ENVIRONMENTAL ASSESSMENT ADDRESSING THE

Department of Defense Satellite Communications Ground Terminal Facility

At Kirtland Air Force Base, New Mexico

JULY 2023

PREPARED FOR

United States Air Force
Kirtland Air Force Base

PREPARED BY

ALLIANCE JOINT VENTURE
WSP

Environmental Assessment Addressing the Department of Defense Satellite Communications Ground Terminal Facility at Kirtland Air Force Base, New Mexico

Prepared for the United States Air Force

July 2023

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Under Contract to:

US Army Corps of Engineers,
Baltimore District

Task Order Number: W912DR22F0298
Under Contract Number: W912DR22D0002

PRIVACY ADVISORY

This Environmental Assessment (EA) is provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) NEPA Regulations (40 Code of Federal Regulations [CFR] §§ 1500–1508) [July 16, 2020, version of the CEQ NEPA regulations (85 Federal Register 43304–43376) and the April 20, 2022, amendments of the 2020 CEQ NEPA regulations (87 Federal Register 23453–23470)], and 32 CFR Part 989, Environmental Impact Analysis Process (EIAP).

The EIAP provides an opportunity for public input on United States Air Force (USAF) decision-making, allows the public to offer inputs on alternative ways for the USAF to accomplish what it is proposing, and solicits comments on the USAF's analysis of environmental effects.

Written comments and inquiries regarding this document should be directed by mail to the Kirtland AFB NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Building 20685, Kirtland AFB, New Mexico 87117-5270, or via email to kirtlandNEPA@us.af.mil.

Public commenting allows the USAF to make better, informed decisions. Letters or other written or oral comments provided may be published in the EA. As required by law, comments provided will be addressed in the EA and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA; however, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the EA.

COVER SHEET

DRAFT ENVIRONMENTAL ASSESSMENT ADDRESSING THE DEPARTMENT OF DEFENSE SATELLITE COMMUNICATIONS GROUND TERMINAL FACILITY AT KIRTLAND AIR FORCE BASE, NEW MEXICO

Responsible Agencies: United States Air Force (USAF) Kirtland Air Force Base (AFB)

Affected Location: Kirtland AFB, New Mexico

Report Designation: Environmental Assessment

Abstract: Kirtland AFB has identified a 15-acre site for the construction of a satellite communications (SATCOM) ground terminal (GT) facility to support communications with satellites in a variety of orbits. The facility would consist of three antennas with an associated equipment shelter, two emergency generators, perimeter fencing, a sensor equipment tower, and utilities. In addition to the three ground terminal sites, a fourth pad site would be constructed to accommodate an equipment shelter, and a fifth pad site would be prepared for future use for a smaller, portable GT that does not require permanent structures or foundations. The portable GT would have an underground utility connection to the equipment shelter and its own portable emergency generator when in temporary use. Lastly, a grounding well would be dug on-site to a depth of up to 1,000 feet to prevent the buildup of electrical voltages on the system that may occur from high voltage surges (i.e., lightning strikes), which could result in undue hazards to equipment and personnel.

Under the No-Action Alternative, Kirtland AFB would take no action, and the GT facility would not be constructed. The SATCOM supported by the GT facility would not be realized, and the necessary ground coverage for these communications would not exist within the New Mexico region. The SATCOM Program Office would select the next highest-ranking site from the candidate sites to construct the GT facility, and any potential impacts would be realized at that location.

The Environmental Assessment analyzes the potential environmental impacts associated with the Proposed Action and No-Action Alternative and aids in determining whether a Finding of No Significant Impact can be prepared or if an Environmental Impact Statement is required.

Written comments and inquiries regarding this document should be directed by mail to the Kirtland AFB National Environmental Policy Act Program Manager, 377th MSG/CEIEC, 2050 Wyoming Boulevard SE, Building 20685, Kirtland AFB, New Mexico 87117-5270, or by email to KirtlandNEPA@us.af.mil.

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ACRONYMS AND ABBREVIATIONS

377th ABW	377th Air Base Wing
377 MSG/CEIEC	377th Mission Support Group/Civil Engineering Installation Environmental Compliance
AEHD-AQD	Albuquerque Environmental Health Department Air Quality Division
AFB	Air Force Base
AFI	Air Force Instruction
BMP	best management practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGP	Construction General Permit
CO2	carbon dioxide
CO2e	carbon dioxide equivalent
DAFI	Department of the Air Force Instruction
DoD	Department of Defense
DOE	Department of Energy
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EMS	Environmental Management System
EO	Executive Order
ER	Environmental Restoration
ERP	Environmental Restoration Program
FAA	Federal Aviation Administration
GHG	greenhouse gas
GT	ground terminal
HWMP	Hazardous Waste Management Plan
LUC	land use control
MMRP	Military Munitions Response Program
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
OSHA	Occupational Safety and Health Administration
PSD	Prevention of Significant Deterioration
SATCOM	satellite communications
SF	square foot
SPCC	Spill Prevention Control and Countermeasure
USAF	United States Air Force
USC	United States Code
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service

1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION AND BACKGROUND

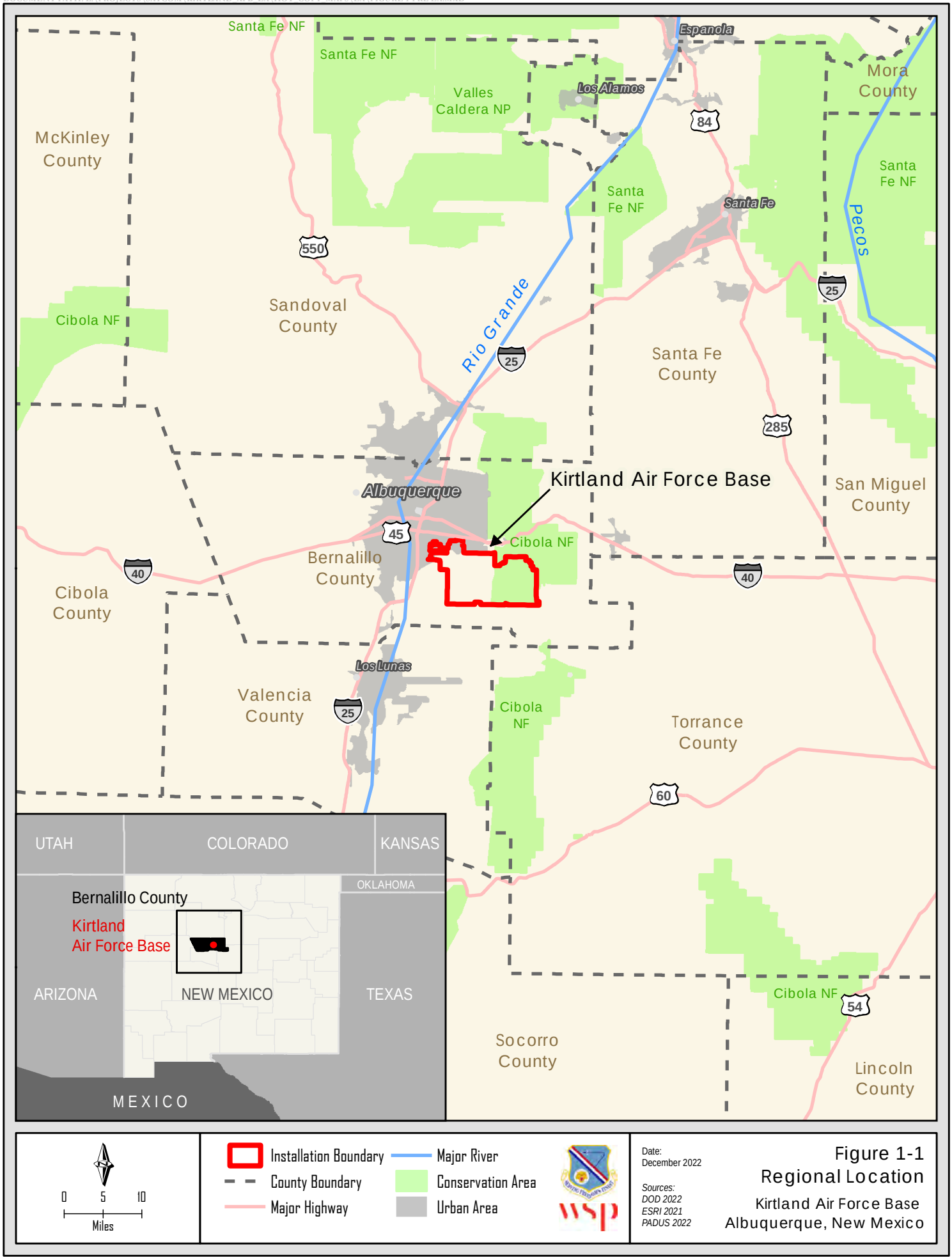
Kirtland Air Force Base (AFB), located southeast of the city of Albuquerque in New Mexico (see **Figure 1-1**), is home to the 377th Air Base Wing (ABW) of the Air Force Global Strike Command. The installation is a center for research, development, and testing of nonconventional weapons, space and missile technology, and laser warfare. The 377th ABW ensures readiness and training of airmen for worldwide duty, operates the airfield for present and future United States Air Force (USAF) operations, and prepares personnel to deploy worldwide on a moment's notice. In addition to the 377th ABW, the installation is host to more than 100 USAF and non-USAF mission partners including 351st Special Warfare Training Squadron, 58th Special Operations Wing, and the Air National Guard. Training activities include aircrew training, pararescue operations, and combat search and rescue training. The installation encompasses 51,585 acres, of which 44,052 acres are under USAF control.

The Proposed Action is to develop and operate a satellite communications (SATCOM) ground terminal (GT) facility on approximately 15 acres of previously disturbed land in the northwestern portion of Kirtland AFB, on the west side of Pennsylvania Street adjacent to the southern end of Wyoming Boulevard (see site layout in **Figure 1-2**). The GT facility would consist of three 44.3-foot (13-meter)-diameter dish antennas, enclosed within approximately 72-foot-high (22-meters-high) radome enclosures, an associated equipment shelter, two emergency generators, perimeter fencing, a sensor equipment tower, and utilities. It would be used to communicate with satellites. The facility would include multiple concrete pads to accommodate all the structures. An additional pad would be constructed for a temporary, small, transportable antenna and emergency generator.

1.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is for the Department of Defense (DoD) to support communications with satellites in a variety of orbits. The action is needed to provide ground coverage for these mission communications in the greater New Mexico area where coverage is currently insufficient. In addition, satellite communication support may be needed for a prospective 2026 DoD mission for expanded satellite communication ground coverage.

The GT facility proposed for Kirtland AFB establishes a new capability for the United States government that would be met by having terminals in the New Mexico/southwest region and others on the Eastern Seaboard. The antennas would be used for downlink (i.e., communication going from a satellite to ground) of mission data and spacecraft telemetry data, as well as for uplink (i.e., communication going from ground to a satellite) of spacecraft command and control data. The data transiting this site (including satellite telemetry, command and control, and various mission data) would consist of unclassified encrypted transmissions. The radio frequency performance of the terminals would be operated in compliance with all applicable laws and regulations (e.g., National Telecommunications and Information Administration and Federal Communications Commission registrations, Federal Aviation Administration (FAA) notifications, DoD Hazard of Electromagnetic Radiation to Ordnance requirements, and occupational health and safety standards).



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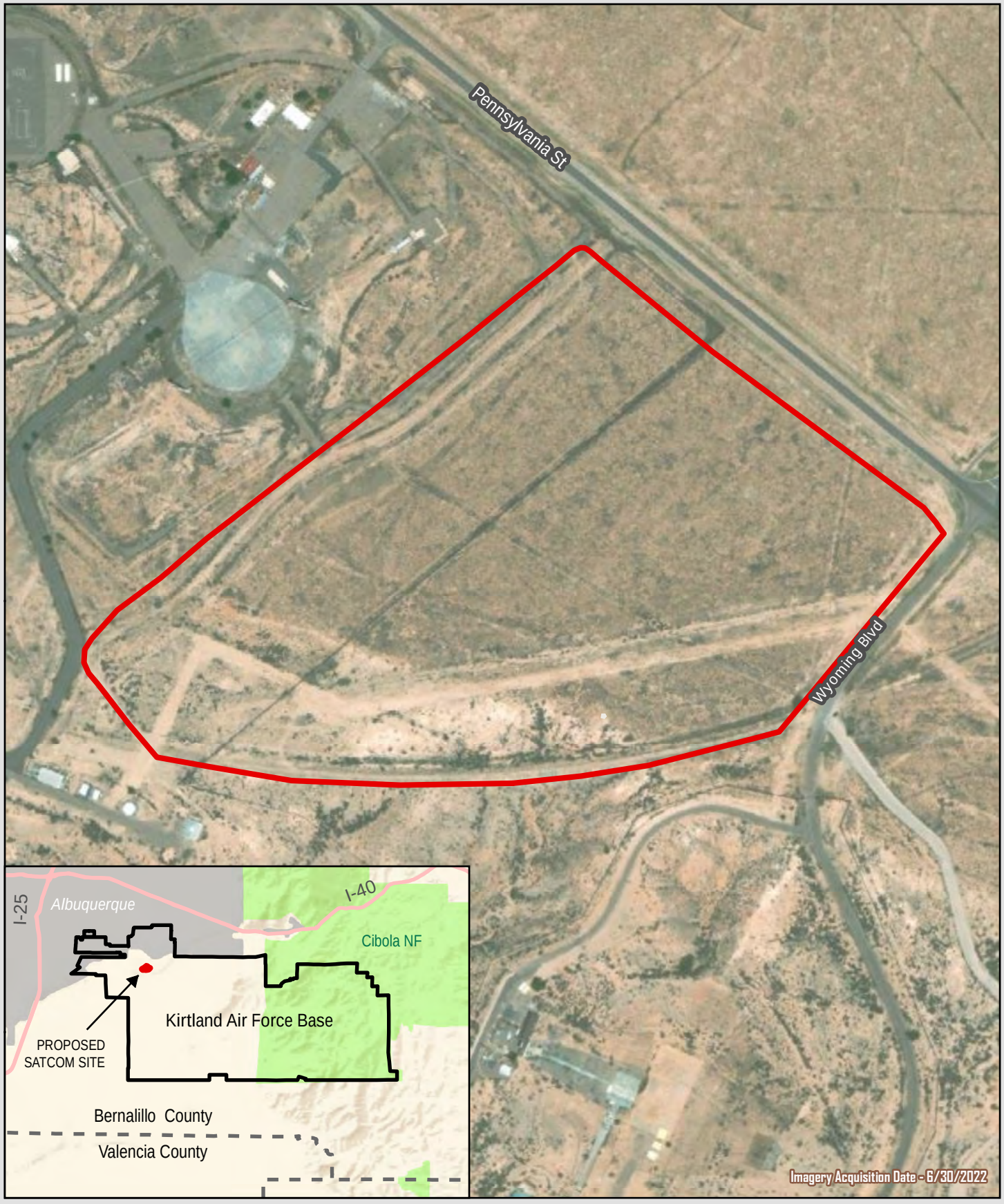

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Feet

Proposed SATCOM Site
County Boundary (Inset)
Kirtland Air Force Base (Inset)
National Forest (Inset)
Major Highway (Inset)
Urban Area (Inset)

WSP

Date:
January 2023

Sources:
DOD 2023
ESRI 2021
Maxar 2022
PADUS 2022

Figure 1-2 Proposed SATCOM Ground Terminal Facility Site

Kirtland Air Force Base
Albuquerque, New Mexico

1.3 DECISION TO BE MADE

This Environmental Assessment (EA) evaluates whether the Proposed Action would result in significant impacts on the natural or human environment. If significant impacts are identified, Kirtland AFB would (1) undertake mitigation to reduce impacts to below the level of significance, (2) prepare an Environmental Impact Statement addressing the Proposed Action, or (3) abandon the Proposed Action. This EA is a planning and decision-making tool to guide Kirtland AFB in implementing the Proposed Action in a manner that complies with all applicable federal, state, and local environmental laws and regulations and is consistent with USAF standards for environmental stewardship. It is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321 et seq.); the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 Code of Federal Regulations [CFR] 1500–1508) [July 16, 2020, version of the CEQ NEPA regulations (85 Federal Register 43304–43376) and the April 20, 2022, amendments of the 2020 CEQ NEPA regulations (87 Federal Register 23453–23470)]; and the Air Force Environmental Impact Analysis Process (EIAP) Regulations (32 CFR Part 989).

1.4 NEPA AND OTHER COMPLIANCE REGULATORY REQUIREMENTS

NEPA provides for the consideration of environmental impacts in federal agency planning and decision-making. NEPA requires that federal agencies responsible for preparing NEPA analyses and documentation do so "in cooperation with State and local governments" and other agencies with jurisdiction by law or special expertise (42 USC 4331(a) and 4332(C)).

In addition to NEPA, **Table 1-1** provides a summary of other applicable regulatory requirements and agencies. Only those applicable to this project are included in **Table 1-1**.

Table 1-1. Applicable/Potential Regulatory Permits and Approvals

Regulation	Agency/Authority	Permit/Approval	Regulated Activity
National Environmental Policy Act (42 USC 4321 et seq.)	US Environmental Protection Agency and USAF	Categorical Exclusion, Finding of No Significant Impact, or Record of Decision	Federal actions
Clean Air Act (42 USC 7401 et seq.)	US Environmental Protection Agency	Compliance with National Ambient Air Quality Standards, Conformity Determination	Federal actions that result in air emissions Compliance with the General Conformity Rule
National Historic Preservation Act of 1966 as amended (16 USC 470 and amendments)	Advisory Council on Historic Preservation New Mexico Department of Cultural Affairs, New Mexico Historic Preservation Division	Section 106 consultation	Federal undertakings that may affect properties that have been formally listed or determined eligible for listing in the National Register of Historic Places
American Indian Religious Freedom Act of 1978 (42 USC 1996) Archaeological Resources Protection Act of 1979 (16 USC 470) Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001-13) National Historic Preservation Act of 1966	Tribes Listed with the New Mexico Historic Preservation Office: Pueblo of Acoma Pueblo of Cochiti Pueblo of Isleta Pueblo of Jemez Pueblo of Laguna Pueblo of Nambe Ohkay Owingeh Pueblo of Picuris Pueblo of Pojaque Pueblo of San Felipe Pueblo of San Ildefonso Pueblo of Sandia Pueblo of Santa Ana Pueblo of Santa Clara Pueblo of Santo Domingo	Consultation with historically affiliated tribes	Presence of tribally significant cultural resources on federal land; presence of Native American gravesites, cultural items, sacred sites, or Traditional Cultural Properties

Regulation	Agency/Authority	Permit/Approval	Regulated Activity
	Pueblo of Taos Pueblo of Tesuque Pueblo of Zia Pueblo of Zuni Ysleta del Sur Pueblo Apache Tribe of Oklahoma Mescalero Apache Tribe Jicarilla Apache Nation San Carlos Apache Tribe White Mountain Apache Tribe Comanche Nation of Oklahoma Kiowa Tribe of Oklahoma Navajo Nation Pawnee Nation of Oklahoma Southern Ute Indian Tribe The Hopi Tribe Ute Mountain Ute Tribe Wichita & Affiliated Tribes Fort Sill Apache Tribe Jicarilla Apache Nation Mescalero Apache Tribe		
Clean Water Act (33 USC 1251 et seq.)	U S Environmental Protection Agency	Construction General Permit for Stormwater Discharge Associated with Construction Activity	General permit: Construction activities on areas equal to or greater than 1 acre

Regulation	Agency/Authority	Permit/Approval	Regulated Activity
Endangered Species Act (16 USC 1531–1544)	US Fish and Wildlife Service	Section 7 coordination for presence of threatened and endangered species or critical habitat	Federal actions potentially impacting threatened and endangered species or resulting in the destruction or adverse modification of critical habitat of such species
New Mexico Wildlife Conservation Act (17-2-40.1 NMSA 1978)	New Mexico Department of Game and Fish	Agency consultation for presence of state-listed species	Actions potentially impacting species listed as threatened or endangered by the state
Albuquerque – Bernalillo County Air Quality Control Board Regulation 20.11.20 New Mexico Administrative Code	City of Albuquerque, Environmental Health Department	Fugitive Dust Control Permit	Projects that will disturb three-quarters of an acre or more of soil
Albuquerque – Bernalillo County Air Quality Control Board Regulation 20.11.41 New Mexico Administrative Code	City of Albuquerque, Environmental Health Department	Authority to Construct Permit – Generator Construction Permit	On-site generators; permit must be in place prior to commencing construction
Albuquerque – Bernalillo County Construction Stormwater Quality Ordinance § 14-5-2-11	City of Albuquerque, Environmental Health Department	Construction Erosion and Sediment Control Permit	Permit must be in place prior to commencing construction

1.5 INTERGOVERNMENTAL COORDINATION/CONSULTATIONS

1.5.1 Interagency Coordination and Consultations

Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416, requires federal agencies to provide opportunities for consultation by elected officials of state and local governments that would be directly affected by a federal proposal. In compliance with NEPA, Kirtland AFB notified relevant stakeholders about the Proposed Action and alternatives (see **Appendix A** [to be included in the final EA] for all stakeholder coordination materials). The notification process provided these stakeholders the opportunity to cooperate with Kirtland AFB and provide comments on the Proposed Action and alternatives.

Per the requirements of Section 106 of the National Historic Preservation Act and implementing regulations (36 CFR Part 800); Section 7 of the Endangered Species Act and implementing regulations (50 CFR Part 17); and the Migratory Bird Treaty Act (16 USC 703-712), findings of effect and a request for concurrence were transmitted to the State Historic Preservation Officer and the US Fish and Wildlife Service (USFWS). All correspondence with the State Historic Preservation Officer and USFWS and correspondence regarding the findings and concurrence will be included in **Appendix A** (in the final EA). Note this section will be updated after Kirtland AFB completes the Interagency Coordination process.

1.5.2 Government-to-Government Coordination and Consultations

Consistent with National Historic Preservation Act of 1966 implementing regulations (36 CFR Part 800); DoD Instruction 4710.02, Interactions with Federally Recognized Tribes; Department of the Air Force Instruction (DAFI) 90-2002, Air Force Interaction with Federally Recognized Tribes; and Air Force Manual 32-7003, Environmental Conservation, the Air Force is also consulting with federally recognized tribes that are historically affiliated with the geographic region being considered for the Proposed Action regarding the potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal coordination process is distinct from NEPA consultation or the intergovernmental coordination processes and requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of intergovernmental consultations.

Federally recognized tribes that are historically affiliated with the geographic region were invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historic, or religious significance to the tribes (see **Appendix A** [in the final EA] for all tribal coordination materials). Note this section will be updated after Kirtland AFB completes the Interagency Coordination process.

1.6 PUBLIC AND AGENCY REVIEW OF DRAFT EA

A Notice of Availability for the Draft EA will be published in *The Albuquerque Journal* announcing the availability of the document. Letters will be provided to relevant federal, state, and local agencies and Native American tribal governments informing them that the Draft EA is available for review. The publication of the Notice of Availability will initiate a 30-day comment period. A copy of the Draft EA will be made available for review at the San Pedro Public Library at 5600 Trumbull Avenue SE, Albuquerque, New Mexico 87108. A copy of the Draft EA will also be made available for review online at *http://www.kirtland.af.mil* under the Environment Information tab. At the closing of the public review period, applicable comments from the general public and interagency and intergovernmental coordination/consultation will be incorporated into the EA analysis of potential environmental impacts, where applicable, and included in **Appendix A** of the Final EA.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The Proposed Action includes the construction of a SATCOM GT facility that would consist of three antennas with an associated equipment shelter, two emergency generators, perimeter fencing, a sensor equipment tower, and utilities. Three 44.3-foot (13-meter)-diameter dish antennas enclosed within approximately 72-foot-high (22-meters-high) radome enclosures would be mounted on concrete pedestals, which would be contained within individual ring walls with surrounding concrete aprons spanning 100 feet (30 meters) and covered by radomes approximately 72 feet tall (22 meters high) and 62 feet (19-meters) in diameter (**Figure 2-1**). The facility would be supported from one 40-foot by 60-foot (12-meter by 18-meter) equipment shelter that houses the mission equipment and electrical distribution gear. The emergency generators are required to support redundant power requirements of the antennas and would be powered by low-sulfur diesel fuel. The equipment shelter would also contain electrical equipment for all power distribution, an uninterruptable power supply for temporary power support in the event of an interruption to base power, and would be the location for the fire main tie-in for fire suppression. In addition to the three ground terminal sites, a fourth pad site would be constructed to accommodate equipment shelter, and a fifth pad site would be prepared for future use for a smaller, portable GT that does not require permanent structures or foundations. The portable GT would have an underground utility connection to the equipment shelter and its own portable emergency generator when in temporary use. Lastly, a grounding well would be dug on-site to a depth of up to 1,000 feet to prevent the buildup of electrical voltages that may occur on the system from high voltage surges (i.e., lightning strikes), which could result in undue hazards to equipment and personnel.

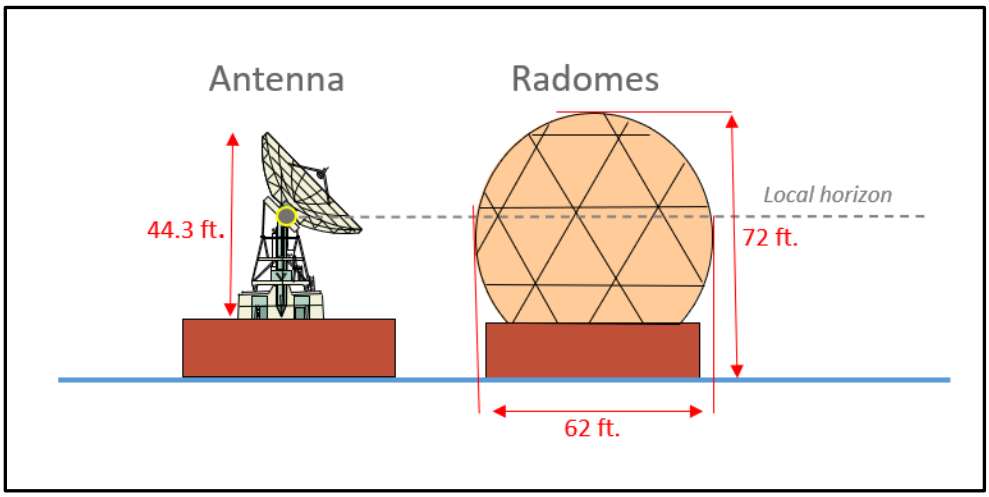


Figure 2-1. SATCOM GT Antenna and Radome Design Specifications

The various structures that make up the GT facility would be enclosed by a chain link security fence with lighting and cameras for remote security monitoring. The fence would be approximately 12 feet tall. The GT facility would be operated remotely, with no personnel required on-site.

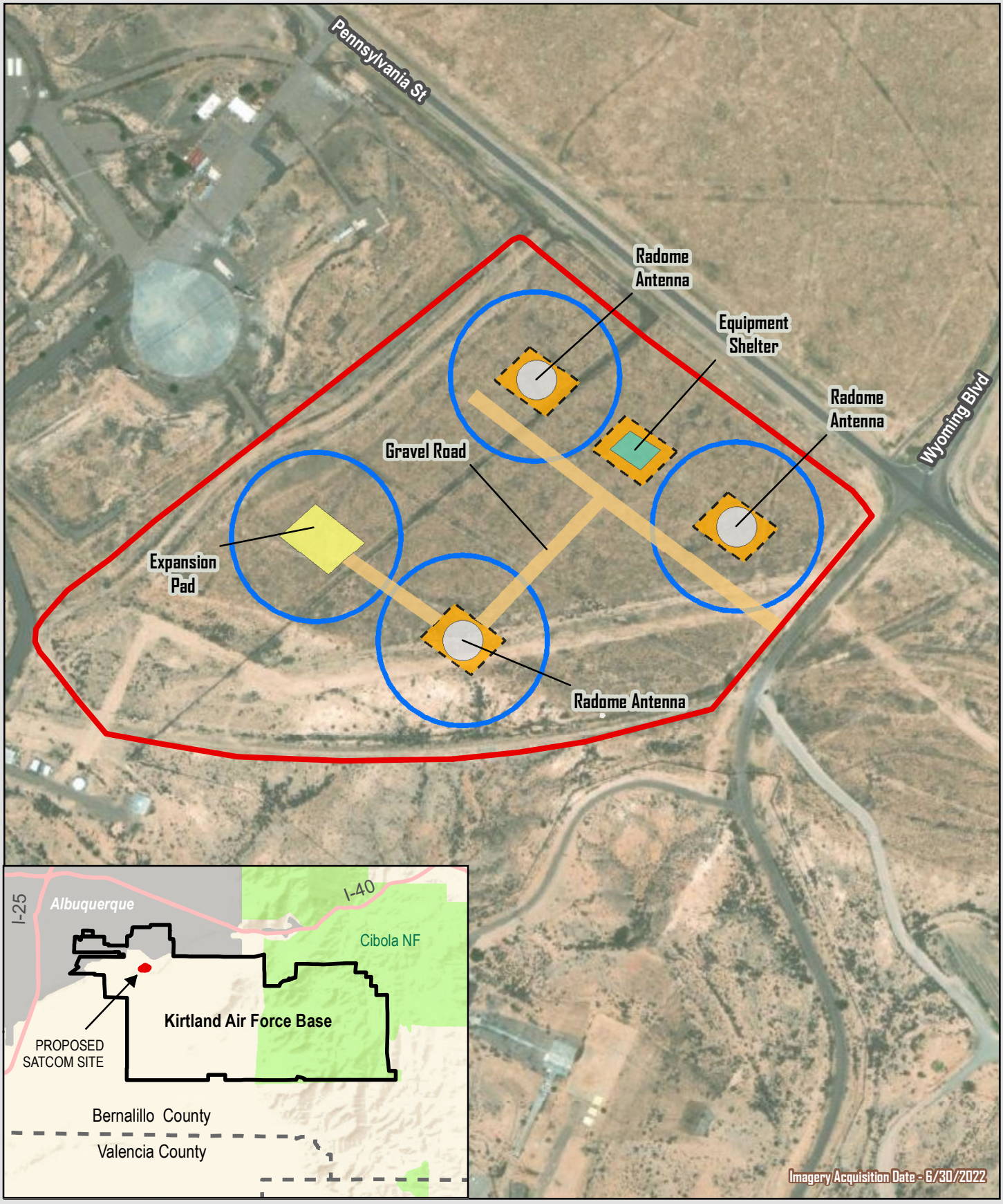
Utilities required by the SATCOM GT facility include:

- The primary source of electricity (650 kilowatts) for site operations would be provided via a new electrical line, either direct buried or overhead, routed from substation 22 along the existing Pennsylvania Avenue right-of-way to the equipment shelter at the site. In addition, another existing overhead power line that runs south of the site would be tapped for a secondary energy feed. All power lines once on-site would be routed underground to the various service points.
- A telecommunications line for remote operations and monitoring would be routed underground along existing rights-of-way from a tie-in point to be determined prior to final design to the equipment shelter within the GT facility site. An existing underground conduit bank near the proposed site could be used. The total distance of this line is not expected to exceed 2 miles.
- A new water line extension to provide fire suppression and for periodic use in cleaning the radome surfaces would be routed underground from the existing line along Pennsylvania Street. The line would serve several hydrants on the GT facility site as well as the equipment shelter sprinkler system. Annual total water consumption for automatic flushing, testing, and maintenance purposes is expected to be 20,000 gallons.

Trenching for the utility lines within the SATCOM GT facility would extend to depths between 3 and 4 feet. Additional excavation would be required for the foundations for the equipment shelter and ring walls/aprons surrounding the antennas. Excavation is anticipated to extend to a depth of approximately 4 feet or as needed to accommodate foundation footers.

SATCOM submitted a notice to the FAA notifying the agency of the proposed use of a 100-ton capacity crane (with an estimated maximum height 200 feet) that may pose an aeronautical hazard during construction of the GT facility.

A site plan showing representative locations and spacing of the facility structures and expansion pads is provided in **Figure 2-2**. The actual site plan is subject to modification during design as the results of soil analysis and existing utility location become known.



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Feet

Proposed SATCOM Site
150 ft Buffer
Radome Antenna
Equipment Shelter
Expansion Pad
Gravel Road
Pad
County Boundary (Inset)
Kirtland Air Force Base (Inset)
National Forest (Inset)
Major Highway (Inset)
Urban Area (Inset)

Date:
March 2023

Sources:
DOD 2023
ESRI 2021
Maxar 2022
PADUS 2022

Figure 2-2
Proposed SATCOM Ground Terminal Facility Site Plan
Kirtland Air Force Base
Albuquerque, New Mexico

The proposed GT facility at Kirtland AFB would be accessed directly from Pennsylvania Street and Wyoming Boulevard. Within the SATCOM GT facility, new gravel roads would provide vehicle access to each of the new structures. Minimal leveling would be required prior to construction, and vegetation would be removed. All 15 acres are anticipated to be disturbed through clearing, grading, and/or equipment laydown and staging. Construction of the GT facility is anticipated to take 18 months with an operational lifespan of approximately 25 years. Following construction, the site would be reseeded with native vegetation, and routine ground maintenance would occur, as needed. Routine ground maintenance is expected to include the removal of unwanted vegetation, such as tumbleweeds, and should be defined to a standard in a host-tenant agreement.

The GT facility would be operated remotely, with no requirement for personnel to be present on-site. Maintenance would be conducted on a regular schedule by a contracted vendor in compliance with all regulatory and recordkeeping requirements of the base, permit authorities, and other authorities, as applicable. Approximately 60 person-visits per year are estimated for operation and maintenance activities.

2.2 SELECTION STANDARDS AND CRITERIA

Selection criteria were developed to assist the SATCOM program office in determining reasonable site alternatives for the proposed GT facility and the basis for eliminating any of them. A range of installations were considered. The following selection criteria were used to determine the feasibility of each alternative site and to determine which of the alternatives would be the best fit to meet the needs of the project:

- Potential available locations on-base and a minimum of 15 acres of usable terrain;
- Existing infrastructure (i.e., roads and utilities) within a reasonable distance to the site;
- Lack of radio frequency interference from surrounding base users;
- Expanded user coverage necessary for ground coverage for communications in the greater New Mexico area;
- Force protection posture to mitigate hostile actions against DoD facilities;
- Cost to implement; and
- Logistics.

Kirtland AFB was selected as the highest-ranking overall site from a ranked list of candidate sites. That decision was heavily driven by the minimal risk to existing base missions within the proposed transmit spectrum, as indicated by a Frequency Interference Study, as well as its available land. Four sites were initially examined at Kirtland AFB, and the proposed site (Site 3a, **Figure 2-3**) was chosen as the most suitable for the Proposed Action because it has access to stable power and is a relatively flat and level site, which would minimize the amount of ground disturbance.

2.3 NO-ACTION ALTERNATIVE

If no action is taken, the construction and operation of a SATCOM GT facility would not occur at Kirtland AFB. The SATCOM Program Office would select the next highest-ranking site from the candidate sites to construct the GT facility, and any potential impacts would be realized at that location. The No-Action Alternative would not meet the purpose and need for the Proposed Action, as described in Section 1.2. Although the No-Action Alternative does not meet the purpose and need, the inclusion of this alternative is prescribed by CEQ regulations and will be carried forward

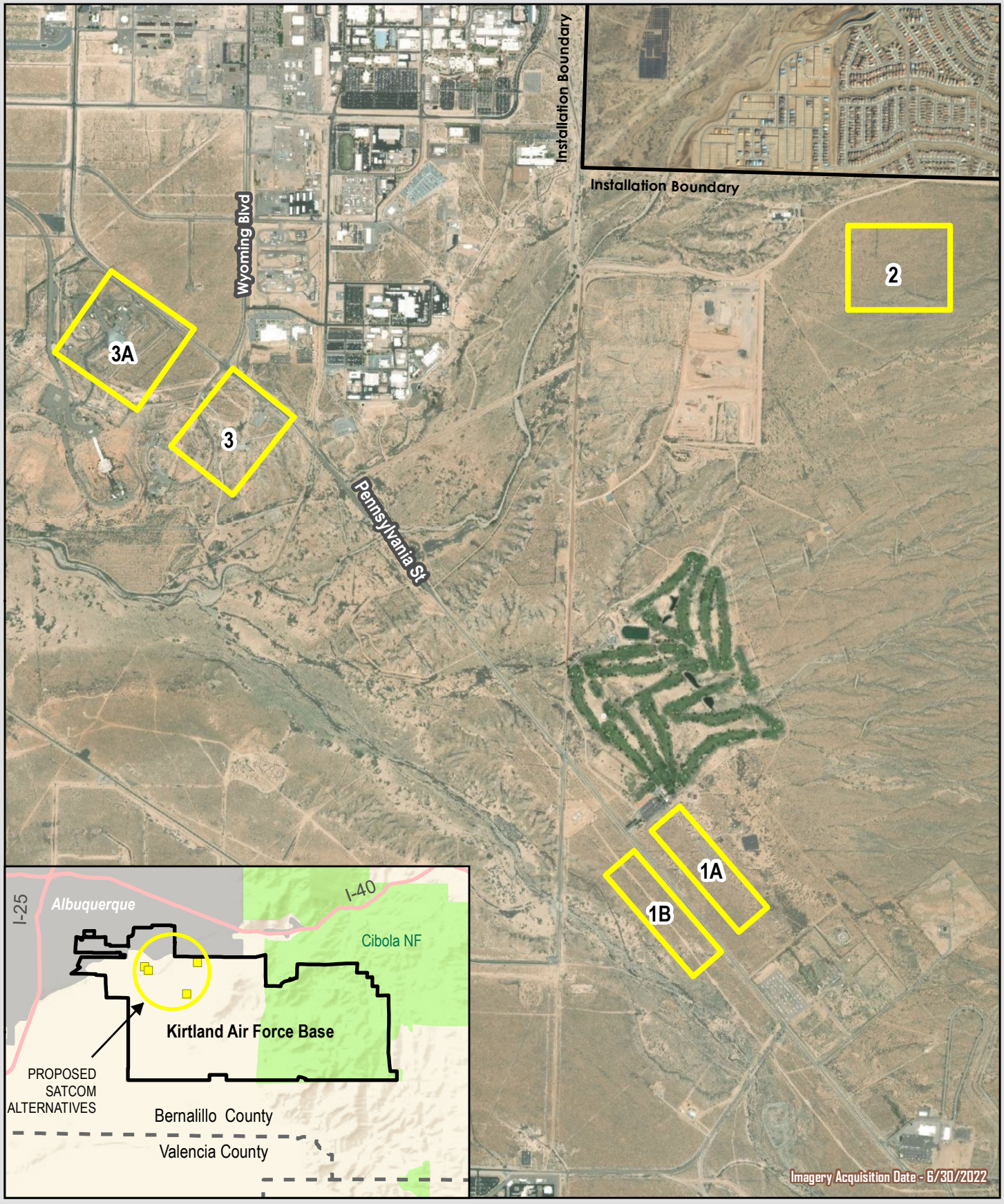
for analysis in this EA. The No-Action Alternative also serves as a baseline against which the impacts of the Proposed Action can be evaluated.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

The following alternatives were eliminated from further consideration based upon the selection criteria stated in Section 2.2 and other reasons as explained below.

Four locations at Kirtland AFB were considered for siting of the GT facility. Sites 1A and 1B (collectively considered as one site) are located adjacent to the golf course along either side of Pennsylvania Street. Site 2 is adjacent to the east side of the base landfill, Site 3 is adjacent to the north side of the Archery Range (see **Figure 2-3**). Sites 1A and 1B were eliminated because of the unreliability of the power infrastructure at that location. Site 2 was eliminated because it was being permitted for Sandia National Laboratory use, and Site 3 was eliminated because of the significant amount of ground leveling and power line rerouting that would be required to facilitate use of the site as a GT facility. Site 3A is the proposed GT facility site.

DOCUMENT PATH: L:\PROJECTS\SATCOM\KIRTLAND_AFB_EA\HOT_COPY_MAPS\EA\FIGURE 2-3 ALTERNATIVE SITES CONSIDERED.MXD



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Feet

Proposed SATCOM Alternatives
County Boundary (Inset)
Kirtland Air Force Base
National Forest (Inset)
Major Highway (Inset)
Urban Area (Inset)

Date:
January 2023

Sources:
DOD 2023
ESRI 2021
Maxar 2022

Figure 2-3
Alternative Sites Considered
Kirtland Air Force Base
Albuquerque, New Mexico

2.5 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The EA evaluates the reasonably foreseeable environmental impacts of the Proposed Action to construct a GT facility at Kirtland AFB.

2.5.1 Resource Areas Analyzed in Detail

The Proposed Action has the potential to affect the following resource areas:

- Land Use
- Geologic Resources
- Air Quality
- Hazardous Materials and Waste
- Infrastructure

2.5.2 Resource Areas Not Carried Forward for Detailed Analysis

Several other resource areas were considered but were not carried forward for detailed analysis in this EA either because potential impacts from the Proposed Action are not expected to occur or because they would be considered broadly negligible. Consistent with CEQ regulations (40 CFR 1501.9) for determining the scope of issues to be addressed, Kirtland AFB has identified and eliminated from detailed study the issues or resources that are not potentially significant, narrowing the discussion of these issues to a brief presentation that demonstrates why they will not have a significant impact on the natural or human environment. Resources not analyzed further in this EA include the following:

Socioeconomics and Environmental Justice

No local procurement funds would be associated with the GT facility equipment because all equipment would all be brought on-site from specialized source facilities. A small, temporary construction workforce would be present on-site for up to 18 months but would result in minimal direct and indirect economic impacts.

Operation of the proposed GT facility would have no impact on the local or regional economy. The site would be unmanned, so there would be no payroll or annual expenditures made locally. Therefore, socioeconomic impacts from the Proposed Action would be less than significant, and further analysis of the impacts is not warranted.

Environmental justice considers minority or low-income populations in the community to determine whether any of the proposed action alternatives may have a disproportionately high, adverse human health or environmental effect on those populations. Environmental justice analysis is conducted in compliance with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. No environmental justice populations are located in the vicinity of the site that would be affected by the Proposed Action. The southern border of Kirtland AFB is shared with the Pueblo of Isleta, but no impacts from the Proposed Action are expected. Therefore, disproportionately high, adverse human health or environmental effects on minority or low-income populations are not expected. The Proposed Action also would not disproportionately expose children to environmental health risks or safety risks and would comply with EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*.

Cultural Resources

Kirtland AFB has conducted an installation-wide survey of archaeological and cultural resources. A total of 740 archaeological sites were recorded within the boundaries of the installation, and 251 have been determined to be eligible for the National Register of Historic Places. No previously recorded archaeological sites or historic properties are within the project site. No impacts on known cultural resources would occur. If previously unidentified archaeological deposits are encountered during ground-disturbing activities, procedures outlined in the installation's Integrated Cultural Resources Management Plan would be followed.

Note this section will be updated after Kirtland AFB completes the Interagency Coordination process.

Biological Resources

Kirtland AFB conducted installation-wide biological surveys, and the USFWS has not designated or identified any critical habitat on Kirtland AFB (Kirtland AFB, 2022a). Pursuant to Section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.), the USAF sent consultation letters to USFWS and New Mexico Game and Fish requesting concurrence that the Proposed Action is not likely to adversely affect any species or critical habitat. Responses to those consultation letters have not been received as of publication of this Draft EA. The USFWS Section 7 Consultation website was reviewed for a list of species and critical habitat that "may be present" within the project area, and none were identified.

The proposed GT facility site has been previously cleared and disturbed. However, some desert grass and shrub species are present on-site. There would be no significant impacts on vegetation as a result of clearing activities associated with the Proposed Action. Similarly, there would be no significant impacts to biological resources under the Proposed Action. The GT facility footprint would only use a small portion of the overall proposed site. Construction activities and periodic maintenance operations would temporarily disturb native terrestrial wildlife species. However, these species would either move to another location or remain within the area and use other open areas. In addition, the proposed area represents only a small percentage of the total land area that Kirtland AFB maintains. The base's active species management programs and implementation of best management practices (BMPs) and spill prevention and management plans would minimize impacts on biological resources.

Certain areas of Kirtland AFB support the Gunnison's prairie dog (*Cynomys gunnisoni*) and potentially the black-tailed prairie dog (*Cynomys ludovicianus*), both listed as New Mexico Species of Greatest Conservation Need. The Gunnison's prairie dog is present in the grasslands across the western portion of the base (Kirtland AFB, 2022a). However, the proposed site was previously cleared, is disturbed, and does not have grassland habitats or shortgrass prairie. Additionally, both species of prairie dog have been affected by the sylvatic plague, and numbers have drastically declined (Kirtland AFB, 2022a; Reynolds, 2022). Western burrowing owls (*Athene cunicularia*), a species protected under the Migratory Bird Treaty Act, are also common residents of grassland habitat at Kirtland AFB, and often use prairie dog burrows. Because prairie dogs are not present on-site, no western burrowing owls are present within the proposed GT facility site. However, a preconstruction ground survey for prairie dogs would be conducted prior to construction to ensure that there are none present.

If burrows are encountered during the preconstruction survey or ground-disturbing activities, procedures outlined in the installation's Integrated Natural Resources Management Plan would be followed. Impacts on biological resources from the Proposed Action would be less than

significant, and no impacts on critical species or designated habitat would occur; thus, this resource is not carried forward for detailed analysis.

Note this section will be updated after Kirtland AFB completes the Interagency Coordination process.

Water Resources

Due to the arid nature of the high desert ecosystem and the lack of on-site water features, including arroyos and temporal streams, the Proposed Action would not affect these resources. Stormwater management for the proposed GT facility site will be part of the final design and will address on-site management of stormwater to prevent it from moving offsite. Implementation of BMPs and spill prevention and management plans would eliminate impacts on the quality of surface and groundwater. No permanent bodies of water or floodplains are within the project area. Impacts on water resources from the Proposed Action would be less than significant, and no impacts on floodplains would occur; thus, this resource is not carried forward for detailed analysis.

Noise

The ambient noise environment at Kirtland AFB is dominated by existing on-station sources (i.e., airfield operations, vehicles, construction equipment, generators). The closest off-station noise-sensitive receptors are the residential areas to the north and northwest of the property.

Construction noise from the GT facility would not be audible at these receptors because the site is in the interior of the installation. Noise associated with the operation of the GT facility would be limited to the running of the emergency generators monthly for 30 minutes, as well as on-site maintenance visits which would occur approximately 60 times per year. Operational noise would not be audible at the off-station noise-sensitive receptors.

Impacts on the ambient noise environment from the Proposed Action would be less than significant, and further analysis of the impacts on the noise environment is not warranted.

Traffic and Transportation

Traffic and transportation are not analyzed because the GT facility would be operated remotely, with on-site maintenance conducted on a regular schedule, with 60 person-visits per year. During construction, existing installation roadways would be used for material deliveries and would not require improvement. The construction of the GT facility would take 18 months to complete, and the various facility components would be constructed in sequence and not simultaneously, reducing construction traffic. Therefore, traffic and transportation impacts from the Proposed Action would be less than significant, and further analysis of the impacts on this topic is not warranted.

Visual Resources

Visual resources are the natural and cultural landscape features that people see and that contribute to the public's enjoyment of the environment. The visual character and quality of the viewed landscape include the natural and human-made features on the installation. The proposed GT facility site is located in the industrial area of the installation that is dominated by multiple human-made features, including roadways, military testing facilities, aboveground utility lines, airfield communications systems, parking lots, and industrial buildings. The visual character in the area is not considered a high-quality natural landscape. There are no public views of this area of the installation. There would be no visual impacts on local Native American tribes, including the

Pueblo of Isleta, which is located approximately 6 miles south of the installation and is unlikely to see the proposed project. Views of this portion of Kirtland AFB are limited to personnel, contractors, and civilians working on or visiting the installation, and these viewers are aware of the missions that occur at or near the installation. Furthermore, the facility would appear visually similar to the existing uses and infrastructure surrounding the project site as well as other communication facilities on the installation. Therefore, visual impacts from the Proposed Action would be less than significant, and further analysis of the impacts on this topic is not warranted.

Human Health and Safety

Within the context of this EA, safety issues are associated with potential impacts affecting the safety of installation personnel and the public. The health and safety of on-site military and civilian workers are safeguarded by numerous DoD and military branch-specific requirements designed to comply with standards issued by federal Occupational Safety and Health Administration (OSHA), the US Environmental Protection Agency (USEPA), and state occupational safety and health agencies. Worker safety associated with construction and demolition activities is covered by OSHA regulations and all applicable installation safety requirements; typical construction and demolition activities do not pose a safety issue to workers provided all applicable OSHA and Kirtland AFB safety requirements (Air Force Instruction [AFI] 91-202, *The U.S. Air Force Mishap Prevention Program)* are implemented.

Radiation hazards are always a potential safety issue with antenna transmissions during antenna integration and operations and are assessed and mitigated as an integral part of the system design. Radiation hazards are the hazards of electromagnetic radiation to fuels, electronic hardware, ordnance, and personnel. The program office has examined radiation hazards associated with this project in light of applicable industry standards (American National Standards Institute/Institute of Electrical and Electronics Engineers) and DoD standards. Based on present system designs, radiation hazards are not believed to present a concern. The project statement of work includes performing a third-party study during antenna integration to assess actual levels of radio frequency radiation to ensure that the system adheres to published standards.

No further analysis is warranted given the scope of the Proposed Action and lack of safety issues outside those normally associated with construction and demolition activities that are covered by OSHA and other safety requirements/regulations.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 OVERVIEW OF THE IMPACTS ANALYSIS

This chapter describes the affected environment and analyzes the potential environmental impacts of each alternative for the resources described below. The affected environment describes existing conditions for those elements of the human environment that would be affected by the implementation of the alternatives considered in this EA. Beneficial and adverse impacts that would result from implementing any of the alternatives considered are analyzed in the "Environmental Consequences" section for each alternative. As required by the CEQ regulations implementing NEPA, this chapter compares the environmental consequences for each alternative.

The significance of an action varies with the setting of the proposed action. The degree of the effects of a proposed action should consider the following:

- ***Short term or long term.*** In general, short-term impacts are those that would occur only with respect to a particular activity, for a finite period, or only during the time required for construction or installation activities. Long-term impacts are those that are more likely to be persistent and chronic.
- ***Significant, moderate, minor, negligible, or no impact.*** These relative terms are used to characterize the magnitude or intensity of an impact. Significant impacts are those effects that would result in substantial changes to the environment and should receive the greatest attention in the decision-making process. Less than significant impacts are those that would be slight but detectable.
- ***Adverse or beneficial.*** An adverse impact is one having unfavorable or undesirable outcomes on the human-made or natural environment. A beneficial impact is one having positive outcomes on the human-made or natural environment.

Table 3-1 summarizes the impacts anticipated under the Proposed Action and No-Action Alternative.

Table 3-1. Summary of Potential Impacts

Affected Resource	Action Alternative	No-Action Alternative
Land Use	• Minor, long-term, adverse impacts to on-site land use with permanent conversion of vacant open spaces to developed. • Temporary, adverse impacts to off-installation land uses due to the use of a 100-ton capacity crane (with an estimated maximum height of 200 feet) during construction, which may pose an aeronautical hazard. • No impact on adjacent land uses, on or off-base. • No significant impacts.	• No effect on land use; existing conditions would remain unchanged.

Affected Resource	Action Alternative	No-Action Alternative
Geologic Resources	• Temporary disturbance from clearing, leveling, and grading, leading to increased risk of erosion. • BMPs would further reduce impacts. • Permanent soil disturbance within footprint of aboveground structures. • No significant impacts.	• No effect on geologic resources; existing conditions would remain unchanged.
Air Quality	• Temporary, negligible impacts on air quality from release of criteria pollutants during construction and operation. • BMPs would be used to further reduce emissions and impacts.	• No change to criteria air pollutant emissions or greenhouse gas levels; existing conditions would remain unchanged.
Hazardous Materials and Wastes	• Minor, short-term impacts on the generation and management of hazardous waste during construction. • No significant impacts on generation and management of hazardous waste during operation. • No effect on Environmental Restoration Program (ERP) sites.	• No effect on hazard waste or materials management; existing conditions would remain unchanged.
Infrastructure	• Expansion of existing electrical, water, and communications systems. • Potential temporary disruptions to existing service lines during installation and connection of the new electrical, water, and telecommunications lines. • Final design to avoid overlap with any on-site buried lines.	• No change to the existing infrastructure and utilities would occur; existing conditions would remain unchanged.

3.2 LAND USE

Land use comprises the natural conditions and/or human-modified activities occurring at a particular location. Human-modified land use categories include residential, commercial, industrial, transportation, communications and utilities, agricultural, institutional, recreational, and other developed or open space use areas. General land use patterns characterize the types of uses within a particular area, including agricultural, residential, military, and recreational.

3.2.1 Affected Environment

Installation land use management falls under the authority of Kirtland AFB's Civil Engineering Division. The division assists the commander of the 377th ABW in managing the installation's facilities and developing real property in an orderly manner, consistent with current and projected mission needs. Land uses at Kirtland AFB are managed in 12 planning districts. Of these, eight are located within the cantonment area and are proximate to the location of the Proposed Action.

The cantonment area of the installation consists of the Flightline, Science and Technology, Medical, Industrial, Community, Enterprise, Airfield, and Arroyo planning districts (Kirtland AFB, 2016). The Cibola National Forest borders Kirtland AFB on the northeastern side of the installation. The city of Albuquerque borders the installation to the northwest and west. Predominant land use abutting the installation within the city limits includes residential, commercial and retail, parks and open spaces, and community lands uses such as golf courses (City of Albuquerque, 2022). The land to the south of the installation boundary is Pueblo of Isleta tribal land (Albuquerque/Bernalillo County, 2013).

The 15-acre facility site is located approximately 1 mile southeast of the nearest installation boundary adjacent to Albuquerque International Sunport in the installation's Industrial planning district. The facility site is bounded on the northeast by Pennsylvania Street, on the northwest by a dirt road and the Horizontally Polarized Dipole facility, on the south by a dirt road, and on the west by Wyoming Boulevard. The site consists of previously disturbed land that currently is classified as open space and covered with grassland vegetation. The site is mostly level, but areas in the southwest part of the site are subject to erosion, which has formed ravine-like topography. The proposed GT facility site is surrounded by industrial land uses to the north, south, and west, and open space to the east. Industrial and open space uses make up the majority of the Industrial planning district; however, limited administrative facilities also are located in this district (Kirtland AFB, 2016).

Various parts of the site are subject to land use controls (LUCs). Facilities must be offset from Pennsylvania Street by 150 feet, outside an explosives safety buffer. The entire site is also subject to LUCs under the installation's Environmental Restoration Program (ERP), including a restriction on installation of groundwater wells associated with Site ST-105 due to the presence of contaminated groundwater. Another ERP site, Storm Water Management Unit SS-102, occurs within approximately 1,000 feet of the proposed GT facility site. However, this site has been remediated, and no LUCs have been established. ERP sites on and in the vicinity of the facility site are described in Section 3.5.1.

3.2.2 Environmental Consequences

3.2.2.1 Alternative 1 – Preferred Action

With implementation of Alternative 1, land use at the site would change from undeveloped, disturbed grassland to developed communication and mission support uses. Construction of the proposed GT facility would disturb the entire 15-acre site and permanently convert areas occupied by aboveground facilities. The security fence and required clear zone (150-foot buffer) around each of the antennas would encompasses 3.1 acres within the site boundary. The proposed use would be consistent with current land use types in the Industrial planning district.

The proposed GT facility would be located approximately 1 mile from the nearest installation boundary at Albuquerque International Sunport. SATCOM has submitted a notice to the FAA notifying the agency of the proposed use of a 100-ton capacity crane (with an estimated maximum height of 200 feet) that may pose an aeronautical hazard during construction of the GT facility. This notice is under review, and further information will be included in this section once this review is completed. Operation of the GT facility would not violate height limits established by the FAA or Sunport. Outdoor lighting would be designed and operated in compliance with Albuquerque Code of Ordinances, Integrated Development Ordinance part 14-16-5-8, Outdoor Lighting, and the New Mexico Night Sky Protection Act. No long-term impacts on off-installation land uses are expected under Alternative 1.

The proposed GT facility would be consistent with other developed land uses across the installation and would not displace existing missions or conflict with planned projects. The facility would be constructed outside the safety buffer along Pennsylvania Street and would comply with LUCs associated with Site ST-105. A grounding well would be constructed on the site up to a depth of 1,000 feet to electrically ground the GT facility. The well would not be used to draw groundwater for any purpose; therefore, it would comply with the LUC associated with Site ST-105. Impacts that may result from encountering contaminated groundwater during construction are discussed in Section 3.5.2.1.

Alternative 1 would have minor, adverse impacts to on-site land use. The land use at the site would permanently change from vacant open spaces to developed communication and mission support uses. The action would result in temporary, adverse impacts to off-installation land uses from the use of the 100-ton capacity crane during construction, which may pose an aeronautical hazard. Coordination with the FAA before the start of construction would minimize this hazard. No long-term, adverse effects to land use on or off the installation are expected under Alternative 1.

3.2.2.2 No-Action Alternative

Under the No-Action Alternative, construction and operation of a SATCOM GT facility would not occur at Kirtland AFB. The proposed facility site would remain undeveloped, and no vegetation clearing, leveling, or utility work would occur. Therefore, the No-Action Alternative would have no effect on land use.

3.2.3 Compatibility of the Proposed Action with the Objectives of Federal, Regional, and Local Land Use Plans, Policies, and Controls

The Proposed Action would occur entirely within Kirtland AFB. Construction and operation of the GT facility would be compatible with all current and planned land uses on the installation and all applicable off-installation land use ordinances. The Proposed Action would follow all applicable permitting, building, and safety requirements.

3.3 GEOLOGIC RESOURCES

Geological resources consist of the earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of geology, topography and physiography, soils, and, where applicable, geologic hazards. Geology is the study of the earth's composition and provides information on the structure and configuration of surface and subsurface features. Topography and physiography pertain to the general shape and arrangement of the land surface, including its height and the position of its natural and human-made features.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types, in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential, affect their ability to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use.

Geological hazards include earthquake activity or seismicity and are generally caused by displacement across active faults. Earthquakes are more prevalent in areas with a high-level of tectonic activity such as volcanic regions and fault zones. Landslides or mudslides are also commonly associated with tectonically active zones. Landslides include a wide range of ground

movements and are typically caused by multiple, overlapping environmental factors (e.g., rockfalls, deep failure of slopes, land modifications, earthquakes, and storms).

3.3.1 Affected Environment

The discussion of the affected environment for geologic resources includes regional geology, topography and soils, and geological hazards.

Regional Geology. Kirtland AFB is located along the eastern margin of the Albuquerque Basin within the area of the Rio Grande Rift. When the rift formed, it resulted in uplift of the Sandia, Manzanita, and Manzano mountain blocks. The basin between these mountain blocks later filled with alluvium. The Albuquerque Basin is crossed by a series of major fault trends and displacements within the Tijeras fault zone. Faults that cross the installation and associated geologic hazards are discussed further below. No energy or mineral resources are mapped on Kirtland AFB in the vicinity of the GT facility site (New Mexico Bureau of Geology and Mineral Resources, 2023), and installation property is not available for extraction of geologic resources.

Topography and Soils. The installation lies within the Mexican Highland section of the Basin and Range physiographic province. Topography in the western part of the installation, including the GT facility site, is mostly flat and gently sloping (USAF, 2018). All soils at Kirtland AFB are well-drained. However, some areas, including the southwest part of the GT facility site, are vulnerable to erosion with topographic relief. In this area, erosion has formed ravine-like topography.

Soils on Kirtland AFB primarily consist of poorly consolidated sediments that eroded from surrounding mountain ranges. These soils typically are “well-drained and loamy” (USAF, 2018). The facility site is currently undeveloped and consists of unmaintained grassland. Soils occurring on the facility site include Embudo gravelly fine sand (covering 4.9 acres) and Wink fine sandy loam (covering 27.5 acres). Embudo gravelly fine sand is a deep, well-drained soil type formed in alluvium from granite. This soil type is suitable for growing black grama (*Bouteloua eriopoda*), blue grama (*Bouteloua gracilis*), and tree cholla (*Cylindropuntia imbricata*). Wink fine sandy loam likewise is a deep and well-drained soil type formed in unconsolidated alluvium at the base of mountain ranges. Wink fine sandy loam is suitable for growing blue grama, broom snakeweed (*Gutierrezia sarothrae*), and sand dropseed (*Sporobolus cryptandrus*) (USAF, 2018).

Wink fine sandy loam, which covers the majority (approximately 85 percent) of the facility site, may be more suitable for urban development than Embudo gravelly fine sand. Embudo gravelly fine sand has a high risk of corrosion of uncoated steel, is very limited for development of structures on spread footings of reinforced concrete due to the potential for flooding, and is somewhat limited for development of paved roads due to flood risk and shrink-swell potential. Wink fine sandy loam has a moderate risk of corrosion of uncoated steel but does not present any other significant limitations for development (US Department of Agriculture Natural Resources Conservation Service, 2022).

None of the soils in the project area are classified as prime farmland, or farmland of statewide or local importance pursuant to the Farmland Protection Policy Act of 1981. Additionally, Kirtland AFB is not currently used for agriculture, nor is any agricultural use planned in the future.

The primary source of electricity for site operations would be provided via an electrical line, either direct buried or overhead, routed from substation 22 along the existing Pennsylvania Avenue right-of-way to the equipment shelter at the site. In addition, another existing overhead power line that runs south of the site would be tapped for a secondary electrical feed. All power lines once

on-site would be routed underground to the various service points; therefore, the soil types impacted are those identified within the 15-acre project area.

Geological Hazards. More commonly known as the Tijeras fault zone, the Tijeras-Cañoncito fault system consists of several northeast-oriented, sub-vertical faults that form the eastern edge of the Albuquerque Basin. The Tijeras fault zone is part of this regionally extensive group of faults. The southern end of the Tijeras fault zone converges with the southern Sandia and Hubbell Spring fault zones beneath Kirtland AFB near Tijeras Arroyo (US Geological Survey, 2002). Frequent, low magnitude and intensity earthquakes are common occurrences for the Albuquerque region, including Kirtland AFB.

Accordingly, the United States Geological Survey rates the seismic hazard of this area as "moderate" based on a measurement of expected building damage in an earthquake scenario. Similarly, the International Conference of Building Officials Uniform Building Code classifies the region as having a moderate potential for damage to structures from seismic activity (US Geological Survey, 2014).

3.3.2 Environmental Consequences

3.3.2.1 Alternative 1 – Preferred Action

Construction of the GT facility would temporarily disturb the entire 15-acre site. Site leveling is not anticipated to be required; however, installation of utility lines and foundations for the equipment shelters and ring walls/aprons surrounding the antennas would require excavation to depths of 3 to 4 feet (or as needed to accommodate foundation footers). Additionally, a grounding well would be dug on-site to a depth of up to 1,000 feet. These localized effects would not result in substantial changes to regional geology. No energy or mineral resources are mapped on the installation in the vicinity of the facility site, and construction and operation of the GT facility would not disrupt any existing or planned extraction activities.

As indicated above, substantial site leveling is not anticipated; therefore, significant long-term impacts to topography are not expected. Areas of the site subject to active erosion would be avoided during construction. Clearing and construction activities would temporarily disturb soils and increase the risk of erosion or contamination of soils through accidental spills of hazardous materials. The Proposed Action would implement strategies to minimize soil erosion and sedimentation using environmental protection measures and appropriate BMPs. The project proponent would be required to obtain a Permit for Stormwater Discharge Associated with Construction Activity under the National Pollutant Discharge Elimination System Construction General Permit (CGP).The CGP requires the preparation, approval, and implementation of site-specific Stormwater Pollution Prevention Plans prior to construction, including appropriate structural and non-structural erosion, sediment, and waste control BMPs, which would prevent or mitigate soil erosion at the facility site. In accordance with the current CGP, the Kirtland AFB Municipal Separate Storm Sewer System Stormwater Management Program, and the Kirtland AFB Multi-Sector General Permit Stormwater Pollution Prevention Plan, all project activities would be reviewed to ensure proper erosion and sediment control measures area are considered and incorporated into project designs. Additionally, the project proponent would be required to complete a stormwater post-construction evaluation form under Bernalillo County's building regulations.

If contaminated soils are encountered during construction, these soils would be characterized, handled, transported, and disposed of in compliance with Kirtland AFB's ERP and applicable local, state, and federal laws (see Section 3.5.2 for additional discussion). Contaminated soils

removed from the site would be replaced with clean fill from a source on the installation or a nearby commercial source of fill.

Permanent impacts to soils would occur as a result of construction of the GT facility. The presence of new aboveground facilities would compact underlying soils, reducing the porosity of the soil and reducing biological activity in the soil.

Following construction, areas of the facility site that are not occupied by permanent facilities would be reseeded with native vegetation. During operation of the facility, vegetated areas would be mowed regularly. These activities would not require additional clearing and are not expected to result in long-term impacts to soils at the facility site.

The GT facility would require a double-walled diesel tank that would be used to store fuel for the generator units. The tank would be constructed aboveground on a concrete pad, and a secondary containment structure would be constructed around the tank to contain any potential spills. Maintenance and operation of this tank could result in contamination of surrounding soils in the event of an accidental diesel spill that escapes secondary containment. This tank would be managed in compliance with the Kirtland AFB Spill Prevention Control and Countermeasure (SPCC) Plan and monitored monthly via visual inspections conducted by installation personnel, which would mitigate the risk of impacts to soils. Any spills would be cleaned up, and contaminated soils removed and disposed of in accordance with the SPCC Plan.

The GT facility would be constructed and operated in a region that experiences moderate seismic hazards. An earthquake in the Tijeras fault zone could damage to the facility, including the utility lines and diesel tank, which could result in subsequent environmental impacts, including contamination of soil and surface waters. The GT facility would be designed in accordance with applicable local and state building codes to mitigate seismic risks. Most structures in the GT facility would not be occupied, and the equipment shelter would rarely be occupied. Therefore, seismic risks to human safety would be minimal during operation of the facility.

3.3.2.2 No-Action Alternative

Under the No-Action Alternative, construction and operation of a SATCOM GT facility would not occur at Kirtland AFB. The proposed facility site would remain undeveloped, and no vegetation clearing, leveling, or utility work would occur. Therefore, the No-Action Alternative would have no effect on geologic resources, topography, soils, or geologic hazards.

3.4 AIR QUALITY

Air quality is defined by the concentration of various pollutants in the atmosphere at a given location. Under the Clean Air Act, the six pollutants defining air quality, called “criteria pollutants,” include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide, ozone (O_3), suspended particulate matter (measured less than or equal to 10 microns in diameter [PM_{10}] and less than or equal to 2.5 microns in diameter [$PM_{2.5}$]), and lead. The USEPA has established National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) for criteria pollutants. Additionally, the General Conformity Rule (40 CFR 93, Subpart B) applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of the relevant pollutants (or their precursors) exceed specified thresholds.

The New Mexico Environment Department (NMED) Air Quality Bureau oversees programs for permitting the construction and operation of new or modified stationary source air emissions in the state of New Mexico. The NMED Air Quality Bureau has delegated authority over air quality in Bernalillo County to the Albuquerque Environmental Health Department Air Quality Division

(AEHD-AQD). AEHD-AQD has also promulgated fugitive dust control permits and open burn program requirements in the New Mexico Administrative Code (NMAC).

Climate Change and Greenhouse Gases (GHGs). GHGs are gases that trap heat in the atmosphere. These emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere contributes to global climate change. Primary GHGs include carbon dioxide (CO_2), methane, nitrous oxide, and fluorinated gases. Each GHG has an estimated global warming potential—a measure of how much energy the emissions of one ton of a gas will absorb over a given period of time, relative to the emissions of one ton of CO_2. The larger the global warming potential, the more that a given gas warms the earth compared to CO_2 over that time period. The global warming potential of a particular gas provides a relative basis for calculating its CO_2 equivalent (CO_2e). CO_2 has a global warming potential of 1 and is, therefore, the standard by which all other GHGs are measured. The potential effects of proposed GHG emissions are by nature global and result in cumulative impacts because most individual anthropogenic sources of GHG emissions are not large enough to have a noticeable effect on climate change. Therefore, the impact of proposed GHG emissions to climate change is discussed in the context of cumulative impacts in Section 4.2.4.

3.4.1 Affected Environment

The region of influence for air quality includes Kirtland AFB in Bernalillo County, New Mexico, which is within the Albuquerque-Mid Rio Grande Intrastate Air Quality Control Region 152. Bernalillo County is in attainment for all criteria pollutants. As a result, the General Conformity Rule would not apply to the Proposed Action.

Kirtland AFB operates under Title V Operating Permit #527-RN1 and is also considered a synthetic minor source of hazardous air pollutants under Title I, Section 112 of the Clean Air Act. The stationary sources covered include fueling operations, storage tanks, mulcher, painting operations, generators, test cells, a soil vapor extraction unit, and a construction and demolition waste landfill. Mobile source emissions are generated by aircraft, vehicles, equipment, and other sources that move or have the potential to move from place to place. Vehicle emissions include both government-owned vehicles and privately owned vehicles. Equipment emissions come from forklifts, backhoes, tractors, and other on-site construction equipment. Aerospace Ground Equipment used to service aircraft include generators, light carts, compressors, bomb lifts, hydraulic test stands, and other portable equipment required for aircraft operations.

The 2021 Stationary Source Air Emissions Inventory for Kirtland AFB is found in **Table 3-2**.

Table 3-2. Calendar Year 2021 Stationary Source Air Emissions Inventory for Kirtland AFB

	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Actual Emissions	7.05	25.98	4.19	0.68	0.31	0.31

Notes: CO = carbon monoxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; SO_2 = sulfur dioxide; tpy = tons per year; VOC = volatile organic compound.

Source: Kirtland AFB, 2022b.

3.4.2 Environmental Consequences

3.4.2.1 Alternative 1 – Preferred Action

The Proposed Action would result in a negligible, temporary impact on air quality. While emissions of criterial pollutants and GHGs would be produced from construction activities, they would be temporary in nature.

The air pollutant of greatest concern is particulate matter, such as fugitive dust. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of activity. Fugitive dust emissions would be produced from the ground disturbance associated with the Proposed Action. Fugitive dust air emissions would be greatest during the initial site grading and excavation and would vary daily depending on the work phase, level of activity, and prevailing weather conditions. Particulate matter emissions would also be produced from the combustion of fuels in vehicles and equipment needed for construction.

Construction activities would incorporate BMPs and environmental control measures (e.g., wetting the ground surface with the use of a water truck that would source non-potable water) to minimize fugitive particulate matter air emissions. Additionally, work vehicles are assumed to be well-maintained and to use diesel particulate filters to reduce particulate matter air emissions. Construction activities would comply with 20.11.20 NMAC, Fugitive Dust Control, to prevent the release of fugitive dust. USAF would obtain a fugitive dust control construction permit from AEHD-AQD. Application for the fugitive dust control construction permit would require USAF to develop a fugitive dust control plan, which would outline specific dust control measures that would be implemented during construction. These BMPs and environmental control measures could reduce uncontrolled particulate matter emissions from a construction site by approximately 50 percent depending on the number of BMPs and environmental control measures required and the potential for particulate matter air emissions.

USAF's Air Conformity Applicability Model was used to estimate the annual air emissions (i.e., total net direct and indirect emissions) from construction activities associated with the Proposed Action and to achieve "steady state" (i.e., net gain/loss upon action fully implemented) emissions. **Table 3-3** summarizes the anticipated air emissions from construction activities, **Table 3-4** summarizes the steady state emissions, and **Appendix C** contains the detailed Air Conformity Applicability Model report. **Table 3-3** shows construction emissions for 2023 since the majority of the construction is assumed to occur in 2023.

Table 3-3. Estimated Annual Air Emissions from Construction Associated with the Proposed Action Compared to Insignificance Indicators

Pollutant	Action Emissions (Ton/Year)	Insignificance Indicator	
		Indicator (Ton/Year)	Exceedance (Yes or No)
Volatile Organic Compounds	0.522	100	No
Nitrogen Oxides	2.938	100	No
Carbon Monoxide	3.447	250	No
Sulfur Oxides	0.010	250	No
PM_{10}	15.460	250	No
$PM_{2.5}$	0.110	250	No

Pollutant	Action Emissions (Ton/Year)	Insignificance Indicator	
		Indicator (Ton/Year)	Exceedance (Yes or No)
Lead	0.000	25	No
Ammonia	0.004	250	No
CO2e	941.5	--	--

Notes: CO2e = carbon dioxide equivalents; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of potential impacts to air quality based on current ambient air quality relative to the NAAQS. These insignificance indicators are the 250 tons/year Prevention of Significant Deterioration (PSD) major source threshold for actions occurring in areas that are "Clearly Attainment" (i.e., not within 5 percent of any NAAQS) and the General Conformity Rule de minimis values (25 tons/year for lead and 100 tons/year for all other criteria pollutants) for actions occurring in areas that are "Near Nonattainment" (i.e., within 5 percent of any NAAQS). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutant is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQS. Based on projected construction emissions summarized in **Table 3-4**, emissions would be below the insignificant indicators and would be negligible and temporary, and impacts on air quality would not be significant.

Operations. Operational activities that would result in direct air emissions would be minimal and would occur from operation of the on-site emergency generator and infrequent trips to the site for maintenance. The emergency generator would use ultra-low-sulfur diesel fuel and would operate an average of 30 minutes per month. Operational emissions in 2025, considered the steady state, are presented in **Table 3-4** and would be considerably less than emissions during construction. Therefore, operation of the facility would result in negligible emissions and would not result in significant impacts on air quality.

Table 3-4. Operational Emissions 2025 (Steady State)

Pollutant	Action Emissions (Ton/Year)	Insignificance Indicator	
		Indicator (Ton/Year)	Exceedance (Yes or No)
Volatile Organic Compounds	0.005	100	No
Nitrogen Oxides	0.171	100	No
Carbon Monoxide	0.051	250	No
Sulfur Oxides	0.000	250	No
PM_{10}	0.005	250	No
$PM_{2.5}$	0.005	250	No
Lead	0.000	25	No
Ammonia	0.000	250	No
CO2e	9.3	--	--

Climate Change and Greenhouse Gases. With respect to GHG emissions (measured as CO_2e), Section 6.3.1 of the Air Force Air Quality EIAP Guide does not establish a quantity of GHG emissions as significant relating to impacts to the environment but does imply methods (e.g., the use of Air Conformity Applicability Model) to establish significance indicators. Indicators are USEPA thresholds applied out of context to their intended use that do not provide a definitive impact determination but rather provide evidence to the potential significance of GHG emissions on air quality. The USEPA has established a requirement for GHG emissions to undergo a Best Available Control Technology analysis under the PSD permit program. If a permitting project would emit or has the potential to emit 75,000 short tons (2,000 pounds per short ton) per year of CO_2e, and would otherwise be subject to the PSD requirements, then a Best Available Control Technology analysis must be performed. This value was used as the significance indicator for the Proposed Action included in this EA. The calculated operational emissions for CO_2e for the Proposed Action are 9.3 tons per year, well below the 75,000 tons per year threshold.

3.4.2.2 No-Action Alternative

The No-Action Alternative would result in no change to criteria air pollutant emissions or GHG levels.

3.5 HAZARDOUS MATERIALS AND WASTE

"Hazardous materials," "hazardous waste," and "toxic substances," broadly defined, can all be classified as "hazardous substances" as defined by the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 because they may present a threat to human health and/or the environment. The phrase "hazardous substance" is used in this document to describe any item or agent (i.e., biological, chemical, or physical) that has the potential to cause harm to humans, animals, or the environment. Definitions of these terms are summarized below.

Hazardous Materials. Hazardous materials are defined by 49 CFR § 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR § 172.101), and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR Part 173. Transportation of hazardous materials is regulated by the US Department of Transportation regulations within 49 CFR Parts 105–180.

Hazardous Wastes. Hazardous wastes are defined by the Resource Conservation and Recovery Act at 42 USC § 6903(5), as amended by the Hazardous and Solid Waste Amendments, as: "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in, mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." The USAF maintains a Hazardous Waste Management Plan (HWMP) as directed by Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*. Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR Part 273.

Toxic Substances. A toxic substance is a chemical or mixture of chemicals that may present an unreasonable risk of injury to health or the environment. These substances include asbestos-containing material, polychlorinated biphenyls, and lead-based paint. The USEPA is given

authority to regulate these special hazard substances by the Toxic Substances Control Act (15 USC Ch. 53) and has established regulations regarding asbestos abatement and worker safety under 40 CFR Part 763, with additional regulations concerning emissions at 40 CFR Part 61. Asbestos is regulated by the USEPA under the Clean Air Act, Toxic Substances Control Act of 1976, and the Comprehensive Environmental Response, Compensation, and Liability Act. The USEPA has established that any material containing more than 1 percent asbestos is considered an asbestos-containing material. Any asbestos-containing material that is friable or will be made friable during modification or demolition activities in any public access or commercial building must be inspected and properly abated prior to modification or demolition if the amount exceeds the trigger levels of 260 linear feet on pipes, 160 square feet (SF) on other surfaces, or the volume equivalent of a 55-gallon drum (35 cubic feet).

Environmental Management System. Kirtland AFB has implemented an Environmental Management System (EMS) program in accordance with International Organization for Standardization 14001 Standards; EO 13834, *Regarding Efficient Federal Operations* [revoking EO 13693]); and AFI 32-7001, *Environmental Management*. The EMS policy prescribes to protect human health, natural resources, and the environment by implementing operational controls, pollution prevention environmental action plans, and training.

Specifically, all personnel, including contractors, are made aware of the Kirtland AFB EMS program. All project-related activities must be conducted in a manner that is consistent with relevant policy and objectives identified in the installation's EMS program. Project Managers must ensure that all personnel are aware of environmental impacts associated with their activities and reduce those impacts by practicing pollution prevention techniques.

***Hazardous Materials and Petroleum Products*.** Contractors proposing to use hazardous materials on the installation must notify the 377th Mission Support Group/Civil Engineering Installation Environmental Compliance (377th MSG/CEIEC) Hazardous Material Program by submitting a completed Hazardous Material Worksheet and a list of all materials along with their associated Safety Data Sheets prior to use. The Kirtland AFB SPCC Plan provides operating procedures to prevent the occurrence of spills, control measures to prevent spills from entering surface waters, and countermeasures to contain and cleanup the effects of an oil spill that could impact surface waters (Kirtland AFB, 2018). Kirtland AFB has identified the Environmental Office as the responsible entity to oversee hazardous material tracking on the installation. Part of the office's responsibilities is to control the procurement and use of hazardous materials to support USAF missions, ensure the safety and health of personnel and surrounding communities, and minimize USAF dependence on hazardous materials. The Kirtland AFB Environmental Office is charged with managing hazardous materials to reduce the amount of hazardous waste generated on the installation in accordance with the Kirtland AFB HWMP (Kirtland AFB, 2021). Typical hazardous materials used within the installation include solvents, paints, adhesives, sealants, petroleum/oils/lubricants, and batteries.

***Hazardous and Petroleum Wastes*.** The 377th MSG/CEIEC Hazardous Waste Program is responsible for implementing the hazardous waste management program at Kirtland AFB by characterizing waste; establishing collection sites; receiving and processing hazardous waste for turn-in; reporting, tracking logs, and manifesting; regulatory interfacing; recordkeeping; and hosting and conducting inspections (Kirtland AFB, 2021).

Kirtland AFB is a large-quantity generator of hazardous waste (USEPA ID #NM9570024423). The installation's HWMP provides guidance for waste identification, storage, transportation, and disposal and establishes the procedures to comply with applicable federal, state, and local standards for solid waste and hazardous waste management. The Kirtland AFB HWMP describes

the roles and responsibilities of all entities at Kirtland AFB with respect to the waste stream inventory, a waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. While numerous units are responsible for various functions of generation and management of hazardous waste, it is ultimately the waste generators (host and tenant organizations and on-site contractors) who are responsible for ensuring that hazardous waste management functions comply with the HWMP (Kirtland AFB, 2021).

Contaminated Sites. The DoD developed the ERP to facilitate thorough investigation and cleanup of contaminated sites on military installations (i.e., active installations, installations subject to Base Realignment and Closure, and Formerly Used Defense Sites) through both the Installation Restoration Program and the Military Munitions Response Program (MMRP). The Installation Restoration Program requires each active/operating DoD installation to identify, investigate, and clean up hazardous substances, pollutants, and contaminants. The MMRP addresses nonoperational rangelands that are suspected or known to contain unexploded ordnance, discarded military munitions, or munitions constituent contamination. A description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in the identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be restricted until remediation of a groundwater contamination plume has been completed).

The Department of Energy (DOE) developed the Office of Environmental Restoration and Waste Management in 1989 to ensure that past, present, and future operations do not threaten human health or environmental health and safety. The DOE Office of Site Closure is responsible for achieving closure of Environmental Restoration (ER) sites in a manner that is safe, cost-effective, and coordinated with stakeholders. The current investigation being conducted at Kirtland AFB under the ERP is intended to determine the nature and extent of hazardous and radioactive contamination and to restore any sites where such materials pose a threat to human health or the environment.

For the USAF, Air Force Policy Directive 32-70, *Environmental Quality*, and Air Force Regulation 2-7000 series incorporate the requirements of all federal regulations and other AFIs and DoD Directives for the management of hazardous materials, hazardous wastes, and special hazards.

Environmental Restoration Program. Kirtland AFB has 58 active ERP sites that include known and suspected soil and groundwater contamination associated with landfills, oil/water separators, drainage areas, septic systems, fire training areas, and spill areas. Kirtland AFB has seven active MMRP sites, comprising 3,238.3 acres. These sites are former impact areas that are primarily located along the outer perimeter and center of the installation. The sizes, types of munitions debris, and potential for unexploded ordnance varies by location (Kirtland AFB, 2013).

Additionally, the DOE actively manages 11 open ER sites on Kirtland AFB property, including 3 groundwater areas of concern and 8 solid waste management units.

3.5.1 Affected Environment

Hazardous Materials and Petroleum Products. There are no existing hazardous and petroleum materials associated with the proposed GT facility site.

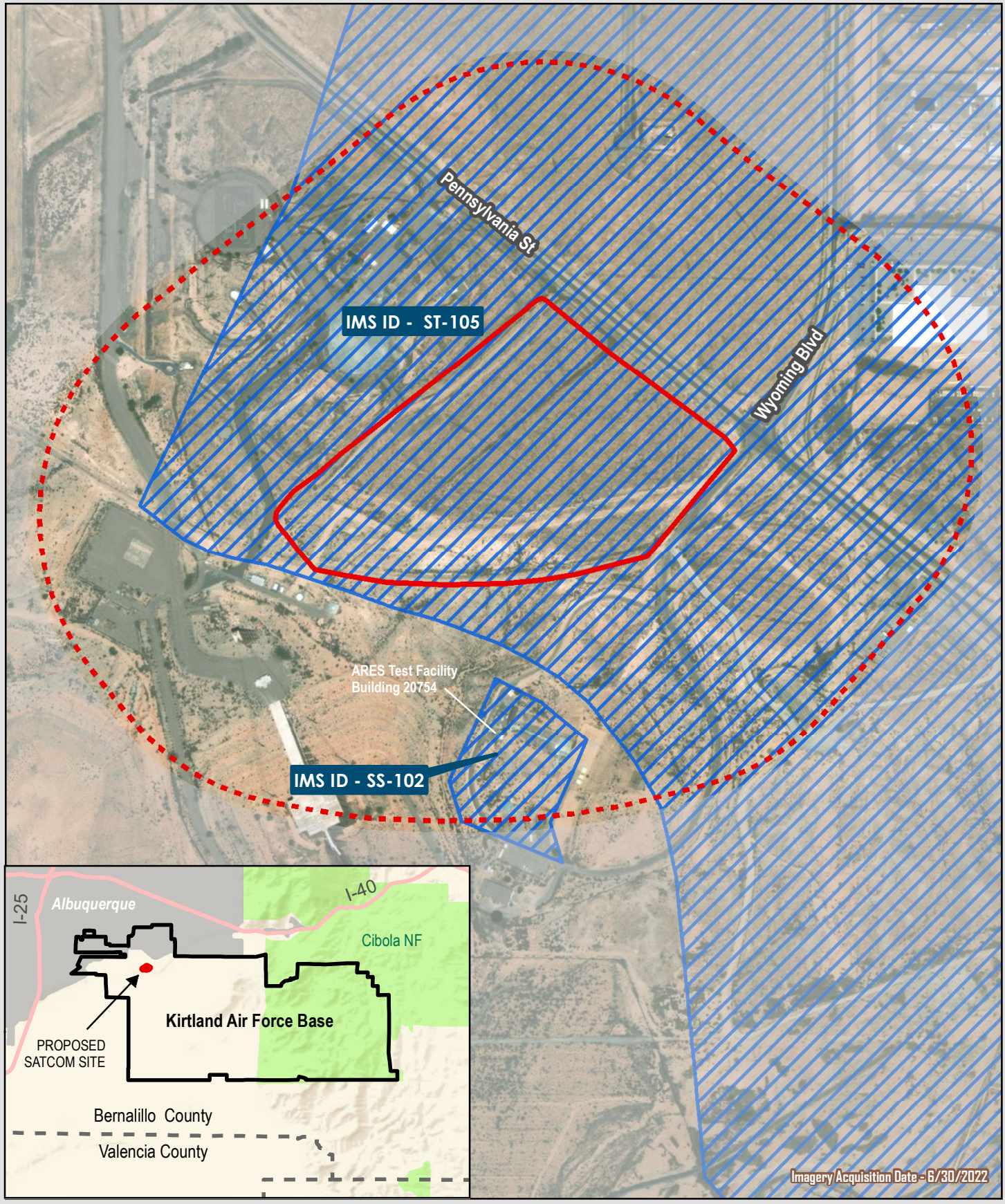
Hazardous and Petroleum Wastes. There are no existing hazardous and petroleum wastes associated with the proposed GT facility site.

Toxic Substances. An existing water line encased in asbestos lies beneath the proposed GT facility site (Underwood, 2022).

Environmental Restoration Program*.* The proposed GT facility site is located within the boundaries of Site ST-105, Estimated Nitrate-Impacted Perched Groundwater Plume, and within approximately 1,000 feet from the Solid Waste Management Unit SS-102, the ARES Test Facility Building site (see **Figure 3-1**). Both of these are active sites. Site ST-105 is a base-wide area of concern designated to address broad perched and regional groundwater issues across the base. The nitrate component of Site ST-105 is being addressed in compliance with a NMED-mandated abatement under the Groundwater Quality Bureau (Knight, 2023). Suspected sources of nitrate include the closed sewage lagoons, the Golf Course Main Pond, local arroyos, Albuquerque-Bernalillo County Water Utility Authority sanitary sewer line breaks in 1994 and 2003, and the Sandia National Laboratories acid waste outfall line. In addition, a collapse of the top portion of the sewer line that occurred in 2013 potentially contributed to nitrate impacts on groundwater (Knight, 2023). All suspected anthropogenic sources of nitrate have been closed or mitigated, and the only LUC associated with ST-105 is a restriction on installation of groundwater wells.

Site SS-102, the ARES Test Facility Building 20754, was designated a Solid Waste Management Unit from dielectric fluid releases over time. These releases resulted in soil impacts originating from the two drain pipes west of Building 20754. Contaminated areas were excavated and backfilled with soil, and the drain lines from Building 20754 were plugged with concrete. In November 2010, the NMED agreed that the site was suitable for No Further Action (Devergie, 2023).

Additional sites were identified within a 1,000-foot buffer of the site, as depicted on **Figure 3-1**; the majority of these are closed ER sites.



0 200 400
Feet

Proposed SATCOM Site
Proposed SATCOM Site (1,000 foot buffer)
Environmental Restoration Program Information Management System (within 1,000 feet)
County Boundary (Inset)
Kirtland Air Force Base (Inset)
National Forest (Inset)
Major Highway (Inset)
Urban Area (Inset)

wsp

Date:
March 2023

Figure 3-1 Environmental Restoration Program Sites within 1,000 Feet of the Proposed GT Facility Site

Sources: DOD 2023, ESRI 2021, Maxar 2022, PADUS 2022, EPIMS 2023

Kirtland Air Force Base
Albuquerque, New Mexico

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

Operating construction equipment and machinery and construction produce wastes such as waste oils and oily wastes, as well as universal wastes such as batteries. Construction contractors would be required to manage these wastes in accordance with state and federal regulations. There would, therefore, be minor, short-term impacts on the generation and management of hazardous waste under the Proposed Action.

Operation of the proposed GT facility would require a double-walled diesel tank placed on concrete pads for the on-site emergency generators. The tank would be managed in compliance with the Kirtland AFB SPCC and monitored monthly via visual inspections conducted by installation personnel. No significant impacts would be associated with the tank under the Proposed Action.

If pesticides are applied to control vegetation during operation and maintenance of the GT facility, the pesticides would be applied and managed in accordance with the Kirtland AFB Integrated Pest Management Plan, using listed and approved products, applied by certified applicators. Therefore, no impacts would be associated with pesticide management under the Proposed Action.

With respect to ERP sites, as discussed in Section 3.2.1, the proposed GT facility site is located within the boundaries of an active site, ST-105. The only LUC associated with the site is a restriction on the installation of groundwater wells. No groundwater wells would be installed under the Proposed Action; however, one grounding well would be installed at a depth of 1,000 feet to prevent the buildup of electrical voltages associated with the antennas. Due to the nature of the well (i.e., grounding and not groundwater), coupled with the depth to groundwater across the installation (200 to more than 450 feet belowground), Site ST-105 would not affect activities associated with the Proposed Action (Knight, 2023).

3.5.2.2 No-Action Alternative

Under the No-Action Alternative, the proposed GT facility site would be maintained as an undeveloped site, and there would be no effect on hazardous waste or materials management.

3.6 INFRASTRUCTURE

Infrastructure refers to the system of public works, such as utilities, which provide the underlying framework for a community. Utilities include such amenities as water, power supply, and waste management. The infrastructure components discussed in this section, as applicable to the Proposed Action, include the electrical system, water supply system, and communications.

3.6.1 Affected Environment

Electrical System. Kirtland AFB purchases electrical power from the Western Area Power Administration. Electric lines are placed above and below ground, feeding the 20 substations on the installation. The installation's average yearly consumption is approximately 407,010 kilowatt hours (Kirtland AFB, 2016).

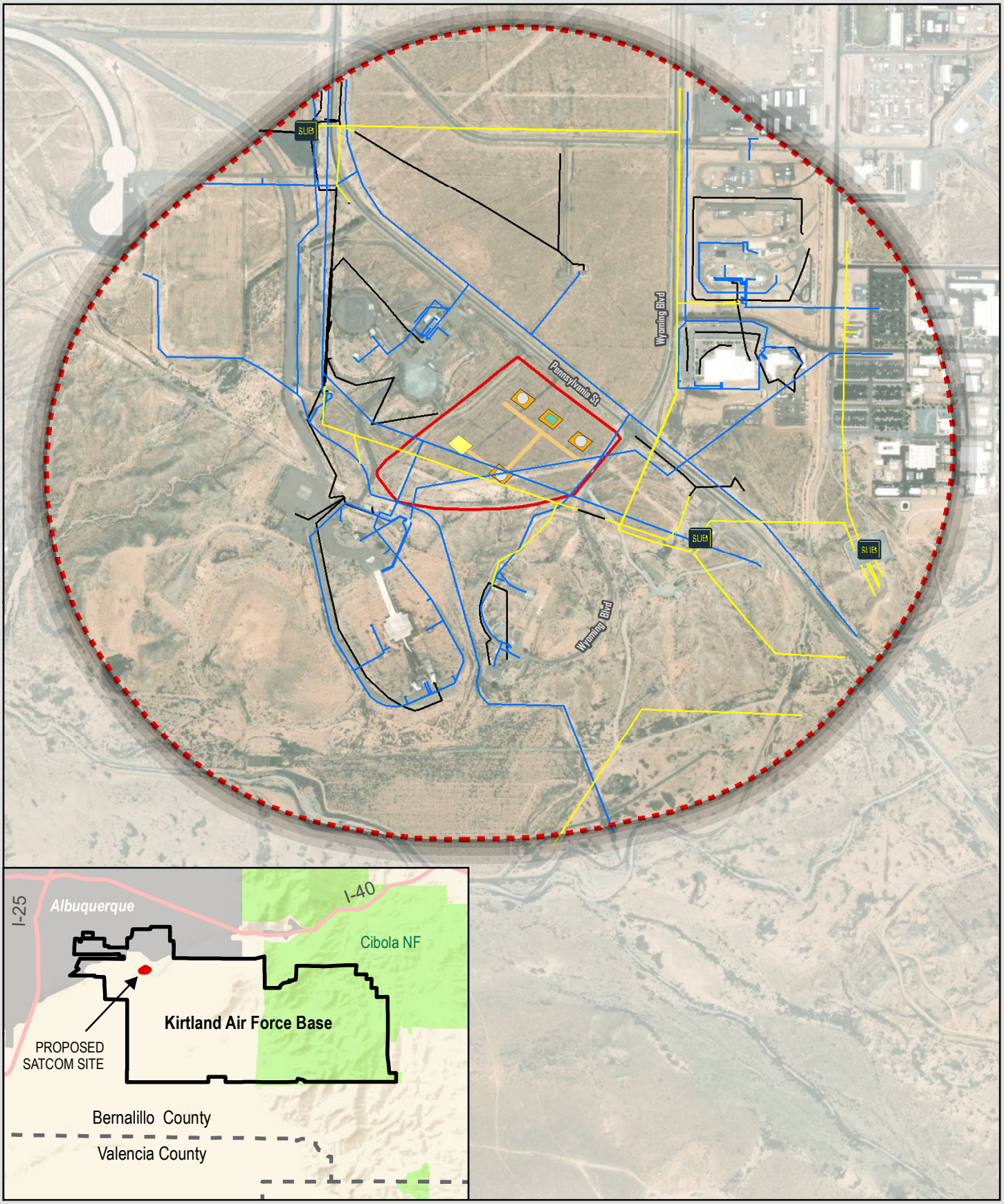
Water Supply System. Water is supplied to Kirtland AFB by six groundwater wells and two distribution systems that have a collective water-pumping maximum capacity of 8.1 million gallons per day. The installation pumps an average of 5.5 million gallons per day of treated, potable

water through 160 miles of distribution mains (Kirtland AFB, 2016). In addition, approximately 50 miles of non-potable water pipeline serve the Tijeras Golf Course and provide water for fire protection. In 2017, the most recent date for which this information was available, Kirtland AFB pumped 744 million gallons (2,283 acre-feet) of water from these wells (Kirtland AFB, 2016). The installation can also purchase water from the Albuquerque-Bernalillo County Water Utility Authority to meet demand during peak periods; however, the amount of water purchased from the city has been negligible since 1998. A 2019 Government Accounting Office report identified Kirtland AFB as being at risk of water scarcity and vulnerable to drought and desertification (Government Accounting Office, 2019).

Communications System. The communication network on Kirtland AFB was constructed as two separate systems that were later connected to provide redundancy. The main information transfer node is located on the west side of the installation. The Communication Main Switch Facility is located on the east side of the installation.

As shown in **Figure 3-2**, one overhead existing electrical line bisects the southern portion of the proposed GT facility site. Additionally, four existing water lines traverse the southern and easternmost portions of the site. These include an active 6-inch PVC water line and an asbestos-lined water line (Underwood, 2022). Additionally, north of the proposed GT facility site, a 6-inch duct iron water line runs down the north side of Pennsylvania Street.

With respect to stormwater, no underground stormwater lines are within the proposed GT facility site, but several open drainage lines run parallel to Pennsylvania Street and along the Wyoming Boulevard loop, which are evident in site aerial photography, as shown on **Figure 3-2**. The largest and most prominent drainage line is approximately 10 to 15 feet wide and runs northeast to southwest through the site.



0 500 1,000
Feet

Proposed SATCOM Site
Site (1/2 mile buffer)
SUB Substation
Overhead Electrical Line
Water Line
Underground Electrical Line
Radome Antennas
Equipment Shelter
Expansion Pad
Gravel Road
Pad
County Boundary (Inset)
Kirtland Air Force Base (Inset)
National Forest (Inset)
Major Highway (Inset)
Urban Area (Inset)

Date:
March 2023

Sources:
DOD 2023
ESRI 2021
Maxar 2022
PADUS 2022

Figure 3-2
Existing Utilities

Kirtland Air Force Base
Albuquerque, New Mexico

3.6.2 Environmental Consequences

3.6.2.1 Proposed Action

The Proposed Action would require new utility lines for water, electrical, and telecommunications. Utility extensions would be connected to existing lines/tie-in points and would ensure that the new facilities have the proper supporting infrastructure to function successfully. The existing utility systems at Kirtland AFB have sufficient capacity to support the Proposed Action.

The primary source of electricity (650 kilowatts) for site operations would be provided via a new electrical line, either direct buried or overhead, routed from substation 22 along the existing Pennsylvania Avenue right-of-way to the equipment shelter at the site. In addition, another existing overhead power line that runs south of the site would be tapped for a secondary electrical feed. All power lines once on-site would be routed underground to the various service points. An on-site emergency generator would support redundant power requirements of the antennas and be powered by low-sulfur fuel stored on-site.

A telecommunications line (up to 2 miles long) for remote operations and monitoring would be routed underground along existing rights-of-way from a tie-in point to be determined prior to final design to the equipment shelter within the GT facility site. There is an existing underground conduit bank near the proposed site that could be used for the tie-in point. Lastly, a new water line extension to provide fire suppression and for periodic use in cleaning the radome surfaces would be routed underground from the existing line along Pennsylvania Street. The line would serve several hydrants on the GT facility site as well as the equipment shelter sprinkler system. Annual total water consumption for automatic flushing, testing, and maintenance purposes is expected to be 20,000 gallons. The Proposed Action would not require wastewater or natural gas.

Temporary disruptions to existing service lines may be necessary during installation and connection of the new electrical, water, and telecommunications lines; however, such disruptions would be limited and coordinated with users and activities that require use of the utilities to minimize adverse impacts. Installation of the underground conduits and lines could require the relocation and/or co-location of other utility lines along the existing easements. As discussed in Section 2.1, trenching for the utility lines within site boundaries would extend to depths between 3 and 4 feet. The locations of known lines would be marked in the field prior to trenching activities to avoid the lines to the extent feasible.

As presented in **Figure 3-2**, the northwestern-most proposed antenna pad may overlap with an existing open stormwater drainage feature. The final design would address any overlap with drainage features with a focus on avoidance. Additionally, based on the proposed site layout, two water lines run under the southernmost antenna pad. Excavation would be required for the foundations for the ring walls/aprons surrounding the antennas. Excavation is anticipated to extend to a depth of approximately 4 feet or as needed to accommodate footers. Therefore, during final design, the depths of the existing water lines would be confirmed in the field, and modifications to the location of the proposed antennas may be made to avoid disturbing the water lines.

3.6.2.2 No-Action Alternative

Under the No-Action Alternative, no change to the existing infrastructure and utilities at Kirtland AFB would occur. No additional facilities would create the need for additional lines. Infrastructure and utility usage would remain consistent with current conditions.

3.7 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The relationship between short-term uses and enhancement of long-term productivity from implementation of the Proposed Action is evaluated from the standpoint of short- and long-term effects. Short-term effects would be those associated with construction of the SATCOM GT facility. The long-term enhancement of command and control capabilities would be those effects associated with operation and maintenance of the facilities after implementation of the Proposed Action. The Proposed Action represents an enhancement of long-term satellite communication and enhanced capability for spacecraft system command and control mission support at Kirtland AFB. The negative effects of short-term impacts from construction activities would be minor compared to the long-term positive impacts of a SATCOM GT facility at Kirtland AFB.

3.8 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible and irretrievable resource commitments are related to the use of non-renewable resources and the impacts that the use of these resources would have on future generations. Irreversible impacts primarily result from the use or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., energy and minerals). The irreversible and irretrievable commitments of resources that would result from implementation of the Proposed Action involve the consumption of material resources used for construction, energy resources, biological resources, and human labor resources. The use of these resources is considered to be permanent.

Material Resources. Material resources used for the Proposed Action would potentially include building materials, concrete and asphalt, and various construction materials and supplies.

Energy Resources. Energy resources used for the Proposed Action would be irretrievably lost. This includes petroleum-based products (e.g., gasoline and diesel). During construction and maintenance activities, gasoline and diesel would be used for the operation of vehicles and construction equipment. Consumption of these energy resources would not place a significant demand on their availability in the region; therefore, less than significant impacts are expected.

Biological Resources. The Proposed Action would result in a negligible loss of vegetation and wildlife habitat. Because the project area consists primarily of bare ground with minimal vegetation, the loss would be minimal and not considered significant. Only minimal, if any, loss of insect life may occur due to the Proposed Action; this would not constitute a significant adverse impact to biological resources.

Human Resources. The use of human resources for construction and maintenance activities is considered an irretrievable loss only in that it would preclude such personnel from engaging in other work activities. A small, temporary construction workforce would be present on-site for up to 18 months but would result in minimal direct and indirect economic impacts. The site would be unmanned and monitored remotely. The use of human resources for the Proposed Action represents employment opportunities and is considered beneficial.

4.0 REASONABLY FORESEEABLE ACTIONS AND CUMULATIVE IMPACTS

According to CEQ regulations, the cumulative effects analysis of an EA should consider the potential environmental impacts resulting from "the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." (40 CFR 1508.1(g)(3)). Cumulative effects can "result from individually minor but collectively significant actions taking place over a period of time." Cumulative effects may occur when there is a relationship between a proposed action or alternative and other actions expected to occur in a similar location or during a similar timeframe. The effects may then be incremental and may result in cumulative impacts. Actions overlapping with or in proximity to the proposed action or alternatives can reasonably be expected to have more potential for cumulative effects on "shared resources" than actions that may be geographically separated. Similarly, actions that coincide in the same timeframe tend to offer a higher potential for cumulative effects.

This EA addresses cumulative impacts to assess the incremental contribution of the alternatives to impacts on affected resources from all factors. The USAF has attempted to identify actions on or near the affected areas that are under consideration and in the planning stage at this time. These actions are included in the cumulative effects analysis, drawn from the level of detail that exists now. Although the level of detail available for those future actions varies, this approach provides the decision-maker with the most current information to evaluate the consequences of the proposed action alternatives.

4.1 PAST, PRESENT AND REASONABLY FORESEEABLE ACTIONS

In this section, past, present, and reasonably foreseeable actions that have a potential to interact with the Proposed Action at Kirtland AFB were identified. This approach enables decision-makers to have the most current information available so that they can evaluate the potential cumulative environmental consequences of the development of a GT facility at Kirtland AFB.

Kirtland AFB is an active military installation that undergoes changes in mission and training requirements in response to defense policies, current threats, and tactical and technological advances. The installation, like any other major institution (e.g., university, industrial complex), requires new construction, facility improvements, infrastructure upgrades, and maintenance and repairs. In addition, tenant organizations may occupy portions of the installation, conduct aircraft operations, and maintain facilities. All these actions (i.e., mission changes, facility improvements, and tenant use) will continue regardless of the alternative selected. Projects that could have cumulative impacts on resources within the northwestern portion of the installation and are located within a 2.5-mile buffer of the proposed GT facility site are listed in **Table 4-1** and noted on **Figure 4-1**. Other ongoing maintenance and repair activities would occur within the same footprint as current activities (i.e., repairing existing pavements, curbs, sidewalks, and fences; interior building modifications); therefore, they would not introduce any newly disturbed or impervious surfaces and are not included herein.

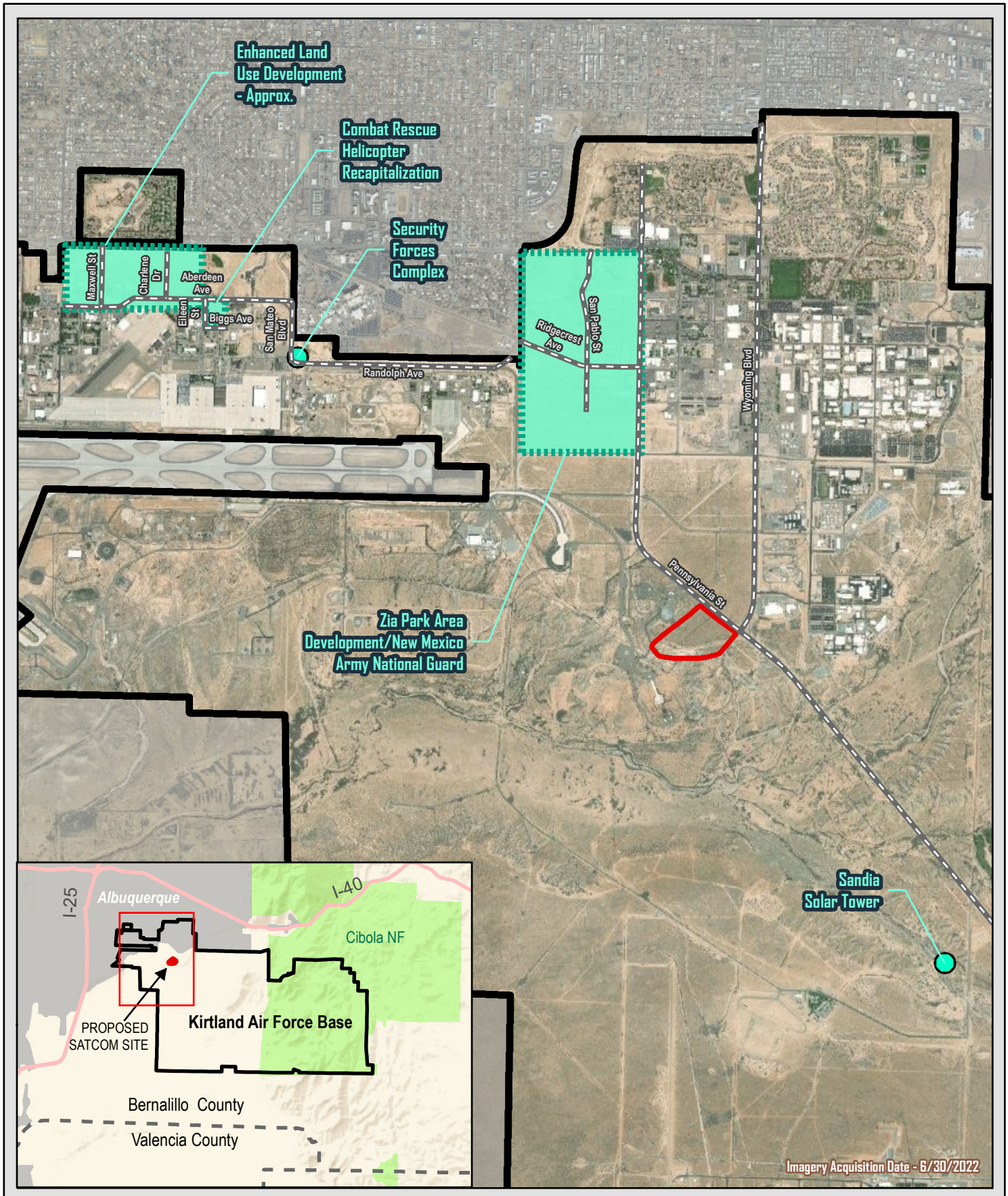
Table 4-1. Past, Present, and Reasonably Foreseeable Projects at Kirtland AFB

Project Name	Description	Potential Relevance to the Proposed Action	Status/Timeline
Zia Park Area Development	Development of a former housing area, called Zia Park, which encompasses approximately 300 acres of land central to the primary cantonment area of the installation. Construction would include administrative buildings, infrastructure improvements, medical facilities, community services, residential lodging, outdoor recreation space, and demolition of several facilities that would be redundant with new construction (e.g., gyms, child development center, dormitory).	Approximately 0.7 miles northwest of the proposed GT facility site.	Construction projects would be completed in various phases, either short-term (1-7 years), mid-term (8-16 years), or long-term (17+ years).
Enhanced Land Use Development	Development of a 90-acre site for mixed-use development that would include office, retail/commercial, multifamily housing, hotel, and restaurant space. This development area is on the northwestern edge of Kirtland AFB, south of Gibson Boulevard, and west of Truman Gate/Visitors Center.	Approximately 2.5 miles northwest of the proposed GT facility site.	1-5 years
Demolition and Construction of Military Support Facilities	The USAF proposes to demolish and construct, operate, and maintain several military personnel support facilities in the northwestern portion of the installation. The areas include the Visiting Officer Quarters, the Main Enlisted Dormitory Campus, the Noncommissioned Officer Academy, and Dormitory Campus 2. This project would include the demolition of facilities totaling approximately 498,000 SF and construction of facilities totaling approximately 389,000 SF, resulting in a net decrease of approximately 109,000 SF of building space on the installation. Approximately 36 acres would be impacted by construction and demolition activities.	Approximately 2.5 northwest of the proposed GT facility site. (Note: This is assumed to be near the Enhanced Land Use Development project.)	TBD
Building Demolition at Kirtland AFB	The USAF is in the process of demolishing 23 buildings totaling approximately 105,000 SF to make space available for future construction and to fulfill its mission as installation host through better site utilization. None of the buildings proposed for demolition are currently occupied or used by installation personnel.	Assumed that one or more projects would be within the 2.5-mile study area.	TBD

Project Name	Description	Potential Relevance to the Proposed Action	Status/Timeline
Security Forces Complex	The USAF proposes to construct, operate, and maintain a 43,500-SF security forces complex to provide adequate space and modern facilities to house all 377 Security Forces Group administrative and support functions in a consolidated location. The functions that would be transferred to the new security forces complex include a base operations center with command and control facility, administration and office space, training rooms, auditorium or assembly room, guard mount, hardened armory for weapons and ammunition storage, confinement facilities, law enforcement, logistics warehouse, general storage, vehicle garage with maintenance area, and associated communications functions. One existing building (879 SF) within the footprint of the complex would be demolished. This project would result in an increase of 41,621 SF of building space on the installation.	Approximately 2 miles northwest of the proposed GT facility site. (Note: Security Forces Complex was assumed to be in the vicinity of Randolph Avenue and San Mateo Boulevard.)	1-5 years
Renewable Energy Projects	The USAF proposes to develop renewable energy projects at Kirtland AFB. The proposed project would include the installation of various renewable energy technologies installation-wide, up to a 20-megawatt solar photovoltaic array and rooftop/carport solar voltaic systems.	Assumed that one or more projects would be within the 2.5-mile study area.	TBD
Upgrade, Develop, and Maintain the Storm Drainage System	The USAF proposes to develop, upgrade, and maintain storm drainage systems and conduct arroyo erosion repair and damage avoiding measures across the installation. Storm drainage system activities could include constructing stormwater system upgrades and components including cleaning, regrading, ditching, trenching, trench lining, backfilling, bedding, reinforced concrete pipe, culverts, vegetation, rip-rap, drop inlets, and retention and outlet structures. Arroyo repair activities could include excavating, filling, and lining arroyo banks and constructing and repairing box culverts, bank protection, and grade control structures to assist in stabilizing the arroyo bed toward a stable slope.	Assumed that storm drainage system activities would be within the 2.5-mile study area.	11+ years

Project Name	Description	Potential Relevance to the Proposed Action	Status/Timeline
New Mexico Army National Guard 515th Regiment	The New Mexico Army National Guard proposes to relocate its 515th Regiment from the Onate Training Complex in Santa Fe to Kirtland AFB. Construction includes a 366,000-SF main campus in the former Zia Park housing area and a 40-acre maneuver and driver's training course with motor pool and classroom near the Tijeras Arroyo Golf Course. The main campus will include an educational facility, billeting, dining facilities, and associated parking.	Approximately 0.7 miles northwest of the proposed GT facility site.	TBD
Sandia National Research Laboratory – Solar Tower	The Sandia National Research Laboratory has proposed a 400-foot solar tower with mirrors on a site across from the Tijeras Arroyo Golf Course off Pennsylvania Street.	Approximately 1.5 miles southeast of the proposed GT facility site.	TBD
Construct New Military Working Dog Facility	The USAF proposes to construct, operate, and maintain a new Military Working Dog facility that consists of 14 indoor/outdoor kennels, 4 isolation kennels, storage and staff space, restrooms, food storage room, a covered walkway, and a veterinarian examining room, totaling 8,000 SF. A parking area with 25 spaces and new access roads would also be constructed as part of the project. Demolition of facilities totaling 2,520 SF would also be included in this project, resulting in a net increase of 5,480 SF of building space on the installation.	Unknown	11+ years
21st Explosive Ordnance Division Expansion	The 21st Explosive Ordnance Division proposes to expand its current site to 280 acres, add three permanent structures totaling 40,000 SF, demolish five of the six substandard structures (75,000 SF), add two temporary storage containers, tie into nearby utilities, construct water tanks for fire suppression, and construct several concrete pads for training activities. This project would result in a decrease of 35,000 SF of building space on the installation.	Unknown	TBD
Development, Testing, Use, and Associated Training at the Technical	The Defense Threat Reduction Agency and USAF propose to enhance the testing and training capabilities and use and the functionality of the TEAMS. Specifically, the proposed facilities and activities include a new	Unknown	TBD

Project Name	Description	Potential Relevance to the Proposed Action	Status/Timeline
Evaluation Assessment Monitor Site (TEAMS)	radiological source storage facility, a mock train station, in-kind replacement of current TEAMS temporary buildings with permanent buildings, and potential increase in testing and training event personnel levels by up to 50 percent. Approximately 2.7 acres would be affected during construction activities.		
New Military Training Activities	The 210 Red Horse Squadron would construct a permanent laydown yard on the Base Exercise Evaluation and Skills Training Area to store equipment to be used during monthly training activities. The Combat Rescue Officer/Pararescue school is proposing to construct a Urban Training Complex on 25 acres within the Coyote Canyon Training Area. The complex would consist of the placement of conexes on a gravel base to simulate a mock village similar to those found in the Middle East. The USAF is proposing to begin firing.50-caliber M107 Barrett sniper rifles and M2 machine guns at small-arms range East. An existing building located south of Firing Range 44 would be demolished to provide line-of-sight from the firing point to the target array. Approximately 240 acres would be cleared by tree removal and thinning to create firebreaks along Firing Ranges 40, 40B, 530B, and 53.	Unknown; assumed outside the 2.5-mile study area. No anticipated impacts.	Completed
AC-130J Formal Training Unit Relocation	The USAF is proposing to relocate the AFSOC AC-130J Formal Training Unit from Hurlburt Field, Florida, to Kirtland AFB, New Mexico, and organizationally realign the unit under the 58th Special Operations Wing (Air Education and Training Command). The Proposed Action also includes personnel needed to operate and maintain the AFSOC AC-130J, and construction of new and/or modification of existing facilities on the installation to support the relocation.	Within 2 miles of Proposed Action; no anticipated impacts.	Fiscal Year 2025–Fiscal Year 2029



0 1,000 2,000
Feet

Proposed SATCOM Site
Kirtland Air Force Base
Projects Identified (Area)
County Boundary (Inset)
National Forest (Inset)
Projects Identified (Location)
Major Highway (Inset)
Urban Area (Inset)
Roads

Date:
January 2023

Figure 4-1 Past, Present, and Reasonably Foreseeable Projects

Sources:
ESRI 2021, Maxar 2022,
PADUS 2022, DOD & WSP 2023

Kirtland Air Force Base
Albuquerque, New Mexico

4.2 ASSESSMENT OF CUMULATIVE IMPACTS

4.2.1 Land Use

Multiple construction, renovation, and demolition projects listed in Table 4-1 would occur within 2.5 miles of the proposed GT facility site on Kirtland AFB. As noted in Section 4.1, Kirtland AFB is an active military installation that requires new construction, facility improvements, infrastructure upgrades, and maintenance and repairs. The other actions listed in Table 4-1 are being undertaken in response to mission needs and primarily would occur in previously developed or disturbed areas of the installation. These land use changes would be consistent with Kirtland AFB's Installation Development Plan and have or would be reviewed by the installation prior to implementation.

It is unknown whether any ongoing or reasonably foreseeable actions would require use of tall cranes during construction. If cranes are required, these structures would require separate coordination with the FAA prior to construction to avoid or minimize temporary aeronautical hazards. Based on the above, adverse cumulative impacts to land use are not expected.

4.2.2 Geologic Resources

Other past, present, or reasonably foreseeable actions on Kirtland AFB within 2.5 miles of the proposed GT facility would require temporary and permanent soil disturbance. Most of these projects are located in areas that have previously been developed, which is expected to minimize the need for excavation or site leveling. Therefore, no substantial changes to regional geology or topography are expected. No energy or mineral resources are mapped on the installation, and land within Kirtland AFB is not available for mineral extraction. Therefore, no cumulative impacts to extraction activities are expected.

Because soils across much of the cantonment area of the installation have previously been disturbed, typical of developed urban areas, adverse impacts to natural soils are not expected to be significant. Any contaminated soils encountered during construction of these projects would be characterized, transported, and disposed of in compliance with Kirtland AFB's ERP and applicable local, state, and federal laws. A proposed project to develop, upgrade, and maintain the installation's stormwater systems and repair areas of erosion generally would have a beneficial impact on soils across the installation by repairing areas of erosion and constructing infrastructure improvements to mitigate erosion in the future.

New and renovated facilities on Kirtland AFB are designed in accordance with applicable local and state building codes to mitigate seismic risk. Many of the projects listed in Table 4-1 involve construction of facilities that would be occupied during working hours, and personnel in these facilities would be exposed to a degree of risk from earthquakes. Construction of new facilities and renovation of facilities to current code generally would reduce this risk, compared to continued operation of facilities constructed to older building codes. Therefore, cumulative effects to geologic hazards are expected to be beneficial.

4.2.3 Air Quality

GHG emissions occur locally, but GHG impacts and climate change are both global in scale and cumulative over time.

The Proposed Action would have short- and long-term, minor, adverse impacts on air quality from emissions of criteria pollutants from construction equipment, vehicles, and generators. Cumulative impacts to air quality would occur from the Proposed Action and other construction

projects if they occurred at the same time. However, emissions from the Proposed Action would be negligible compared to emissions from the other larger construction projects, such as the Zia Park Area Development and the Enhanced Use Lease Area.

4.2.4 Hazardous Materials and Waste

Minor impacts would be associated with the generation and management of hazardous wastes under the Proposed Action. These impacts would primarily be associated with construction waste and management of a double-walled diesel tank for the on-site emergency generators. As discussed in Section 3.5.2, construction contractors would manage these wastes in accordance with state and federal regulations, and the tanks would be managed in compliance with the installation's SPCC Plan. While the proposed GT facility site is located within the boundaries of an active ER site (ST-105), all suspected anthropogenic sources of nitrate have been closed or mitigated, and the only LUC associated with the site is a restriction on the installation of groundwater wells. No groundwater wells would be installed under the Proposed Action; however, one grounding well, to prevent the buildup of electrical voltage associated with the antennas, would be installed at a depth of 1,000 feet. Due to the nature of the well (i.e., grounding and not groundwater), coupled with the depth to groundwater across the installation (200 to more than 450 feet below ground), Site ST-105 would not affect activities associated with the Proposed Action (Knight, 2023).

There are 11 open ER sites on Kirtland AFB property, and some of these are associated with LUCs. Some of the projects included in Table 4-1 could overlap with ER sites and LUCs. Development of those projects would be required to adhere to the USAF, Air Force Policy Directive 32-70, *Environmental Quality*, and Air Force Regulation 2-7000 series, which incorporates the requirements of all federal regulations and other AFIs and DoD Directives for the management of hazardous materials, hazardous wastes, and special hazards, as well as any applicable NMED requirements.

Overall, hazard and hazardous materials impacts would result in cumulative impacts; however, control measures and BMPs would be implemented with each project to minimize impacts. Cumulative impacts as a result of hazardous materials and waste would be minor.

4.2.5 Infrastructure

The Proposed Action would require new utility lines for water, electrical, and telecommunications. Utility extensions would be connected to existing lines/tie-in points and would ensure that the new facilities have the proper supporting infrastructure to function successfully. Temporary disruptions to existing service lines may be necessary during installation and connection of the new electrical, water, and telecommunications lines; however, such disruptions would be limited and coordinated with users and activities that require use of the utilities to minimize adverse impacts. Installation of the underground conduits and lines could require the relocation and/or co-location of other utility lines along the existing easements. The final design process for the proposed GT facility site will consider any potential overlap with existing open stormwater drainage features and on-site water lines.

Some of the projects listed in Table 4-1, like the Zia Park Area Development and Enhanced Use Lease development, would be associated with potential infrastructure expansions and upgrades and may place new demands on the base infrastructure supply and network that would be evaluated through base-wide planning processes. Overall, cumulative impacts may result on base utilities; however, these impacts are anticipated to be minor.

5.0 LIST OF PREPARERS

Name	Organization/Title	Qualifications
William Huber, AICP	Alliance WSP Joint Venture (JV) Project Manager	BS, Biology MS, Urban and Regional Planning
Kathleen Evans, PMP	Alliance WSP JV Deputy Project Manager	BS, Environmental Biology MS, Urban and Regional Planning
Jessica Forbes	Alliance WSP JV Environmental Planner	BA, Environmental Studies
Deborah Mandell	Alliance WSP JV Senior Editor	BA, Government MBA, Finance and Marketing
Mark Moore, GISP	Alliance WSP JV GIS Specialist	BA, Geography GIS Certification Institute
Ryan Long, AICP	Alliance WSP JV Quality Assurance/Quality Control	BS, Environmental Policy and Planning BS, Agricultural and Applied Economics

6.0 REFERENCES

Albuquerque/Bernalillo County. 2013. *Albuquerque/Bernalillo County Comprehensive Plan*. Available online: https://www.bernco.gov/planning/wpcontent/uploads/sites/58/2021/03/Albuquerque-Bernalillo-County-Comprehensive-Plan-2013.pdf.

City of Albuquerque. 2022. City of Albuquerque Land Use Map. Available online: https://cabq.maps.arcgis.com/apps/View/index.html?appid=6e56e1b54f6d4292a6a9ad760b389343.

Devergie, S. 2023. Email communication between S. Devergie and B. Sisneros, Kirtland Air Force Base on January 25, 2023, as provided to WSP.

Government Accounting Office. 2019. United States Government Accountability Office Report to the Committee on Armed Services, U.S. Senate. November 2019GAO-20-98. Available online: https://www.gao.gov/assets/gao-20-98.pdf.

Kirtland AFB (Kirtland Air Force Base). 2013. Final Remedial Investigation Report Military Munitions Response Program. Prepared by HydroGeoLogic, Inc. for Kirtland Air Force Base, Albuquerque, New Mexico. March.

Kirtland AFB. 2016. Installation Development Plan. March 2016.

Kirtland AFB. 2018. New Mexico Spill Prevention Control and Countermeasure Plan. February 2018.

Kirtland AFB. 2021. Hazardous Waste Management Plan for Kirtland AFB. April 2015.

Kirtland AFB. 2022a. Draft Integrated Natural Resources Management Plan. November 2022.

Kirtland AFB. 2022b. Kirtland Air Force Base Calendar Year 2021 Annual Air Emissions Inventory. Submitted to Albuquerque Environmental Health Department – Air Quality Program. Received 20 August.

Knight, D. 2023. Email communication between Suzanne Devergie and Brianne Sisneros, Kirtland Air Force Base on January 25, 2023, as provided to WSP.

New Mexico Bureau of Geology and Mineral Resources. 2023. NMBGMR Interactive Resources Map view of Kirtland AFB. Available online: https://maps.nmt.edu. Accessed January 17, 2023.

Reynolds, D. 2022. Kirtland AFB Natural Resources/Cultural Resources Manager. Data gathering meeting, November 9, 2022.

Underwood, J. 2022. Installation Civil Engineer. Site visit data gathering meeting held on November 9, 2022.

USAF (US Air Force). 2018. Integrated Natural Resources Management Plan. Kirtland Air Force Base.

US Department of Agriculture Natural Resources Conservation Service. 2022. Custom Soil Resource Report for Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico. Kirtland AFB GT Facility Site. Available online: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

US Geological Survey. 2002. "Simulation of Ground-Water Flow in the Middle Rio Grande Basin between Cochiti and San Acacia, New Mexico." Water Investigations Report 02-4200.

US Geological Survey. 2014. "Seismic Hazard Maps and Site-Specific Data: 2014 Long-term Model." Available online: https://earthquake.usgs.gov/hazards/hazmaps/.

APPENDIX A – COMMENTS ON THE DRAFT ENVIRONMENTAL ASSESSMENT (PLACEHOLDER)

APPENDIX B – RECORD OF NON-APPLICABILITY

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 Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 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: KIRTLAND AFB
State: New Mexico
County(s): Bernalillo
Regulatory Area(s): Albuquerque, NM

b. Action Title: Environmental Assessment for DoD SATCOM Ground Terminal Facility at Kirtland Air Force Base, New Mexico

c. Project Number/s (if applicable): Contract W912DR22D0002, TO W912DR22F0298

d. Projected Action Start Date: 10 / 2023

e. Action Description:

The Proposed Action includes the construction of a SATCOM GT facility that would consist of three antennas with an associated equipment shelter, two emergency generators, perimeter fencing, a sensor equipment tower, and utilities. Three 44.3-foot (13-meter) diameter dish antennas would be mounted on concrete pedestals, which would be contained within individual ring walls with surrounding concrete aprons spanning 100 feet and covered by radomes approximately 72 feet tall and 62 feet in diameter.

The facility would be supported from one 40-foot by 60-foot equipment shelter that houses the mission equipment and electrical distribution gear. The emergency generators are required to support redundant power requirements of the antennas and would be powered by ultra-low sulfur diesel fuel. The equipment shelter would also contain electrical equipment for all power distribution, an uninterruptable power supply for temporary power support in the event of an interruption to base power and would be the location for the fire main tie-in for fire suppression. In addition to the three ground terminal sites, a fourth 'pad' site will be constructed to accommodate future expansion and a fifth 'pad' site would be prepared for future use for a smaller portable GT that does not require permanent structures or foundations. This pad site will have an underground utility connection to the equipment shelter and could also have its own portable emergency generator when installed. Lastly, a grounding well would be dug on-site to a depth of up to 1,000 feet.

A total of 12 acres of the proposed 15-acre GT facility site would be cleared of scrub vegetation. Minimal grading / leveling will be required on the site. Construction of the GT facility is anticipated to take 18 months.

The various structures that make up the GT facility would be enclosed by a chain link security fence with lighting and cameras for remote security monitoring. The fence would be approximately 12 feet tall. The GT facility would be operated remotely, with no personnel required on-site.

The GT facility would be operated remotely, with no requirement for personnel to be present on-site. Maintenance would be conducted on-site on a regular schedule by a contracted vendor. Approximately 60 person-visits per year are estimated.

Utilities required by the SATCOM GT facility include:

• The primary source of electricity (650 kilowatts) for site operations would be provided via an existing overhead electrical line routed from substation to the equipment shelter at the site. In addition, another existing overhead power line that runs south of the site would be tapped for a second feed. All power lines once on-site would be routed underground to the various service points.

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

• A telecommunications line for remote operations and monitoring would be routed underground along existing rights-of-way from a tie-in point to be determined prior to final design to the equipment shelter within the GT facility site. The total distance of this line is not anticipated to exceed 2 miles.

• A new water line extension to provide fire suppression and for periodic use in cleaning the radome surfaces would be routed underground from the existing line along Pennsylvania Street. The line would serve several hydrants on the GT facility site as well as the equipment shelter sprinkler system. Annual total water consumption for automatic flushing, testing, and maintenance purposes is expected to be 20,000 gallons.

Trenching for the utility lines within site boundaries would extend to depths between 3 and 4 feet. Additional excavation would be required for the foundations for the equipment shelter and ring walls surrounding the antennas. Excavation is anticipated to extend to a depth of approximately 4 feet or as needed to accommodate footers.

f. Point of Contact:

Name: Marcel Briguglio
Title: Junior Engineer
Organization: WSP
Email: marcel.briguglio@wsp.com
Phone Number: 443-617-5054

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:

2023

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Albuquerque, NM			
VOC	0.522		
NOx	2.938		
CO	3.447	100	No
SOx	0.010		
PM 10	15.460		
PM 2.5	0.110		
Pb	0.000		
NH3	0.004		
CO2e	941.5		

2024

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Albuquerque, NM			
VOC	0.214		
NOx	0.488		

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

SOx	0.002		
PM 10	0.016		
PM 2.5	0.015		
Pb	0.000		
NH3	0.001		
CO2e	160.0		

2025 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Albuquerque, NM			
VOC	0.005		
NOx	0.171		
CO	0.051	100	No
SOx	0.000		
PM 10	0.005		
PM 2.5	0.005		
Pb	0.000		
NH3	0.000		
CO2e	9.3		

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.

marcel.briguglio Digitally signed by marcel.briguglio
Date: 2023.03.07 10:57:09 -05'00'

Marcel Briguglio, Junior Engineer

03/07/2023

DATE

APPENDIX C – AIR EMISSION CALCULATIONS

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: KIRTLAND AFB
State: New Mexico
County(s): Bernalillo
Regulatory Area(s): Albuquerque, NM

- Action Title: Environmental Assessment for DoD SATCOM Ground Terminal Facility at Kirtland Air Force Base, New Mexico

- Project Number/s (if applicable): Contract W912DR22D0002, TO W912DR22F0298

- Projected Action Start Date: 10 / 2023

- Action Purpose and Need:

The purpose of the Proposed Action is to construct a SATCOM GT facility for the Department of Defense (DoD) to support communications with satellites in a variety of orbits. The antennas would be used for downlink (i.e., communication going from a satellite to ground) of mission data and spacecraft telemetry data, as well as for uplink (i.e., communication going from ground to a satellite) of spacecraft command and control data. The action is needed to provide necessary ground coverage for these communications that is currently insufficient in the greater New Mexico area. The project will support a prospective 2026 DoD mission for expanded satellite communication ground coverage.

The GT facility proposed for Kirtland AFB establishes a new capability for the United States government that is met by having terminals in the New Mexico/southwest region and others on the Eastern Seaboard. The data transiting this site (including satellite telemetry, command and control, and various mission data) would consist of unclassified encrypted transmissions.

- Action Description:

The Proposed Action includes the construction of a SATCOM GT facility that would consist of three antennas with an associated equipment shelter, two emergency generators, perimeter fencing, a sensor equipment tower, and utilities. Three 44.3-foot (13-meter) diameter dish antennas would be mounted on concrete pedestals, which would be contained within individual ring walls with surrounding concrete aprons spanning 100 feet and covered by radomes approximately 72 feet tall and 62 feet in diameter.

The facility would be supported from one 40-foot by 60-foot equipment shelter that houses the mission equipment and electrical distribution gear. The emergency generators are required to support redundant power requirements of the antennas and would be powered by ultra-low sulfur diesel fuel. The equipment shelter would also contain electrical equipment for all power distribution, an uninterruptable power supply for temporary power support in the event of an interruption to base power and would be the location for the fire main tie-in for fire suppression. In addition to the three ground terminal sites, a fourth 'pad' site will be constructed to accommodate future expansion and a fifth ‘pad’ site would be prepared for future use for a smaller portable GT that does not require permanent structures or foundations. This pad site will have an underground utility connection to the equipment shelter and could also have its own portable emergency generator when installed. Lastly, a grounding well would be dug on-site to a depth of up to 1,000 feet.

A total of 12 acres of the proposed 15-acre GT facility site would be cleared of scrub vegetation. Minimal grading / leveling will be required on the site. Construction of the GT facility is anticipated to take 18 months.

The various structures that make up the GT facility would be enclosed by a chain link security fence with lighting and cameras for remote security monitoring. The fence would be approximately 12 feet tall. The GT facility would be operated remotely, with no personnel required on-site.

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

The GT facility would be operated remotely, with no requirement for personnel to be present on-site. Maintenance would be conducted on-site on a regular schedule by a contracted vendor. Approximately 60 person-visits per year are estimated.

Utilities required by the SATCOM GT facility include:

• The primary source of electricity (650 kilowatts) for site operations would be provided via an existing overhead electrical line routed from substation to the equipment shelter at the site. In addition, another existing overhead power line that runs south of the site would be tapped for a second feed. All power lines once on-site would be routed underground to the various service points.

• A telecommunications line for remote operations and monitoring would be routed underground along existing rights-of-way from a tie-in point to be determined prior to final design to the equipment shelter within the GT facility site. The total distance of this line is not anticipated to exceed 2 miles.

• A new water line extension to provide fire suppression and for periodic use in cleaning the radome surfaces would be routed underground from the existing line along Pennsylvania Street. The line would serve several hydrants on the GT facility site as well as the equipment shelter sprinkler system. Annual total water consumption for automatic flushing, testing, and maintenance purposes is expected to be 20,000 gallons.

Trenching for the utility lines within site boundaries would extend to depths between 3 and 4 feet. Additional excavation would be required for the foundations for the equipment shelter and ring walls surrounding the antennas. Excavation is anticipated to extend to a depth of approximately 4 feet or as needed to accommodate footers.

- Point of Contact

Name: Marcel Briguglio
Title: Junior Engineer
Organization: WSP
Email: marcel.briguglio@wsp.com
Phone Number: 443-617-5054

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Site Grading – Onsite (12 acres with offsite disposal of 19,360 cubic yds)
3.	Construction / Demolition	Foundation Excavation and Concrete Apron Construction
4.	Construction / Demolition	Utility Trenching – Electric (2 miles, 3 ft deep)
5.	Emergency Generator	Emergency Generators (2 @ 750 kW each)
6.	Construction / Demolition	Utility Trenching – Water (500 feet, 3 ft deep)
7.	Construction / Demolition	Utility Trenching – Communications (2 miles, 3 ft deep)
8.	Construction / Demolition	Construction of Equipment Shed (40 ft x 60 ft, 1 story)
9.	Construction / Demolition	Construction of Radomes (3 @ 62 ft diameter, 5 stories)
10.	Personnel	Maintenance and operation activities
11.	Construction / Demolition	Installation of grounding well (1 square foot, 1000 feet deep)

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Location
County: Bernalillo
Regulatory Area(s): Albuquerque, NM

- Activity Title: Site Grading – Onsite (12 acres with offsite disposal of 19,360 cubic yds)

- Activity Description:
12 acres on the site will be graded / cleared of scrub vegatation will be removed to a depth of 1 foot. Assumed a total material yield of 19,360 cubic yds and that all material will be disposed of off-site.

- Activity Start Date
Start Month: 10
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.235628
SO_x	0.004132
NO_x	1.434265
CO	1.336363
PM 10	13.025037

Pollutant	Total Emissions (TONs)
PM 2.5	0.052981
Pb	0.000000
NH_3	0.001981
CO_2e	421.4

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 2
Number of Days: 15

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 522720
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 19360

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day

Excavators Composite	1	8
Graders Composite	1	8
Off-Highway Trucks Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Scrapers Composite	2	8
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20

Average Hauling Truck Round Trip Commute (mile): 40

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 40

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0614	0.0013	0.2820	0.5096	0.0117	0.0117	0.0055	119.71
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Off-Highway Trucks Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1243	0.0026	0.5880	0.5421	0.0188	0.0188	0.0112	260.35
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1640	0.0026	1.0170	0.7431	0.0406	0.0406	0.0148	262.85
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.309	000.002	000.239	003.421	000.007	000.006		000.023	00318.896
LDGT	000.374	000.003	000.418	004.700	000.009	000.008		000.024	00411.188
HDGV	000.696	000.005	001.076	015.187	000.021	000.019		000.044	00758.535
LDDV	000.115	000.003	000.139	002.492	000.004	000.004		000.008	00309.094

LDDT	000.250	000.004	000.394	004.238	000.007	000.006		000.008	00438.938
HDDV	000.572	000.013	005.669	001.917	000.170	000.156		000.030	01506.304
MC	002.734	000.003	000.845	013.302	000.027	000.023		000.055	00396.858

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): Albuquerque, NM

- Activity Title: Foundation Excavation and Concrete Apron Construction

- Activity Description:
Soil will be removed to allow foundation construction for each of the four concrete pads and the equipment shelter. For each foundation, an area of 100' by 100' will be excavated to a depth of 4 feet. Assumed a total material yield of 4,169 cubic yards and that all material will be disposed of off-site.

Five concrete aprons will then be constructed, four for the antennas and one for the equipment shelter. Each apron will be 100 feet by 100 feet by 6 inches deep. All material will be hauled offsite.

- Activity Start Date
Start Month: 10
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.071910
SO_x	0.001232
NO_x	0.455078
CO	0.427770
PM 10	1.257991

Pollutant	Total Emissions (TONs)
PM 2.5	0.017007
Pb	0.000000
NH_3	0.000729
CO_2e	126.4

3.1 Site Grading Phase

3.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 2

Number of Days: 15

3.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft^2): 50000
Amount of Material to be Hauled On-Site (yd^3): 925
Amount of Material to be Hauled Off-Site (yd^3): 4169

- Site Grading Default Settings

Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 15
Average Hauling Truck Round Trip Commute (mile): 40

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 40

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e

LDGV	000.309	000.002	000.239	003.421	000.007	000.006		000.023	00318.896
LDGT	000.374	000.003	000.418	004.700	000.009	000.008		000.024	00411.188
HDGV	000.696	000.005	001.076	015.187	000.021	000.019		000.044	00758.535
LDDV	000.115	000.003	000.139	002.492	000.004	000.004		000.008	00309.094
LDDT	000.250	000.004	000.394	004.238	000.007	000.006		000.008	00438.938
HDDV	000.572	000.013	005.669	001.917	000.170	000.156		000.030	01506.304
MC	002.734	000.003	000.845	013.302	000.027	000.023		000.055	00396.858

3.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): Albuquerque, NM

- Activity Title: Utility Trenching – Electric (2 miles, 3 ft deep)

- Activity Description:
To supply electricity to the site, it is assumed that 2 miles of underground electrical line will be installed and that the excavation depth will be 3 feet. No material will be hauled off site.

- Activity Start Date
Start Month: 10
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.052561
SO_x	0.001017
NO_x	0.257511
CO	0.413427
PM 10	0.744141

Pollutant	Total Emissions (TONs)
PM 2.5	0.009931
Pb	0.000000
NH_3	0.000262
CO_2e	96.7

4.1 Trenching/Excavating Phase

4.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 2

Number of Days: 10

4.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft^2): 31680
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings

Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 40

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 40

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.604	000.007	000.679	005.119	000.013	000.012		000.033	00365.157
LDGT	000.784	000.010	001.171	008.128	000.015	000.013		000.034	00488.008
HDGV	001.315	000.015	003.118	025.189	000.035	000.031		000.045	00760.452
LDDV	000.249	000.003	000.329	003.517	000.007	000.006		000.008	00371.991
LDDT	000.550	000.005	000.880	007.137	000.008	000.008		000.008	00579.910
HDDV	000.934	000.014	009.704	002.987	000.373	000.344		000.031	01586.560
MC	002.847	000.008	000.870	014.993	000.028	000.025		000.051	00396.071

4.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5. Emergency Generator

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bernalillo
Regulatory Area(s): Albuquerque, NM

- Activity Title: Emergency Generators (2 @ 750 kW each)

- Activity Description:
2, 750kVa (750 kW) emergency generators will be installed. Both will burn ultra-low sulfur diesel fuel. Assumed that generator engines will produce 1,100 hp each and that each unit will operate an average of 30 minutes per month.

- Activity Start Date
Start Month: 10
Start Year: 2024

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.004726
SO_x	0.000083
NO_x	0.170940
CO	0.045408
PM 10	0.005339

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005339
Pb	0.000000
NH_3	0.000000
CO_2e	8.8

5.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 2

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 1100
Average Operating Hours Per Year (hours): 6

5.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.000716	0.0000125	0.0259	0.00688	0.000809	0.000809			1.33

5.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
$AE_{POL} = (NGEN * HP * OT * EF_{POL}) / 2000$

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): Albuquerque, NM

- Activity Title: Utility Trenching – Water (500 feet, 3 ft deep)

- Activity Description:
To supply water to the site, 500 feet of underground water line will be installed at a depth of 3 feet along Pennsyvlania Street. No material will be hauled off site.

- Activity Start Date
Start Month: 10
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.052561
SO_x	0.001017
NO_x	0.257511
CO	0.413427
PM 10	0.044705

Pollutant	Total Emissions (TONs)
PM 2.5	0.009931
Pb	0.000000
NH_3	0.000262
CO_2e	96.7

6.1 Trenching/Excavating Phase

6.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 2
Number of Days: 10

6.1.2 Trenching / Excavating Phase Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft^2): 1500
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings

Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 40

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 40

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.604	000.007	000.679	005.119	000.013	000.012		000.033	00365.157
LDGT	000.784	000.010	001.171	008.128	000.015	000.013		000.034	00488.008
HDGV	001.315	000.015	003.118	025.189	000.035	000.031		000.045	00760.452
LDDV	000.249	000.003	000.329	003.517	000.007	000.006		000.008	00371.991
LDDT	000.550	000.005	000.880	007.137	000.008	000.008		000.008	00579.910
HDDV	000.934	000.014	009.704	002.987	000.373	000.344		000.031	01586.560
MC	002.847	000.008	000.870	014.993	000.028	000.025		000.051	00396.071

6.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Regulatory Area(s): Albuquerque, NM

- Activity Title: Utility Trenching – Communications (2 miles, 3 ft deep)

- Activity Description:
To supply communications infrastructure to the site, assume 2 miles of underground communication line will be installed at a depth of 3 feet. No material will be hauled off site.

- Activity Start Date
Start Month: 10
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.052561
SO_x	0.001017
NO_x	0.257511
CO	0.413427
PM 10	0.377042

Pollutant	Total Emissions (TONs)
PM 2.5	0.009931
Pb	0.000000
NH_3	0.000262
CO_2e	96.7

7.1 Trenching/Excavating Phase

7.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 2
Number of Days: 10

7.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 15840
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20

Average Hauling Truck Round Trip Commute (mile): 40

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 40

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.604	000.007	000.679	005.119	000.013	000.012		000.033	00365.157
LDGT	000.784	000.010	001.171	008.128	000.015	000.013		000.034	00488.008
HDGV	001.315	000.015	003.118	025.189	000.035	000.031		000.045	00760.452
LDDV	000.249	000.003	000.329	003.517	000.007	000.006		000.008	00371.991
LDDT	000.550	000.005	000.880	007.137	000.008	000.008		000.008	00579.910
HDDV	000.934	000.014	009.704	002.987	000.373	000.344		000.031	01586.560
MC	002.847	000.008	000.870	014.993	000.028	000.025		000.051	00396.071

7.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): Albuquerque, NM

- Activity Title: Construction of Equipment Shed (40 ft x 60 ft, 1 story)

- Activity Description:
An equipment shed will be installed. Dimensions of the equipment shed will be 40 ft by 60 ft. The building was assumed to be 1 story tall.

- Activity Start Date
Start Month: 6
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 8

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End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.057621
SO_x	0.000566
NO_x	0.143175
CO	0.254076
PM 10	0.004728

Pollutant	Total Emissions (TONs)
PM 2.5	0.004699
Pb	0.000000
NH_3	0.000334
CO_2e	55.5

8.1 Building Construction Phase

8.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 20

8.1.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 2400
Height of Building (ft): 14
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 40

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 40

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC

POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 100

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

8.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.309	000.002	000.239	003.421	000.007	000.006		000.023	00318.896
LDGT	000.374	000.003	000.418	004.700	000.009	000.008		000.024	00411.188
HDGV	000.696	000.005	001.076	015.187	000.021	000.019		000.044	00758.535
LDDV	000.115	000.003	000.139	002.492	000.004	000.004		000.008	00309.094
LDDT	000.250	000.004	000.394	004.238	000.007	000.006		000.008	00438.938
HDDV	000.572	000.013	005.669	001.917	000.170	000.156		000.030	01506.304
MC	002.734	000.003	000.845	013.302	000.027	000.023		000.055	00396.858

8.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.2 Architectural Coatings Phase

8.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2

Number of Days: 20

8.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 2400
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Worker Trips
Average Worker Round Trip Commute (mile): 40

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.309	000.002	000.239	003.421	000.007	000.006		000.023	00318.896
LDGT	000.374	000.003	000.418	004.700	000.009	000.008		000.024	00411.188
HDGV	000.696	000.005	001.076	015.187	000.021	000.019		000.044	00758.535
LDDV	000.115	000.003	000.139	002.492	000.004	000.004		000.008	00309.094
LDDT	000.250	000.004	000.394	004.238	000.007	000.006		000.008	00438.938
HDDV	000.572	000.013	005.669	001.917	000.170	000.156		000.030	01506.304
MC	002.734	000.003	000.845	013.302	000.027	000.023		000.055	00396.858

8.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

9. Construction / Demolition

9.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): Albuquerque, NM

- Activity Title: Construction of Radomes (3 @ 62 ft diameter, 5 stories)

- Activity Description:
Three radomes will be installed. The dimensions of each radome is 62 feet in diameter and 72 feet in height.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.154888
SO_x	0.000990
NO_x	0.301491
CO	0.362238
PM 10	0.009584

Pollutant	Total Emissions (TONs)
PM 2.5	0.009245
Pb	0.000000
NH_3	0.001081
CO_2e	102.2

9.1 Building Construction Phase

9.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 10

9.1.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial

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Area of Building (ft^2): 9056
Height of Building (ft): 72
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 40

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 40

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 100

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

9.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.309	000.002	000.239	003.421	000.007	000.006		000.023	00318.896
LDGT	000.374	000.003	000.418	004.700	000.009	000.008		000.024	00411.188
HDGV	000.696	000.005	001.076	015.187	000.021	000.019		000.044	00758.535

LDDV	000.115	000.003	000.139	002.492	000.004	000.004		000.008	00309.094
LDDT	000.250	000.004	000.394	004.238	000.007	000.006		000.008	00438.938
HDDV	000.572	000.013	005.669	001.917	000.170	000.156		000.030	01506.304
MC	002.734	000.003	000.845	013.302	000.027	000.023		000.055	00396.858

9.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

9.2 Architectural Coatings Phase

9.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 10

9.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 9056
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Worker Trips
Average Worker Round Trip Commute (mile): 40

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.309	000.002	000.239	003.421	000.007	000.006		000.023	00318.896
LDGT	000.374	000.003	000.418	004.700	000.009	000.008		000.024	00411.188
HDGV	000.696	000.005	001.076	015.187	000.021	000.019		000.044	00758.535
LDDV	000.115	000.003	000.139	002.492	000.004	000.004		000.008	00309.094

LDDT	000.250	000.004	000.394	004.238	000.007	000.006		000.008	00438.938
HDDV	000.572	000.013	005.669	001.917	000.170	000.156		000.030	01506.304
MC	002.734	000.003	000.845	013.302	000.027	000.023		000.055	00396.858

9.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

10. Personnel

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bernalillo
Regulatory Area(s): Albuquerque, NM

- Activity Title: Maintenance and operation activities

- Activity Description:
The GT facility will be operated remotely, with no personnel required on-site. It is estimated that 60 person-visits per year will be required for operation and maintenance activities.

- Activity Start Date
Start Month: 10
Start Year: 2024

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- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.000521
SO_x	0.000003
NO_x	0.000475
CO	0.005797
PM 10	0.000011

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000010
Pb	0.000000
NH_3	0.000032
CO_2e	0.5

10.2 Personnel Assumptions

- Number of Personnel
Active Duty Personnel: 0
Civilian Personnel: 0
Support Contractor Personnel: 1
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: No

- Average Personnel Round Trip Commute (mile): 20

- Personnel Work Schedule
Active Duty Personnel: 1 Days Per Month
Civilian Personnel: 1 Days Per Month
Support Contractor Personnel: 5 Days Per Month
Air National Guard (ANG) Personnel: 1 Days Per Month
Reserve Personnel: 1 Days Per Month

10.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

10.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.309	000.002	000.239	003.421	000.007	000.006		000.023	00318.896
LDGT	000.374	000.003	000.418	004.700	000.009	000.008		000.024	00411.188
HDGV	000.696	000.005	001.076	015.187	000.021	000.019		000.044	00758.535
LDDV	000.115	000.003	000.139	002.492	000.004	000.004		000.008	00309.094
LDDT	000.250	000.004	000.394	004.238	000.007	000.006		000.008	00438.938
HDDV	000.572	000.013	005.669	001.917	000.170	000.156		000.030	01506.304
MC	002.734	000.003	000.845	013.302	000.027	000.023		000.055	00396.858

10.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year
$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)
NP: Number of Personnel
WD: Work Days per Year
AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year
$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)
VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)
VMT_C: Civilian Personnel Vehicle Miles Travel (miles)
VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)
VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)
VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year
$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{Total}: Total Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Personnel On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11. Construction / Demolition

11.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): Albuquerque, NM

- Activity Title: Installation of grounding well (1 square foot, 1000 feet deep)

- Activity Description:
To prevent a build-up of electrical voltages, a grounding well will be installed at the site. The dimensions of the grounding well is 1 square foot in area and a depth of 1000 feet. It is assumed all material will be hauled off-site.

- Activity Start Date
Start Month: 10
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)

Pollutant	Total Emissions (TONs)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

VOC	0.056326
SO_x	0.001090
NO_x	0.276194
CO	0.442836
PM 10	0.010684

PM 2.5	0.010646
Pb	0.000000
NH_3	0.000283
CO_2e	103.6

11.1 Trenching/Excavating Phase

11.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 2
Number of Days: 15

11.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 37

- Trenching Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 40

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 40

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.604	000.007	000.679	005.119	000.013	000.012		000.033	00365.157
LDGT	000.784	000.010	001.171	008.128	000.015	000.013		000.034	00488.008
HDGV	001.315	000.015	003.118	025.189	000.035	000.031		000.045	00760.452
LDDV	000.249	000.003	000.329	003.517	000.007	000.006		000.008	00371.991
LDDT	000.550	000.005	000.880	007.137	000.008	000.008		000.008	00579.910
HDDV	000.934	000.014	009.704	002.987	000.373	000.344		000.031	01586.560
MC	002.847	000.008	000.870	014.993	000.028	000.025		000.051	00396.071

11.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons