligible, negative, short-term** impacts on regional air quality would result from the Proposed Action construction and demolition activities. Construction and demolition activities would generate air pollutant emissions primarily from site-disturbing activities such as grading, filling, compacting, and trenching; operating construction and demolition equipment; and evaporative emissions from architectural coatings. Construction and demolition activities would also generate particulate emissions as fugitive dust from ground-disturbing activities and from the combustion of fuels in construction and demolition equipment. Fugitive dust emissions would be greatest during the initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of

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construction activity. Construction and demolition activities would incorporate BMPs and control measures (such as frequent use of water for dust-generating activities) to minimize fugitive particulate matter emissions. Construction workers commuting daily to and from the construction site in their personal vehicles would also result in criteria pollutant emissions.

Construction and demolition emissions were estimated using the USAF's Air Conformity Applicability Model (ACAM) Version 5.0.16. Both the ACAM Report and ACAM Detail Report are produced by the model and summarize the Proposed Action's projected total annual air emissions from construction and demolition activities. These reports are provided in **Appendix D**. ACAM results, including estimates for the peak construction year (2022), are summarized in **Table 4-2**.

Table 4-2. ACAM Results for Construction and Demolition Emissions

Year	Estimated Emissions (tpy)					
	VOC	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}
2021	0.09	0.54	0.58	0.00	2.34	0.02
2022^a	0.69	3.37	2.85	0.01	1.00	0.12
2023	0.30	1.43	1.08	0.00	0.34	0.04
2024	0.31	1.07	0.76	0.00	0.22	0.03
2025	0.10	0.66	0.56	0.00	1.54	0.02
2026	0.00	0.00	0.00	0.00	0.00	0.00
2027	0.00	0.00	0.00	0.00	0.00	0.00
2028	0.32	0.78	0.52	0.00	0.32	0.02
Total	1.81	7.85	6.35	0.01	5.76	0.25

^a 2022 is the peak year for emissions

Negligible, negative, short-term impacts on GHG emissions would be expected from the construction and demolition activities associated with the Proposed Action. Construction and demolition activities associated with the Proposed Action would contribute directly to emissions of GHGs from the combustion of fossil fuels. When compared to EPA's Mandatory GHG Reporting rule threshold of 25,000 metric tons of CO₂e emissions per year (per 40 CFR Part 98), construction-related GHG emissions from the Proposed Action would be insignificant.

4.6.2.2 Operational Emissions

Beneficial, long-term impacts on local and regional air quality would result from operation of the proposed new NRO/ADF-C electrical infrastructure. The Proposed Action would include the phased removal of 10 existing diesel-fueled generators and the phased installation of 10 new diesel-fueled contingency generators with emissions meeting Tier 4 standards.

During 2023, six proposed diesel-fueled generators would begin operation in a new building. Three natural gas boilers (0.4 million British thermal units per hour [MBtu/hr] each) would be included in the building for comfort heat and sanitary water. The existing 10 diesel-fueled generators would be taken offline the following year. Four proposed new 50,000-gallon USTs will be added in 2024, followed by the removal of 12 existing 10,000-gallon tanks in 2025, and the demolition of the building currently housing the existing generators. During 2028, four additional proposed diesel-fueled generators and two additional 50,000-gallon USTs would begin operation. The proposed 10 diesel-fueled contingency generators are anticipated to operate under the same power output limit as the units to be replaced, operating at no more than 11,500,000 kilowatt-hours per year (kWh/yr), or a maximum average of 450 hours per year each, for a maximum combined total of 4,500 hours per year once all generators are operational beginning in 2028.

Compliance with the Title V permit limits on total annual power generation for the facility would be maintained at all times. As the project is implemented and the new contingency generators are brought online, use of the new generators would result in emissions reductions over current levels. The only exceptions to this are for CO and SO₂, where small increases in operations emissions are estimated, as

shown in **Table 4-3**. According to its Title V permit, Buckley AFB is considered a major source of NO_x emissions for new source review permitting under both the federal Nonattainment New Source Review regulations and the PSD regulations. The applicable thresholds for major sources or significant modifications to an existing major source under the federal New Source Review and PSD regulations are shown in **Table 4-3**. Results show that the emissions increases associated with the proposed sources would be well below the thresholds for a major source or a significant modification to an existing major source, and in most cases would represent a net emission reduction, indicating there would be no significant air quality impacts associated with permitting the new sources under the Proposed Action.

Appendix D contains detailed calculations and the assumptions used to estimate the annual air emissions from the operation of the new NRO/ADF-C electrical infrastructure. Emissions from the proposed generators would be minimized by conducting proper maintenance on all equipment.

Operational GHG emissions would not change significantly. The operational generators must adhere to the Buckley AFB Title V limit of 11,500,000 kWh/yr, the operating limit at which emissions have been estimated. Both proposed and existing generator GHG emissions have been estimated using the methodology found in the GHG Mandatory Reporting Rule (40 CFR 98, Subpart C).

The air emissions from the proposed project, including the net decreases to some emissions resulting from removal of older equipment, will be reviewed in detail by the CDPHE Air Pollution Control Division to ensure that the construction and operation are in compliance with state and federal laws and regulations. Under the authority of the CAA, the owners and operators of all proposed and existing facilities that are significant sources of air emissions must conduct proper reviews and obtain approval from appropriate authorities to construct and operate the sources.

In this case, NRO/ADF-C must obtain approval in the form of a Construction Air Permit from CDPHE prior to beginning the project. This permit application is ongoing. CDPHE will check that air emissions from the sources are within applicable technology-based guidelines—that is, that they represent best-in-class emissions for these types of engines and sources. CDPHE will also review those emissions to determine whether emissions from the project could possibly result in ground-level concentrations harmful to public health under any type of weather condition and, if indicated by state and federal modeling guidelines, will require detailed air dispersion modeling to verify that the project design is protective of human health. After approval and construction of the project, NRO/ADF-C will be required to perform sampling and laboratory analysis of emissions from the sources to verify that actual emissions match those used in the dispersion analysis.

Table 4-3. Proposed Action Operational Emissions

Emission Source	Emissions upon project completion (tpy)					
	VOC	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}
10 Existing Contingency Generators in CPP Taken Offline	(28.14)	(42.34)	(189.13)	(0.09)	(3.80)	(3.80)
12 Existing 10,000-gallon Tanks to be Removed	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
10 Proposed Contingency Generators	2.38	44.18	8.50	0.09	0.37	0.37
6 Proposed 50,000-gallon Diesel USTs	0.131	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Proposed Natural Gas Boilers	0.028	0.428	0.509	0.003	0.039	0.039
Total Operational Emissions	(25.67)	2.268	(180.12)	0.003	(3.39)	3.39
Applicable thresholds for major sources or significant modifications to an existing major source under the federal New Source Review and PSD regulations	100	250	40	250	250	250
Threshold Exceeded?	No	No	No	No	No	No

Note: Parentheses indicate negative emissions values, or reductions associated with the proposed action due to shutdown and replacement of existing equipment.

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4.6.2.3 General Conformity Applicability

As documented in the previous section, operational emissions would be largely reduced over time with the Proposed Action, other than small increases estimated for CO and SO₂ emissions. All new contingency generators, tanks, and boilers associated with facility operations would be subject to new source review and permitting, and as a result, emissions from these sources are not included in evaluation of general conformity applicability. Other operational sources and emissions would not change with the Proposed Action, so operational emissions have been listed as not applicable (N/A), in the general conformity applicability comparison presented in **Table 4-4**. The criteria pollutant emissions estimated for project construction during the peak construction year (2022) have been compared with the applicable general conformity *de minimus* levels. None of the applicable *de minimus* thresholds would be exceeded, indicating that the project can be assumed to conform, and no significant air quality impacts would be associated with the Proposed Action.

Table 4-4. Estimated Emissions and General Conformity Applicability

Emission Source	Estimated Emissions Rates (tpy)					
	VOC	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}
Operational Emissions	N/A	N/A	N/A	N/A	N/A	N/A
Construction Emissions (Peak Construction Year - 2022)	0.69	3.37	2.85	0.01	1.00	0.12
<i>de minimis</i> levels (tpy)	50	100	50	N/A	100	N/A
Threshold Exceeded for Any Activity?	No	No	No	No	No	No

4.6.3 No Action Alternative

Implementation of the No Action Alternative would not result in a change in current conditions. Therefore, **no impacts** to air quality would occur.

4.7 Hazardous Materials and Solid Wastes

4.7.1 Evaluation Criteria

The threshold for a significant impact would be: (1) noncompliance with applicable federal and state regulations as a result of the proposed action; (2) disturbance or creation of contaminated sites resulting in adverse effects on human health or the environment; and (3) established management policies, procedures, and handling capacities unable to accommodate the proposed activities, impacting fuel management.

4.7.2 Proposed Action

The Proposed Action would have impacts to hazardous materials and solid wastes based on the construction and demolition of buildings, along with the construction of additional diesel generators and fuel tanks.

4.7.2.1 Hazardous Materials

During construction of the Proposed Action, parts of the existing 312,939-gallon fuel farm would be demolished, and six 50,000-gallon diesel USTs would be constructed at a new fuel farm location. The new fuel farm would hold up to 300,000 gallons. This slight increase would have no noticeable effects on the management of hazardous materials at the NRO/ADF-C. Because diesel fuel tanks currently exist within NRO/ADF-C boundaries, no new substances would be introduced from the implementation of the Proposed Action. The construction of the USTs would be compliant with established guidelines. Therefore, the slight increase in NRO/ADF-C fuel capacity would be **minor, negative, and long-term**.

No hazardous waste is anticipated from demolition activities. The Contractor will prepare a construction waste management plan prior to demolition to address the requirements for managing nonhazardous construction waste and demolition debris/waste materials, as well as the waste diversion goals for the

project. The construction activities would have no noticeable effects on hazardous waste or solid waste management at Buckley AFB and there would be **minor, negative, and short-term**.

The demolition of existing facilities has the potential to result in the discovery of ACM. The contractor will develop an asbestos management plan in accordance with CDPHE regulations. If there is an inadvertent discovery of ACM, the asbestos management plan would be followed. There is also the possibility of asbestos in soil at Buckley AFB and the NRO/ADF-C. The contractor will have a certified asbestos building inspector (CABI) on site observing excavations. The CABI shall have the required level of experience with RACS sites (40 hours). Any asbestos found would follow the contractor's asbestos management plan. Therefore, impacts would be **minor, negative, and short-term**.

The two LUCs in the vicinity of the NRO/ADF-C are not within the Proposed Action demolition or construction footprint. Therefore, impacts from construction and demolition activities would have **no impact** on hazardous materials.

Operation of the Proposed Action would use hazardous materials. Buckley has established discharge prevention measures, including training personnel to prevent oil discharges during the handling, use, or transfer of oil products on the Base. In the case of an oil spill or discharge, the response and cleanup procedures would be followed based on requirements established in the SPCC plan. The installation personnel would follow the appropriate level of response, reporting, and cleanup procedures based on the level of spill (major or minor). Therefore, impacts to hazardous waste would be **minor, negative, and short-term**.

4.7.2.2 Solid Waste

During construction, workers would follow the Buckley AFB solid waste management plan. Solid waste from demolition of existing buildings and construction of new buildings would be transported offsite. Recyclable materials and universal wastes would be segregated from the waste stream. The amount of solid waste generated from demolition and construction activities would not exceed the capacity of the Denver Arapahoe Disposal Site (Waste Management 2016). Therefore, impacts from solid waste would be **negligible, negative, and long-term**.

4.7.3 No Action Alternative

Construction and demolition of facilities and the expansion of the fuel farm would not occur under the No Action Alternative. There would be **no impacts** to hazardous materials or solid wastes.

4.8 Noise

4.8.1 Evaluation Criteria

Noise impacts were determined based on the potential increased noise levels around noise-sensitive land uses and to onsite workers. Noise-sensitive land uses are locations where unwanted sound would adversely affect the designated use and typically include residential areas, hospitals, places of worship, libraries, schools, historic structures/districts, and wildlife preserves and parks. Impacts were also evaluated for onsite workers.

4.8.2 Proposed Action

Construction equipment associated with the Proposed Action would generate onsite noise. Typical noise levels from these types of equipment have been measured and published in the Roadway Construction Noise Model prepared by the Federal Highway Administration in the Roadway Construction Noise Model User's Guide (FHWA 2006). Noise for any specific receptor would be dominated by the closest and loudest equipment. Representative construction equipment and the predicted noise level at 50 feet (dBA) that may be used in the Proposed Action is provided in **Table 4-5**.

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Table 4-5. Predicted Noise Levels for Construction Equipment

Construction Equipment	Predicted Noise Level at 50 feet (dBA)
Dozer	82
Dump Truck	76
Roller	80
Backhoe	78
Jackhammer	89
Concrete Mixer Truck	78
Crane	81
Paver	77

Table 4-6 provides construction equipment noise levels at various distances using the Roadway Construction Noise Model. Three representative construction equipment operating simultaneously were modeled: a jackhammer, a dozer, and a dump truck. These estimated noise levels are conservative because the only sound-buffering mechanism considered was distance from the source. Additional buffering would be provided by vegetation, structures, atmospheric absorption, and terrain features. This additional buffering was not considered in the evaluation.

Table 4-6. Representative Equipment Noise Levels Versus Distance

Distance from Sensitive Receptor (feet)	Equivalent Noise Level (dBA)
50	87
100	81
200	75
400	59
800	53
1,600	57
3,200	51
6,400	45

The noise resulting from construction (**Table 4-6**) would range from 53 dBA to 57 dBA at a distance of 800 to 1,600 feet, where the nearest noise sensitive land uses are located.

This noise level is less than the noise conditions resulting from Buckley AFB's typical military aircraft operations and automobile traffic modeled in the 1998 air installation compatible use zone study (Buckley Air National Guard Base 1998). Therefore, the impacts of noise resulting from Proposed Action construction to noise sensitive land uses would be **negligible, negative, and short-term** and. Construction noise would be generated only during typical working hours (0700 to 1700 hrs).

Workers would be exposed to noise levels above 85 dBA, resulting in **minor, negative, and short-term** impacts. AFI 48-127, *Occupational Noise and Hearing Conservation Program*, and Air Force Occupational Safety and Health Standard 48-20, *Occupation Noise and Hearing Conservation Program*, provide instructions to educate and protect workers who are exposed to hazardous noise through the use of engineering or administrative controls or PPE. Workers would wear appropriate PPE and adhere to the administrative controls because compliance with these instructions and standards is mandatory.

There are no sensitive receptors located within the NRO/ADF-C facility. The closest sensitive facility is a day care center located approximately 2,200 feet south of the existing Colorado Powerhouse. At this distance the sound level would be reduced by at least 30 dBA solely by geometric spreading (distance

attenuation). Additional reductions are anticipated because of the presence of intervening buildings located between the source and receptor that provided additional shielding. Presuming the sound level outside (rather than inside) the power generation facility complies with the Occupational Safety and Health Administration threshold of 85 dBA, the estimated exterior sound level at the day care facility is expected to be less than 55 dBA. When considering if noise abatement is required from highways, the Federal Highway Administration (FHWA) Noise Abatement Criteria for schools is 67 dBA (according to 23 CFR Appendix Table 1 to Part 772, *Noise Abatement Criteria*). Because the expected sound level at the day care facility is substantially less than the FHWA's criteria for noise abatement, no additional mitigation is anticipated.

Operation of the generators would result in considerable noise; however, the generators would be contained within a sound-reducing building. The noise levels outside the proposed power plant would be minor, negative, and long-term. Workers inside the facility would wear PPE to comply with AFI 48-127 and Air Force Occupational Safety and Health Standard 48-20.

4.8.3 No Action Alternative

Implementation of the No Action Alternative would not result in a change in current conditions. Therefore, **no impacts** from noise would occur.

4.9 Cumulative Impacts

Cumulative impacts are defined by the CEQ as *“the impact on the environment which results from the incremental impact of the action when added to other past, present or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertake such other actions”* (40 CFR Section 1508.7). Cumulative impacts can result from individually minor but collectively substantial actions undertaken over a period by various agencies or individuals. Cumulative impacts must occur to the same resources, in the same geographic area, and within the same period as the Proposed Action.

No projects from outside the NRO/ADF-C were considered relevant to the cumulative impact discussion, because negative project impacts from the Proposed Action are confined within the boundaries of the NRO/ADF-C. All of the impacts that would occur off-base would be minor to negligible and would not likely combine with off-base activities. Based on the potential resource impacts and the geographic scope of the Action Alternatives, the following activities identified in the NRO/ADF-C Master Plan (NRO/ADF-C 2015) were determined to be relevant to cumulative impacts:

Phase I, Near-term Construction (Years 1 to 4)

- New Executive Office/Operations Center Building and Parking Structure
- Executive/Operations Building Move-in and Building refeed buildings

Phase II, Mid-term Construction (Years 4 to 8)

- New Facility Support Office Building
- Site Management and Facility Space Management
- Facility Space Management and Building Demolition

Phase III, Long-term Construction (Years 8 to 10)

- Infrastructure Modifications and Site Improvements
- New Warehouse

All of the identified impacts for the Proposed Action were found to be negligible to minor (see Section 4.10 Summary). While these projects would overlap with the Proposed Action activities, they are similar in scope to the Proposed Action; therefore, it is assumed that the overall impacts would also be similar. Consequently, there is limited possibility for these activities to combine with Proposed Action to result in a significant cumulative impact.

4. Environmental Consequences

4.10 Summary

Table 4-7 compares the impacts to resources analyzed in this EA. Impacts are color-coded based on their severity: long-term impacts are shown in shades of orange, short-term impacts are shown in shades of green, and benefits are shown in shades of blue. Darker shades indicate greater impact.

Based on the intensity definitions provided in **Section 2.4** (negligible, minor, moderate and significant), none of the resources analyzed in this document reaches the level of significant impact for any of the alternatives.

Table 4-7. Impact Summary

Impacted Resources	Impacts	Proposed Action	No Action Alternative	BMP or Environmental Protection Measure
Cultural Resources	Archaeological Resources	Negligible, Negative, Short-term No Adverse Effect	No Impact	Completion of the Section 106 consultation process with SHPO and tribes. Unanticipated archaeological discoveries will follow the procedures in Appendix C (Standard Operating Procedure 7.4 in the Buckley AFB ICRMP)
	Architectural Resources	Minor, Negative, Short-term No Adverse Effect	No Impact	Completion of the Section 106 consultation with SHPO and tribes.
Water Resources	Groundwater: Construction Phase	Negligible, Negative, Short-term	No Impact	N/A
	Groundwater: Operational Phase	Negligible, Negative, Short-term	No Impact	N/A
	Surface Water: Construction Phase	Minor, Negative, Short-term	No Impact	N/A
	Surface Water: Operational Phase	Minor, Beneficial, Long-term	No Impact	N/A
Biological Resources	Vegetation: Construction Phase	Minor, Negative, Short-term	No Impact	N/A
	Vegetation: Operational Phase	Minor, Beneficial, Long-term	No Impact	N/A
	Wildlife: Construction Phase	Minor, Negative, Short-term	No Impact	N/A
	Federally Listed Threatened or Endangered Species	No Impact	No Impact	N/A
	State-Listed Species	Negligible, Negative, Short-term	No Impact	Implement the Buckley AFB western burrowing owl BMP
	Migratory Birds	Minor, Negative, Short-term	No Impact	N/A
Transportation and Infrastructure	Transportation: Construction Phase	Minor, Negative, Short-term	No Impact	N/A
	Transportation: Operational Phase	Minor, Beneficial, Long-term	No Impact	N/A
	Power Supply: Construction Phase	Minor, Negative, Short-term	No Impact	N/A

4. Environmental Consequences

Impacted Resources	Impacts	Proposed Action	No Action Alternative	BMP or Environmental Protection Measure
	Power Supply: Operational Phase	Major, Beneficial, Long-term	No Impact	N/A
	Liquid Fuel	Minor, Beneficial, Long-term	No Impact	N/A
	Water Supply	Minor, Negative, Short-term	No Impact	N/A
	Solid Waste	Negligible, Negative, Long-term	No Impact	N/A
Geologic Resources	Geology	No Impact	No Impact	N/A
	Topography	Negligible, Negative, Long-term	No Impact	N/A
	Soils	Minor, Negative, Short-term	No Impact	Follow BMPs in SWPPP
Air Quality	Local Air Quality: Construction Phase	Minor, Negative, Short-term	No Impact	N/A
	Regional Air Quality: Construction Phase	Negligible, Negative, Short-term	No Impact	N/A
	Local and Regional Air Quality: Operational Phase	Beneficial, Long-term	No Impact	N/A
	Greenhouse Gases: Construction	Negligible, Negative, Short-term	No Impact	N/A
	Greenhouse Gases: Operational Phase	No Impact	No Impact	N/A
Hazardous Materials and Solid Wastes	Hazardous Materials Storage and Use	Minor, Negative, Long-term	No Impact	Construction of the USTs would be compliant with established guidelines for the construction of USTs.
	Demolition Phase Hazardous Waste	Minor, Negative, Short-term	No Impact	A demolition waste management plan would be developed by the contractor prior to demolition. The contractor would be responsible for separating and managing solid waste and hazardous waste.
	Asbestos Containing Materials During Demolition	Minor, Negative, Short-term	No Impact	If there is an inadvertent discovery of ACM, the asbestos management plan would be followed. There is also the possibility of asbestos in soil at Buckley AFB and the NRO/ADF-C. the contractor will have a certified asbestos inspector on site observing excavations. If any asbestos is found, the asbestos management plan would be followed.
	Land Use Control	No Impact	No Impact	N/A

4. Environmental Consequences

Impacted Resources	Impacts	Proposed Action	No Action Alternative	BMP or Environmental Protection Measure
	Hazardous Materials Use During Construction	Minor, Negative, Short-term	No Impact	The contractor will develop a hazardous materials management plan and a construction-specific SPCC plan.
	Hazardous Materials Use During Operation	Minor, Negative, Short-term	No Impact	Implement the established Buckley AFB discharge prevention measures, including training personnel to prevent oil discharges during the handling, use, or transfer of oil products on the Base. In the case of an oil spill or discharge, the response and cleanup procedures would be followed based on the requirements established in the SPCC plan. Base personnel would follow the appropriate level of response, reporting, and cleanup procedures based on the level of spill (major or minor).
	Solid Waste	Negligible, Negative, Long-term	No Impact	N/A
Noise	Construction Noise	Negligible, Negative, Short-term	No Impact	Construction noise would be generated only during typical working hours (0700 to 1700 hrs).
	Worker Exposure to Construction Noise	Minor, Negative, Short-term	No Impact	Workers would wear appropriate PPE and adhere to the administrative controls because compliance with these instructions and standards is mandatory.
	Operational Noise	Minor, Negative, Long-term	No Impact	Generators would be contained within a sound-reducing building. Workers inside the facility would wear PPE to comply with AFI 48-127 and Air Force Occupational Safety and Health 48-20.

5. List of Preparers, Agencies Contacted, and Distribution

5.1 Preparers

Table 5-1 lists the preparers of this EA.

Table 5-1. Preparers of the Environmental Assessment for the NRO/ADF-C Electrical Infrastructure Master Plan

Name	Education and Experience	Primary Responsibilities
Kristine MacKinnon, PE	B.S. Biological Systems Engineering 18 years of experience in NEPA analysis, environmental permitting, and project management	Environmental lead
Michelle Rau, PMP	M.S., Business Administration; B.S., Ecology and Evolutionary Biology 22 years of experience	Senior technical review
Laura Dreher	B.S., Civil Engineering 16 years of experience in NEPA analysis, environmental permitting, and NEPA document management	NEPA lead
Christina McDonough, PE	M.E. Environmental Engineering, B.S. Civil Engineering 27 years of experience	Lead author
Benjamin A. Roberts, MHP	M.H.P., Historic Preservation, B.S., Geographic Information Science, B.S. Anthropology 15 years of experience in cultural resources consulting and compliance	Cultural resources
Pamela Vanderbilt	M.A., University of South Dakota, B.S., University of South Dakota 40+ years of experience in federal air quality permitting, regulatory review and environmental compliance	Air quality lead
Emily Gulick	B.A., Environmental Studies; B.A., Geography 3 years of experience in planning	Project planner
Jill Rosenberger	B.A., Geography 4 years of experience, geospatial analysis, construction design support, figure production	GIS support
Steve Petron	Ph.D. Zoology, M.S. Natural and Environmental Resources, B.S., Wildlife Management 25+ years of experience	Senior independent technical review

GIS = Geographic Information System

5.2 Agency Distribution List

The following entities received copies of the EA. Copies of agency coordination documentation are provided in **Appendix B**:

- EPA Region 8
- USFWS, Ecological Field Services Office, Lakewood, CO
- Colorado Department of Public Health and Environment, Water Quality Control Division
- Colorado Department of Public Health and Environment, Air Pollution Control Division
- Colorado Department of Public Health and Environment, Federal Facilities
- Colorado State Historic Preservation Office
- Colorado Division of Wildlife
- City of Aurora, Environmental Management Section
- City of Aurora, Director of Planning
- Metro Wastewater Reclamation District
- Arapahoe County
- Aurora Public Library, Central Library Reference Supervisor

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Appendix A

IICEP Documentation

Appendix A will be provided in the final report.

Appendix B

Public Involvement

Tribal Consultation Summary

In accordance with Executive Order 13175 *Consultation and Coordination with Indian Tribal Governments* (6 November 2000) and with 36 CFR 800.4(a)(4), Section 106 of the National Historic Preservation Act of 1966, as amended, the USAF coordinated and consulted with the following 39 Native American tribes regarding the Proposed Action via letters that will be submitted concurrent with the public comment period. The letters themselves, which contain private contact information, are not being published in the Draft EA. Coordination and consultation are ongoing.

- Apache Tribe of Oklahoma
- Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation
- Cheyenne and Arapaho Tribes of Oklahoma
- Cheyenne River Sioux Tribe
- Comanche Nation of Oklahoma
- Crow Creek Sioux Tribe
- Crow Nation
- Eastern Shoshone Tribe of Wind River Reservation
- Flandreau Santee Sioux Tribe of South Dakota
- Fort Belknap Indian Community
- Fort Sill Apache Tribe
- Jicarilla Apache Tribe
- Kiowa Tribe of Oklahoma
- Lower Brule Sioux Tribe of the Lower Brule Reservation, SD
- Mescalero Apache Tribe
- Northern Arapaho Tribe
- Northern Cheyenne Tribe
- Oglala Sioux Tribe
- Pawnee Nation of Oklahoma
- Pueblo of Taos
- Pueblo of Zuni
- Rosebud Sioux Tribe
- Santee Sioux Nation
- Southern Ute Indian Tribe
- Spirit Lake Nation
- Standing Rock Sioux Tribe
- Three Affiliated Tribes of the Mandan, Hidatsa & Arikara Nation
- Upper Sioux Indian Community
- Ute Indian Tribe of the Uintah & Ouray Reservation
- Ute Mountain Ute Tribe
- Yankton Sioux Tribe
- Navajo Nation, Window Rock, Arizona
- Pueblo of Acoma, Acoma Pueblo (Sky City), New Mexico
- Pueblo de Cochiti, Cochiti Pueblo, New Mexico
- Pueblo of Picuris, Pensacon, New Mexico
- Pueblo of Santa Ana, Tamaya Pueblo, New Mexico
- Pueblo of Santa Clara, Santa Clara, Pueblo, New Mexico
- San Ildefonso Pueblo, San Ildefonso Pueblo, New Mexico
- Wichita and Affiliated Tribes of Oklahoma, Anadarko, Oklahoma

Appendix C
Discoveries of Archaeological Resources
and NAGPRA Cultural Items

1.1 7.4 Discoveries of Archaeological Resources and NAGPRA Cultural Items

Applicability Statement:

This SOP applies to all USAF installations that contain or potentially contain archaeological resources and/or NAGPRA cultural items.

Background/Overview:

Accidental or unanticipated discoveries of archaeological resources may occur on USAF controlled lands. When discoveries occur, the proper actions must be taken to minimize damage to these resources and to ensure that legal requirements are met. The relevant statute is Archaeological Resources Protection Act (ARPA) and the regulation is 32 CFR Part 229, *Protection of Archaeological Resources*.

There is also an important legal subset of archaeological resources, which includes NAGPRA cultural items (i.e., Native American human remains, associated or unassociated burial artifacts, and objects of cultural patrimony). The relevant regulation is 43 CFR Part 10, *Native American Graves Protection and Repatriation Regulations*. See the [Cultural Resources Management Playbook](#) for detailed guidance on the requirements of NAGPRA and this regulation.

It is a federal offense, under the provisions of ARPA and 32 CFR Part 229, to excavate, remove, damage, or otherwise deface any archaeological resources located on federal lands, without authorization. The provisions of ARPA apply to archaeological material greater than 100 years in age, regardless of the NRHP status of the site where they are found. Any person wishing to excavate or remove archaeological resources from an USAF installation must apply for an ARPA permit. USAF-contracted work is exempted from the permitting provision of ARPA. In the event of a permit request, the installation CRM should notify the AFCEC Section CRS. Detailed information to assist in facilitating ARPA permitting is available in the [Cultural Resources Management Playbook](#).

Procedure:

USAF or contractor personnel that make or become aware of a potential archaeological discovery on installation lands should:

- Immediately notify the CRM of the nature and location of the discovery; and
- Immediately cease potentially damaging activities and take efforts to ensure protection of resources until arrival of the CRM or designee.

The CRM should:

- Notify Security Forces of the discovery to facilitate their protection;
- Ensure that all archaeological items are left in place and that no further disturbance is permitted to occur;
- Sufficiently identify the location of the discovery to provide efficient relocation, yet take efforts to minimize the types of signs that could attract personnel and place the discovery in danger; and
- Direct installation personnel and contractors to take efforts to resume mission-associated activities in a reasonable and timely manner if possible.

Security Forces should:

- Notify the Wing Commander regarding the location, nature, and circumstances of the discovery; and
- Provide security/protection for the site to prevent unauthorized disturbance, looting, or vandalism.

If human remains are discovered or if there is sufficient reason to suspect that human remains are present, the CRM should:

- Determine (with the aid of a coroner or forensic anthropologist) if the remains are human, and whether or not they are associated with an archaeological deposit.
- If the remains are not human, and not associated with an archaeological deposit, work may continue.
- Invite consultation with Native American tribes, as appropriate. If a qualified professional finds the human remains to be Native American, the provisions of NAGPRA apply. Follow the procedures outlined in 43 CFR Part 10 or in existing installation NAGPRA agreements with tribes.

Appendix D

Air Emissions Modeling

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

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, *Air Quality Compliance And Resource Management*; the Environmental Impact Analysis Process (EIAP) (32 *Code of Federal Regulations* [CFR] 989); and the General Conformity Rule (GCR) (40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: Buckley Air Force Base (AFB)

State: Colorado

County(s): Arapahoe

Regulatory Area(s): Denver Metro/North Front Range, CO; Denver Metro, CO; Denver-Boulder, CO

b. Action Title: Aerospace Data Facility Colorado (ADF-C) Electrical Infrastructure Master Plan

c. Project Number/s (if applicable):

d. Projected Action Start Date: August 2021

e. Action Description:

The Proposed Action is to recapitalize the existing onsite backup power generation and distribution systems and replace the existing Central Power Plant (CPP) with a new power plant with lower emissions. Construction would be phased to meet funding requirements and prevent interruption in backup power generation capacity.

f. Point of Contact:

Name: Michelle York

Title: Air Quality Consultant

Organization: Jacobs Engineering Group Inc.

Email: michelle.york@jacobs.com

Phone Number: 360.694.6756

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are:

_____ applicable
__X__ not applicable

Conformity Analysis Summary:

2021

Regulatory Area	Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
			Threshold (ton/yr)	Exceedance (Yes or No)
Denver Metro/North Front Range, CO	VOC	0.089	50	No
	NO _x	0.580	50	No
	CO	0.535	N/A	N/A
	SO _x	0.001	N/A	N/A
	PM ₁₀	2.335	N/A	N/A
	PM _{2.5}	0.024	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.000	N/A	N/A
	CO _{2e}	134.3	N/A	N/A
Denver Metro, CO	VOC	0.089	N/A	N/A
	NO _x	0.580	N/A	N/A
	CO	0.535	N/A	N/A
	SO _x	0.001	N/A	N/A
	PM ₁₀	2.335	100	No
	PM _{2.5}	0.024	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.000	N/A	N/A
	CO _{2e}	134.3	N/A	N/A
Denver-Boulder, CO	VOC	0.089	N/A	N/A
	NO _x	0.580	N/A	N/A
	CO	0.535	100	No
	SO _x	0.001	N/A	N/A
	PM ₁₀	2.335	N/A	N/A
	PM _{2.5}	0.024	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.000	N/A	N/A
	CO _{2e}	134.3	N/A	N/A

2022

Regulatory Area	Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
			Threshold (ton/yr)	Exceedance (Yes or No)
Denver Metro/North Front Range, CO	VOC	0.692	50	No
	NO _x	2.846	50	No
	CO	3.373	N/A	N/A
	SO _x	0.008	N/A	N/A
	PM ₁₀	1.002	N/A	N/A
	PM _{2.5}	0.117	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.002	N/A	N/A
	CO _{2e}	820.1	N/A	N/A
Denver Metro, CO	VOC	0.692	N/A	N/A
	NO _x	2.846	N/A	N/A
	CO	3.373	N/A	N/A
	SO _x	0.008	N/A	N/A
	PM ₁₀	1.002	100	No
	PM _{2.5}	0.117	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.002	N/A	N/A
	CO _{2e}	820.1	N/A	N/A
Denver-Boulder, CO	VOC	0.692	N/A	N/A
	NO _x	2.846	N/A	N/A
	CO	3.373	100	No
	SO _x	0.008	N/A	N/A
	PM ₁₀	1.002	N/A	N/A
	PM _{2.5}	0.117	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.002	N/A	N/A
	CO _{2e}	820.1	N/A	N/A

2023

Regulatory Area	Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
			Threshold (ton/yr)	Exceedance (Yes or No)
Denver Metro/North Front Range, CO	VOC	0.302	50	No
	NO _x	1.077	50	No
	CO	1.432	N/A	N/A
	SO _x	0.004	N/A	N/A
	PM ₁₀	0.340	N/A	N/A
	PM _{2.5}	0.042	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.001	N/A	N/A
	CO _{2e}	353.9	N/A	N/A
Denver Metro, CO	VOC	0.302	N/A	N/A
	NO _x	1.077	N/A	N/A
	CO	1.432	N/A	N/A
	SO _x	0.004	N/A	N/A
	PM ₁₀	0.340	100	No
	PM _{2.5}	0.042	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.001	N/A	N/A
	CO _{2e}	353.9	N/A	N/A
Denver-Boulder, CO	VOC	0.302	N/A	N/A
	NO _x	1.077	N/A	N/A
	CO	1.432	100	No
	SO _x	0.004	N/A	N/A
	PM ₁₀	0.340	N/A	N/A
	PM _{2.5}	0.042	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.001	N/A	N/A
	CO _{2e}	353.9	N/A	N/A

2024

Regulatory Area	Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
			Threshold (ton/yr)	Exceedance (Yes or No)
Denver Metro/North Front Range, CO	VOC	0.307	50	No
	NO _x	0.757	50	No
	CO	1.067	N/A	N/A
	SO _x	0.002	N/A	N/A
	PM ₁₀	0.215	N/A	N/A
	PM _{2.5}	0.028	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.001	N/A	N/A
	CO _{2e}	225.7	N/A	N/A
Denver Metro, CO	VOC	0.307	N/A	N/A
	NO _x	0.757	N/A	N/A
	CO	1.067	N/A	N/A
	SO _x	0.002	N/A	N/A
	PM ₁₀	0.215	100	No
	PM _{2.5}	0.028	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.001	N/A	N/A
	CO _{2e}	225.7	N/A	N/A
Denver-Boulder, CO	VOC	0.307	N/A	N/A
	NO _x	0.757	N/A	N/A
	CO	1.067	100	No
	SO _x	0.002	N/A	N/A
	PM ₁₀	0.215	N/A	N/A
	PM _{2.5}	0.028	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.001	N/A	N/A
	CO _{2e}	225.7	N/A	N/A

2025

Regulatory Area	Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
			Threshold (ton/yr)	Exceedance (Yes or No)
Denver Metro/North Front Range, CO	VOC	0.099	50	No
	NO _x	0.562	50	No
	CO	0.658	N/A	N/A
	SO _x	0.002	N/A	N/A
	PM ₁₀	1.539	N/A	N/A
	PM _{2.5}	0.021	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.001	N/A	N/A
	CO _{2e}	188.6	N/A	N/A
Denver Metro, CO	VOC	0.099	N/A	N/A
	NO _x	0.562	N/A	N/A
	CO	0.658	N/A	N/A
	SO _x	0.002	N/A	N/A
	PM ₁₀	1.539	100	No
	PM _{2.5}	0.021	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.001	N/A	N/A
	CO _{2e}	188.6	N/A	N/A
Denver-Boulder, CO	VOC	0.099	N/A	N/A
	NO _x	0.562	N/A	N/A
	CO	0.658	100	No
	SO _x	0.002	N/A	N/A
	PM ₁₀	1.539	N/A	N/A
	PM _{2.5}	0.021	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.001	N/A	N/A
	CO _{2e}	188.6	N/A	N/A

2026

Regulatory Area	Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
			Threshold (ton/yr)	Exceedance (Yes or No)
Denver Metro/North Front Range, CO	VOC	0.000	50	No
	NO _x	0.000	50	No
	CO	0.000	N/A	N/A
	SO _x	0.000	N/A	N/A
	PM ₁₀	0.000	N/A	N/A
	PM _{2.5}	0.000	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.000	N/A	N/A
	CO _{2e}	0.0	N/A	N/A
Denver Metro, CO	VOC	0.000	N/A	N/A
	NO _x	0.000	N/A	N/A
	CO	0.000	N/A	N/A
	SO _x	0.000	N/A	N/A
	PM ₁₀	0.000	100	No
	PM _{2.5}	0.000	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.000	N/A	N/A
	CO _{2e}	0.0	N/A	N/A
Denver-Boulder, CO	VOC	0.000	N/A	N/A
	NO _x	0.000	N/A	N/A
	CO	0.000	100	No
	SO _x	0.000	N/A	N/A
	PM ₁₀	0.000	N/A	N/A
	PM _{2.5}	0.000	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.000	N/A	N/A
	CO _{2e}	0.0	N/A	N/A

2027

Regulatory Area	Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
			Threshold (ton/yr)	Exceedance (Yes or No)
Denver Metro/North Front Range, CO	VOC	0.000	50	No
	NO _x	0.000	50	No
	CO	0.000	N/A	N/A
	SO _x	0.000	N/A	N/A
	PM ₁₀	0.000	N/A	N/A
	PM _{2.5}	0.000	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.000	N/A	N/A
	CO _{2e}	0.0	N/A	N/A
Denver Metro, CO	VOC	0.000	N/A	N/A
	NO _x	0.000	N/A	N/A
	CO	0.000	N/A	N/A
	SO _x	0.000	N/A	N/A
	PM ₁₀	0.000	100	No
	PM _{2.5}	0.000	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.000	N/A	N/A
	CO _{2e}	0.0	N/A	N/A
Denver-Boulder, CO	VOC	0.000	N/A	N/A
	NO _x	0.000	N/A	N/A
	CO	0.000	100	No
	SO _x	0.000	N/A	N/A
	PM ₁₀	0.000	N/A	N/A
	PM _{2.5}	0.000	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.000	N/A	N/A
	CO _{2e}	0.0	N/A	N/A

2028

Regulatory Area	Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
			Threshold (ton/yr)	Exceedance (Yes or No)
Denver Metro/North Front Range, CO	VOC	0.317	50	No
	NO _x	0.520	50	No
	CO	0.780	N/A	N/A
	SO _x	0.002	N/A	N/A
	PM ₁₀	0.320	N/A	N/A
	PM _{2.5}	0.018	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.001	N/A	N/A
	CO _{2e}	200.5	N/A	N/A
Denver Metro, CO	VOC	0.317	N/A	N/A
	NO _x	0.520	N/A	N/A
	CO	0.780	N/A	N/A
	SO _x	0.002	N/A	N/A
	PM ₁₀	0.320	100	No
	PM _{2.5}	0.018	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.001	N/A	N/A
	CO _{2e}	200.5	N/A	N/A
Denver-Boulder, CO	VOC	0.317	N/A	N/A
	NO _x	0.520	N/A	N/A
	CO	0.780	100	No
	SO _x	0.002	N/A	N/A
	PM ₁₀	0.320	N/A	N/A
	PM _{2.5}	0.018	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.001	N/A	N/A
	CO _{2e}	200.5	N/A	N/A

2029 - (Steady State)

Regulatory Area	Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
			Threshold (ton/yr)	Exceedance (Yes or No)
Denver Metro/North Front Range, CO	VOC	0.000	50	No
	NO _x	0.000	50	No
	CO	0.000	N/A	N/A
	SO _x	0.000	N/A	N/A
	PM ₁₀	0.000	N/A	N/A
	PM _{2.5}	0.000	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.000	N/A	N/A
	CO _{2e}	0.0	N/A	N/A
Denver Metro, CO	VOC	0.000	N/A	N/A
	NO _x	0.000	N/A	N/A
	CO	0.000	N/A	N/A
	SO _x	0.000	N/A	N/A
	PM ₁₀	0.000	100	No
	PM _{2.5}	0.000	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.000	N/A	N/A
	CO _{2e}	0.0	N/A	N/A
Denver-Boulder, CO	VOC	0.000	N/A	N/A
	NO _x	0.000	N/A	N/A
	CO	0.000	100	No
	SO _x	0.000	N/A	N/A
	PM ₁₀	0.000	N/A	N/A
	PM _{2.5}	0.000	N/A	N/A
	Pb	0.000	N/A	N/A
	NH ₃	0.000	N/A	N/A
	CO _{2e}	0.0	N/A	N/A

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

 Michelle York, Air Quality Consultant

 DATE

Emission Calculations for Colorado Powerhouse Generators, including Expansion

All Emissions calculated in accordance with guidance found in the Air Emissions Guide for Air Force Stationary Sources, AFCEC, August 2018. See equation 3-2.

Generator Data

Total number of generators ⁽¹⁾ 10

Kilowatt Rating, Site-Rated ⁽²⁾ 2,553

Horsepower Rating, Site-Rated ⁽³⁾ 3,422.30

Engine load factor (%) ⁽⁴⁾ 100

Total power (kilowatt hours per year) produced by the generators ⁽⁵⁾ 11,500,000

Operating Time: Estimated operating time (hour per year per generator) 450.45

Convert kilowatts to horsepower 1.3405

Convert grams to pounds 0.0022046

Criteria Pollutant Emissions

Constituent	EF (g/hp-hour)	Emissions per Unit per Year		Total Emissions per Year
		Pounds	Short Tons	Short Tons
Nitrous Oxide ⁽⁶⁾	0.5	1,699	0.8	8.50
CO ⁽⁶⁾	2.6	8,836	4.4	44.18
VOC ⁽⁶⁾	0.14	476	0.2	2.38
PM ⁽⁶⁾	0.022	75	0.0	0.37
SOx ⁽⁷⁾	0.000012135	19	0.0	0.09

HAP Emissions

Constituent	EF (pounds/MMBtu) ⁽⁸⁾	Emissions per Unit per Year		Total Emissions per Year
		pounds	Short Tons	Short Tons
Total HAP	4.15E-03	48.7	0.0	0.24
Benzene	7.76E-04	9.1	0.0	0.05
Toluene	2.81E-04	3.3	0.0	0.02
Xylenes	1.93E-04	2.3	0.0	0.01
Propylene	2.79E-03	32.7	0.0	0.16
Formaldehyde	7.89E-05	0.9	0.0	0.00
Acetaldehyde	2.52E-05	0.3	0.0	0.00
Acrolein	7.88E-06	0.1	0.0	0.00

Appendix D. ACAM Emissions Modeling

Note: MMBtu = one million British Thermal Units

GHG Emissions

Fuel consumption rate (gallons per hour) per unit ⁽²⁾ 189

Annual fuel consumption (gallon) per unit 85,000

High Heating Value for Diesel (MMBtu per gallon) ⁽⁹⁾ 0.138

Constituent	EF (kilograms per MMBtu)	Emissions per Unit per Year		Total Emissions per Year ⁽¹¹⁾	Total Emissions per Year ⁽¹¹⁾
		Kilograms	Metric Tons	Metric Tons	Short Tons
CO ₂ ⁽⁹⁾	73.96	867,551	867.6	8,675.5	9,563.11
CH ₄ ⁽¹⁰⁾	0.0030	35	0.0	0.4	0.39
N ₂ O ⁽¹⁰⁾	0.0006	7	0.0	0.1	0.08

⁽¹⁾ Construction Plan

⁽²⁾ *Project Sizing Report*, CAT, 12 Feb 2020. Displacement = 85 L, Cylinder Configuration = VEE-16.

Name plate rating is 2,750.0 kW.

⁽³⁾ Conversion: https://www.holtcat.com/online_tools/power_calculator 2,553 Kilowatt = 3,422.25 horsepower (1.3405 horsepower per kilowatt)

⁽⁴⁾ Per Title V, total power produced shall be calculated based on the following equation: Kilowatt -hour = hours of operation * rated power (Kilowatt)

⁽⁵⁾ Per Title V condition

⁽⁶⁾ Tier 4 emission standards Table 4: <https://dieselnet.com/standards/us/nonroad.php>.

Tier 4 emission standards—Engines above 560 Kilowatt, g/kWh (g/bhp-hour)

Year	Category	CO	NMHC	Nitrous Oxide	PM
2015	Generator sets	3.5 (2.6)	0.19 (0.14)	0.67 (0.50)	0.03 (0.022)

Source: *Consistent with SCRT System for C175 2725 kw Diesel Engine / Genset, Johnson Matthey, 17 Dec, 2018*. Air Emission Guide for Air Force Stationary Sources (AFCEC, Aug 2018), Table 3-4, Noted, Internal Combustion sources can assume PM=PM10=PM2.5

⁽⁷⁾ Table 3.4-1, Section 3.4, AP-42: Compilation of Air Emissions Factors, Fifth Edition, US EPA, Oct 1996. Assumed a sulfur content of 0.0015 wt%.

⁽⁸⁾ Table 3.4-3, Section 3.4, AP-42: Compilation of Air Emissions Factors, Fifth Edition, US EPA, Oct 1996

⁽⁹⁾ 40 CFR 98, GHG Mandatory Reporting Rule, Subpart C, Table C-1

⁽¹⁰⁾ 40 CFR 98, GHG Mandatory Reporting Rule, Subpart C, Table C-2

⁽¹¹⁾ Back-calculating the brake-specific fuel consumption using the equation [Fuel flowrate (gallons per hour) * High heating value (MMBtu per gallon) / Engine rating (horsepower)] results in a brake-specific fuel consumption of 0.0076 MMBTU per horsepower hour, which is based on operation at peak capacity.

This value for brake-specific fuel consumption represents an engine efficiency of 33%.

- Brake-specific fuel consumption (back-calculated): 0.0076 MMBtu per horsepower hour
- Ideal Conversion between MMBTU and per horsepower hour: 0.0025 MMBtu per horsepower hour
- Efficiency: 33%

Because engine efficiency will fluctuate based on operational parameters, GHG emissions should be assumed comparable between proposed and existing units.

Emission Calculations for Building 465, to be Demolished

All Emissions calculated in accordance with guidance found in the Air Emissions Guide for Air Force Stationary Sources, AFCEC, Aug 2018. See equation 3-2.

Generator Data

Total number of generators ⁽¹⁾ 10

Kilowatt Rating, Site-Rated ⁽¹⁾ 2,500

HP Rating, Site-Rated ⁽¹⁾ 3,351.25

Engine load factor (%) ⁽¹⁾ 100

Total power (kilowatt hours per year) produced by the generators ⁽²⁾ 11,500,000

Operating Time: Estimated operating time (hour per year per generator) 460.00

Convert kilowatt to horsepower 1.3405

Convert g to pounds 0.0022046

Criteria Pollutant Emissions

Constituent	EF (g/kW-hour)	Emissions per Unit per Year		Total Emissions per Year
		Pounds	Short Ton	Short Ton
Nitrous Oxide ⁽³⁾	14.92	37,827	18.9	189.13
CO ⁽³⁾	3.34	8,468	4.2	42.34
VOC ⁽³⁾	2.22	5,628	2.8	28.14
PM ⁽³⁾	0.3	761	0.4	3.80
SOx ⁽³⁾	0.00738	19	0.0	0.09

HAP Emissions

Constituent	EF (pounds per MMBTU) ^(4,5)	Emissions per Unit per Year		Total Emissions per Year
		pounds	Short Ton	Short Ton
Total HAP	4.15E-03	51.8	0.0	0.26
Benzene	7.76E-04	9.7	0.0	0.05
Toluene	2.81E-04	3.5	0.0	0.02
Xylenes	1.93E-04	2.4	0.0	0.01
Propylene	2.79E-03	34.8	0.0	0.17
Formaldehyde	7.89E-05	1.0	0.0	0.00
Acetaldehyde	2.52E-05	0.3	0.0	0.00
Acrolein	7.88E-06	0.1	0.0	0.00

GHG Emissions

Constituent	EF (kilograms per MMBtu) ⁽⁴⁾	Emissions per Unit per Year		Total Emissions per Year ⁽⁸⁾	Total Emissions per Year ⁽⁸⁾
		Kilograms	Metric Ton	Metric Ton	Short Ton
CO ₂ ⁽⁶⁾	73.96	922,266	922.3	9,222.7	10,166.24
CH ₄ ⁽⁷⁾	0.0030	37	0.0	0.4	0.41
N ₂ O ⁽⁷⁾	0.0006	7	0.0	0.1	0.08

⁽¹⁾ Title V

⁽²⁾ Email from Jeff Harrison to Kristine MacKinnon dated Aug 29, 2019.

⁽³⁾ Title V, Table on page 5

⁽⁴⁾ Using a brake-specific fuel consumption value of 0.008089 MMBTU per horsepower hour as found in Table 3-3 notes from Air Emissions Guide for Air Force Stationary Sources, AFCEC, Aug 2018

⁽⁵⁾ Table 3.4-3, Section 3.4, AP-42: Compilation of Air Emissions Factors, Fifth Edition, US EPA, Oct 1996

⁽⁶⁾ 40 CFR 98, GHG Mandatory Reporting Rule, Subpart C, Table C-1

⁽⁷⁾ 40 CFR 98, GHG Mandatory Reporting Rule, Subpart C, Table C-2

⁽⁸⁾ 0.008089 MMBtu per horsepower hour used for brake-specific fuel consumption represents an engine efficiency of 31%.

- Brake-specific fuel consumption (back-calculated): 0.008 MMBtu per horsepower hour
- Ideal Conversion between MMBTU and per horsepower hour: 0.0025 MMBtu per horsepower hour
- Efficiency” 31%

Because engine efficiency will fluctuate based on operational parameters, GHG emissions should be assumed comparable between proposed and existing units.

Buckley AFB ADF-C Fuel Tank Emissions

All Emissions calculated in ACAM

Tank Emission Timeline

Phase	Total Annual VOC Emissions (tons)	Construction Begins	Operational Units
Current	0.113		Two 20,000-gallon tanks + 5 existing day tanks + 12 10,000-gallon tanks at CPP Tanks
Phase 1	0.149	1-Sep-2021	Addition of six day tanks
Phase 4	0.267	25-Jan-2024	Addition of four 50,000-gallon tanks
Phase 6	0.195	2-Jun-2025	Removal of 12 10,000-gallon tanks at CPP
Phase 7 ¹	0.263	1-Aug-2028	Addition of 4 day tanks and two 50,000-gallon tanks
Final ²	0.233		Two 20,000-gallon tanks + 15 day tanks + six 50,000-gallon tanks

¹ First four 50,000-gallon tanks assumed to be operating at peak throughput until additional two 50,000-gallon tanks are operational.

² All six 50,000-gallon tanks operating at steady state.

Detailed Specifications and Emissions:

- Existing two 20,000-gallon Tanks
 - Assumed a length of 28 feet, diameter of 11 feet.
 - Fuel throughput of existing five generators, split into two tanks
- Tank Data
 - 2 each
 - gallons per year per tank: 212,500
 - gallons per year total: 425,000
- VOC Emissions (tons)
 - Per Unit: 0.005
 - Total: 0.010

Six Additional 1,000-gallon Day Tanks

(Phase 1) Assumed a length of 10 feet, diameter of 4 feet. AST, exterior to building

- Tank Data
 - Each: 6
 - gallons per year per tank: 85,000
 - gallons per year total: 510,000
- VOC Emissions (tons)
 - Per Unit: 0.006
 - Total: 0.037

Four Additional 50,000-gallon USTs

(Phase 4)

Diameter = 12 feet, Length = 59.5 feet

Appendix D. ACAM Emissions Modeling

Assumed peak throughput, when 2 existing tanks are demolished, additional 4 generators added, and 2 new USTs in Phase 7 have not been built.

All fuel for combined 15 generators pass through 4 tanks, assumed existing 5 generators have same fuel consumption rate as new generators

- Tank Data
 - each 4
 - Total Fuel Throughput 1,275,000
 - Throughput per tank 318,750
- VOC Emissions (tons)
 - Per Unit 0.029
 - Total 0.117

Demolition of 12 10,000-gallon Tanks

(Phase 6) Building 465

Assumed a length of 26 feet, diameter of 10.5 feet.

- Tank Data
 - each 12
 - gallons per year per tank 65,163
 - gallons per year total 781,956
- VOC Emissions (tons)
 - Per Unit -0.006
 - Total -0.072

Four Additional 1,000-gallon Day Tanks

(Phase 7)

- Tank Data
 - each 4
 - gallons per year per tank 85,000
 - gallons per year total 340,000
- VOC Emissions (tons)
 - Per Unit 0.006
 - Total 0.024

Two Additional 50,000-gallon USTs

(Phase 7)

Diameter = 12 feet, Length = 59.5 feet

All fuel for combined 15 generators pass through 6 tanks, assumed existing 5 generators have same fuel consumption rate as new generators

Assumed peak throughput, 4 new tanks plus these two

- Tank Data
 - each 2
 - Total Fuel Throughput: 1,275,000
 - Throughput per tank: 212,500
- VOC Emissions (tons)
 - **Per Unit:** 0.022 Note: All 50,000-gallon tanks will drop to this emission level at this time.
 - **Total:** 0.044

Emission Calculations for Colorado Powerhouse Comfort Heat Boilers, including Expansion

All Emissions calculated in accordance with guidance found in the Air Force Potential to Emit (PTE) Guide, AFCEC, Dec 2014. See equation 14.

Total number of boilers ⁽¹⁾: 3

MMBtu per hour ⁽²⁾: 0.50

Btu/cubic feet ⁽³⁾: 1026

Heating Days ⁽⁴⁾: 274

Annual Operating Hours 6,576.00

Natural Gas consumed (million cubic feet of gas per year) 9.61

Criteria Pollutant Emissions

Constituent	EF (pounds per million cubic feet of gas) ⁽⁵⁾	Emissions per Unit per Year		Total Emissions per Year
		pounds	Short Ton	Short Ton
Nitrous Oxide	100	961.40	0.5	1.44
Carbon	84	807.58	0.4	1.21
VOC	5.5	52.88	0.0	0.08
PM10	7.6	73.07	0.0	0.11
PM2.5	7.6	73.07	0.0	0.11
SOx	0.6	5.77	0.0	0.01
Pb	0.0005	0.00	0.0	0.00

HAP Emissions

Constituent	EF (pound per million cubic feet of gas) ⁽⁶⁾	Emissions per Unit per Year		Total Emissions per Year
		pounds	Short Ton	Short Ton
Total HAP	9.15E-02	0.880	0.0	0.00
2-Methylnapthalene	2.40E-05	0.000	0.0	0.00
3-Methylcholanthrene	1.80E-06	0.000	0.0	0.00
Acenaphthene	1.80E-06	0.000	0.0	0.00
Acenaphthylene	1.80E-06	0.000	0.0	0.00
Acetaldehyde	4.30E-03	0.041	0.0	0.00
Acrolein	2.70E-03	0.026	0.0	0.00
Anthracene	2.40E-06	0.000	0.0	0.00
Arsenic	2.00E-04	0.002	0.0	0.00
Benzene	8.00E-03	0.077	0.0	0.00

Constituent	EF (pound per million cubic feet of gas) ⁽⁶⁾	Emissions per Unit per Year		Total Emissions per Year
		pounds	Short Ton	Short Ton
Benzo(a)anthracene	1.80E-06	0.000	0.0	0.00
Benzo(a)pyrene	1.60E-06	0.000	0.0	0.00
Benzo(b)fluoranthene	1.80E-06	0.000	0.0	0.00
Benzo(g,h,i)perylene	1.60E-06	0.000	0.0	0.00
Benzo(k)fluoranthene	1.80E-06	0.000	0.0	0.00
Beryllium	1.20E-05	0.000	0.0	0.00
Cadmium	1.10E-03	0.011	0.0	0.00
Chromium	1.40E-03	0.013	0.0	0.00
Chrysene	1.80E-06	0.000	0.0	0.00
Cobalt	8.40E-05	0.001	0.0	0.00
Dibenzo(a,h)anthracene	1.60E-06	0.000	0.0	0.00
Dichlorobenzene	1.20E-03	0.012	0.0	0.00
Ethylbenzene	9.50E-03	0.091	0.0	0.00
Fluoranthene	3.00E-06	0.000	0.0	0.00
Fluorene	2.80E-06	0.000	0.0	0.00
Formaldehyde	1.70E-02	0.163	0.0	0.00
Hexane	6.30E-03	0.061	0.0	0.00
Indeno(1,2,3-cd)pyrene	1.80E-06	0.000	0.0	0.00
Manganese	3.80E-04	0.004	0.0	0.00
Mercury	2.60E-04	0.002	0.0	0.00
Naphthalene	3.00E-04	0.003	0.0	0.00
Nickel	2.10E-03	0.020	0.0	0.00
Phenanthrene	1.70E-05	0.000	0.0	0.00
Pyrene	5.00E-06	0.000	0.0	0.00
Selenium	2.40E-05	0.000	0.0	0.00
Toluene	3.66E-02	0.352	0.0	0.00

GHG Emissions

Constituent	EF (kilograms per MMBtu)	Emissions per Unit per Year		Total Emissions per Year	Total Emissions per Year
		Kilograms	Metric Ton	Metric Ton	Short Ton
CO ₂ ⁽⁷⁾	53.06	523,384	523.4	5,233.8	1,730.80
CH ₄ ⁽⁸⁾	0.0010	10	0.0	0.1	0.03
N ₂ O ⁽⁸⁾	0.0001	1	0.0	0.0	0.00

⁽¹⁾ Construction Plan

⁽²⁾ *Submittal Sheet*, Lochinvar, Knight XL Commercial Condensing Heating Boilers, Model KBN501

⁽³⁾ Table 3-2. Air Emissions Guide for Air Force Stationary Sources, AFCEC, Aug 2018

⁽⁴⁾ Appendix B, Air Force Potential to Emit (PTE) Guide, AFCEC, Dec 2014

⁽⁵⁾ Table 2-3. Air Emissions Guide for Air Force Stationary Sources, AFCEC, Aug 2018

⁽⁶⁾ Table 2-5. Air Emissions Guide for Air Force Stationary Sources, AFCEC, Aug 2018

⁽⁷⁾ 40 CFR 98, GHG Mandatory Reporting Rule, Subpart C, Table C-1

⁽⁸⁾ 40 CFR 98, GHG Mandatory Reporting Rule, Subpart C, Table C-2

Appendix E
EPA Stormwater Program,
2017 Construction General Permit -
Endangered and Threatened Species and
Critical Habitat Preservation



DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

1 March 2017

MEMORANDUM FOR RECORD

FROM: 460 CES/CEIE
660 South Aspen Street (Stop 86)
Buckley AFB CO 80011-9551

SUBJECT: USEPA Stormwater Program, 2017 Construction General Permit – Endangered and Threatened Species and Critical Habitat Protection

1. The U.S. Environmental Protection Agency's (USEPA) National Pollution Discharge Elimination System (NPDES) 2017 General Permit for Storm Water Discharges From Construction Activities, commonly referred to as the 2017 Construction General Permit (CGP), authorizes stormwater discharges from construction sites with land disturbance greater than one acre. One of the restrictions is Endangered and Threatened Species and Critical Habitat Protection (Part 7.2.9.a of the 2017 CGP). To be eligible for coverage under the 2017 CGP, an applicant must demonstrate that its stormwater discharges and related activities are not likely to jeopardize the continued existence of any species that are federally-listed as endangered or threatened ("listed") under the Endangered Species Act (ESA) or result in the adverse modification or destruction of habitat that is federally-designated as critical under the ESA ("critical habitat"). The 2017 CGP Appendix D specifies the process that must be used to make this demonstration.

2. The 460th Civil Engineer Squadron Installation Management Flight, Environmental Element (460 CES/CEIE) has completed the specified process regarding federally listed species/designated critical habitat and has determined that stormwater discharges and authorized non-stormwater discharge-related activities on Buckley Air Force Base (AFB) are not likely to adversely affect any federally listed species or designated critical habitat.

- a. Buckley AFB is located in Arapahoe County, Colorado. In March 2017, the U.S. Fish & Wildlife Service (USFWS) Electronic Environmental Conservation Online System (ECOS) was accessed and the Information, Planning, & Conservation tool (located at <http://ecos.fws.gov/ipac/>) was utilized for Arapahoe County, CO. The results from the project builder, when queried for "development" identified the following eight federally listed species under the ESA that are known to occur in Arapahoe County or downstream of Buckley AFB:

- i. Interior least tern (*Sterna antillarum athalassos*),
- ii. Mexican spotted owl (*Strix occidentalis lucida*),
- iii. Pallid Sturgeon (*Scaphirhynchus albus*),
- iv. Piping plover (*Charadrius melodus*),
- v. Preble's meadow jumping mouse (*Zapus hudsonius preblei*),
- vi. Ute ladies' tresses (*Spiranthes diluvialis*),
- vii. Western Prairie Fringed Orchid (*Platanthera praeclara*), and

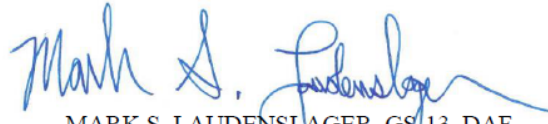
PERSISTENT GLOBAL SURVEILLANCE

viii. Whooping crane (*Grus americana*).

- b. According to the USFWS (March 2017) there is no critical habitat designated in or near the area of Buckley AFB.
- c. To date, no listed species have been found or are expected to be present on Buckley AFB.
- d. Buckley AFB has potentially suitable habitat for the Preble's meadow jumping mouse and Ute ladies'-tresses. Buckley AFB 460 CES/CEIE had performed surveys for these listed species.
- e. The black-footed ferret (*Mustela nigrapes*) a federally endangered listed species, was block cleared from surveys in Arapahoe County, CO, by the USFWS in September 2009.
- f. There are occasional sightings of bald eagles and is a winter visitor to Buckley AFB, but does not nest on or near the installation. The eagle is not dependent upon wetland or riparian habitats either on Buckley AFB or in the vicinity. The bald eagle was delisted on 9 August 2007, but is presently still protected under both the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

3. Based on the information above, 460 CES/CEIE has determined that no federally-listed threatened or endangered species or their designated critical habitats are likely to occur on Buckley AFB and therefore stormwater discharges, authorized non-stormwater discharges, and stormwater discharge-related activities on Buckley AFB are not likely to adversely affect any federally listed species or designated critical habitat. Buckley AFB satisfies 2017 CGP eligibility restrictions for the ESA under Criterion A.

4. Please contact me at (720) 847-9218, email mark.laudenslager.1@us.af.mil , or Krystal Phillips, Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, at (720) 847-6937, email krystal.phillips.1@us.af.mil with any questions or concerns.



MARK S. LAUDENSLAGER, GS-13, DAF
Chief, Installation Management Flight