Final

Environmental Assessment Addressing the High-Powered Electromagnetic Laboratory at The Air Force Research Laboratory at Kirtland Air Force Base, New Mexico

November 2019

This page intentionally left blank.

FINDING OF NO SIGNIFICANT IMPACT (FONSI)
FOR THE
ENVIRONMENTAL ASSESSMENT
ADDRESSING THE HIGH-POWERED ELECTROMAGNETIC LABORATORY AT THE AIR FORCE RESEARCH LABORATORY AT KIRTLAND AIR FORCE BASE, NEW MEXICO

Pursuant to provisions of the National Environmental Policy Act, 42 United States Code §§ 4321 to 4347, as amended; implementing Council on Environmental Quality Regulations, 40 Code of Federal Regulations (CFR) §§ 1500–1508; and 32 CFR § 989, Environmental Impact Analysis Process, the United States Air Force (USAF) prepared an Environmental Assessment (EA) to Address the proposed construction a modern, flexible High-Powered Electromagnetic (HPEM) laboratory space for development of advanced High-Power Microwave (HPM) systems and High Energy Density Physics (HEDP) research, as operated by the Air Force Research Laboratory (AFRL) Directed Energy Directorate, High-Powered Electromagnetics Division at Kirtland Air Force Base (AFB), Bernalillo County, New Mexico.

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

This EA analyzes the potential impacts of the Proposed Action and the No Action Alternative, and also considers cumulative environmental impacts with other projects within the Region of Influence.

PROPOSED ACTION (EA § 2.1, page 2-1)

The USAF proposes to construct a modern, flexible HPEM laboratory space for development of advanced HPM systems and HEDP research, as operated by AFRL at Kirtland AFB. Currently, AFRL conducts HPEM research in all or part of seventeen facilities that, on average, exceed 50 years in age and feature neither the infrastructure necessary for modern laboratories nor the space required for the research and development of planned technologies. Additionally, the inefficiencies created by having operations divided amongst fifteen geographically separated facilities – in some cases by up to several miles – create hurdles that negatively impact the AFRL mission and potentially compromises the security of sensitive research projects.

The Proposed Action would include construction of a 48,000 ft^2 addition to the north side of Building 323 as well as renovation of 19,970 ft^2 of existing laboratory space in Buildings 322 and 323. These efforts would be undertaken to modernize, expand, and consolidate operations. In order to create footprint offsets for the USAF to adhere with the Office of Management and Budget (OMB) Freeze the Footprint and Reduce the Footprint initiatives, several existing AFRL facilities at Kirtland AFB would need to be demolished or divested. Per USAF implementation of OMB policies, any new construction must be offset by demolition or divestment of other owned properties in an amount to exceed the footprint of the new construction.

NO ACTION ALTERNATIVE (EA § 2.3, page 2-4)

The No Action Alternative was analyzed to provide a baseline of the existing environmental, social, and economic conditions the Proposed Action was compared against. Under the No Action Alternative, the construction and demolition activities described in the Proposed Action would not occur. AFRL would continue to utilize existing facilities for research and development activities but would not be able to meet all USAF requirements, potentially resulting in future defense projects being delayed or cancelled.

SUMMARY OF FINDINGS

Based on the scope of the Proposed Action, the following environmental resource areas were eliminated from detailed analysis: airspace management, land use, visual resources, biological resources, infrastructure, socioeconomics, and environmental justice and sensitive receptors **(EA § 3.0, pages 3-1 to 3-2)**. Under the Proposed Action, none of the activities would result in a change to current airspace types, flight activities, or training, and no changes to current aircraft operations would occur. The proposed activities would not result in a change in current land use designations or adversely affect the existing visual landscape. The Proposed Action would not result in impacts on biological resources as no wildlife species or habitats are known to exist at the project sites and no threatened, endangered, or state listed species reside in the region. No changes in infrastructure would be necessary as overall power consumption and other utility usage at AFRL would remain unchanged by the Proposed Action. No impacts to socioeconomics are expected as the Proposed Action would result in no change in the number of personnel employed by AFRL. All impacted sites described in the Proposed Action have been previously disturbed by construction and are located within the installation boundary of Kirtland AFB, so no disproportionately high environmental or adverse human health impacts to minority, low-income, or child populations would occur.

Noise (EA § 3.1, pages 3-2 to 3-7). The Proposed Action would result in short-term negligible to minor adverse impacts on noise during construction and demolition activities. The nearest sensitive receptors would be the Kirtland Elementary School and the Raymond G. Murphy VA Medical Center. All other facilities identified in the Proposed Action are at least several miles from the nearest sensitive receptor. Activities would be audible at these locations, but due to the distances involved the loudness would generally be comparable to that of a running air conditioner.

Air Quality (EA § 3.2, pages 3-7 to 3-11). The Proposed Action would result in a short-term, minor adverse impact on air quality during construction and demolition operations. Emissions of criteria pollutants and greenhouse gasses would be directly produced from activities such as operation of heavy equipment, heavy duty diesel vehicles hauling debris to and from the project area, and workers commuting daily to and from the project areas in their personal vehicles. As shown in Table 3-4 of the EA, expected air emissions from the Proposed Action are well below the 100 ton per year threshold and are spread over an expected project duration of approximately two years. As the Proposed Action will disturb an area greater than 0.75-acres a fugitive dust control permit from the Albuquerque Environmental Health Department, Air Quality Division would be obtained to control particulate matter generated from disturbed soils. Each permit would include site-specific measures for dust control and suppression such as watering and the use of soil stabilization agents as necessary.

Geological Resources (EA § 3.3, pages 3-11 to 3-15). Implementation of the Proposed Action would result in negligible to minor adverse impacts to geology, topography, and soil resources dependent on the final design of proposed construction activities and soil surveys prior to construction. Negligible adverse impacts on geology and topography would be expected when removing old footings and utilities during demolition and digging for new footings, piers, and utilities for new construction. The areas around the work sites would be returned to the natural topography upon project completion, including backfill, compression, and grading after removal of subsurface facility features.

As the land disturbance of this project will exceed one acre in size it must adhere to the 2017 Construction General Permit (CGP). Coverage under the CGP would require the preparation and implementation of site-specific Storm Water Pollution Prevention Plans to minimize potential adverse impacts during construction. Upon completion of site operations long-term erosion and

soil compaction would be controlled by employing soil stabilization techniques, such as re-vegetating graded areas.

Water Resources (EA § 3.4, pages 3-16 to 3-21). The Proposed Action would result in short-term, minor adverse impacts to groundwater and surface water. The project areas are not impacted by the 100-year floodplain so no impact is expected.

Short-term, minor, adverse impacts would be expected during construction and demolition activities due to ground disturbances that are inherently part of grading, excavating, and other uses of heavy equipment. These soil disturbances could lead to increased surface water runoff during rainfall events and causing increased sediment transportation that could be transferred to ground water resources or drainage ditches. Additional contamination is possible by leaking heavy equipment (fuels, oils, etc.) Best practices and planning during construction and demolition activities would minimize this impact by controlling the movement of surface water runoff and ensuring no direct access to ground water recharge points. Drainage control measures can include utilizing temporary construction of barriers such as fiber logs or silt fences and would be placed based on site-specific evaluations on an as-needed basis. Spill kits would be available to control spills of any hazardous material. Additionally, construction areas of at least one acre must adhere to specific requirements under the Kirtland AFB CGP and are subject to inspections by base personnel to ensure compliance.

Cultural Resources (EA § 3.5, pages 3-21 to 3-25). Implementation of the Proposed Action at Kirtland AFB would result in long-term, significant, adverse impacts to architectural properties but would have no impact on archaeological or traditional cultural properties. Several facilities identified for demolition are eligible for inclusion on the National Register of Historic Places. Additionally, some facilities are located in the 34th Air Division Historic District in the 900-compound. However, through coordination with the State Historic Preservation Officer, impacts can be reduced by completing an Historic American Building Survey (HABS) and Historic American Engineering Record (HAER) for each affected facility. This includes, at a minimum, large-format photography and measurements of each facility, archival document production, and lifetime storage for all documentation. Upon completion of HABS/HAER documentation for each impacted facility, and through a memorandum of agreement with the SHPO, impacts to historic properties would be reduced to negligible.

Hazardous Materials and Wastes (EA § 3.6, pages 3-25 to 3-30). Short-term, negligible to minor, adverse impacts on hazardous materials and hazardous wastes would occur during construction and demolition activities associated with the Proposed Action, and long-term beneficial impacts could be realized from removal of toxic materials such as asbestos and lead.

Adverse impacts on hazardous materials and hazardous wastes would occur through use of a variety of hazardous materials and petroleum products required by workers during implementation of the Proposed Action. Negligible amounts of hazardous wastes would be generated from these processes. Contractors would be required to adhere to all federal, state and local regulations, to include those instituted by Kirtland AFB.

Toxic hazards would occur during demolition processes as structures containing lead-based paint, asbestos containing materials (ACM), and polychlorinated biphenyls are likely to be encountered. Surveys would be performed by certified personnel to determine the extent of such materials prior to demolition. Plans would be generated based on the results of the exploratory surveys to identify any areas where controls may be necessary to reduce the hazard to workers and prevent the release of toxic materials from the site. If abatement of ACM is anticipated to exceed 75,000 ft^3 Albuquerque Environmental Health Department-Air Quality Division would be

notified. All hazardous debris would be disposed of at a United States Environmental Protection Agency-approved facility. Disturbances of this material would constitute a short-term minor adverse impact; however, once removed and disposed of a long-term beneficial impact would be expected.

Safety (EA § 3.7, pages 3-30 to 3-32). Implementation of the Proposed Action would result in short-term, negligible, adverse impacts on the safety of contractors working at the construction and demolition project areas. The company performing the work would be required to develop a comprehensive health and safety plan detailing all potential hazards and site-specific guidance to ensure potential safety risks are minimized. Contracted personnel would be responsible for compliance with applicable federal, state, and local safety regulations and would be educated though daily safety briefings to review upcoming work activities and associated hazards.

Cumulative Impacts (EA § 4.0, pages 4-1 to 4-10). USAF has concluded that no significant adverse cumulative impacts would result from activities associated with implementation of the Proposed Action when considered with past, present, and reasonably foreseeable future projects at Kirtland AFB and the region of influence.

CONCLUSION

Based on the description of the Proposed Action as set forth in the EA, all activities were found to comply with the criteria or standards of environmental quality and were coordinated with the appropriate federal, state, and local agencies. The attached EA and this FONSI were made available to the public for a 15-day review period. Agencies have been coordinated with throughout the EA development process and their comments were incorporated into the analysis of potential environmental impacts performed as part of the EA as appropriate.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and analyses contained in the attached EA, conducted under the provisions of National Environmental Policy Act, Council on Environmental Quality Regulations, and 32 CFR § 989, I conclude that the Proposed Action would not have a significant environmental impact, either by itself or cumulatively, with other known projects. Accordingly, an Environmental Impact Statement is not required. The signing of this Finding of No Significant Impact completes the environmental impact analysis process.

DAVID S. MILLER, Colonel, USAF
Commander, 377th Air Base Wing

25 Oct 19
Date

Attachment: *Environmental Assessment Addressing the High-Powered Electromagnetic Laboratory at the Air Force Research Laboratory, Kirtland Air Force Base, New Mexico*

COVER SHEET

FINAL ENVIRONMENTAL ASSESSMENT ADDRESSING THE HIGH-POWERED ELECTROMAGNETIC LABORATORY AT THE AIR FORCE RESEARCH LABORATORY AT KIRTLAND AIR FORCE BASE, NEW MEXICO

Responsible Agencies: United States Air Force (USAF), Air Force Global Strike Command, 377th Air Base Wing.

USAF, Air Force Materiel Command, Air Force Research Laboratory (AFRL)

Affected Location: Kirtland Air Force Base (AFB), New Mexico.

Report Designation: Environmental Assessment (EA).

Abstract: This EA was developed in compliance with USAF's *Environmental Impact Analysis Process* in support of constructing a modern, flexible High-Powered Electromagnetic (HPEM) laboratory space for development of advanced High-Power Microwave systems and High Energy Density Physics research, as operated by the AFRL Directed Energy Directorate, High-Powered Electromagnetics Division. The Proposed Action would include construction of a 48,000 ft^2 addition to the north side of Building 323 and renovation of 19,970 ft^2 of existing laboratory space in Buildings 322 and 323. This project would also include removal of several other facilities to meet USAF space requirements and consolidate all current HPEM operations in the new and renovated facilities. This laboratory is essential for research and development of new technologies in support of national defense.

Currently, AFRL undergoes HPEM research at all or part of nineteen aging facilities located at Kirtland AFB that largely lack the infrastructure required for modern laboratories. While some of these facilities are collocated, others are geographically separated by several miles, requiring personnel to frequently travel to conduct mission related activities.

Under the No Action Alternative, the USAF would take no action, and no construction or renovations would occur. The AFRL would continue to use existing facilities and lease additional space from both Sandia National Laboratories and Kirtland AFB to support their mission. Research benefitting future weapons systems would be limited to what current facilities could support.

This EA analyzes the potential environmental impacts associated with the Proposed Action and the No Action Alternative, and aids in determining if an Environmental Impact Statement is required or if another decision document, such as a Finding Of No Significant Impact, is appropriate.

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, Suite 116, Kirtland AFB, New Mexico 87117-5270, or via email to kirtlandNEPA@us.af.mil.

This page intentionally left blank.

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

ABCWUA	Albuquerque-Bernalillo County Water Utility Authority
ABW	Air Base Wing
ACAM	Air Conformity Applicability Model
ACM	asbestos-containing material
ACP	Architectural Compatibility Plan
AEHD-AQD	Albuquerque Environmental Health Department Air Quality Division
AFB	Air Force Base
AFI	Air Force Instruction
AFR	Albuquerque Fire Rescue
AFRL	Air Force Research Laboratory
AFWL	Air Force Weapons Laboratory
AMAFCA	Albuquerque Metropolitan Arroyo Flood Control Authority
AMRGI	Albuquerque-Mid Rio Grande Intrastate
APE	Area of Potential Effect
AQCR	Air Quality Control Region
ARPA	Archaeological Resources Protection Act
BIA	Bureau of Indian Affairs
BMP	best management practice
CAA	Clean Air Act
CEIEC	Civil Engineering Installation Management – Environmental Management – Compliance
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGP	Construction General Permit
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
CRM	Cultural Resources Manager
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
DNL	day/night sound level
DOD	Department of Defense
DOE	Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EISA	Energy Independence Security Act
EMF	Electromagnetic Field
EMP	Electromagnetic Pulse
EMS	Environmental Management System
EO	Executive Order
ER	Environmental Restoration
ERP	Environmental Restoration Program
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FTF	Freeze the Footprint
GHG	greenhouse gas
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HEDP	High Energy Density Physics
HPEM	High-Powered Electromagnetic
HPM	High-Power Microwave
HWMP	Hazardous Waste Management Plan
I	Interstate
ICRMP	Integrated Cultural Resources Management Plan
IDP	Installation Development Plan
LBP	lead-based paint
LID	Low Impact Design
L_{max}	maximum sound level
MMRP	Military Munitions Response Program
MRCOG	Mid-Region Council of Governments
MS4	Municipal Separate Storm Sewer System
MSG	Mission Support Group
MSGP	Multi-Sector General Permit
NAAQS	National Ambient Air Quality Standards
NAGPRA	North American Graves and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMAC	New Mexico Administrative Code
NMDOT	New Mexico Department of Transportation

ACRONYMS AND ABBREVIATIONS (CONTINUED)

NMED	New Mexico Environment Department
NMSA	New Mexico Statutes Annotated
NO_2	nitrogen dioxide
NOA	Notice of Availability
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
O_3	ozone
OMB	Office of Management and Budget
OSH	occupational safety and health
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PERCHA	Prescribed Endemic Refuge Connected Habitat Area
PJ/CRO	Pararescue/Combat Rescue Officer
$PM_{2.5}$	particulate matter less than 2.5 microns
PM_{10}	particulate matter less than 10 microns
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
RDH	AFRL High-Powered Electromagnetics Division
RDT&E	Research, Development, Testing, and Evaluation
RHS	RED HORSE Squadron
RTF	Reduce the Footprint
RTI	Regional Training Institute
SAR	Small Arms Range
SDS	Safety Data Sheet
SDWA	Safe Drinking Water Act
SFG	Security Forces Group
SHPO	State Historic Preservation Officer
SNL	Sandia National Laboratories
SO_2	sulfur dioxide
SO_x	sulfur oxides
SWPPP	Stormwater Pollution Prevention Plan
TEAMS	Technical Evaluation Assessment Monitor Site
TCLP	toxicity characteristic leaching procedure
tpy	tons per year
US	United States
USACE	US Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USDA	United States Department of Agriculture
USEPA	US Environmental Protection Agency
USFS	United States Forest Service
USFWS	US Fish and Wildlife Service
USGS	United States Geological Survey
UTC	Urban Training Compound
UXO	unexploded ordnance
VA	Veteran's Affairs
VOC	volatile organic compound

This page intentionally left blank.

1.0 PURPOSE OF AND NEED FOR THE ACTION

1.1 INTRODUCTION

This section describes the purpose of and need for the construction of a modern, flexible High-Powered Electromagnetic (HPEM) laboratory space for development of advanced High-Power Microwave (HPM) systems and High Energy Density Physics (HEDP) research, as operated by the Air Force Research Laboratory (AFRL) Directed Energy Directorate, High-Powered Electromagnetics Division (RDH). at Kirtland Air Force Base (AFB). This section also provides summaries of the scope of the environmental review process and applicable regulatory requirements, and presents an overview of the organization of the document.

Federal agencies are required to consider the environmental consequences of proposed actions in the decision-making process under the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] § 4321 et seq.) and the Council on Environmental Quality's (CEQ) implementing regulations for NEPA (40 Code of Federal Regulations [CFR] §§ 1500–1508). Kirtland AFB is also required to consider both the United States Air Force (USAF) NEPA-implementing regulation (32 CFR § 989, as amended), and Department of Defense (DOD) Instruction 4715.9, *Environmental Planning Analysis*.

This Environmental Assessment (EA) addresses the construction of modern laboratory space for AFRL at Kirtland AFB and was prepared in accordance with NEPA. This EA considers the potential environmental impacts of not only the construction of a new facility, but also the impacts of renovating two other facilities and the demolition of several more.

1.2 KIRTLAND AIR FORCE BASE OVERVIEW

Kirtland AFB is in Bernalillo County, southeast of the city of Albuquerque, New Mexico (see Figure 1-1: Kirtland AFB Vicinity Map with Land Ownership and Withdrawn Areas). The installation encompasses 51,585 acres with elevations that range from 5,200 to almost 8,000 feet above mean sea level. The Manzanita Mountains on its eastern boundary rise to over 10,000 feet (KAFB, 2018a). The land within the installation is owned by a variety of entities (see Table 1-1). USAF controls 44,052 acres of the land within Kirtland AFB. The northwest portion of Kirtland AFB is developed. The remaining portion of the installation is relatively undeveloped and is used for training and testing missions.

Table 1-1: Kirtland AFB Land Ownership

Kirtland AFB Lands	Acres
USAF Owned	25,612
United States Forest Service (USFS), withdrawn to the DOD	15,891
Bureau of Land Management, withdrawn to the DOD	2,549
Air Force Total	**44,052**
Department of Energy (DOE) Owned	2,938
USFS Withdrawn to DOE	4,595
DOE Total	**7,533**
Grand Total	**51,585**

Source: Kirtland Air Force Base Real Estate Management Existing Facilities (KAFB, 2012)

Surrounding land uses adjacent to Kirtland AFB include the USFS Cibola National Forest to the northeast and east; the Isleta Pueblo Reservation to the south; Bernalillo County developments to the southwest; residential and business areas of the city of Albuquerque to the west and north; and the Albuquerque International Sunport, hereafter referred to as the Sunport, directly to the northwest.

Kirtland AFB was established in the late 1930s as a training installation for the United States (US) Army Air Corps. At that time the installation was known as the Albuquerque Army Air Base. The base grew rapidly with the involvement of the United States in World War II as a training site for aircrews for many of the country's bomber aircraft. In February 1942, Albuquerque Army Air Base was renamed Kirtland Army Air Field in honor of Colonel Roy C. Kirtland, one of the Army's

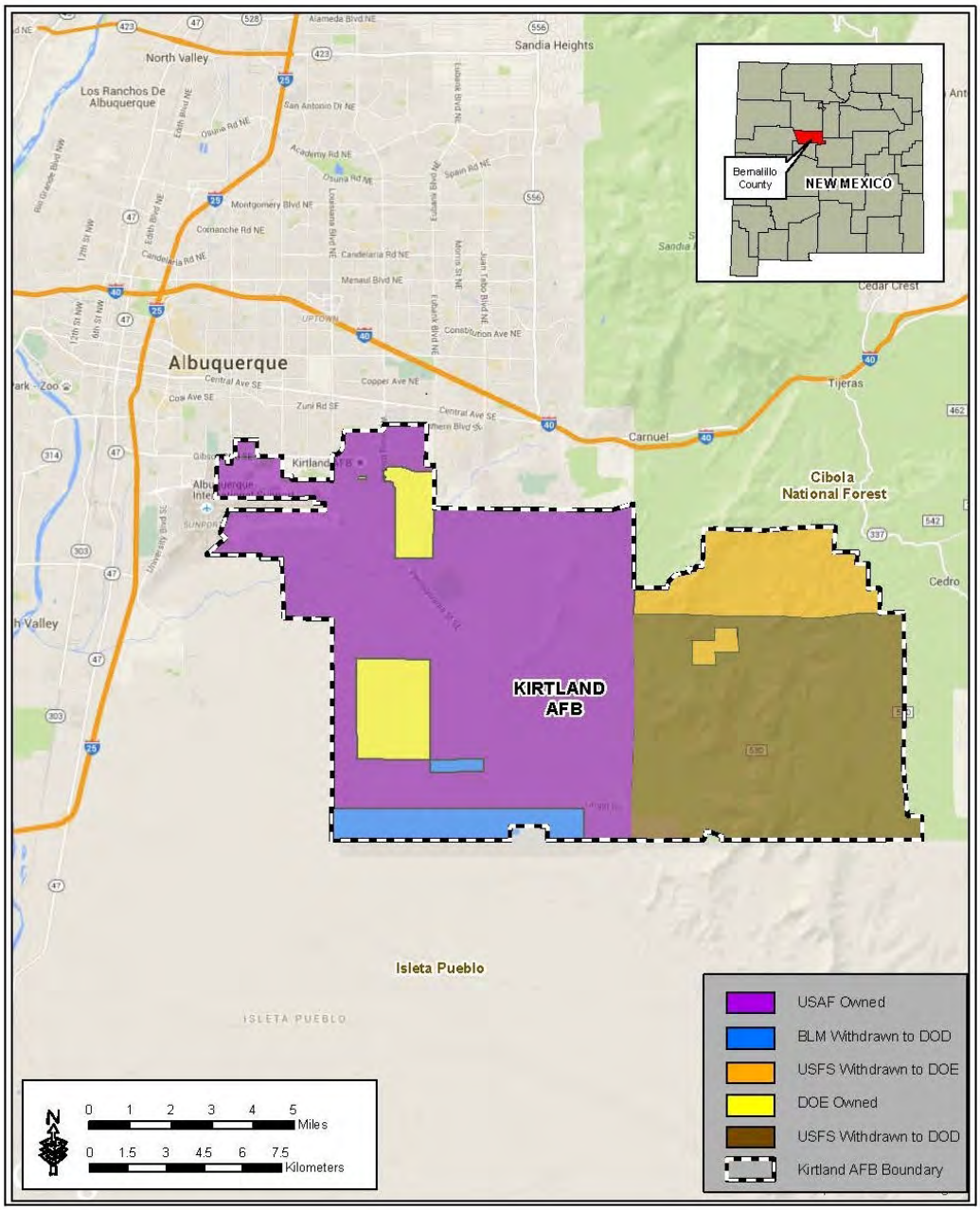


Figure 1-1: Kirtland AFB Vicinity Map with Land Ownership and Withdrawn Areas

earliest aviation pioneers. During this same year, the US Army Air Corps established a training base, later to be known as Sandia Base, just ease of Kirtland Army Air Field. In 1947, the US Army Air Corps became the USAF, and Kirtland Army Air Field was renamed Kirtland AFB.

In 1949, the USAF established its own Special Weapons Center and testing laboratory at Kirtland Field near Sandia Base, which eventually became the Air Force Weapons Laboratory (AFWL) in 1963. This organization became the Phillips Laboratory in 1990, and ultimately became what is now known as AFRL in 1997. A majority of the test and evaluation activities were conducted on a 46,000-acre tract in the Manzanita Mountains, referred to as the New Mexico Proving Ground, on the southern portion of the installation, which includes USFS lands withdrawn for DOD and DOE research, testing, and development activities. The establishment of these activities at Kirtland AFB was considered ideal due to its proximity to the Los Alamos Laboratory and Sandia Base. The late 1940s and 1950s were expansion years as both Kirtland AFB and the adjacent Sandia Army Base played increasing roles in the nation's defense efforts. New buildings, hangars, and the east-west runway, which is now owned by the city of Albuquerque, were constructed. During this period, air defense, weather, and atomic test squadrons operated from Kirtland AFB. In 1971, Kirtland AFB and its adjoining military neighbors to the east, Sandia and Manzano Army Bases, were merged to form what is known as Kirtland AFB.

The late 1940s and 1950s were expansion years as Kirtland AFB and Sandia Base played increasing roles in the nation's defense efforts. New buildings, hangars, and the east-west runway, which is now owned by the City of Albuquerque, were constructed. During this period, air defense, weather, and atomic test squadrons operated from Kirtland AFB, and personnel from both installations took part in 12 nuclear test series conducted by the Atomic Energy Commission in Nevada and the Pacific. In 1958, efforts were underway between the United States and the Soviet Union to agree on a moratorium for atmospheric nuclear testing. The anticipated limitations on determining weapons effects inspired efforts by the Special Weapons Center and Sandia Laboratory to develop methods of simulating nuclear effects with non-nuclear techniques. The Limited Nuclear Test Ban Treaty was signed with the Soviet Union in late 1962, prohibiting nuclear testing in the atmosphere and space, as well as under water.

As atmospheric testing ground to a halt, the AFWL began developing alternative techniques for simulating the effect of nuclear weapons on structures and electronics. Scientists had previously developed the first pulse power system in 1958, and so began extensive testing on electromagnetic pulse (EMP) technology, as well as extended research on the effects of X-ray induced shock and other forms of radiation. Research in nuclear technologies would continue through the 1980's, and eventually be supplemented with additional experimentation in electromagnetic field (EMF) radiation, developing improved systems for identifying objects in flight (such as high-altitude explosives), EMP-proof communication systems, and non-destructive weapons systems (Van Citters & Bisson, 2003). Contemporary research continues exploring various EMF technologies and other directed energy systems for the USAF, with the AFRL as whole becoming of vital importance to the development future weapons systems and defense technologies produced in the United States.

Kirtland AFB is the sixth largest installation in the USAF. It is operated by 377th Air Base Wing (377 ABW), a unit of Air Force Global Strike Command's 20th Air Force and the host unit at Kirtland AFB. Missions at Kirtland AFB fall into four major categories: research, development, and testing; readiness and training; munitions maintenance; and support to installation operations for more than 100 mission partners. The primary mission of 377 ABW is to execute nuclear, readiness, and support operations for American airpower. Kirtland AFB is a center for research, development, and testing of nonconventional weapons, space and missile technology, laser

warfare and much more. Organizations involved in these activities include the Air Force Nuclear Weapons Center, Air Force Operational Test and Evaluation Center, Space and Missile Systems Center, Air Force Inspection Agency, Air Force Safety Center, AFRL, DOE, and Sandia National Laboratories (SNL). In addition, 377 ABW ensures readiness and training of airmen for worldwide duty and operates the airfield for present and future USAF operations, prepares personnel to deploy worldwide on a moment's notice, and keeps the installation secure. Mission partners involved in these activities include the 58th Special Operations Wing, 150th Special Operations Wing (New Mexico Air National Guard), and the USAF Pararescue School.

1.3 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

1.4 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The scope of this EA includes the actions proposed; alternatives considered; a description of the existing environment; and direct, indirect, and cumulative impacts. The scope of the Proposed Action and the range of alternatives to be considered are presented in Section 2.0. The USAF NEPA-implementing regulations, 32 CFR § 989 (as amended), require consideration of the No Action Alternative, which is analyzed to provide the baseline against which the environmental impacts of implementing the range of alternatives addressed can be compared. The EA identifies appropriate measures that are not already included in the Proposed Action or alternatives in order to avoid, minimize, or reduce adverse environmental impacts, if necessary.

This EA identifies the environmental impacts of the Proposed Action and No Action Alternative on affected resource areas. Per CEQ regulations (40 CFR § 1501.7[a][3]), only those resource areas that apply to the Proposed Action and alternatives are analyzed. The following resource areas are analyzed and discussed for potential impacts: Noise, Air Quality, Geological Resources, Water Resources, Cultural Resources, Hazardous Materials and Wastes, and Safety.

1.4.1 NEPA Compliance Requirements

NEPA is a federal law requiring the analysis of potential environmental impacts associated with proposed federal actions before the actions are taken. The intent of NEPA is to make decisions informed by potential environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the CEQ, which is responsible for ensuring federal agency compliance with NEPA. CEQ regulations mandate all federal agencies use a prescribed approach to environmental impact analysis. The approach includes an evaluation of the potential environmental consequences associated with a proposed action and considers alternative courses of action.

The process for implementing NEPA is outlined in 40 CFR §§ 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. These CEQ regulations specify that an EA be prepared to determine whether a Finding of No Significant Impact (FONSI) is appropriate or if preparation of an Environmental Impact Statement (EIS) is necessary. An EA considers the effects (direct, indirect, and cumulative) of a proposed action on the natural and human environment. It uses a systematic, interdisciplinary approach to evaluate a proposed action and possible alternatives and must disclose all considerations to the public. An

EA can aid in an agency's compliance with NEPA when an EIS is unnecessary and facilitate preparation of an EIS when one is required.

USAF regulations under 32 CFR § 989 provide procedures for environmental impact analysis for the USAF to comply with NEPA and CEQ NEPA regulations. Air Force Policy Directive 32-70, *Environmental Quality*, states the USAF will comply with applicable federal, state, and local environmental laws and regulations, including NEPA. If significant impacts are predicted under NEPA, the USAF would decide whether to conduct mitigation to reduce impacts below the level of significance, prepare an EIS, or abandon the Proposed Action. This EA would also be used to guide the USAF in implementing the Proposed Action in a manner consistent with USAF standards for environmental stewardship should the Proposed Action be approved for implementation.

1.4.2 Intergovernmental and Stakeholder Coordination

NEPA requirements help ensure that environmental information is made available to the public during the decision-making process and prior to an action's implementation. A premise of NEPA is that the quality of federal decisions would be enhanced if the public is involved in the planning process. 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 for 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 (NHPA) and implementing regulations (36 CFR Part 800), Section 7 of the Endangered Species Act and implementing regulations (50 CFR Part 17) including the Migratory Bird Treaty Act, findings of effect and a request for concurrence were transmitted to the State Historic Preservation Officer (SHPO) and the U.S. Fish and Wildlife Service (USFWS). A brief summary of comments received is shown below. All correspondence with SHPO and USFWS is included in Appendix A.

- ***SHPO.*** The SHPO requested additional information in order to complete their review. (HPD Log 109892) The requested information was subsequently provided, and coordination will continue throughout this project.

- ***USFWS.*** After review, there is no additional information regarding impacts of the proposed action on the natural environment nor any environmental aspect. See Consultation Code 02ENNM00-2019-SLI-0752 for additional information regarding listed species and critical habitats.

The NHPA requires federal agencies to consult with federally recognized Native American tribes on proposed undertakings that have the potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation or the intergovernmental coordination process, and it requires separate consultation with all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations. The Kirtland AFB point-of-contact for Native American tribes is the Installation Commander. Consultation with the tribes was conducted concurrently with the scoping and Draft EA review periods. The Native American tribal governments coordinated or consulted with regarding the Proposed Action are listed in Appendix A along with all USAF correspondence.

Comments received from the various stakeholders and Native American tribes was considered during preparation of the EA and included in Appendix A.

Scoping letters were provided to relevant federal, state, and local agencies and Native American tribes notifying them that the USAF is preparing an EA to evaluate the AFRL HPEM laboratory space at Kirtland AFB. The agencies and tribes were requested to provide information regarding impacts of the Proposed Action on the natural environment or other environmental aspects that they feel should be included and considered in the preparation of this EA. During the scoping period, the USAF received response from two government agencies (the Bureau of Indian Affairs [BIA] and the United States Department of Agriculture [USDA]), two state agencies (the New Mexico Environment Department [NMED] and Mid-Region Council of Governments [MRCOG]) and two Native American tribes (Comanche Nation and Pawnee Nation of Oklahoma). A brief summary of concerns and comments for each agency and tribe are shown below.

- ***BIA.*** No anticipated impacts or comments on the project. However, ensure Section 106 consultation requirements of the NHPA are met by contacting local Pueblos and Tribes.

- ***USDA.*** As the project areas are not located in lands designated as Prime or Important Farmland this project is not subject to the Farmland Protection Policy Act (FPPA) and no impact is expected.

- ***NMED.*** Comments are broken out by several internal divisions.

    - *Ground Water Quality Bureau:* As domestic wastewater is to be delivered offsite to a municipal or regional wastewater treatment system a permit for the discharge of wastewater will not be required. While the proposed project is not expected to have any adverse impacts on ground water quality, all parties should be aware of notification requirements in the event of a possible contaminant release (e.g., fuel, hydraulic fluid, etc.) associated with equipment malfunctions. (20.6.2.1203 New Mexico Administrative Code [NMAC])

    - *Petroleum Storage Tank Bureau:* The bureau provided several resources and recommendations for determining where current storage tanks and release sites are located in the event they may interfere with the Proposed Action.

    - *Solid Waste Bureau:* Renovation and demolition activities have a high potential to result to result in generation of regulated asbestos waste. This is classified as a special waste and requires several specific steps in order to properly contain, containerize, label, transport, and dispose at a permitted facility.

    - *Surface Water Quality Bureau:* The bureau provided several reminders for storm water management and controls during and post construction.

- ***MRCOG.*** No conflicts with local or regional plans.

- ***Comanche Nation.*** No properties of record have been identified in the project areas.

- ***Pawnee Nation of Oklahoma.*** No concerns or comments regarding this project.

The federal, state, and local agencies and Native American tribal governments coordinated or consulted with regarding the Proposed Action are listed in Appendix A along with all correspondence.

1.4.3 Public and Agency Review of Draft EA

A Notice of Availability (NOA) for the Draft EA was published in *The Albuquerque Journal* on 11 and 12 August, 2019 announcing the availability of the Draft EA beginning 12 August. A copy of the Draft PEA was 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 was also made available for review online at *http://www.kirtland.af.mil* under the Environment Information tab. Letters were provided to relevant federal, state, and local agencies and Native American tribal governments informing them that the Draft EA was available for review (see Appendix A for all stakeholder coordination materials). The publication of the NOA initiated a 30-day comment period.

No comments were received from the general public during the public review period. The USAF received comments from one federal agency (BIA), and three Native American Tribes (Pawnee Nation, White Mountain Apache Tribe, and Ysleta del Sur Pueblo). A brief summary of each comment received is shown below.

- **BIA.** The Proposed Action would not impact and resources under the BIA, but did request KAFB coordinate with local Pueblos and Tribes regarding Section 106 consultation of the NHPA.
    - As Section 106 consultation has been included during each stage of the project no change or addition to this EA was necessary.
- **Pawnee Nation.** The Proposed Action would not adversely affect the cultural landscape of the Pawnee Nation.
- **White Mountain Apache Tribe.** Concurs that the Proposed Action would not have any adverse effects on the White Mountain Apache tribe's historic and/or traditional properties.
- **Ysleta del Sur Pueblo.** No comment on the proposed undertaking and does not have any concern over impacts to traditional, religious, or culturally significant sites of the Pueblo. However, Ysleta del Sur Pueblo requests consultation should any human remains or artifacts be inadvertently discovered that would fall under the North American Graves Protection and Repatriation Act (NAGPRA).
    - Section 3.5.2.1 was revised to ensure clarity on KAFB procedures regarding inadvertent discovery of human remains or artifacts.

Copies of all comment letters received are included in Appendix A.

This page intentionally left blank.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

As discussed in Section 1.4.1, the NEPA process provides for an evaluation of potential environmental consequences associated with a proposed action and considers alternative courses of action. Reasonable alternatives must satisfy the purpose of and need for the Proposed Action, as defined in Section 1.3. In addition, CEQ guidance recommends the inclusion of a No Action alternative against which potential impacts would be compared. While the No Action alternative would not satisfy the purpose of or need for the Proposed Action, it is analyzed in detail in accordance with USAF NEPA-implementing regulations (32 CFR § 989, as amended).

2.1 PROPOSED ACTION

The USAF proposes to construct a modern, flexible HPEM laboratory space for development of advanced HPM systems and HEDP research, as operated by AFRL/RDH. Currently, AFRL conducts HPEM research in all or part of nineteen buildings that, on average, exceed 50 years in age and feature neither the infrastructure necessary for modern laboratories nor the space required for the research and development of planned technologies. Additionally, the inefficiencies created by having operations divided amongst several geographically separated areas – in some cases by up to several miles – creates hurdles that both negatively effects the mission and potentially compromises the security of sensitive research projects.

Figure 2-1: Proposed Action - Construction & Renovation of B322/B323 (Approximated)

As shown in Figure 2-1, the Proposed Action would include construction of a 48,000 ft^2 addition to the north side of Building 323 as well as renovation of 19,970 ft^2 of existing laboratory space in Buildings 322 and 323. These efforts would be undertaken to modernize, expand, and consolidate operations. Laboratory space would be expanded and/or created for a variety of specific tasks, including HPEM equipment setup and development; electrodynamic computation source simulation and visualization; and data analyses.

Table 2-1: Proposed Action - Construction & Renovation

Building Number	Proposed Action	Year Constructed	NRHP Eligibility (Date of SHPO concurrence)	Area (ft^2)
322	Renovation	1972	Eligible (01/05/03)	10,970
323	Renovation	1991	Undetermined[1]	9,000
New	Construction	*n/a*	*n/a*	48,000
			Total:	**67,970**

1. No SHPO concurrence on Building 323 at this time. However, this facility was constructed in 1990's and has neither reached the 50-year age threshold nor was it constructed during the Cold War.
2. All data sourced from AFRL HEPM Lab Facility Planning Charrette Report by the United States Army Corps of Engineers (USACE) (USACE, 2018)

Table 2-2: Proposed Action - Demolition & Divestment

Building Number	Proposed Action	Year Constructed	NRHP Eligibility (Date of SHPO concurrence)	Area (ft^2)
243	Demolition	1970	Eligible (01/05/03)	9,411
324	Demolition	1996	Unevaluated	1,800
326	Demolition	1996	Unevaluated	1,800
430	Demolition	1990	Unevaluated	1,800
906	Demolition	1975	Ineligible (11/04/02)	413
907	Demolition	1970	Ineligible (11/04/02)	1,640
908	Demolition	1968	Ineligible (11/04/02)	432
909	Demolition	1952	Eligible (09/23/02)	30,096
910	Demolition	1952	Eligible (09/23/02)	2,037
911	Demolition	1951	Eligible (09/23/02)	2,737
912	Demolition	1952	Eligible (09/23/02)	823
913	Demolition	1952	Eligible (09/23/02)	835
57003	Demolition	1964	Eligible (03/24/03)	771
57004	Demolition	1963	Eligible (03/24/03	2,000
57012	Demolition	1969	Eligible (03/24/03)	2,076
Total to Demo:				**58,671**
499	Divestment	1955	Ineligible (06/24/13)	6,674
914	Divestment	1971	Eligible (09/23/02)	2,156
Total to Divest:				**8,830**
Total Offset:				**67,501**

1. Footprint data for facilities proposed to be demolished was sourced from Kirtland AFB Real Property Inventory (2016) and the KAFB Master Lists of Building Data spreadsheet
2. Footprint data for facilities proposed to be divested comes from the AFRL HPEM Planning Charrette Report (USACE, 2018)
3. Given the Proposed Action indicates potential construction of 48,000 ft^2 of office/laboratory space the total offset must at least meet this value. As this list is currently not finalized, some listed properties may stay in place provided sufficient footprint offsets remain.

In order to create footprint offsets for the USAF to adhere with the Office of Management and Budget (OMB) *Freeze the Footprint* (FTF), (OMB, 2013) and *Reduce the Footprint* (RTF), (OMB, 2015) initiatives, several existing AFRL facilities at Kirtland AFB would need to be demolished or divested. Per USAF implementation of OMB policies, any new construction must be offset by demolition or divestment of other owned properties in an amount to exceed the footprint of new construction. Facilities potentially affected by the Proposed Action are shown in Table 2-1 andAs shown in Figure 2-1, the Proposed Action would include construction of a 48,000 ft^2 addition to

the north side of Building 323 as well as renovation of 19,970 ft^2 of existing laboratory space in Buildings 322 and 323. These efforts would be undertaken to modernize, expand, and consolidate operations. Laboratory space would be expanded and/or created for a variety of specific tasks, including HPEM equipment setup and development; electrodynamic computation source simulation and visualization; and data analyses.

Table 2-1: Proposed Action - Construction & Renovation

Building Number	Proposed Action	Year Constructed	NRHP Eligibility (Date of SHPO concurrence)	Area (ft^2)
322	Renovation	1972	Eligible (01/05/03)	10,970
323	Renovation	1991	Undetermined[1]	9,000
New	Construction	*n/a*	*n/a*	48,000
			Total:	**67,970**

1. No SHPO concurrence on Building 323 at this time. However, this facility was constructed in 1990's and has neither reached the 50-year age threshold nor was it constructed during the Cold War.
2. All data sourced from AFRL HEPM Lab Facility Planning Charrette Report by the United States Army Corps of Engineers (USACE)

Table 2-2. NHPA Section 106 consultations with the SHPO must be completed prior to any demolition or renovation of facilities eligible for inclusion in the National Register of Historic Places (NRHP). See Section 3.5 for additional information regarding Section 106 consultation.

2.2 SELECTION STANDARDS

In accordance with 32 CFR § 989.8(c), the development of selection standards is an effective mechanism for the identification, comparison, and evaluation of reasonable alternatives. The following selection standards were developed to be consistent with the purpose of and need for the Proposed Action and to address pertinent mission, environmental, safety, and health factors. The following selection standards were used to identify reasonable alternatives for analysis in the EA:

- Meet or exceed current criteria/scope specified in:
    - Air Force Manual 32-1084, *Facility Requirements*
    - USAF Memorandums regarding the OMB FTF and RTF policies
- Meet current and future USAF mission requirements for AFRL/RDH research and development opportunities necessary for future weapons systems and defense programs
- Absence of special environmental considerations:
    - Waters of the US, Section 404 of the Clean Water Act (CWA), which includes ephemeral washes, drainage ditches, intermittent and perennial waterways, and wetlands
    - Proximity to the 100-year Floodplain under EO 11988, *Floodplain Management*
- Avoid impacting environmental resources such as protected plant or animal species, their habitats, and restoration sites
- Result in no other significant adverse impact to the environment

2.3 NO ACTION ALTERNATIVE

Under the No Action Alternative, the construction and demolition activities described in the Proposed Action would not occur. AFRL would continue to utilize existing facilities for research

and development activities but would not be able to meet all USAF requirements, potentially resulting in future defense projects being delayed or cancelled.

The No Action Alternative would not meet the purpose of and need for the Proposed Action as described in Section 1.3; however, the USAF Environmental Impact Analysis Process (32 CFR § 989.8[d]) requires consideration of the No Action Alternative. In addition, CEQ guidance recommends inclusion of the No Action Alternative in an EA to assess any environmental consequences that may occur if the Proposed Action is not implemented. Therefore, this alternative will be carried forward for detailed analysis in the EA. The No Action Alternative also serves as a baseline against which the Proposed Action can be compared.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Alternative site locations were discussed for some of the components of the Proposed Action during the preparatory stages of this EA. However, after considering the purpose of and need for the action and applying the site-selection standards, the sites were not considered viable alternatives.

2.4.1 Split Campus

In the Split Campus Alternative, the USAF would construct a new 48,000 ft^2 laboratory space designed to replace Buildings 243, 324, 326, 430, 906, 907, 908, 909, 910, 911, 912, 913, 57003, 57004, and 57012, which would be demolished to create the necessary footprint offsets. Additionally, this alternative renovates Buildings 322 and 323, and enables AFRL/RDH to vacate space in Buildings 499 and 914. The principal difference between this alternative and the Proposed Action is the newly constructed space and the renovated facilities would be 1.3 miles apart as the new construction would be located in the 900-campus due to space constraints. Were this alternative realized, the HPEM mission would require extensive travel for 90 personnel between the newly constructed space in the AFRL campus and the laboratories in Buildings 322 and 323. Additionally, the RDH Division leadership would be divided between two different campus areas, which could negatively impact oversight and planning functions. Given the elevated security concerns by increased travel, and the research and planning inefficiencies generated by geographical separation, it was decided this alternative would not meet the needs of the USAF mission. Therefore, this alternative will not be carried forward for analysis in the EA.

2.4.2 New Facility

In the New Facility Alternative, the USAF would construct a new 108,100 ft^2 HPEM laboratory, which would replace Buildings 243, 322, 323, 324, 326, 430, 499, 906, 907, 908, 909, 910, 911,912, 913, 914, 57003, 57004, and 57012. The newly constructed space would provide a modern laboratory space where all HPEM functions would be located in one large facility. Due to the large size of the facility it would likely need to be located outside the Research & Development District in the Installation Development Plan (IDP). This alternative would feature many of the same benefits of the Proposed Action, in that all HPEM work would be consolidated in one area of the installation. However, meeting the footprint offsets required by the USAF and OMB for a new facility would be difficult, and may necessitate demolition or divestment of otherwise useful facilities in Buildings 322 and 323. Given the uncertainties of how footprint offsets could be accomplished, and the possibility of such a large facility needing to be located in a remote corner of the installation, it was decided this alternative was not feasible. Therefore, this alternative will not be carried forward for analysis in the EA.

2.5 COMPARATIVE SUMMARY OF IMPACTS

Table 2-3 presents a summary of the anticipated impacts under the two actions that will be assessed in the EA: the Proposed Action and the No Action Alternative. For those resource areas not assessed in detail a descriptive justification is included at the beginning of Chapter 3.0.

Table 2-3: Summary of Potential Impacts

Affected Resource	Proposed Action	No Action Alternative
Noise	The Proposed Action would result in short-term negligible to minor adverse impacts on noise during construction and demolition activities. The nearest sensitive receptors would be the Kirtland Elementary School and the Raymond G. Murphy Veteran's Affairs (VA) Medical Center. All other facilities identified in the Proposed Action are at least several miles from the nearest sensitive receptor. Some construction activities would likely be audible at these receptors, but due to the distances involved the noise would dissipate significantly and would generally be comparable to that of a running air conditioner. Noise would be further attenuated indoors.	Implementation of the No Action Alternative would not result in any new or additional impacts.
Air Quality	The Proposed Action would result in a short-term, minor adverse impact on air quality during construction and demolition operations. Emissions of criteria pollutants and greenhouse gasses would be directly produced from activities such as operation of heavy equipment, heavy duty diesel vehicles hauling debris to and from the project area, and workers commuting daily to and from the project areas in their personal vehicles. Calculated air emissions from the Proposed Action are well below the 100 ton per year threshold and are spread over an expected project duration of approximately two years. As the Proposed Action will disturb an area greater than 0.75-acres a fugitive dust control permit from Bernalillo County would be obtained to control particulate matter generated from disturbed soils. Each permit would include site-specific measures for dust control and suppression such as watering and the use of soil stabilization agents as needed.	Implementation of the No Action Alternative would not result in any new or additional impacts.
Geological Resources	Implementation of the Proposed Action would result in negligible to minor adverse impacts to geology, topography, and soil resources dependent on the final design of proposed construction activities and soil surveys prior to construction. Negligible adverse impacts on geology and topography would be expected when removing old footings and utilities during demolition and digging for new footings, piers, and utilities for new construction. The areas around the work sites would be returned to the natural topography upon project completion, including backfill, compression, and grading after removal of subsurface facility features. Short-term minor, adverse impacts on soils would occur from construction and demolition activities largely via ground disturbance, erosion, and soil compaction. Erosion and soil compaction would be controlled by using established protocols such as applying water to limit airborne dust in windy environments and employing soil stabilization techniques, such as re-vegetating graded areas, once site construction and/or demolition operations are complete. As the land disturbance of this project will exceed one acre in size it must adhere to the 2017 Construction General Permit (CGP). Coverage under the CGP would require the preparation and implementation of site-specific Storm Water Pollution Prevention Plans to minimize potential adverse impacts during construction. Upon completion of site operations long-term erosion and soil compaction would be controlled by employing soil stabilization techniques, such as re-vegetating graded areas.	Implementation of the No Action Alternative would not result in any new or additional impacts.
Water Resources	The Proposed Action would result in short-term, minor adverse impacts to groundwater and surface water. The project areas are not impacted by the 100-year floodplain so no impact is expected. Short-term, minor, adverse impacts would be expected during construction and demolition activities due to ground disturbances that are inherently part of	Implementation of the No Action Alternative would not result in any new or

Affected Resource	Proposed Action	No Action Alternative
	grading, excavating, and other uses of heavy equipment. These soil disturbances could lead to increased surface water runoff during rainfall events and causing increased sediment transportation that could be transferred to ground water resources or drainage ditches. Additional contamination is possible by leaking heavy equipment (fuels, oils, etc.) Best practices and planning during construction and demolition activities would minimize this impact by controlling the movement of surface water runoff and ensuring no direct access to ground water recharge points. Drainage control measures can include utilizing temporary construction of barriers such as fiber logs or silt fences and would be placed based on site-specific evaluations on an as-needed basis. Spill kits would be available to control spills of any hazardous material. Additionally, construction areas of at least one acre must adhere to specific requirements under the Kirtland AFB CGP and are subject to inspections by base personnel to ensure compliance.	additional impacts.
Cultural Resources	Implementation of the Proposed Action at Kirtland AFB would result in long-term, significant, adverse impacts to architectural properties but would have no impact on archaeological or traditional cultural properties. Several facilities identified for demolition are eligible for inclusion on the National Register of Historic Places and would also impact the 34th Air Division Historic District in the 900-compound. Through coordination with the State Historic Preservation Officer, impacts can be reduced by completing an Historic American Building Survey (HABS) and Historic American Engineering Record (HAER) for each affected facility. This includes, at a minimum, large-format photography and measurements of each facility, archival document production, and lifetime storage for all documentation. Upon completion of HABS/HAER documentation for each impacted facility, and through a memorandum of agreement with the SHPO, impacts to historic properties would be reduced to negligible.	Implementation of the No Action Alternative would not result in any new or additional impacts.
Hazardous Materials and Wastes	Short-term, negligible to minor, adverse impacts on hazardous materials and hazardous wastes would occur during construction and demolition activities associated with the Proposed Action, and long-term beneficial impacts could be realized from removal of toxic materials such as asbestos and lead. Adverse impacts on hazardous materials and hazardous wastes would occur through use of a variety of hazardous materials and petroleum products required by workers during implementation of the Proposed Action. Negligible amounts of hazardous wastes would be generated from these processes. Contractors would be required to adhere to all federal, state and local regulations, to include those instituted by Kirtland AFB. Toxic hazards would occur during demolition processes as structures containing lead-based paint, asbestos, and polychlorinated biphenyls are likely to be encountered. Surveys would be performed by certified personnel to determine the extent of such materials prior to demolition. Plans would be generated based on the results of the exploratory surveys to identify any areas where controls may be necessary to reduce the hazard to workers and prevent the release of toxic materials from the site. If abatement of asbestos is anticipated to exceed 75,000 ft^3 Albuquerque Environmental Health Department-Air Quality Division (AEHD-AQD) would be notified. All hazardous debris would be disposed of at a United States Environmental Protection Agency-approved facility. Disturbances of this material would constitute a short-term minor adverse impact; however, once removed and disposed of a long-term beneficial impact would be expected.	Implementation of the No Action Alternative would not result in any new or additional impacts.
Safety	Implementation of the Proposed Action would result in short-term, negligible, adverse impacts on the safety of contractors working at the construction and demolition project areas. The company performing the work would be required to develop a comprehensive health and safety plan detailing all potential hazards and site-specific guidance to ensure potential safety risks are minimized. Contracted personnel would be responsible for compliance with applicable federal, state, and local safety regulations and would be educated though daily safety briefings to review upcoming work activities and associated hazards.	Implementation of the No Action Alternative would not result in any new or additional impacts.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section of the EA describes the natural and human environments that exist within Kirtland AFB and the consequences of the Proposed Action and No Action Alternative on affected resources within that environment. Only those resources that have the potential to be affected by any of the alternatives considered are described, as per CEQ guidance (40 CFR 1501.7[3]).

Specific criteria for evaluating the potential environmental impacts of the Proposed Action and No Action Alternative are discussed in the following text by resource area. The significance of an action is measured in terms of its context and intensity. The context and intensity of potential environmental impacts are described in terms of duration, the magnitude of the impact, and whether they are adverse or beneficial as summarized below:

- ***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 (as defined by 40 CFR 1508.27) 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 man-made or natural environment. A beneficial impact is one having positive outcomes on the man-made or natural environment.

Based upon the scope of the Proposed Action, resource areas with no impacts were identified through a preliminary screening process. The following describes those resource areas not being carried forward for detailed analysis, along with the rationale for their elimination:

- ***Airspace Management.*** Airspace management is not addressed in this EA because none of the proposed activities would result in a change to current airspace types, flight activities, or training and no changes to current aircraft operations would occur. As a result, the USAF anticipates no short- or long-term impacts on airspace management at Kirtland AFB. Therefore, airspace management will not be carried forward for detailed analysis.
- ***Land use.*** Land use is not addressed in this EA as none of the proposed activities would result in a change in the current land use designations within the proposed project areas. According to the 2016 IDP, the proposed construction and demolition activities areas are located within land designated for development and implementation of the Proposed Action would not change this designation. The lands that are the subject of this EA consist of previously developed land. As a result, the USAF anticipates no short- or long-term impacts on land use at Kirtland AFB. Therefore, land use will not be carried forward for detailed analysis.
- ***Visual Resources.*** Visual resources are not addressed in this EA as none of the proposed activities would result in a net change to the characteristic features of the proposed area. Visual resources are defined as the natural and man-made physical features that give a particular landscape its character and influence the visual appeal of an area for workers, residents, and visitors. Given their location on an active military installation, the visual resources of the project areas would be defined by the architecture of the current facilities

and the landscaping around them, all of which is described in detail in the Kirtland AFB Architectural Compatibility Plan (ACP). As all new facilities are required to adhere to the design guidelines listed in the ACP, the visual integrity and appeal of the affected areas would largely be unaffected. As a result, the USAF anticipates no short- or long-term impacts on visual resources at Kirtland AFB. Therefore, visual resources will not be carried forward for detailed analysis.

- ***Biological Resources.*** Biological Resources are not addressed in this EA as there are no known federally or state-listed species that use or inhabit any site impacted by the Proposed Action. Additionally, no critical habitats or other wildlife habitats exist on or in the general vicinity of the project areas as all sites have been previously disturbed by industrial/military operations and limited vegetation is available. As no critical habitats or threatened, endangered, or state-listed species exist in the project areas, the USAF anticipates no short- or long-term impacts on biological resources at Kirtland AFB. Therefore, biological resources will not be carried forward for detailed analysis. Please see Appendix A for concurrence by the USFWS.
- ***Infrastructure.*** Minor/Localized telecommunication infrastructure impacts will occur in this proposal. The siting and proposal will damage/destroy the telecommunication infrastructure supporting Buildings 323, 324, and 326. New telecommunication infrastructure will be required to route the telecom utilities around the site, or address the impacts to each facility individually. The remaining proposed activities will not be addressed in this EA as the proposed activities are intended to consolidate current AFRL personnel and operations into fewer facilities and do not add any new mission requirements. As the operations and number of personnel at AFRL would not change, the USAF anticipates no additional short-term and no long-term impacts on infrastructure at Kirtland AFB.
- ***Socioeconomics.*** Implementation of the Proposed Action would have no long-term economic or socioeconomic effects on the working populations of Bernalillo County. As most, if not all, demolition and construction activities would be contracted to local companies, there could be a slight, short-term positive impact to the local economy for the duration of the Proposed Action. Upon completion of the project, operations of AFRL laboratories would have no impact the socioeconomics of the region as the number of personnel employed at AFRL would not change.
- ***Environmental Justice and Sensitive Receptors.*** EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* was issued by the President of the United States on February 11, 1994. The objectives of this EO, as it pertains to this EA, include the development of federal agency implementation strategies and identification of low-income and minority populations potentially affected because of proposed federal actions. Additionally, potential environmental justice issues regarding children must be addressed pursuant to EO 13405, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO directs federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children.

  Access to Kirtland AFB is limited to military personnel, their families, military retirees, and assigned government and contract workers. The Proposed Action lies entirely within the borders of Kirtland AFB and solely effects current employees of the AFRL by consolidating operations and modernizing their daily work facilities. Therefore, disproportionately high environmental or adverse human health impacts to minority, low-income, or child populations would not occur.

3.1 NOISE

Sound is defined as a particular auditory impact produced by a given source, for example the sound of rain on a rooftop. Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory impact. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise considered an irritant. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. Noise can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between the source and receptor, receptor sensitivity, and time of day. Affected receptors are specific (e.g., residential areas, schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity or noise above ambient levels exists. These are generally referred to as sensitive noise receptors.

Sound levels vary with time. For example, the sound increases as an aircraft approaches, then falls and blends into the ambient, or background, as the aircraft recedes into the distance. Because of this variation, it is often convenient to describe a give noise "event" by its highest or maximum sound level (L_{max}). It should be noted that L_{max} describes only one dimension of an event; it provides no information on the cumulative noise exposure generated by a sound source. In fact, two events with identical L_{max} levels may produce very different total noise exposures. One may be of very short duration, while the other may last much longer.

Human perception of sound and noise is variable, and is largely dependent on the frequency or frequencies an event produces. Several different scales are used to quantify sound depending on the purpose of the measurement taken. Sound can be quantified with instrumentation that records instantaneous sound level in decibels (dBs). The A-weighted decibel (dBA) is the unit used to characterize sound levels that can be sensed by the human ear. “A-weighted” denotes the adjustment of the frequency range to the sensitivity of the average human ear. The threshold of audibility is generally within the range of 10 to 25 dBA for normal hearing. The threshold of pain occurs at the upper boundary of audibility, which is normally in the region of 135 dBA (United State Environmental Protection Agency [USEPA], 1981a).

Table 3-1 compares common sounds and shows how they correspond in terms of auditory impacts. As shown, a whisper is normally 30 dBA and considered to be very quiet while an air conditioning unit 20 feet away is considered an intrusive noise at 60 dBA. Noise levels can become annoying at 80 dBA and very annoying at 90 dBA. As sound pressure level is measured a logarithmic scale, every increase of 3 dB is twice as loud (e.g. 80 dBA is twice as loud as 77 dBA). However, humans do not typically perceive sound to be twice as loud until an increase of at least 10 dB, which can result in inadvertent exposure to hazardous noise levels (USEPA, 1981b).

Under the Noise Control Act of 1972, the Occupational Safety and Health Administration (OSHA) established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 dBA over an 8-hour period. The highest allowable sound level to which workers can be constantly exposed is 115 dBA, and exposure to this level must not exceed 15 minutes within an 8-hour period. These standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that will reduce sound levels to acceptable limits.

The average day/night sound level (DNL) metric is a measure of the total community noise environment. DNL is the average A-weighted sound level over a 24-hour period, with a 10 dB

adjustment added to the nighttime levels (between 2200 and 0700 hours). This adjustment is an effort to account for increased human sensitivity to nighttime noise events. DNL was endorsed by the USEPA for use by federal agencies and was adopted by the US Department of Housing and Urban Development. DNL is an accepted unit for quantifying annoyance to humans from general environmental noise, including construction noise. Land use compatibility and incompatibility are determined by comparing the predicted DNL at a site with the recommended land uses. Noise levels occurring at night generally produce a greater annoyance than those of the same levels occurring during the day. It is generally agreed that people perceive intrusive noise at night as being 10 dBA louder than those occurring during the day, at least in terms of its potential for causing community annoyance.

Table 3-1: Sound Levels and Human Response

Noise Level (dBA)	Common Sounds	Effect[1]	T_{Max} Prior to Hearing Damage[2]
10	Just audible	Negligible	n/a
30	Soft whisper (15 feet)	Very quiet	n/a
50	Light auto traffic (100 feet)	Quiet	n/a
60	Air conditioning unit (20 feet)	Intrusive	n/a
70	Noisy restaurant or freeway traffic	Telephone use difficult	n/a
80	Alarm clock (2 feet)	Annoying	n/a
90	Heavy truck (50 feet) or city traffic	Very annoying	8 hours
100	Garbage truck	Very annoying	2 hours
110	Pile drivers	Strained vocal effort	30 minutes
120	Jet takeoff (200 feet) or auto horn (3 feet)	Maximum vocal effort	7.5 minutes
140	Carrier deck jet operation	Painfully loud	28 seconds

1. Noise and its Measurement (USEPA, 1981b)
2. OSHA Technical Manual TED 01-00-015 (OSHA, 2017)

The federal government established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. According to the US Army, Federal Aviation Administration (FAA), and US Department of Housing and Urban Development criteria, residential units and other noise-sensitive land uses are “clearly unacceptable” in areas where noise exposure exceeds 75 dBA, “normally unacceptable” in regions exposed to noise between 65 and 75 dBA, and “normally acceptable” in areas exposed to noise of 65 dBA or less. For outdoor activities, USEPA recommends 55 dBA as the sound level below which there is no reason to suspect that the general population would be at risk from any of the effects of noise (USEPA, 1974).

3.1.1 Affected Environment

The ambient sound environment at Kirtland AFB is affected mainly by USAF and civilian aircraft operations, automotive vehicles, and live-fire weapons. In the heavily developed northwestern portion of the installation, the commercial and military aircraft operations at the Sunport are the primary source of noise. Figure 3-1 presents the existing DNL noise contours for the Sunport plotted in 5-dB increments, ranging from 65 to 75 dBA DNL. Secondary sources of noise, such as vehicle travel, industrial activities, and military training, also contribute to the louder ambient sound environment of the northwestern portion of the installation compared to other portions of Kirtland AFB. The ambient sound environment of the remaining portions of the installation is quieter because development is less concentrated. Intermittent noises from military training, mainly military vehicles, live-fire weapons, and explosives training, dominate the ambient sound environment of these portions of Kirtland AFB.

Most sensitive noise receptors that could potentially be exposed to noise from installation activities are on or proximate to the northwestern and northern portions of Kirtland AFB. For example, several schools for the city of Albuquerque are on or proximate to the northwestern portion of the installation. There are also several medical centers and hospitals in this region. All Kirtland AFB housing and community functions are within the northeastern portion of the installation, and several residential neighborhoods in the city of Albuquerque are proximate to the northwest and northern boundaries of the installation. No other portions of Kirtland AFB contain or are proximate to sensitive noise receptors (KAFB, 2016).

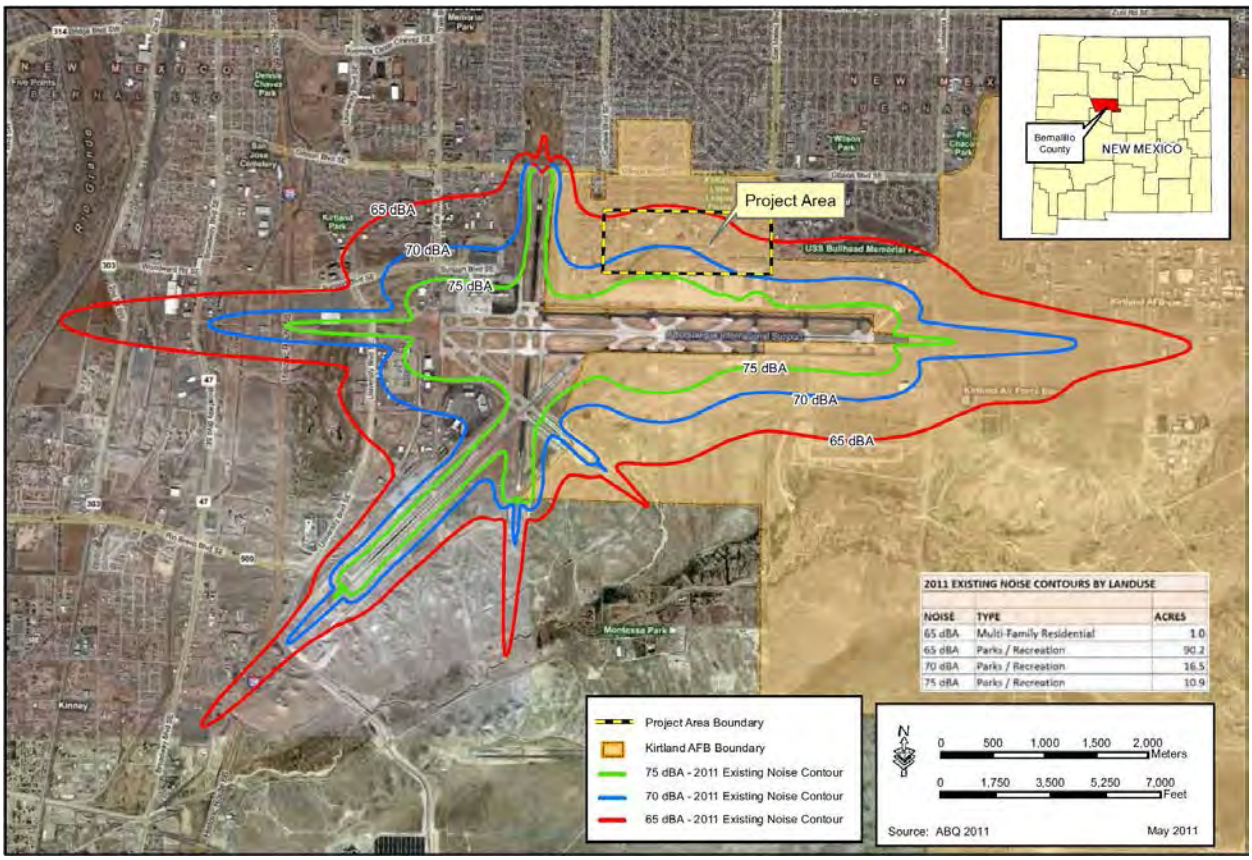


Figure 3-1: Noise Contours at Kirtland AFB

3.1.2 Environmental Consequences

3.1.2.1 Proposed Action

Construction, Demolition, and Renovation. The Proposed Action would result in a short-term, negligible, adverse impact on noise. Construction and demolition activities would be conducted during the daytime hours of 0700 to 1700. Use of heavy equipment would cause an increase in sound that is notably the ambient level in the region. A variety of sounds are emitted from loaders, trucks, graders, and other common construction equipment. Table 3-2 presents noise levels associated with common types of construction equipment, which can exceed the ambient sound levels by 20 to 25 dBA in an urban environment. Unobstructed sound pressure levels decrease according to the inverse square law, or approximately 6 dB for every doubling of distance from the source of noise; therefore, adverse impacts from construction noise are typically confined to within 0.5 mile of a project area.

As seen in Table 3-3, the nearest sensitive receptors would be the Kirtland Elementary School, approximately 0.45 miles from Buildings 322 and 323, and approximately 0.30 miles from Buildings 243 and 430; and the Raymond G. Murphy VA Medical Center opposite the fenceline to the 900-compound. All other facilities identified in the Proposed Action are at least several miles from the nearest sensitive receptor.

Table 3-2: Estimated Noise Levels for Common Construction Equipment

Construction Equipment	L_{max}[a] 50 ft *(dBA)*	L_{max}[b] 100 ft *(dBA)*	L_{max}[b] 200 ft *(dBA)*	L_{max}[b] 400 ft *(dBA)*	L_{max}[b] 800 ft *(dBA)*	L_{max}[b] 1,600 ft *(dBA)*	L_{max}[b] 0.5 mi *(dBA)*
Backhoe	78	72	66	60	54	48	44
Chain Saw	84	78	72	66	60	54	50
Ground Compactor	83	77	71	65	59	53	49
Concrete Mixer Truck	79	73	67	61	55	49	45
Concrete Pump Truck	81	75	69	63	57	51	47
Concrete Saw	90	84	78	72	66	60	56
Crane	81	75	69	63	57	51	47
Dozer	82	76	70	64	58	52	48
Excavator	81	75	69	63	57	51	47
Front End Loader	79	73	67	61	55	49	45
Grapple (Backhoe)	87	81	75	69	63	57	53
Impact Pile Drive	101	95	89	83	77	71	67
Jack Hammer	89	83	77	71	65	59	55
Pavement Scarifier	90	84	78	72	66	60	56
Pneumatic Tools	85	79	73	67	61	55	51
Vacuum Excavator	85	79	73	67	61	55	51

1. Measured values at L_{50} taken from the United State Department of Transportation (USDOT) Federal Highway Administration (FHWA) *Construction Noise Handbook* (USDOT, 2006)

2. Derived values utilizing the inverse square law $\left\{L_{p2} = L_{p1} + 20log_{10}\left(\frac{r_1}{r_2}\right)\right\}$ and published values at L_{p1}=L_{50} from the FHWA

Construction, renovation, and demolition activities would take place around Buildings 322 and 323, and demolition activities at Buildings 243 and 430. As indicated in Table 3-2, the loudest possible noise from these work sites would be attenuated to 71 dBA at 0.30 miles, with all others being 60 dBA or lower. While such noise would likely be audible at the Kirtland Elementary School, the loudness would be comparable to that of a running air conditioner and would be considered a negligible impact. Such noise is likely to be further attenuated by obstructing facilities and would be further lessened inside the school itself.

The 900-compound shares a fence line with the Raymond G. Murphy VA Hospital. The nearest buildings are less than 0.10 miles away from the outlying facilities of the VA campus, with an overall average of approximately 0.30 miles from the main hospital. Most noise at the outlying VA facilities would be abated to less than 70 dBA, which would be comparable to that of a noisy restaurant, and most long-running sources (e.g. noises from a backhoe or dump truck operating on site all day) would be under 65 dBA. Noise at the main VA hospital would be further reduced to an average under 60 dBA, and would be unlikely to be heard indoors due to the concrete construction of the hospital. Impacts to these outlying VA facilities should be considered minor and would cease upon project completion.

Buildings 57003, 57004, and 57012 are located at least six miles from the nearest edge of the installation. Demolition activities performed at these sites would have no impact on any sensitive receptor.

Daily Operation (Post-Construction). Use and maintenance HPEM facilities would result in a negligible increase in noise in the vicinity of buildings 322 and 323. As the AFRL conducts operations daily, an increase in vehicular and foot traffic would be expected once HPEM operations are collocated. However, this location has several other facilities present in the same region and would already be considered an industrial or military work area. Laboratory work conducted within the new facilities would not constitute an increase in noise in the area.

Table 3-3: Estimated Noise Levels at Nearest Sensitive Receptors

Building Number	Nearest Sensitive Receptor	Approximate Distance[1] *(miles)*	Loudest Noise Possible[2] *(dBA)*	Loudest Expected Noise[3] *(dBA)*
243	Kirtland Elementary School	0.30	71	60
324	Kirtland Elementary School	0.45	67	56
326	Kirtland Elementary School	0.45	67	56
430	Kirtland Elementary School	0.30	71	60
906	Raymond G. Murphy VA Medical Center	0.30	71	60
907	Raymond G. Murphy VA Medical Center	0.30	71	60
908	Raymond G. Murphy VA Medical Center	0.30	71	60
909	Raymond G. Murphy VA Medical Center	0.30	71	60
910	Raymond G. Murphy VA Medical Center	0.30	71	60
911	Raymond G. Murphy VA Medical Center	0.30	71	60
912	Raymond G. Murphy VA Medical Center	0.30	71	60
913	Raymond G. Murphy VA Medical Center	0.30	71	60
57003	Installation Boundary	>6.0	*n/a*	*n/a*
57004	Installation Boundary	>6.0	*n/a*	*n/a*
57012	Installation Boundary	>6.0	*n/a*	*n/a*

1. Distances approximated using Google Earth and measuring from the center of the listed facility to the approximate center of population for each sensitive receptor.
2. All noise levels are estimated based on the values seen in Table 3-2. Values provided are for unobstructed noises.
3. Values exclude the loudest sound (Pile Driver) as this equipment is unlikely to be used.

A corresponding decrease in noise would be anticipated in the vicinity of demolished laboratories as fewer personnel would commute to these regions of Kirtland AFB. The anticipated changes in noise would not be expected to impact any sensitive noise receptor.

3.1.2.2 No Action Alternative

Under the No Acton Alternative, the proposed construction and demolition activities associated with the AFRL HPEM laboratory project would not be implemented and the existing conditions discussed in Section 3.1.1 would remain unchanged. No new noises would be introduced to the on- and off-installation noise environments; therefore, no new impacts would occur with implementation of the No Action Alternative.

3.2 AIR QUALITY

Air quality is defined by the concentration of various pollutants in the atmosphere at a given location. Under the Clean Air Act (CAA), the six pollutants defining air quality, called “criteria pollutants,” include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), 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. CO, SO_2, and some particulates are emitted directly into the atmosphere from emissions sources. NO_2, O_3, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes. Volatile organic compounds (VOCs) and nitrogen oxides (NO_x) emissions are used to represent O_3 generation because they are precursors of O_3. Sulfur oxides (SO_x) are used to represent SO_2 emissions.

USEPA has established National Ambient Air Quality Standards (NAAQS) (40 CFR § 50) for criteria pollutants. NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects, such as damage to farm crops and vegetation and damage to buildings. Some pollutants have short-term and long-term standards. Short-term standards are designed to protect against acute, or short-term, health effects, while long-term standards were established to protect against chronic health effects. The state of New Mexico has established its own ambient air quality standards for the criteria pollutants, which in some cases are more stringent than the NAAQS.

Areas that are and have historically been in compliance with the NAAQS or have not been evaluated for NAAQS compliance are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment. The maintenance designation can be removed from an area if the area demonstrates to the USEPA it can consistently remain below NAAQS for more than 20 years.

The USEPA General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emissions thresholds that trigger requirements for a conformity analysis are called de minimis levels. De minimis levels (in tons per year [tpy]) vary by pollutant and also depend on the severity of the nonattainment status for the air quality management area in question.

The 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 AEHD-AQD.

***Fugitive Dust Control Regulation*.** The AEHD-AQD has fugitive dust control requirements in 20.11.20 NMAC, *Fugitive Dust Control*. A fugitive dust control construction permit is required for projects disturbing 0.75 acre or more and the demolition of buildings containing more than 75,000 cubic feet of space. As stated in 20.11.20.12 NMAC, General Provisions, each person shall use reasonably available control measures or any other effective control measure during active operations or on inactive disturbed surface areas, as necessary, to prevent the release of fugitive dust, whether or not the person is required by 20.11.20 NMAC to obtain a fugitive dust control permit.

Climate Change and Greenhouse Gases. Global climate change refers to long-term fluctuations in temperature, precipitation, wind, sea level, and other elements of Earth's climate system. Ways in which the Earth's climate system may be influenced by changes in the concentration of various gases in the atmosphere have been discussed worldwide. Of particular interest, greenhouse gases (GHGs) are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century because of an increase in GHG emissions from human

activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe.

3.2.1 Affected Environment

Kirtland AFB is in Bernalillo County, New Mexico, which is within the Albuquerque-Mid Rio Grande Intrastate (AMRGI) Air Quality Control Region (AQCR) 152. The AMRGI AQCR also includes portions of Sandoval and Valencia counties, New Mexico. As of April 2019, Bernalillo County is no longer subject to a 20-year CO maintenance plan and is in attainment for all criteria pollutants. As a result, conformity applicability analysis is not required. (Rocha, 2019)

Kirtland AFB manages several air quality permits, including 20.11.41 NMAC Construction Permits, 20.11.21 NMAC Open Burn Program permits, 20.11.20 NMAC Fugitive Dust Control permits, and 20.11.40 NMAC Source Registrations, all of which include operating or emissions limits to ensure compliance with the Clean Air Act. Kirtland AFB must also comply with 20.11.42 NMAC Title V Operating Permit #527-RN1, which covers most of the permitted stationary emission sources on the installation. These sources include emergency generators, fire pump engines, boilers, water heaters, fuel storage tanks and fuel dispensing systems, gasoline service stations, surface coating operations, aircraft engine testing, fire training, remediation activities, mulching activities, miscellaneous chemical usage, and open detonation of munitions for military training and research and development. Kirtland AFB is also considered a synthetic minor source of Hazardous Air Pollutants under Title I, Section 112 of the CAA. The Air Emissions Inventories for Kirtland AFB over the past three years is found in Table 3-4.

Table 3-4: Annual Air Emissions for Kirtland AFB (CY16-CY18)

Calendar Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM_{10} (tpy)
2018	7.05	40.75	4.22	0.50	0.50
2017	6.03	41.15	5.60	0.34	0.68
2016	5.63	41.59	2.93	0.42	0.62
3-Year Average	6.24	41.16	4.25	0.42	0.60

Note: Emissions shown are for stationary sources only.

Best management practices (BMPs) such as watering during ground-disturbing activities, using soil stabilization agents for dust suppression, and decreasing speed limits on unpaved roads are utilized during all construction projects.

Climate Change and Greenhouse Gases. Ongoing global climate change has the potential to increase average temperatures and cause more frequent, intense, and prolonged droughts in the southwest United States including New Mexico (Garfin, et al., 2014) These changes to regional climate patterns could result in regional changes to flooding frequency, vegetation types, vegetation growth rates, wildfire potential, groundwater depth, and potable water availability.

3.2.2 Environmental Consequences

3.2.2.1 Proposed Action

The Proposed Action would result in a short-term, minor adverse impact on air quality, primarily associated with construction and demolition operations. Emissions of criteria pollutants and GHGs

would be directly produced from activities such as operation of heavy equipment, heavy duty diesel vehicles hauling debris to and from the project area, and workers commuting daily to and from the project areas in their personal vehicles. Additionally, heavy equipment moving soil and debris would produce a notable amount of particulate matter if uncontrolled. However, all such emissions would be temporary in nature and produced only when construction activities are occurring.

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 disturbances associated with the Proposed Action. Fugitive dust air emissions associated with construction would be greatest during the 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) 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. The USAF contractor would obtain a fugitive dust control permit from AEHD-AQD. Application for the fugitive dust control permit would require USAF contractor 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 upon the number of BMPs and environmental control measures required and the potential for particulate matter air emissions. Kirtland AFB's existing fugitive dust control programmatic permit for routine heavy equipment activities, Permit No. 8091-P, would provide coverage for future maintenance activities. Per 20.11.20.12 NMAC, the USAF contractor would also be required to use reasonably available fugitive dust control measures during any construction activity associated with the Proposed Action, regardless of whether a fugitive dust control permit was required.

The USAF Air Conformity Applicability Model (ACAM) was used to estimate the annual air emissions from construction activities associated with the Proposed Action. Table 3-5 summarizes the anticipated air emissions from construction activities and Table 3-6 shows the estimated change in annual emissions once all construction activities are completed. Please see Appendix B for the complete ACAM report.

As noted in Section 3.2.1, Bernalillo County is designated by the USEPA as unclassified/in attainment for all criteria pollutants. Therefore, the Federal General Conformity Rule does not apply for the Proposed Action and no conformity analysis is required. For informational purposes, the estimated air emissions from the Proposed Action can be compared to the 100 tpy *de minimis* level. As seen in Table 3-5, uncontrolled emissions of criteria pollutants during construction and demolition operations would be well below the 100 tpy threshold. Fugitive dust emissions would be further reduced with BMPs and environmental control measures specified in a fugitive dust control plan.

Table 3-6 presents the expected change in annual emissions from annual AFRL HPEM operations compared to baseline estimates of current operations. This change is primarily associated with heating requirements using natural gas as no other emissions, such as those

from emergency generators or paint booths are anticipated. Therefore, the Proposed Action would not be expected to result in a significant impact on air quality.

Climate Change and Greenhouse Gases. Construction associated with the Proposed Action would emit approximately 820 tons of carbon dioxide equivalent (CO_2e) during a given year. By comparison, this amount of CO_2e is comparable to the GHG footprint of 89 single family houses for one year (USEPA, 2018). As such, this one-time emission of GHGs would not meaningfully contribute to the potential effects of global climate change. Therefore, the Proposed Action would not be expected to result in a significant impact on climate change.

Table 3-5: Estimated Air Emissions from Construction/Demolition Activities

Activity[1,2]	NO_x (tons)	VOC (tons)	CO (tons)	SO_x (tons)	$PM_{2.5}$ (tons)	PM_{10} (tons)	NH_3 (tons)	CO_{2e} (tons)
Demolition	2.50	0.40	2.98	0.01	0.10	3.73	0.001	632
New Construction	3.78	1.79	4.46	0.01	0.16	3.24	0.004	958
Renovation	0.16	0.03	0.21	0.00	0.01	0.01	0.001	50
Project Total:	6.44	2.22	7.65	0.02	0.27	6.98	0.006	1640
Annual Avg[3]:	3.22	1.11	3.83	0.01	0.14	3.49	0.003	820

1. All calculations performed with ACAM v5.0.13a, please see Appendix B for the complete report.
2. Demolition activities include emissions for basic grading of the property after the facility has been removed.
3. Estimated emissions would take place over a period of two years, starting on or about January 2022.
4. PM emissions in this table are uncontrolled. Utilizing standard fugitive dust controls would reduce PM emissions by ~50%.

Table 3-6: Estimated Change in Annual Air Emissions Post-Construction

Activity[1,2]	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	$PM_{2.5}$ (tpy)	PM_{10} (tpy)	NH_3 (tpy)	CO_{2e} (tpy)
Current Heating (2019)	0.160	0.029	0.151	0.001	0.014	0.014	0.000	216.7
New Heating (2024)	0.159	0.008	0.133	0.001	0.012	0.012	0.000	191.0
Annual Change:	-0.001	-0.021	-0.018	0.000	-0.002	-0.002	0.000	-25.7

1. All calculations performed with ACAM v5.0.13a, please see Appendix B for all assumptions
2. Estimated annual emissions once all construction/demolition has been completed, estimated to begin in 2024
3. No other notable sources of emissions (e.g. paint booths, emergency generators, etc.) are anticipated

Ongoing changes to climate patterns in the southwestern United States are described in Section 3.2.1. These climate changes are unlikely to affect USAF's ability to implement the Proposed Action, and the Proposed Action would not appreciably contribute to the regional (i.e., southwestern United States) impacts from global climate change due to an insignificant amount of CO_2e

3.2.2.2 No Action Alternative

Under the No Acton Alternative, the proposed construction and demolition activities associated with the AFRL HPEM laboratory project would not be implemented and the existing conditions discussed in Section 3.2.1 would remain unchanged. Therefore, no air quality impacts would occur with implementation of the No Action Alternative.

3.3 GEOLOGICAL 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 topography and physiography, geology, soils, and, where applicable, geologic hazards. Topography and physiography pertain to the general shape and arrangement of the land surface, including its height and the position of its natural and man-made features. Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface 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 abilities 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.

Prime farmland is protected under the FPPA of 1981. The intent of the FPPA is to minimize the extent that federal programs contribute to the unnecessary conversion of high-quality farmland to non-agricultural uses. The FPPA also ensures that federal programs are administered in a manner that, to the extent practicable, is compatible with private, state, and local government programs and policies to protect farmland. The implementing procedures of the FPPA (7 CFR § 658) require federal agencies to evaluate the adverse effects (direct and indirect) of their activities on farmland, which includes prime farmland, unique farmland, and farmland of statewide or local importance, and to consider alternative actions that could avoid adverse effects.

3.3.1 Affected Environment

Regional Geology. The Rio Grande Rift is a zone of faults and sediment-filled basins extending from south-central Colorado across New Mexico and into northern Mexico. The rift is a defining physiographic feature of central New Mexico and the approximately 3,000-square-mile Albuquerque Basin (also referred to as the Middle Rio Grande Basin). This basin is comprised of three discrete sub-basins each containing more than 14,000 feet of rift-filled valley deposition accrued over millions of years. Along the margins of the basin, sediment deposits thin out to depths as low as 3,000 feet in areas where tectonic activity formed and uplifted mountains (United States Geological Survey [USGS], 2003).

Kirtland AFB is situated near the east-central edge of the Albuquerque Basin, along the margins of the Sandia and Manzanita Mountains. The geology of Kirtland AFB is defined by the vertical displacement between the rock units exposed at the top of these mountains and areas west and southwest towards the Rio Grande River (hereafter, referred to as Rio Grande) and its tributaries. The subsurface environment underlying Kirtland AFB is complex because of the gradual filling of the basin with sediments deposited by river and stream (fluvial), slopes and mountain fronts (alluvial-colluvial), wind (eolian), and volcanic activity in the form of lava or ash. Sediment deposition was further complicated by the large-scale faulting of the Albuquerque Basin that occurred approximately 5 to 11 million years ago (SNL, 2017a).

The portion of the Albuquerque Basin underlying Kirtland AFB is primarily composed of poorly consolidated alluvial-colluvial sediments. The exposed bedrock in the eastern part of the installation generally consists of igneous (i.e., granite) and metamorphic rock, overlain by non-corresponding deposits of marine carbonate rock (i.e., limestone, sandstone, and shale) (KAFB, 2018a).

Topography and Soils. The east-central portion of the Albuquerque Basin (locally referred to as East Mesa) extends west and southwest from the steep foothills and slopes of the Sandia and Manzanita Mountains to the gently sloping areas near the Rio Grande. Similarly, the topography of Kirtland AFB ranges from the mountainous terrain of the Cibola National Forest Withdrawn Area in the east to the relatively flat mesa in the west. Elevations range from nearly 8,000 feet above mean sea level in the Manzanita Mountains to approximately 5,200 feet above mean sea level on the mesa. The greatest change in elevation occurs in the centrally located Coyote Canyon and along the far eastern boundary of Kirtland AFB. The ground surface slope across the installation generally occurs in a west to southwest direction.

Regionally, the soils of the Albuquerque Basin vary from fine-grained clays and silts near river channels to well-drained sands and sandy loams on plateaus and highlands. Soils associated with Kirtland AFB predominately consist of sand and loam with varying amounts of gravel, cobble, or stone. Nearly all soils on the installation are well drained, and some are susceptible to erosion, particularly in areas with topographic relief (KAFB, 2018a). Table 3-7 shows the soil characteristics for areas of Kirtland AFB that directly support the USAF mission, those soils in bold are expected in the project areas of the Proposed Action.

Table 3-7: Soil Characteristics of USAF-Controlled Lands at Kirtland AFB

Soil Series	Slope	Runoff
Bluepoint loamy fine sand	1 to 9%	low
Embudo gravelly fine sandy loam	0 to 5%	very low
Embudo-Tijeras complex	0 to 9%	very low to medium
Gila fine sandy loam	0 to 2%	low
Ildefonso gravelly sandy loam	1 to 9%	low
Laporte-Rock Outcrop-Escabosa complex	5 to 20%	medium
Latine sandy loam	**1 to 5%**	**low**
Madurez loamy fine sand	1 to 5%	low
Madurez-Wink Association	1 to 7%	very low to low
Nickel-Latene Association	1 to 30%	low to medium
Pino-Rock outcrop Association	3 to 15%	very high
Rock outcrop (various)	15 to 80%	high to very high
Salas complex	20 to 80%	high
Seis-Silver complex	10 to 40%	very high
Seis very cobbly loam	0 to 15%	medium
Silver and Witt soils	5 to 9%	high to very high
Tesajo-Millet stony sandy loam	3 to 20%	low to medium
Tijeras gravelly fine sandy loam	**1 to 5%**	**low**
Tome very fine sandy loam	0 to 2%	medium
Wink fine sandy loam	**0 to 5%**	**very low**

Source: United States Department of Agriculture, Natural Resource Conservation Service (USDA-NRCS) "*Web Soil Survey*" (USDA-NRCS, 2017)

None of the soils listed in Table 3-7 are classified as prime farmland, unique farmland, or farmland of statewide or local importance pursuant to the FPPA (USDA-NRCS, 2018). Additionally, Kirtland AFB is not currently utilized for agriculture, nor is any agricultural use planned in the future. The soils in the project areas on the northwestern edge of the installation are primarily Latine sandy loam and Wink fine sandy loam with low slopes and runoff. Soils present near buildings 57003, 57004, and 57012 are primarily Tijeras gravelly fine sandy loam which also has generally low slope and minimal runoff (USDA-NRCS, 2017).

Geological Hazards. Earthquake activity or seismicity is 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).

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 (USGS, 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 upon 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 (USGS, 2014).

3.3.2 Environmental Consequences

3.3.2.1 Proposed Action

Implementation of the Proposed Action would result in both long- and short-term negligible and short-term minor adverse impacts to geology, topography, and soil resources dependent on the final design of proposed construction activities and soil surveys prior to construction. All facilities identified in Section 2.1 are located on previously disturbed land, and those plots of land associated with facilities noted for demolition have not been designated future development at this time. As such, any previously occupied area would be graded to level and receive soil stabilization in the form of seeding and/or placement of gravel.

Regional Geology. Long-term, negligible, adverse impacts on geology would occur from construction activities. A geotechnical investigation would be performed prior to any required excavation to determine the final design of the supporting foundation. Grade beams spanning drilled piers at column support locations would be required to support the "Heavy Lab" portion of the HPEM laboratory. Depth, location, and number of these piers would be based on geological data of the region, previous surveys for similar construction in the region, and the final design of the laboratory. Although impacts to geological features could occur, the proposed construction and demolition would not be substantial or deep enough to cause notable adverse impacts to geological features such as those controlling distribution of stormwater to the Sante Fe aquifer or the supporting bedrock.

Short-term, negligible adverse impacts on geology would occur from demolition activities when extracting previously placed utilities, footings, and other subsurface features of affected facilities. Additionally, some short-term, impacts on geology will also be experienced as some affected utilities (including Telecom) are re-routed on new paths to support Buildings 323, 324, and 326.

Topography. Long-term, negligible, adverse impacts on topography would occur from construction and demolition activities. All affected areas were originally graded to level to support existing structures at the time of their construction; however, intermittent settling at some sites is expected due to the age of facilities present. Additionally, as utilities, footings, and other subsurface features of existing structures are extracted from demolition sites, some need for backfill would be expected. After demolition activities are completed for each structure, each site

will receive minor grading and backfill as necessary to return the site to the natural topography of the area. Similarly, prior to construction of the new HPEM laboratory the site would be graded to level to support the new facility.

Soils. Short-term minor, adverse impacts on soils would occur from construction and demolition activities largely via ground disturbance, erosion, and soil compaction. Under the Proposed Action, erosion and soil compaction would be controlled by using established protocols such as applying water to limit airborne dust in windy environments and employing soil stabilization techniques, such as re-vegetating graded areas, once site construction and/or demolition operations are complete. As the land disturbance of this project will exceed one (1) acre in size it must adhere to the 2017 CGP. Coverage under the CGP would require the preparation and implementation of site-specific Storm Water Pollution Prevention Plan to minimize potential adverse impacts during construction.

Additionally, as the Proposed Action will disturb an area greater that 0.75-acres a fugitive dust control permit from Bernalillo County must be obtained. Each permit would include site-specific measures for dust control and suppression such as watering and the use of soil stabilization agents if necessary. Some activities under the Proposed Action may be subject to a Programmatic Fugitive Dust Control Permit (Permit No. 8091-P) held by Kirtland AFB that includes similar requirements for dust control and suppression. Implementation of the Proposed Action could also result in the accidental release of contaminants into soil media. In such cases, contaminants could be transported in surface runoff, leach into groundwater, or remain in-situ. These impacts would primarily be associated with the construction and demolition phases of the Proposed Action. No impacts would be expected upon project completion.

Geological Hazards. The Proposed Action would be sited in an area where earthquake activity is common. Over the last 10 years, the area around Albuquerque has experienced twelve earthquakes, with the largest having a magnitude of 3.7 and the average magnitude being 3.1 (USGS, 2019). No major earthquake has been recorded in the region, and no Federal, State, or local codes require use of specific construction techniques for new construction in the area as the risk of significant damage to structures is moderate. The Federal Emergency Management Agency (FEMA) recommends Earthquake-resistant construction in such regions via the National Earthquake Hazards Reduction Program (FEMA, 2010). Such construction resists lateral and vertical movements during an earthquake, and generally features:

- Stable foundations, such as deep anchors and connected foundation segments
- Connected building segments to prevent independent movement
- Even weight and mass of all building components
- Steel construction versus that of masonry or wood

The design of the new HPEM laboratory does not specifically include provisions for earthquake resistance; however, the design does inherently include a stable concrete foundation, largely steel construction, and reinforced concrete masonry unit exterior load-bearing walls. Given the planned construction techniques, the history of relatively high-volume but low-magnitude earthquakes, and the moderate risk rating provided by the USGS, no significant impact is expected.

3.3.2.2 No Action Alternative

Under the No Acton Alternative, the proposed construction and demolition activities associated with the AFRL HPEM laboratory project would not be implemented and the existing conditions

discussed in Section 3.3.1 would remain unchanged. Therefore, no new impacts on geology or soils would occur with implementation of the No Action Alternative.

3.4 WATER RESOURCES

Water resources are natural and man-made sources of water that are available for use by, and for the benefit of, humans and the environment. Water resources relevant to Kirtland AFB's location in New Mexico include groundwater, surface water, floodplains, and wetlands. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes and ensures compliance with CWA, 33 U.S.C. §1251 et seq. (1972).

Groundwater. Groundwater is water that exists in the saturated zone beneath the Earth's surface that collects and flows through aquifers. Groundwater is an essential resource that functions to recharge surface water and is used for drinking, irrigation, and industrial purposes. Groundwater typically can be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations. The state of New Mexico passed ground and surface water protection objectives subject to the Water Quality Act, New Mexico Statutes Annotated (NMSA) 74-6, under 20.6.2 NMAC.

Groundwater quality and quantity are regulated under several federal and state programs. The federal Underground Injection Control regulations, authorized under the Safe Drinking Water Act (SDWA), require a permit for the discharge or disposal of fluids into a well. The federal Sole Source Aquifer regulations, also authorized under the SDWA, protect aquifers that are critical to water supply. The state of New Mexico passed state drinking water rules, which incorporate the federal SDWA regulations, under 20.7.10 NMAC and regulates water rights under NMSA 72-1.

Surface Water. Surface water includes natural, modified, and man-made water confinement and conveyance features above groundwater that may or may not have a defined channel and discernable water flow. These features are generally classified as streams, springs, wetlands, natural and artificial impoundments (e.g., ponds, lakes), and constructed drainage canals and ditches. Stormwater is surface water generated by precipitation events that may percolate into permeable surficial sediments or flow across the top of impervious or saturated surficial areas, a condition known as runoff. Stormwater is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade surface waters, such as lakes, rivers, or streams. Proper management of stormwater flows, which can be intensified by high proportions of impervious surfaces associated with buildings, roads, and parking lots, is important to the management of surface water quality and natural flow characteristics.

The CWA establishes federal limits, through the National Pollutant Discharge Elimination System (NPDES) permit process, for regulating point (end of pipe) and non-point (e.g. stormwater) discharges of pollutants into the Waters of the United States and quality standards for surface waters. The term "Waters of the United States" has a broad meaning under the CWA and incorporates deep water aquatic habitats and special aquatic habitats (including wetlands). Sections 401 and 404 of the CWA regulate the discharge of dredged or fill materials into the Waters of the United States.

USEPA's Municipal Separate Storm Sewer System (MS4) program addresses pollution from stormwater runoff conveyed by an MS4 and discharged into rivers and streams. Common pollutants include oil and grease from roadways, pesticides from lawns, sediment from construction sites, and trash and other inappropriately disposed of waste materials. In compliance

with provisions of the CWA, operators of stormwater discharges associated with industrial activities are authorized to discharge to Waters of the United States in accordance with the eligibility and Notice of Intent requirements, effluent limitations, inspection requirements, and other conditions set forth in the 2015 Multi-Sector General Permit (MSGP). The USEPA currently regulates large (equal to or greater than one acre) construction activity through the 2017 CGP, which provides coverage for a period of five years.

Energy Independence Security Act (EISA) Section 438 (42 USC § 17094) establishes into law stormwater design requirements for federal development projects that disturb a footprint of greater than 5,000 square feet. EISA Section 438 requirements are independent of stormwater requirements under the CWA. The project footprint consists of all horizontal hard surface and disturbed areas associated with project development. Under these requirements, pre-development site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Pre-development hydrology would be modeled or calculated using recognized tools and must include site-specific factors, such as soil type, ground cover, and ground slope.

Additionally, Low Impact Design (LID) features need to be incorporated into new construction activities to comply with the restrictions on stormwater management promulgated by EISA Section 438. LID is a stormwater management strategy designed to maintain site hydrology and mitigate the adverse impacts of stormwater runoff and non-point source pollution. LIDs can manage the increase in runoff between pre- and post-development conditions on the project site through interception, infiltration, storage, and evapotranspiration processes before the runoff is conveyed to receiving waters. Examples of LID methods include bio-retention, permeable pavements, cisterns/recycling, and green roofs (DOD 2010).

Floodplains. Floodplains are areas of low, level ground present along rivers, stream channels, or coastal waters that are subject to periodic or infrequent inundation because of rain or melting snow. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and provision of habitat for a diversity of plants and animals. Flood potential is evaluated by FEMA, which defines the 100-year floodplain as an area within which there is a 1 percent chance of inundation by a flood event in a given year, or a flood event in the area once every 100 years. The risk of flooding is influenced by local topography, the frequencies of precipitation events, the size of the watershed above the floodplain, and upstream development. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreation and conservation activities, to reduce the risks to human health and safety. EO 11988, *Floodplain Management*, requires federal agencies to determine whether a proposed action would occur within a floodplain and directs them to avoid floodplains to the maximum extent possible wherever there is a practicable alternative.

3.4.1 Affected Environment

Groundwater. Kirtland AFB is within the limits of the Rio Grande Underground Water Basin, which is defined as a natural resources area and designated as a “declared underground water basin” by the state of New Mexico. The average depth to groundwater beneath Kirtland AFB is 450 to 550 feet below ground surface. The Rio Grande Basin’s source of groundwater is the Santa Fe Aquifer, which has an estimated 2.3 billion acre-feet of recoverable water. This aquifer is most likely recharged east of the installation in the Manzanita Mountains where the sediment soil materials favor rapid infiltration (KAFB, 2018a). The regional aquifer is used for the installation’s

water supply. Kirtland AFB has a water right that allows it to divert approximately 6,400 acre-feet of water, or approximately 2 billion gallons, per year from the underground aquifer (KAFB, 2016).

Surface Water. Kirtland AFB is within the Rio Grande watershed. The Rio Grande is the major surface hydrologic feature in central New Mexico, flowing north to south through Albuquerque, approximately five miles west of the installation. Surface water resources on Kirtland AFB reflect its dry climate. The average annual rainfall in Albuquerque is nine inches, with half of the average annual rainfall occurring from July to October during heavy thunderstorms. Surface water generally occurs in the form of stormwater sheet flow that drains into small gullies during heavy rainfall events (KAFB, 2018a). Surface water generally flows across the installation in a westerly direction toward the Rio Grande.

The two main surface water drainage channels on Kirtland AFB are the Tijeras Arroyo and the smaller Arroyo del Coyote, which joins the Tijeras Arroyo approximately 1 mile west of the Tijeras Arroyo Golf Course (see Figure 3-2). The Tijeras Arroyo and Arroyo del Coyote are tributaries to the Rio Grande. They flow intermittently during heavy thunderstorms and the spring snowmelt, but most of the water percolates into alluvial deposits or is lost to the atmosphere via evapotranspiration. The Tijeras Arroyo, which is dry for most of the year, is the primary surface channel that drains surface water from Kirtland AFB to the Rio Grande. Precipitation reaches the Tijeras Arroyo through a series of storm drains, flood canals, and small, mostly unnamed arroyos. Nearly 95 percent of the precipitation that flows through the Tijeras Arroyo evaporates before it reaches the Rio Grande. The remaining five percent is equally divided between groundwater recharge and runoff (KAFB, 2018a).

In the developed area of the installation, stormwater drains into small culverts towards Gibson Boulevard along the installation boundary. There are also four detention ponds in the area. Stormwater in the industrial/laboratory areas discharges through surface runoff or three large culverts that drain toward the Tijeras Arroyo in the south (KAFB, 2018a).

Wetlands are considered "waters of the United States" if they are determined to be jurisdictional by the USACE and USEPA. There are 10 wetlands supplied by at least 15 naturally occurring springs on Kirtland AFB; however, no Jurisdictional Determinations have been made concerning these water features. There are no natural lakes or rivers on Kirtland AFB; however, six man-made ponds have been created on the Tijeras Arroyo Golf Course.

Kirtland AFB operates under three NPDES Permits: the MSGP for industrial activities, the MS4 permit for stormwater conveyances from installation development, and the CGP for construction projects. Stormwater runoff on the installation predominantly flows through the drainage patterns created by natural terrain and paved surfaces. In some areas, runoff is directed through ditches and piping, with direct discharges into a receiving stream or surface water body. Issued in December 2015, the MSGP, Permit No. NMR050001, focuses on facilities and industry sector-specific BMP requirements. It requires the installation to have a Stormwater Pollution Prevention Plan (SWPPP) and includes specific requirements for implementing control measures (e.g., minimize exposure, good housekeeping, maintenance, spill prevention and response), conducting self-inspections and visual assessments of discharges, taking corrective actions, and conducting training, as appropriate.

Kirtland AFB is a co-permittee to the city of Albuquerque, Bernalillo County, for compliance with the Middle Rio Grande Watershed Based MS4 General Permit No. NMR04A000. The MS4 permit, issued in September 2015, regulates stormwater sediment and pollutant discharges from the municipality sources of the installation. The MS4 collects and conveys stormwater from storm

drains, pipes, and ditches and discharges into the Tijeras Arroyo and the city of Albuquerque's MS4. Kirtland AFB has developed a Stormwater Management Plan as required by the MS4 permit.

Finally, Kirtland AFB operates under a 2017 CGP (#NMR100000), which expires 16 February 2022. It includes several guidelines to implement erosion and sedimentation control, pollution prevention, and stabilization on construction sites of one (1) or more acres. If a project at Kirtland AFB is subject to the CGP requirements, the contractor must develop a site-specific SWPPP and provide the plan to the 377th Mission Support Group/Civil Engineering Installation Management – Environmental Management – Compliance (MSG/CEIEC) for review and approval. Upon approval, both the contractor and Kirtland AFB must submit Notices of Intent and be granted approval from USEPA before work begins. When construction projects are not subject to NPDES CGP requirements (i.e., due to the size of the project or a waiver granted), the contractor must still implement appropriate BMPs to minimize stormwater pollutants.

Floodplains. Floodplains are typically low-lying areas that are subject to inundation during significant rainfall events. Flooding potential is evaluated by FEMA, and is often related to the 100-year floodplain; or what would amount to essentially the worst flood that could be expected in a given region during a 100-year period. The 100-year floodplain for Kirtland AFB is associated with the Arroyo del Coyote and Tijeras Arroyo (see the orange-colored regions of Figure 3-2). Arroyo del Coyote and Tijeras Arroyo floods occur infrequently and are characterized by high peak flows, small volumes, and short durations (KAFB, 2018a). As stated in Section 3.4.1, various portions of the stormwater drainage and arroyo systems on the installation are owned and maintained by either Kirtland AFB or Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA).

3.4.2 Environmental Consequences

3.4.2.1 Proposed Action

Ground water. Short-term, minor, adverse impacts would be expected during construction and demolition activities due to ground disturbances that are inherently part of grading, excavating, and other uses of heavy equipment. These soil disturbances could lead to increased surface water runoff during rainfall events, and causing increased sediment transportation that could be transferred to ground water resources. Best practices and planning during construction and demolition activities can minimize this impact by controlling the movement of surface water runoff and ensuring no direct access to ground water recharge points. The work areas identified in the Proposed Action feature low slopes due to prior construction disturbances and minimal controls are expected. Drainage control measures can include utilizing temporary construction of barriers such as fiber logs or silt fences, and would be placed based on site-specific evaluations on an as-needed basis.

Vehicles and equipment used during the Proposed Action may increase the potential for petroleum of hazardous material spills, typically due to leaks or accidents at the work site. Heavy equipment contains a variety of oil, lubricants, hydraulic fluid, and fuels which have the potential for leaking. Additionally, these same materials may be stored on site to maintain and operate the equipment in use, and may also be subject to leaks or spills via accidents, such as being punctured with a forklift. Any such leaks or spills could be transported to ground water either by runoff of surface water during rain events or by leaching through the soil. Proper maintenance of equipment and good housekeeping of storage sites can both minimize the potential for leaking equipment and identify a potential leak before a significant spill can occur.

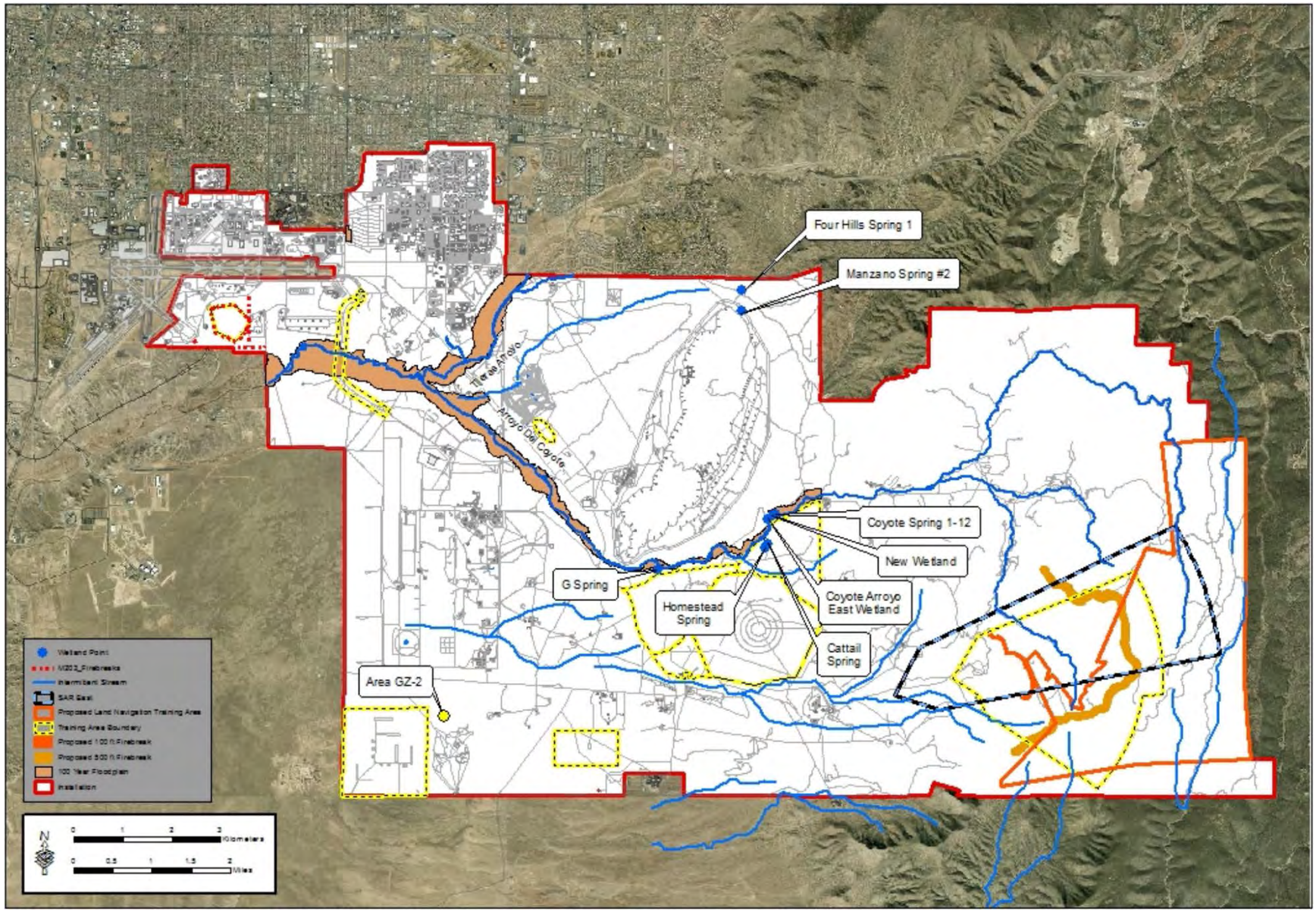


Figure 3-2: Surface Water, Floodplains, and Wetlands on Kirtland AFB

Any work area that requires hazardous materials to be stored on site must also have a spill kit present to contain, control, and clean up any spills that occur.

Surface Water. Short-term, minor adverse impacts would be expected during construction and demolition activities during implementation of the Proposed Action. No permanent bodies of water are located in the project areas; however, during rain events flowing stormwater has the potential to transport sediment and hazardous materials to drainage ditches. As previously discussed regarding potential routes for impacting ground water, through use of best practices and controls such impacts can be minimized. Additionally, construction areas of at least one acre must adhere to specific requirements under the Kirtland AFB CGP and are subject to inspections by base personnel to ensure compliance.

Floodplains. As previously shown in Figure 3-2, no construction or demolition site associated with the Proposed Action is located in the 100-year floodplain, therefore there is no anticipated impact.

3.4.2.2 No Action Alternative

Under the No Acton Alternative, the proposed construction and demolition activities associated with the AFRL HPEM laboratory project would not be implemented and the existing conditions discussed in Section 3.4.1 would remain unchanged, resulting in no impacts to water resources.

3.5 CULTURAL RESOURCES

The term 'cultural resource' refers to any prehistoric or historic resource, such as settlement sites, historic archaeological sites, or other evidence of our cultural heritage. The term “historic property” refers specifically to a cultural resource that has been determined to be eligible for inclusion in the NRHP. These resources are protected and identified under several federal laws and EOs. Federal laws include the NHPA (1966), the Archaeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (ARPA) (1979), and NAGPRA (1990).

Five classes of historic properties are defined as eligible for listing in the NRHP: buildings, sites, districts, structures, and objects (36 CFR 60.3). According to the NRHP, a “historic district” possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects that are historically or aesthetically united by plan or physical development.

Under Section 106 of the NHPA, the USAF is required to assess the effects of undertakings prior to initiation to ensure that there will be no adverse effects to historic properties (36 CFR 800). Under this process, the USAF evaluates the NRHP eligibility of resources within the proposed undertaking’s Area of Potential Effect (APE) and assesses the possible effects of the proposed undertaking on prehistoric and historic resources in consultation with the SHPO and other parties. The APE is defined as the geographic area(s) “within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.” Title 36 CFR Section 60.4 defines the criteria used to establish significance and eligibility for the NRHP. Section 110 of the NHPA requires the USAF to complete an inventory of historic properties located on its land (36 CFR 60, 63, 78, 79, and 800).

3.5.1 Affected Environment

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 NRHP. These sites contain artifacts such as pottery, ground stone, stone tools, and historic artifacts. In addition to artifacts many of the archaeological sites on Kirtland AFB contain features which include hearths, prehistoric structures, storage pits, historic structures, mines, weapons testing structures, and military training structures. Many of these sites occur within the undeveloped portion of the installation, which is also where many of the training areas exist. It is possible to encounter surface artifacts in these areas, which are protected under ARPA. The exact locations of these sites are protected and not disclosed to the general population. In addition to archaeological sites, a total of 2,189 facilities have been evaluated for NRHP eligibility, and 271 were found to be eligible (KAFB, 2018b).

Kirtland AFB has an Installation Cultural Resources Management Plan (ICRMP) in place. The ICRMP is an integral part of the installation's comprehensive plan, and addresses the cultural resources on the installation. It integrates the Cultural Resources Management Program with ongoing mission activities and the property managed by Kirtland AFB, allows for the identification of conflicts between mission activities and cultural resources management, and provides guidelines for mitigating any such conflicts. The ICRMP provides guidelines and standard operating procedures to non-technical managers and planners in order to comply with the installation's legal responsibilities for the preservation of significant archaeological and historic resources (KAFB, 2018b).

The APE for the HPEM project will be defined by the Kirtland AFB Cultural Resources Manager (CRM), the New Mexico SHPO, tribes/pueblos, and interested stakeholders.

3.5.1.1 Archaeological and Traditional Cultural Properties

No archaeological sites are located within the vicinity of any of the buildings proposed for additional construction, renovation, demolition, or divestment (KAFB, 2018b; Sullivan, Giedraitis, Schilz, & Burleson, 2002).

Traditional cultural properties and sacred sites are a special class of cultural resources that require specialized expertise in their identification and assessment. Thirty-four federally recognized tribes—both in- and out-of-state—have been identified as having an interest in protecting cultural resources located on the base. At present, there are no known Native American burial grounds or sacred areas located on Kirtland AFB (KAFB, 2018b).

3.5.1.2 Architectural Properties

A total of 17 architectural properties would be impacted by the proposed action. Following is a description of the buildings, delineated by the proposed actions, that would be impacted by the project.

Addition and Renovation. Buildings 322 and 323 (Table 3-8) are proposed for additional construction and renovations to accommodate advanced HPEM development. Building 323, a Research, Development, Testing, and Evaluation (RDT&E) laboratory, was constructed in 1991 and is therefore not yet subject to consideration of NRHP eligibility due to its relatively recent, post-Cold War construction. Building 322, also an RDT&E laboratory, was constructed in 1972. It was determined to be eligible for inclusion in the NRHP in 2003 for its association with Cold War pulsed power research (Hare, 2003a).

Demolition. Thirteen properties are proposed for demolition (Table 3-9) in order to offset the proposed new HPEM construction. Seven of the properties are eligible for inclusion in the NRHP. Buildings 243, 57003, 57004, and 57012, laboratories, are eligible for inclusion in the NRHP

(Hare, 2003a; Hare, 2003b). Building 243 is significant for its association with Cold War airborne laser research, while Buildings 57003, 57004, and 57012 is associated with Cold War nuclear effects testing.

Table 3-8: Properties Proposed for Addition and/or Renovation

Facility No.	Type	Build Date	NRHP Status and SHPO Concurrence	Historic Theme
322[a]	RDT&E Laboratory, Dynamics Environment	1972	Eligible (1/5/03)	Pulsed Power Studies
323	RDT&E Laboratory, Radiation	1991	Not yet evaluated (post-Cold War)	n/a

a. Under the Proposed Action, building 322 is anticipated to undergo renovations in addition to a 48,000 ft^2 addition

Buildings 909, 910, 911, 912, and 913 are eligible for inclusion in the NRHP. They are contributing elements of the 34th Air Division Historic District (Hare, 2002a). The NRHP-eligible historic district represents early Cold War air defense activities of the 1950s (KAFB, 2018b; Van Citters & Bisson, 2003). Building 908, located within the district boundaries, is not eligible for inclusion in the NRHP and dates past the period of significance (1952 to 1960) for the district (Zook, 2016).

Buildings 906 and 907 are located approximately 30 ft outside the 34th Air Division Historic District, and date post the period of significance (1952 to 1960) for the district. Buildings 906 and 907, support facilities, have been determined not eligible for inclusion in the NRHP (Hare, 2002a).

Table 3-9: Properties Proposed for Demolition

Facility No.	Type	Build Date	NRHP Status and SHPO Concurrence	Historic Theme
243	RDT&E Laboratory, Laser	1970	Eligible (1/5/03)	Airborne Laser Development
324	General Administrative Building	1996	Not yet evaluated (post-Cold War)	n/a
326	General Administrative Building	1996	Not yet evaluated (post-Cold War)	n/a
430	General Administrative Building	1990	Not yet evaluated (post-Cold War)	n/a
906	RDT&E Laboratory, Nucleonics	1975	Not Eligible (11/4/02)	n/a
907	Research Equipment Storage	1970	Not Eligible (11/4/02)	n/a
908	RDT&E Laboratory, Radiation	1968	Not Eligible (2/12/16)	n/a
909	RDT&E Laboratory, Personnel Research	1952	Eligible (9/23/02)	Early Cold War Air Defense
910	Utility Building, Heating	1952	Eligible (9/23/02)	Early Cold War Air Defense
911	RDT&E Facility, Electronics	1951	Eligible (9/23/02)	Early Cold War Air Defense
912	RDT&E Facility, Electronics	1952	Eligible (9/23/02)	Early Cold War Air Defense
913	Utility Building, Heating	1952	Eligible (9/23/02)	Early Cold War Air Defense
57003	RDT&E Laboratory, Soil Engineering Science Lab	1964	Eligible (3/24/03)	Blast and Shock Effects
57004	RDT&E Laboratory, Civil Engineering Science	1963	Eligible (3/24/03)	Blast and Shock Effects
57012	RDT&E Laboratory, Civil Engineering Science	1969	Eligible (3/24/03)	Blast and Shock Effects

The remaining three buildings, administrative facilities 324, 326 and 430, were constructed during the 1990s. Therefore, they are not yet subject to consideration of NRHP eligibility due to their relatively recent construction after the Cold War.

Divestment. Two properties are proposed for divestment (Table 3-10) in order to offset the proposed new HPEM construction. Building 914, built in 1971 for Cold War electromagnetic pulse research, is individually eligible for the NRHP (Hare, 2002a). Building 499, an administrative facility, dates to the Cold War but is not eligible for inclusion in the NRHP (Zook, 2013).

Table 3-10: Properties Proposed for Divestment

Facility No.	Type	Build Date	NRHP Status and SHPO Concurrence	Historic Theme
499	General Administrative Building	1955	Not Eligible (6/24/13)	n/a
914	RDT&E Laboratory, Nuclear Engineering	1971	Eligible (9/23/02)	Electromagnetic Pulse Testing

3.5.2 Environmental Consequences

Adverse impacts or effects to historic properties might include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the historic property out of agency ownership (or control) without adequate enforceable restrictions or conditions to ensure preservation of the property's historic significance.

The exact APE for the HPEM project will be defined by the Kirtland AFB CRM, New Mexico SHPO, tribes/pueblos, and interested stakeholders.

3.5.2.1 Proposed Action

Implementation of the Proposed Action at Kirtland AFB would result in long-term, significant, adverse impacts to architectural properties but would have no impact on archaeological or traditional cultural properties.

Archaeological and Traditional Cultural Properties. There are no archaeological sites located within the vicinity of any of the potentially affected buildings. At present there are no known Native American burial grounds or sacred areas located on Kirtland AFB (KAFB, 2018b). If any cultural resources, such as human remains or artifacts, are inadvertently encountered during the project, work in the area shall be halted, the immediate vicinity of the resource shall be secured, and the KAFB CRM shall be notified. Work would not continue until the KAFB CRM evaluates the site and determines appropriate steps to move forward, to include engaging with local Native American Tribes and Pueblos if necessary.

Architectural Properties. Under the Proposed Action, the USAF is proposing to construct a 48,000 ft^2 addition to the north side of Building 323, and to renovate 10,970 ft^2 and 9,000 ft^2 of existing laboratory space in Buildings 322 and 323, respectively. These renovations would produce a modern, flexible HPEM laboratory space for AFRL/RDH development of advanced HPM systems and HEDP research.

Regarding structures designated for renovations:

- Building 323 is less than 30 years old, and therefore not subject to consideration of NRHP eligibility.
- Building 322 is eligible for inclusion in the NRHP. The interior renovations to Building 322 may result in an adverse effect to historic properties.

In order to offset the proposed new HPEM construction by reducing the footprint of existing AFRL property, the Proposed Action also includes the demolition of 13 buildings:

- Building 324, 326, and 430, constructed during the 1990s, are not historic.
- Buildings 243, 909, 910, 911, 912, 913, 57003, 57004, and 57012 are eligible for inclusion in the NRHP. Their demolition would result in an adverse effect to historic properties—both to the individual buildings and to the 34th Air Division Historic District (Buildings 909, 910, 911, 912 and 913).
- Buildings 906 and 907, support facilities, are not located within the 34th Air Division Historic District and date post the period of significance (1952 to 1960) for the district. Buildings 906 and 907 are not currently eligible for the NRHP.

Lastly, two properties are proposed for divestment in order to offset the proposed new HPEM construction.

- Building 499 is not eligible for inclusion in the NRHP.
- Building 914, built in 1971 for Cold War electromagnetic pulse research, is eligible for the NRHP. The divestment of Building 914 may result in an adverse effect to historic properties.

Through coordination with the SHPO, impacts to NRHP-eligible facilities can be resolved by completing full HABS/HAER documentation of each building. This includes, at a minimum, large-format photography and measurements of each facility, archival document production, and lifetime storage for all documentation. Upon completion of HABS/HAER documentation for each impacted facility, and through a memorandum of agreement with the SHPO, impacts to historic properties would be reduced to negligible.

3.5.2.2 No Action Alternative

Under the No Action Alternative, the USAF would take no action, and no construction or renovations would occur. AFRL would continue to use existing facilities and lease additional space from SNL and Kirtland AFB, and no adverse impacts would occur to any existing cultural resource.

3.6 HAZARDOUS MATERIALS AND WASTES

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 §173. Transportation of hazardous materials is regulated by the US Department of Transportation regulations within 49 CFR Parts 105–180.

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) 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." 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 § 273. Four types of waste are currently covered under the universal waste regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected as part of waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

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 materials (ACM), polychlorinated biphenyls (PCBs), and lead-based paint (LBP). USEPA is given authority to regulate these special hazard substances by the Toxic Substances Control Act (15 USC § 53). USEPA has established regulations regarding asbestos abatement and worker safety under 40 CFR § 763, with additional regulations concerning emissions at 40 CFR § 61. The disposal of PCBs is addressed in 40 CFR §§ 750 and 761. Appropriate disposal of LBP-containing debris is dependent on testing of representative waste streams, typically via the toxicity characteristic leaching procedure (TCLP). If TCLP analysis indicates representative debris meets toxicity characteristic for lead, it is regulated by RCRA under 40 CFR § 261. The presence of toxic substances, including describing their locations, quantities, and condition, assists in determining the significance of a proposed action.

The DOD developed the Environmental Restoration Program (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). The Installation Restoration Program and Military Munitions Response Program (MMRP) are components of the ERP. The Installation Restoration Program requires each DOD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The MMRP addresses non-operational rangelands that are suspected or known to contain unexploded ordnance (UXO), 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).

DOE developed the Office of Environmental Restoration and Waste Management in 1989. The goal of this office is to implement DOE's policy of ensuring that past, present, and future operations do not threaten human health or environmental health and safety. The DOE Environmental Management Office was reorganized in 1999 to implement procedures to meet these goals through five underlying offices. The 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. As a facility operated for DOE under the Albuquerque Operations Office, SNL is part of this program. The current investigation being conducted at SNL under the ER program 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 32-7000 series incorporate the requirements of all federal regulations and other Air Force Instructions (AFI) and DOD Directives for the management of hazardous materials, hazardous wastes, and toxic substances.

3.6.1 Affected Environment

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*; 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.

All personnel, to include contractors, are made aware of the Kirtland AFB EMS program. All project-related activities should be conducted in a manner that is consistent with relevant policy and objectives identified in the installation's EMS program. Project Managers shall 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. AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of hazardous materials throughout the USAF to be in compliance with the Emergency Planning and Community Right to Know Act. AFI 32-7086 applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or track any of those activities.

Kirtland AFB has identified the 377 MSG/CEIEC as the responsible entity to oversee hazardous material tracking on the installation. Part of their 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. Contractors bringing hazardous materials onto the installation must notify the 377 MSG/CEIEC Hazardous Material Program Team by submitting a completed Hazardous Material Worksheet and a list of all materials along with their associated Safety Data Sheets (SDSs).

The Kirtland AFB Spill Prevention, Control, and Countermeasures 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 (KAFB, 2018c).

Contractors, to include construction workers, who transport hazardous materials to Kirtland AFB must get prior approval by submitting associated SDSs and a Hazardous Material Worksheet to the 377 MSG/CEIEC Hazardous Material Program Team.

Hazardous and Petroleum Wastes. The USAF maintains a Hazardous Waste Management Plan (HWMP) as directed by AFI 32-7042, *Waste Management*. This plan describes the roles and responsibilities of all entities at Kirtland AFB with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. 377 MSG/CEIEC is charged with managing hazardous materials to reduce the amount of hazardous waste generated on the installation in accordance with the Kirtland

HWMP (KAFB, 2018d). The HWMP establishes the procedures to comply with applicable federal, state, and local standards for solid waste and hazardous waste management.

Kirtland AFB is a large-quantity generator of hazardous waste (USEPA ID #NM9570024423). Kirtland AFB and the DOE/SNL maintain separate RCRA permits for all current operations that generate hazardous waste.

Toxic Substances. Facilities constructed prior to 1990 are likely to contain ACM, and those constructed prior to 1978 could contain LBP and PCBs. Given the age of Kirtland AFB, for many facilities there is a high potential for encountering these toxic substances during demolition and renovation processes.

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 is working to cleanup most sites to residential standards and to obtain no further action required approval from NMED. Once sites achieve the no further action required approval, they no longer represent constraints for land use and are closed. Active ERP sites are in various stages of remediation and some sites, such as the former landfills, may require more than 30 years of monitoring before closure can be obtained (KAFB, 2016).

Kirtland AFB has seven active MMRP sites that are former impact areas primarily located along the outer perimeter of the installation. The sizes, types of munitions debris, and potential for UXO varies by location.

The DOE actively manages 11 open ER sites on Kirtland AFB that require or may require corrective action. These sites are on DOE-leased lands and include three groundwater areas of concern and eight solid waste management units. When such sites are no longer active, DOE personnel determine if a site meets NMED criteria for acceptable levels of risk to human health and the environment. If the criteria are met, DOE submits a Corrective Action Complete proposal to NMED to modify its RCRA permit accordingly. As necessary, remediation is performed to meet NMED criteria for Corrective Action Complete status (SNL, 2017b). Figure 3-3 presents the location of active ERP, MMRP, and DOE ER sites on Kirtland AFB.

3.6.2 Environmental Consequences

Implementation of the Proposed Action would result in short-term, minor, adverse impacts on hazardous materials, hazardous waste, petroleum products, petroleum wastes, and toxic materials. The removal of toxic substances from Kirtland AFB may be considered a long-term, negligible, beneficial impact.

3.6.2.1 Proposed Action

Hazardous Materials/Wastes and Petroleum Products/Wastes. Short-term, minor adverse impacts on hazardous materials and hazardous wastes would occur during construction and demolition activities associated with the Proposed Action. Both construction and demolition activities would require the use of hazardous materials (in the form of structural coatings, adhesives, solvents, welding materials, etc.) and petroleum products (fuels, lubricants, hydraulic fluids, etc.). Negligible amounts of hazardous wastes would be generated from the same processes. Construction equipment would be well maintained, and absorbent materials placed under them when parked if a leak hazard exists. Additional hazardous wastes would be generated in the form of debris from demolition processes. The contractors performing the work would be responsible for containing, storing, managing, and coordinating the disposal of all hazardous

wastes generated during the Proposed Action. Contractors would be required to adhere to all federal, state and local regulations, to include those instituted by Kirtland AFB.

No long-term impacts from daily operation of the new and renovated HPEM facilities would exist as future operations would not significantly differ from those currently performed. While AFRL would utilize hazardous materials and generate hazardous wastes in the new facilities, this would be offset by ceasing research operations in other facilities planned for demolition or divestment. No new hazardous materials or wastes are expected to be used. AFRL would continue to operate in accordance with the KAFB HWMP to manage any generated wastes.

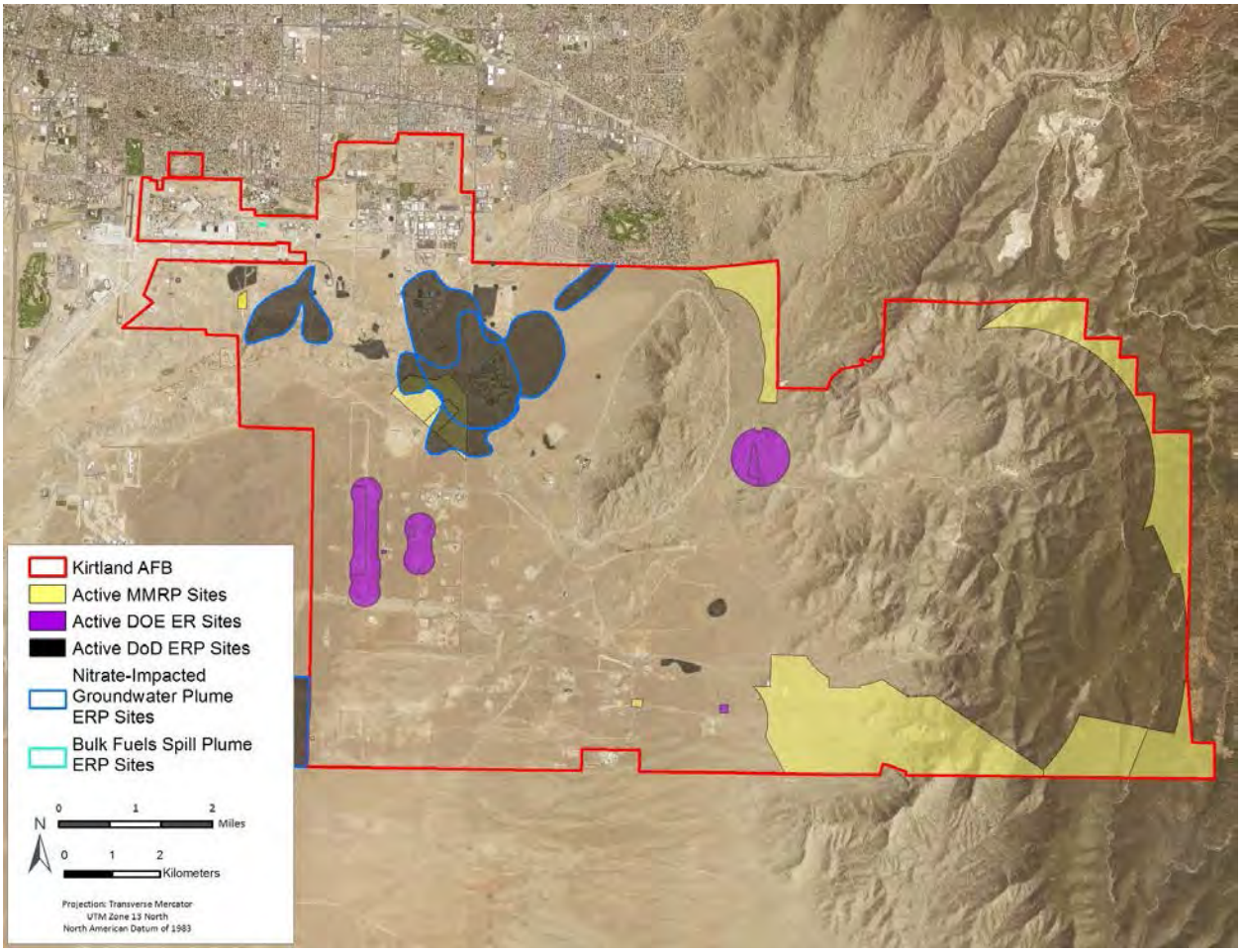


Figure 3-3: Active MMRP, DOE ER, and DOD ERP Sites at Kirtland AFB

Toxic Substances. Short-term, minor, adverse impacts from toxic hazards would occur during demolition processes as structures containing LBP, ACM, and PCBs are likely to be encountered. Surveys would be performed by certified personnel to determine the presence and extent of such materials prior to demolition. Plans would be generated based on the results of the exploratory surveys to identify any areas where controls may be necessary to reduce the hazard to workers and prevent the release of toxic materials from the site. Per NMAC 20.11.20.22, AEHD-AQD would be notified if abatement of ACM is anticipated to exceed 75,000 ft^3. All hazardous debris would be disposed of at a USEPA-approved facility.

The removal of toxic substances from Kirtland AFB may be considered a long-term beneficial impact by reducing the likelihood of human and environmental exposure to these materials.

Environmental Restoration Program. No construction activity is or soil disturbance at any MMRP, DOE ER, or DOD ERP site would occur as the Proposed Action is not located in any such area.

3.6.2.2 No Action Alternative

Under the No Action alternative, the USAF would take no action, and no construction or renovations would occur. Since no construction or demolition activities would occur, no hazardous materials of any sort would be generated and the existing conditions described in Section 3.6.1 would remain unchanged.

3.7 SAFETY

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Human health and safety address workers' and public health and safety during and following construction, demolition, and training activities.

Site safety requires adherence to regulatory requirements imposed for the benefit of employees and the public. Site safety includes implementation of engineering and administrative practices that aim to reduce risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by numerous DOD and military branch-specific requirements designed to comply with standards issued by federal OSHA, USEPA, and state occupational safety and health (OHS) agencies. These standards specify health and safety requirements, the amount and type of training required for workers, the use of personal protective equipment (PPE), administrative controls, engineering controls, and permissible exposure limits for workplace stressors.

Health and safety hazards can often be identified and reduced or eliminated before an activity begins. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself, together with the exposed (and possibly susceptible) population or public. The degree of exposure depends primarily on the proximity of the hazard to the population. Hazards include transportation, maintenance, and repair activities, and the creation of a noisy environment or a potential fire hazard. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation process creates unsafe environments due to noise or fire hazards for nearby populations. Noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

3.7.1 Affected Environment

Contractor Safety. All contractors performing construction and demolition activities are responsible for following federal and state of New Mexico safety regulations and are required to conduct construction and demolition activities in a manner that does not increase risk to workers or the public.

New Mexico is one of several states that administer their own Occupational Safety and Health (OSH) program according to the provision of the federal OSHA of 1970, which permits a state to administer its own OSH program if it meets all of the federal requirements regarding the program's structure and operations. The New Mexico Occupational Health and Safety Bureau program has the responsibility of enforcing Occupational Health and Safety Regulations within the state of New Mexico. Its jurisdiction includes all private and public entities such as city, county, and state

government employees. Federal employees are excluded as they are covered by federal OSHA regulations.

OSH programs address the health and safety of people at work. OSH regulations cover potential exposure to a wide range of chemical, physical, and biological hazards, and ergonomic stressors. The regulations are designed to control these hazards by eliminating exposure to the hazards via administrative or engineering controls, substitution, or use of PPE. Occupational health and safety is the responsibility of each employer, as applicable. Employer responsibilities are to review potentially hazardous workplace conditions; monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous substances), physical (e.g., noise propagation, falls), and biological (e.g., infectious waste, wildlife, poisonous plants) agents, and ergonomic stressors; recommend and evaluate controls (e.g., prevention, administrative, engineering, PPE) to ensure exposure to personnel is eliminated or adequately controlled; and ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to the use of respiratory protection or engaged in hazardous waste, asbestos, lead, or other work requiring medical monitoring.

Military Personnel Safety. Each branch of the military has its own policies and regulations that act to protect its workers, despite their work location. AFI 91-202, *The US Air Force Mishap Prevention Program,* "establishes mishap prevention program requirements, assigns responsibilities for program elements, and contains program management information." In order to meet the goals of minimizing loss of USAF resources and protecting military personnel, mishap prevention programs should address: groups at increased risk for mishaps, injury of illness; a process for tracking incidents; funding for safety programs; metrics for measuring performance; safety goals; and methods to identify safety BMPs.

Public Safety. Kirtland AFB has its own emergency services department. The emergency services department provides the installation with fire suppression, crash response, rescue, emergency medical response, hazardous substance protection, and emergency response planning and community health and safety education through the dissemination of public safety information to the installation. The Veterans Affairs Medical Center hospital and the 377th Medical Groups' Outpatient Clinic are the primary military medical facilities at Kirtland AFB. Several other hospitals and clinics, which are devoted to the public, are located off-installation in the city of Albuquerque. These facilities include the Heart Hospital of New Mexico, University of New Mexico Hospital, and Kaseman Presbyterian Hospital.

Albuquerque Fire Rescue (AFR) provides fire suppression, crash response, rescue, emergency medical response, and hazardous substance response to the nearby city of Albuquerque. The AFR has 704 full-time, uniformed firefighter/emergency medical technicians; 23 fire engine companies; seven fire ladder companies; four wildland task force stations; three hazardous materials task forces; one mobile command unit; and 20 frontline rescue and seven rescue reserve medical response ambulances (AFR, 2018; City of Albuquerque, 2019). The city of Albuquerque also has approximately 831 sworn police officers available to provide law enforcement services (APD, 2016). The Southeast Area Command (Phil Chacon Memorial Substation) borders the northwest corner of Kirtland AFB. A mutual service agreement is in place between the city of Albuquerque and Kirtland AFB.

3.7.2 Environmental Consequences

3.7.2.1 Proposed Action

Implementation of the Proposed Action would result in short-term, negligible, adverse impacts on the safety of contractors, military personnel, and members of the public.

Contractor Safety. The Proposed Action would result in a short-term, negligible, adverse impact on the health and safety of contract personnel working on this project. Construction and demolition activities associated with the Proposed Action would slightly increase the health and safety risk to personnel within the project areas. The selected company performing the work would be required to develop a comprehensive health and safety plan detailing all potential hazards and site-specific guidance to ensure potential safety risks are minimized. The plan would include, at a minimum, emergency response and evacuation procedures; operating manuals; PPE recommendations; procedures for handling, storing, and disposing of hazardous materials and wastes; information on the effects and symptoms of potential exposures; and guidance with respect to hazard identification. Contracted personnel would be responsible for compliance with applicable federal, state, and local safety regulations and would be educated though daily safety briefings to review upcoming work activities and associated hazards. Only certified contractors would be allowed to perform remediation for toxic materials such as ACM or LBP, would wear appropriate PPE at all times, and be required to adhere to all federal, state, and local regulations during abatement. Therefore, the Proposed Action would not be expected to result in a significant impact on contractor safety.

Military Personnel Safety. The Proposed Action would result in a short-term, negligible, adverse impact on the health and safety of military personnel that work near the construction and demolition sites. Construction and demolition activities associated with the Proposed Action would comply with all applicable safety requirements and installation-specific protocols and procedures, including appropriately marking potentially hazardous area and posting warning signs and barriers to limit access to approved construction and oversight personnel only. Upon completion of construction and demolition activities, no further safety hazard would remain. Therefore, the Proposed Action is not expected to result in a significant impact on the safety of military personnel.

Public Safety. The Proposed Action would result in a short-term, negligible, adverse impact on the health and safety of the public. Construction and demolition activities associated with the Proposed Action would comply with all applicable safety requirements and installation-specific protocols and procedures, including appropriately marking potentially hazardous area and posting warning signs and barriers to limit access to approved construction and oversight personnel only. Upon completion of construction and demolition activities, no further safety hazard would remain. Therefore, the Proposed Action is not expected to result in a significant impact on public safety.

3.7.2.2 No Action Alternative

Under the No Action alternative, the USAF would take no action, and no construction or renovations would occur. The existing conditions described in Section 3.7.1 would remain unchanged, and no new safety concerns would result.

4.0 CUMULATIVE IMPACTS

CEQ defines cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR §1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time by various agencies (i.e., federal, state, and local) or individuals. Informed decision-making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future. Reasonably foreseeable future actions consist of activities that have been approved and can be evaluated with regard to their impacts.

This section briefly summarizes past, present, and reasonably foreseeable future projects within the same general geographic scope as the Proposed Action. The geographic scope of the analysis varies by resource area. For example, the geographic scope of the cumulative impacts on noise, geological resources, and safety is narrow and focused on the location of the resource. The geographic scope of air quality, infrastructure, and socioeconomics is broader and considers more county- or region-wide activities.

The past, present, and reasonably foreseeable future projects, identified below, make up the cumulative impact scenario for the Proposed Action. The Proposed Action's impacts on the individual resource areas analyzed in Sections 3.1 through 3.7 are added to the cumulative impact scenario to determine the cumulative impacts of the Proposed Action. In accordance with CEQ guidance, the impacts of past actions are considered in aggregate as appropriate for each resource area without delving into the historical details of individual past actions.

4.1 IMPACT ANALYSIS

4.1.1 Past Actions

Kirtland AFB has been used for military missions since the 1930s and has continuously been developed as DOD missions, organizations, needs, and strategies have evolved. Development and operation of training ranges have impacted thousands of acres with synergistic and cumulative impacts on soil, wildlife habitats, water quality, and noise. Beneficial impacts also have resulted from the operation and management of the installation including increased employment and income for Bernalillo County, the city of Albuquerque, and its surrounding communities; restoration and enhancement of sensitive resources such as Coyote Springs wetland areas; consumptive and nonconsumptive recreation opportunities; and increased knowledge of the history and pre-history of the region through numerous cultural resources surveys and studies.

4.1.2 Present and Reasonably Foreseeable Actions

Kirtland AFB is a large military installation that is continually evolving. Projects that were examined for potential cumulative impacts are included in Table 4-1 for military activities and Table 4-2 for non-military activities

Table 4-1: Present and Reasonably Foreseeable Military Actions at Kirtland AFB

Project Name	Description	Potential Relevance to Proposed Action
New Military Training Activities	The 210 RED HORSE Squadron (RHS) would conduct monthly training activities on the Base Exercise Evaluation and Skills Training Area. Monthly training activities involve the disturbance of up to 40 acres of ground and include the use of the abandoned dirt airstrip to practice demolishing, denying access to, and reconstructing airstrips; construction of forward operating bases to allow other units to train with the 210 RHS tearing them down; and dirt movement for heavy-equipment training. This recurring training could last up to 5 days and involve approximately 120 personnel. The Pararescue/Combat Rescue Officer (PJ/CRO) school is proposing to construct an Urban Training Compound (UTC) on 25 acres within the Coyote Canyon Training Area. The UTC would consist of the placement of connexes on a gravel base to simulate a mock village similar to those found in the Middle East. Training activities would include helicopter pararescue and insertion/extraction operations. Other training activities would include small team tactics, climbing, and emergency medical. During training activities at the UTC, personnel would use smokes, ground burst simulators, trip flares, flash-bang pyrotechnics, booby trap simulators, and blanks/simunitions. When the UTC is not scheduled for use by PJ/CRO, it would be open for use by other groups. Therefore, it is anticipated that the UTC could be used on a monthly basis. The USAF is proposing to begin firing .50-caliber M107 Barrett sniper rifles and M2 machine guns at Small Arms Range (SAR) East. An existing building south of Forest Road 44 would be demolished in order 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 FRs 40, 40B, 530B, and 53. SAR East would continue to be available for training operations and deployment qualification 24 hours a day, 7 days a week. The 377th Security Forces Group (SFG) would begin using the M583A1 parachute illumination round at the M203 Range. This round has a burst height of 500 to 700 feet above ground surface when fired vertically, a candle burn rate of approximately 40 seconds, and an average candlepower of 90,000. The average class using the illumination round would consist of 15 to 30 students, once per month. It is anticipated that an average of 250 to 500 rounds would be dispensed per year. Training would occur during early morning hours, approximately 0300 to 0500, dependent upon coordination with the FAA and air traffic scheduling. Prior to initial use of this round, firebreaks consisting of cleared paths totaling approximately 8 acres would need to be created. The cleared paths would also be used for emergency vehicle access in case of an accidental fire.	Not in the project area.
Additional Development, Testing, Use, and Training at the Technical Evaluation Assessment Monitor Site (TEAMS)	The Defense Threat Reduction Agency and USAF propose to enhance the testing and training capabilities and use, as well as the functionality, of the TEAMS. Specifically, the proposed facilities and activities include: a new 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.	Not in the project area. Construction could potentially overlap, slightly impacting the generation of airborne dust.
Demolition and Construction of Military Support Facilities	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 square feet and construction of facilities totaling approximately 389,000 square feet, resulting in a net decrease of approximately 109,000 square feet of building space on the installation. Approximately 36 acres would be impacted by construction and demolition activities.	Not in the project area. Construction could potentially overlap, slightly impacting the generation of airborne dust.

Project Name	Description	Potential Relevance to Proposed Action
Construction, Operation, and Maintenance of a New Fire Station	USAF proposes to construct, operate, and maintain a new Fire Station south of the intersection of Pennsylvania Street and Powerline Road. The proposed structure would be approximately 7,300 square feet in size and one story high with three high-bay drive-through apparatus stalls.	Not in the project area. Construction could potentially overlap, slightly impacting the generation of airborne dust.
Building Demolition at Kirtland AFB	USAF is in the process of demolishing 23 buildings totaling approximately 105,000 square feet 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.	Not in the project area. Demolition could potentially overlap, slightly impacting the generation of airborne dust.
Security Forces Complex	USAF proposes to construct, operate, and maintain a 42,500-square-foot security forces complex to provide adequate space and modern facilities to house all 377 SFG administrative and support functions in a consolidated location. The 377 SFG 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 square feet) within the footprint of the proposed security forces complex would be demolished. This project would result in an increase of 41,621 square feet of building space on the installation.	Not in the project area. Construction and demolition could potentially overlap, slightly impacting the generation of airborne dust.
Construct New Military Working Dog Facility	USAF proposes to construct, operate, and maintain a new military working dog facility that consists of 14 indoor/outdoor kennels, four isolation kennels, storage and staff space, restrooms, food storage room, a covered walkway, and a veterinarian examining room, totaling 8,000 square feet. 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 square feet would also be included in this project, resulting in a net increase of 5,480 square feet of building space on the installation.	Not in the project area. Construction and demolition could potentially overlap, slightly impacting the generation of airborne dust.
21st Explosive Ordnance Division Expansion	The 21st Explosive Ordnance Division proposes facility expansion and site improvements for the Weapons of Mass Destruction Company Complex. This unit currently operates from a 90-acre property leased by the US Army within Kirtland AFB. The current site has seven structures, six of which are substandard and do not have adequate fire protection. The 21st Explosive Ordnance Division proposes to expand this site to a total of 280 acres, add three permanent structures totaling 40,000 square feet, demolish five of the six substandard structures (75,000 square feet), add two temporary storage containers, tie in to 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 square feet of building space on the installation.	Not in the project area. Construction and demolition could potentially overlap, slightly impacting the generation of airborne dust.
New Deployable Structures Laboratory	AFRL is proposing to construct a new 4,125-square-foot high-bay addition to the southeast corner of Building 472. Proposed new construction would include structural pads on columns and trusses for anchoring active gravity off-load support frame; high precision environmental controls (temperature and humidity with low air currents); Gantry crane; and optically-diffuse wall coatings for high precision optical motion metrology system (videogrammetry).	Construction could potentially overlap, slightly impacting the generation of airborne dust and noise.

Project Name	Description	Potential Relevance to Proposed Action
Enhanced Use Lease	Kirtland AFB is in the process of leasing 107 acres of USAF property along Gibson Boulevard to Thunderbird Kirtland Development, Ltd., to develop a research park with office, industrial, laboratory, retail, and hospital facilities.	A portion of the Proposed Action occurs directly south and adjacent to the western portion of this project. Construction operations could potentially overlap, slightly impacting the generation of airborne dust and noise.
Navigation Technology Satellite Integration Laboratory	AFRL is proposing to construct a 10,000-square-foot high bay laboratory south of Building 590. The facility would contain office space; Near Field Antenna Range and control room; vault; security vestibule; restrooms; loading dock; and conference, break, storage, communications, and mechanical rooms.	Construction could potentially overlap, slightly impacting the generation of airborne dust and noise.
Kirtland Exhaust Helium Gas Recovery Facility	AFRL is proposing to construct a 3,700-square-foot facility between Buildings 580 and 581 to recover helium gas exhaust from experiments occurring within these buildings. The recovered gas would be reliquefied for reuse in the laboratories.	Construction could potentially overlap, slightly impacting the generation of airborne dust and noise.
Renewable Energy Projects	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 photovoltaic systems.	May occur near project area. Construction and could potentially overlap, slightly impacting the generation of airborne dust.
Upgrade, Stormwater Drainage System and Arroyo Repair Activities	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 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 towards a stable slope.	Unknown location. If done concurrently in the project area, may affect location of project storm water controls during construction and demolition, could also slightly impact noise and airborne dust generation

Project Name	Description	Potential Relevance to Proposed Action
Zia Park Area Development Plan	Zia Park is comprised of land bounded by Gibson Boulevard to the north, Pennsylvania Street to the east, Hardin Boulevard to the south, and Kirtland Road and Louisiana Boulevard to the west. Zia Park encompasses approximately 300 acres of land east of the airfield, in the center of the installation. Within the next 5 years, the New Mexico Army National Guard's 515th Regional Training Institute (RTI) proposes to relocate from Santa Fe to the area adjacent to the PJ/CRO Campus within Zia Park. The plan for Zia Park also includes the creation of an east-west vehicular connection for the installation in order to establish a cohesive community core. Proposed projects include: relocation of the 515 RTI; expansion of the PJ/CRO Campus; development of vehicular, pedestrian, and bicycle circulation; parking; and community facilities such as the medical/dental clinics, pharmacy, dining facility, unaccompanied housing, outdoor recreational facilities, and a state-of-the art physical fitness center. Proposed activities are projected to occur up to 20 years into the future and would complete the long-term vision for Zia Park.	Not in the project area. Construction could potentially overlap, slightly impacting the generation of airborne dust and noise.
Combat Rescue Helicopter Recapitalization	The USAF proposes a one-to-one replacement of the existing HH-60G helicopter fleet at Kirtland AFB with the new HH-60W model. Associated projects include construction of a two-story 11,000 square foot addition to Building 957, and demolition of Buildings 954 and 960 (8,277 square feet) to construct a new 35,973 square foot flight simulator facility.	Not in the project area. Construction could potentially overlap, slightly impacting the generation of airborne dust and noise.
UH-1N Helicopter Transition	The USAF proposes to replace the existing 6 UH-1N helicopters at Kirtland AFB with 10 MH-139 helicopters. Associated projects include construction of a 35,776 square foot addition containing three 60 feet x 60 feet high bays to Building 951, a 4,800 square foot addition to Building 957, a 75,000 square foot facility near Hangar 1001, a 23,400 square foot parking lot, and demolition of Buildings 953 and 924 (29,235 square feet).	Not in the project area. Construction could potentially overlap, slightly impacting the generation of airborne dust and noise.
New Mexico Army National Guard (NMArmyNG) 515th Regional Training Institute	The NMArmyNG proposes to relocate their 515th RTI from the Onate Training Complex in Santa Fe to Kirtland AFB. Construction includes a 366,000 square foot 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 would include an educational facility, billeting, dining facilities and associated parking.	Not in the project area. Construction could potentially overlap, slightly impacting the generation of airborne dust and noise.

Table 4-2: Present and Reasonably Foreseeable Non-Military Actions at Kirtland AFB

Project Name	Description	Potential Relevance to Proposed Action
Sunport South Business Park *(formerly Valle del Sol)*	Sunport South Business Park is a proposed 330-acre business park expected to attract manufacturing, fabrication, warehousing, and distribution centers. It will be multi-modal to include access to the Sunport and an active rail spur. An additional 200 acres will be reserved for bike trails and walking paths. The site is south of the Sunport.	Not in the project area. No anticipated impacts.
Albuquerque International Sunport Projects	The Sunport began the Terminal Improvement Project in February 2017. This project will refurbish and upgrade the ticketing, baggage claim, and exterior areas of the terminal. It is anticipated to take approximately 15 months to complete. Development began on the Destination Sunport project in March 2017. The project will transform decommissioned Runway 17/35, approximately 80 acres, into space for aviation and aerospace businesses, high tech companies, and retail. The Aviation Center of Excellence is the centerpiece of the development, which also features "The Landing" a 10-acre strip along Gibson Boulevard that will contain retail businesses. Future projects planned for the Sunport over the next 20 years include rehabilitation of various runways, taxiways, and aprons; installation/expansion of aprons and taxiways; removal/closure of taxiways; construction of an Aircraft Rescue Firefighting Facility; removal of the Belly Freight Building; construction of an addition to Concourse B; and construction of a Federal Inspection Services/International Terminal.	Runway 17/35 is west of the of KAFB and shares a fence line. Projects in this area could be within 0.25 of project areas. Construction could potentially overlap, slightly impacting the generation of airborne dust and noise in the area.
Interstate 25 (I-25) and Rio Bravo Interchange	The New Mexico Department of Transportation (NMDOT) is currently reconstructing the I-25 and Rio Bravo Interchange and the Rio Bravo roadway corridor from University to the AMAFCA channel. Improvements include a new intersection layout at I-25/Rio Bravo and new roadway pavement and features within the right-of-way infrastructure including multi-modal improvements.	Not in the project area. No anticipated impacts.
Sunport Boulevard Extension	NMDOT has proposed an expansion project for Sunport Boulevard from Broadway Boulevard to I-25, consisting of constructing a four-lane median divided urban arterial roadway. The roadway is approximately 0.5 mile in length and would contain twin bridges over both the existing AMAFCA South Diversion Channel and twin bridges over Edmunds Street.	Not in the project area. No anticipated impacts.
Albuquerque-Bernalillo County Water Utility Authority (ABCWUA) Water Treatment Facility on Kirtland AFB	To accommodate future growth in Bernalillo County, ABCWUA proposes to construct a wastewater treatment plant on Kirtland AFB. This project is proposed to occur between 2027 and 2037 on approximately 60 acres of land near the western boundary of the installation, south of Tijeras Arroyo.	Not in the project area. No anticipated impacts.
Juan Tabo Hills West	Juan Tabo Hills West is Phase 4 of the Voltera Village community and sits on approximately 25 acres near Juan Tabo Boulevard and the Tijeras Arroyo. Phase 4 would consist of 250 single-family lots.	Not in the project area. No anticipated impacts.
AMAFCA Louisiana-Gibson Regional Drainage Facility	AMAFCA is constructing a 30-acre-foot drainage facility on Kirtland AFB at the southeast quadrant of the Louisiana/Gibson intersection in order to collect and limit stormwater runoff. Currently, stormwater flow off Kirtland AFB is not controlled and causes damage downstream of the installation, contributing to flooding in the San Pedro/Gibson area. Proposed to begin in the fourth quarter of Fiscal Year 2018.	Not in the project area. No anticipated impacts.

Project Name	Description	Potential Relevance to Proposed Action
Valle de Oro Phase II	USFWS is proposing to conduct restoration, development, and management activities on Valle de Oro National Wildlife Refuge (NWR) in Bernalillo County. The refuge is 570 acres primarily located between 2nd Street SW and the Rio Grande in the South Valley, approximately 3.5 miles southwest of the Sunport and Kirtland AFB. Proposed activities include habitat restoration; construction of a visitor's center, a parking lot, trails, and roads; vegetation and wildlife management; construction and management of AMAFCA stormwater drainage facilities, including a swale and water quality structures; and in partnership with Mid-Rio Grande Conservancy District align the Barr Interior Drain.	Not in the project area. No anticipated impacts.
Mesa del Sol Master Plan	Mesa del Sol is a 12,900-acre, mixed-use master planned community. It is bound by the Sunport along the northwestern edge, Kirtland AFB on the north and east, the Isleta reservation to the south, and I-25 to the west. The community would be built over 40 years and would cover 9,000 of the 12,900 acres. It is proposed to include 3,200 acres for park and open space; 4,400 acres for residential and supporting retail; 413 acres of office space; and 800 acres for schools, including university branches.	Not in the project area. No anticipated impacts.
Prescribed Endemic Refuge Connected Habitat Areas (PERCHAs) Project	USFWS, through the Valle de Oro NWR, in cooperation with Bernalillo County, is proposing to develop native habitat areas on County properties within existing County-owned and –maintained drainage facilities. The County and Valle de Oro NWR are working together to establish forage and habitat areas for wildlife with the goal of linking County properties and the Albuquerque South Valley with the Valle de Oro NWR, so the PERCHAs are viewed as one whole system of habitat areas. There are approximately 15 PERCHA properties on lands owned by the County, but the initial phase of this project focuses on habitat improvements at the following four properties: approximately 8 acres at Los Padillas Community Center, 2 acres at McEwen Pond, 5 acres at Mountain View Community Center, and 14 acres at Sanchez Farms. Habitat improvements include removal of nonnative and invasive vegetation; replanting native wetland and upland grass species; installing songbird and pollinator habitat areas; creating appealing recreation space for Albuquerque residents; increasing existing drainage basins; and installing erosion control measures to include revegetation of slopes. Work at the properties is proposed to begin in June 2019 and continue for approximately 5 years.	Not in the project area. No anticipated impacts.

4.2 CUMULATIVE IMPACT ANALYSIS BY RESOURCE AREA

4.2.1 Noise

Construction, demolition, and renovations activities associated with the Proposed Action are anticipated to incur short-term, negligible, adverse impacts to noise for the duration of the project. Noise impacts are generated by the heavy equipment and tools required to perform these activities. The AFRL HPEM project is not near the boundaries of Kirtland AFB and noise impacts are not expected to be noticeable off the installation. However, several other construction and demolition projects are planned on Kirtland AFB, some of which are located in the vicinity of the Proposed Action, that would also produce noise impacts from similar activities. Any noise generated would result in only temporary increases in ambient noise levels, during construction, demolition, and renovation activities, and would largely be unnoticed by non-workers given the location of these actions. Therefore, the Proposed Action, in conjunction with other foreseeable actions both on and off-base, would not result in significant cumulative impacts to noise.

4.2.2 Air Quality

Construction, demolition, and renovation activities would result in short-term, minor, adverse impacts to air quality for the duration of the Proposed Action. No significant change in annual air emissions would be expected upon project completion. Additional construction and demolition activities that coincide with the Proposed Action may contribute to slightly increased airborne dust (primarily PM_{10}), however all such occurrences would be temporary in nature and cease upon completion of construction activities. No emissions from the Proposed Action would be considered significant for the region. Therefore, the Proposed Action, in conjunction with other foreseeable actions both on and off-base, would not result in significant cumulative impacts to air quality.

4.2.3 Geological Resources

The Proposed Action would result in short-term minor adverse impacts on geography and topography, and long-term negligible adverse impacts on soils. Any such impacts by the Proposed Action on geological resources would be constrained within project boundaries and minimized by best management practices where possible. Additionally, none of the projects listed in Table 4-1 and Table 4-2 occur in the same area. Therefore, the Proposed Action, in conjunction with other foreseeable actions both on and off-base, would not result in significant cumulative impacts to geological resources.

4.2.4 Water Resources

Short-term, minor, adverse impacts would be expected to ground water and surface water during construction and demolition activities during implementation of the Proposed Action due to ground disturbances and potential leaks from heavy equipment. Impacts can be minimized through use of best management practices and controls such as temporary barriers and absorbent pads. Present and future construction projects conducted in the same region would also be held to the same standard with minimal expected impacts. Therefore, the Proposed Action, in conjunction with other foreseeable actions both on and off-base, would not result in significant cumulative impacts to water resources.

4.2.5 Cultural Resources

Long-term, significant, adverse impacts would result from demolition of NRHP-eligible facilities during the Proposed Action; however, through agreed upon documentation with the SHPO the impacts would be reduced to negligible. Projects listed in Table 4-1 and Table 4-2 occurring in the same area, which have the potential to impact NRHP-eligible facilities, would also be required to undergo separate, project-specific, SHPO consultations. Therefore, the Proposed Action, in conjunction with other foreseeable actions both on and off-base, would not result in significant cumulative impacts to Cultural Resources.

4.2.6 Hazardous Materials and Waste

Short-term, minor, adverse impacts on hazardous materials, hazardous waste, petroleum products, petroleum wastes, and toxic materials would occur during the Proposed Action. The removal of toxic substances from Kirtland AFB may be considered a long-term, negligible, beneficial impact. Potential adverse impacts from hazardous materials and wastes and special hazards would be minimized or eliminated by following standard Kirtland AFB policies regarding use of hazardous materials and generation of hazardous and toxic wastes. Present and reasonably foreseeable projects would likewise incorporate measures to limit or control hazardous materials and wastes in their construction and operation plans. Therefore, the

Proposed Action, in conjunction with other foreseeable actions both on and off-base, would not result in significant cumulative impacts to water resources.

4.2.7 Safety

Short-term, negligible, adverse impacts on safety would occur for the duration of construction, demolition, and renovation associated with the Proposed Action. All appropriate safety requirements, including use of PPE, would be adhered to during such activities to minimize the potential for safety impacts. Applicable safety standards would also be applied to present and foreseeable projects. Therefore, the Proposed Action, in conjunction with other foreseeable actions both on and off-base, would not result in significant cumulative impacts to safety.

4.3 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts would result from implementation of the Proposed Action, however of these impacts would be considered significant. Non-renewable resources in the form of fuels would be consumed by heavy equipment during construction and demolition tasks. Construction would necessitate use of a variety of materials such on concrete, steel, wiring, etc. Use of any such material would not significantly decrease the availability of these resources to other projects. No irretrievable resources commitments would occur.

4.4 COMPATIBILITY OF THE PROPOSED ACTION WITH THE OBJECTIVES OF FEDERAL, REGIONAL, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS

Proposed Action would occur entirely within the boundaries of Kirtland AFB. Construction, demolition, and renovation activities would not be incompatible with any current land uses on the installation and would not conflict with any applicable off-installation land use ordinances. The Proposed Action would follow all applicable permitting, building, and safety requirements.

4.5 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-term effects and long-term effects. Short-term effect would be those associated with construction and demolition activities to consolidate AFRL HPEM operations. Long-term enhancement of productivity would those effects associated with operation and maintenance of the HPEM laboratories once all research personnel and operations have been collocated.

The Proposed Action represents an enhancement to long-term productivity and enhanced capability for the research and development mission of AFRL at Kirtland AFB. The negative effects of short-term impacts from construction and demolition activities would be minor compared to the long-term positive impacts by modernizing and collocating AFRL research.

4.6 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 will have on future generations. Irreversible impacts primarily result from 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. The materials that would be consumed are not in short supply, would not limit other unrelated construction activities, and would not be considered significant.

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 would be expected.

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. However, the use of human resources for the Proposed Action represents employment opportunities and is considered beneficial.

5.0 LIST OF PREPARERS

Courtney Addie, MBA
B.A. Business Management
M. Business Administration
Years of Experience: 19
HazAir, Inc.

Lindsay Brandt
B.A. English
Years of Experience: 9
HazAir, Inc.

Jessie Moore
B.S. Environmental Science
Years of Experience: 1
HazAir, Inc.

Kristen Reynolds
M.A. History
Years of Experience: 19
Versar, Inc.

Heather Seus, PMP
B.S. Environmental Engineering
Year of Experience: 19
HazAir, Inc.

Phillip Shoopman, PE
B.S. Mechanical Engineering
M.S. Environmental Engineering
Years of Experience: 25
HazAir, Inc.

Danny Taylor, PMP
B.S. Materials Engineering
Years of Experience: 12
HazAir, Inc.

This page intentionally left blank.

6.0 REFERENCES

AFR. (2018). *The Albuquerque Fire Department 2017 Annual Report*. Retrieved from City of Albuquerque: https://www.cabq.gov/fire/documents/abq-fire-2017-annual-report.pdf

APD. (2016). *ABQ Police Department 2016 Annual Report*. Retrieved from City of Albuquerque: http://www.cabq.gov/police/documents/2016-annual-report-final.pdf

City of Albuquerque. (2019). *Albuquerque Fire Rescue*. Retrieved from City of Albuquerque: https://www.cabq.gov/fire/our-department

FEMA. (2010). *Earthquake-Resistant Design Concepts: An Introduction to the NEHRP Recommended Seismic Provision for New Buildings and Other Structures.*

Garfin, G., Franco, G., Blanco, H., Comrie, A., Gonzalez, P., Piechota, T., . . . Waskom, R. (2014). Ch. 20: Southwest. In J. M. Melillo, T. Richmond, & G. W. Yohe (Eds.), *Climate Change Impacts in the United States: The Third National Climate Assessment* (pp. 462-486). U.S. Global Change Research Program. doi:10.7930/J08G8HMN

Hare, J. (2002a). *Concurrence with Letter Regarding the Eligibility of 50 Buildings (23 September, 2002).* HPD Log No. 65905.

Hare, J. (2002b). *Letter RE: Determination of Eligibility for 70 Buildings: DOD, Kirtland (4 November 2002).* HPD Log No. 66171.

Hare, J. (2003a). *Letter RE: Determination of Eligibility for 75 Buildings: DOD, Kirtland (5 January 2003).* HPD Log No. 66644.

Hare, J. (2003b). *Letter RE: Determination of Eligibility for 134 Buildings: DOD, Kirtland (24 March 2003).* HPD Log No. 67372.

KAFB. (2012). *Kirtland Air Force Base Real Estate Management Existing Facilities.*

KAFB. (2016). *Installation Development Plan, Kirtland Air Force Base, New Mexico (March 2016).*

KAFB. (2018a). *Integrated Natural Resources Management Plan, Kirtland Air Force Base, New Mexico.*

KAFB. (2018b). *Integrated Cultural Resource Management Plan, Kirtland Air Force Base, New Mexico.*

KAFB. (2018c). *Spill Prevention Control and Countermeasure Plan, Kirtland Air Force Base, NM.*

KAFB. (2018d). *Hazardous Waste Management Plan, Kirtland Air Force Base, New Mexico.*

OMB. (2013). *Management Procedures Memorandum No. 2013-02, Implementation of Memorandum M-12-12 Section 3: Freeze the Footprint. March 14, 2013.*

OMB. (2015). *Management Procedures Memorandum No. 2015-01, Implementation of Memorandum M-12-12 Section 3: Reduce the Footprint. March 25, 2015.*

OSHA. (2017). *OSHA Technical Manual Section III, Chapter 5: Noise (Revised 8/15/13).* Retrieved May 1, 2019, from https://www.osha.gov/dts/osta/otm/new_noise/index.html

Rocha, D. (2019, March 12). Email Correspondence to AFCEC Air Quality Support Team, Re: End of 20 Year Maintenance Plan.

SNL. (2017a). *Annual Groundwater Monitoring Report, Calendar Year 2016.* SAND2017-5876 R.

SNL. (2017b). *2016 Annual Site Environmental Report, Sandia National Laboratories, New Mexico.* SAND2017-8026R.

Sullivan, R. B., Giedraitis, E. A., Schilz, A. J., & Burleson, R. (2002). *Report on the Results of an Archaeological Inventory of 16,090 Acres on Kirtland Air Force Base, New Mexico.* AMEC Earth and Environmental, Inc., Albuquerque, New Mexico.

USACE. (2018). *Planning Charrette Report, Air Force Research Laboratory (AFRL) High Power Electromagnetic (HPEM) Lab Facility, Kirtland AF Base, Project No. MHMV043090.*

USDA-NRCS. (2017). *Web Soil Survey.* Retrieved May 5, 2019, from https://websoilsurvey.nrcs.usda.gov/app/

USDA-NRCS. (2018). *Farmland Classification - Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico.* Retrieved August 27, 2018, from https://websoilsurvey.nrcs.usda.gov/app/

USDOT. (2006). *Federal Highway Administration Construction Noise Handbook, Final Report (August 2006).* Retrieved May 1, 2019, from https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/

USEPA. (1974). *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* Retrieved May 1, 2019, from https://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF

USEPA. (1981a). *Noise Effects Handbook: A Desk Reference to Health and Welfare Effects of Noise, October 1979, Revised July 1981.* Office of Noise Abatment and Control. Retrieved from http://nonoise.org/epa/Roll7/roll7doc27.pdf

USEPA. (1981b). *Noise and its Measurement, January 1981.* Retrieved from http://nonoise.org/epa/Roll19/roll19doc49.pdf

USEPA. (2018). Greenhouse Gas Equivalencies Calculator. Retrieved May 2, 2019, from https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

USGS. (2002). *Simulation of Ground-Water Flow in the Middle Rio Grande Basin between Cochiti and San Acacia, New Mexico.* Water Investigations Report 02-4200.

USGS. (2003). *Simulated Effects of Ground-Water Management Scenarios on the Santa Fe Group Aquifer System, Middle Rio Grande Basin, New Mexico, 2001-40.* Prepared by Laura M. Bexfield and Douglas P. McAda. Retrieved May 2, 2019, from https://pubs.usgs.gov/wri/wri034040/pdf/wri034040.pdf

USGS. (2014). *Seismic Hazard Maps and Site-Specific Data: 2014 Long-term Model.* Retrieved May 2, 2019, from https://earthquake.usgs.gov/hazards/hazmaps/

USGS. (2019). *Earthquake Hazards Program*. Retrieved May 8, 2019, from United States Geological Survey: https://earthquake.usgs.gov/

Van Citters, K., & Bisson, K. (2003). *National Register of Historic Places Historic Context and Evaluation for Kirtland Air Force Base.* Van Citters Historic Preservation, LLC, Albuquerque, New Mexico.

Zook, B. (2013). *Letter to Colonel John C. Kubinec, Re: Correspondence, April 27, 2013, 25 KAFB Buildings and Structure Eligibility Assessments (24 June 2013).* HPD Log No. 96727.

Zook, B. (2016). *Letter to Dustin Akins, Re: NRHP Eligibility for 24 Buildings at Kirtland Air Force Base, Bernalillo County, New Mexico (12 February 2016).* HPD Log No. 102867.

This page intentionally left blank.

APPENDIX A
INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING AND PUBLIC INVOLVEMENT MATERIALS

Public Notice announcing public availability of the Draft EA, found in the legal section of the *Albuquerque Journal* 11 and 12 August

PUBLIC NOTICE

DRAFT ENVIRONMENTAL ASSESSMENT
Addressing the High-Powered Electromagnetic Laboratory at the Air Force Research Laboratory at Kirtland Air Force Base, New Mexico

A Draft Environmental Assessment (EA) was developed to evaluate the proposal for construction of a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB). The Proposed Action includes construction of a 48,000 ft² addition on the northern end of an existing AFRL facility (Building 323) and a combined 18,300 ft² of renovations at Buildings 322 and 323. In order to meet Federal footprint reduction initiatives, construction of a new facility necessitates the demolition or divestment of up to seventeen facilities unsuitable for AFRL use. The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

Copies of the Draft EA and the proposed Finding of No Significant Impact (FONSI) are available now at http://www.kirtland.af.mil/Home/Environment/ or at the San Pedro Public Library located at 5600 Trumbull Avenue SE, Albuquerque, NM 87108.

The comment period is from **12 August 2019** through **12 September 2019**. All comments must be received by 12 September 2019. Individuals wishing further information, or to contribute comments, should contact the NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB, NM 87117 or send an email to KirtlandNEPA@us.af.mil.

AGENCY DISTRIBUTION LIST

Federal, State, and Local Agencies

Regional Director
Bureau of Indian Affairs
Southwest Regional Office
1001 Indian School Road SW
Albuquerque NM 87104

Ms. Danita Burns, District Manager
Bureau of Land Management
New Mexico State Office
Albuquerque District Office
Pan American Building
100 Sun Avenue NE, Suite 330
Albuquerque NM 87109-4676

Mr. Stephen Spencer, Regional Environmental Officer
U.S. Department of Interior
Office of Environmental Policy and Compliance, Albuquerque Region
1001 Indian School Road NW, Suite 348
Albuquerque NM 87104

Mr. Terry Biggio, Regional Administrator
Federal Aviation Administration
Southwest Region
10101 Hillwood Parkway
Fort Worth TX 76177-1524

Ms. Pearl Armijo, District Conservationist
Natural Resources Conservation Service
Albuquerque Service Center
100 Sun Avenue NE, Suite 160
Albuquerque NM 87109

Mr. George MacDonell, Chief
Environmental Resources Section
U.S. Army Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque NM 87109

Ms. Anne L. Idsal, Regional Administrator
U.S. Environmental Protection Agency, Region 6
Fountain Place 12th Floor, Suite 1200
1445 Ross Avenue
Dallas TX 75202-2733

Ms. Cheryl Prewitt, Regional Environmental Coordinator
U.S. Forest Service
Southwestern Region
333 Broadway Boulevard SE
Albuquerque NM 87102-3407

Ms. Susan Lacy
DOE/NNSA Sandia Field Office
PO Box 5400
Albuquerque NM 87187

Mr. John Weckerle
DOE/NNSA Office of General Counsel
PO Box 5400
Albuquerque NM 87187

The Honorable Martin Heinrich
United States Senate
400 Gold Avenue SW, Suite 1080
Albuquerque NM 87102

The Honorable Tom Udall
United States Senate
400 Gold Avenue SW, Suite 300
Albuquerque NM 87102

The Honorable Xochitl Torres Small
United States House of Representatives
430 Cannon HOB
Washington DC 20515

The Honorable Debra Haaland
United States House of Representatives
400 Gold Avenue SW, Suite 680
Albuquerque NM 87102

The Honorable Ben R. Luján
United States House of Representatives
1611 Calle Lorca, Suite A
Santa Fe NM 87505

Stephanie Garcia Richard
Commissioner of Public Lands
New Mexico State Land Office
310 Old Santa Fe Trail
Santa Fe NM 87501

Mr. Matt Wunder, Chief
Conservation Services
New Mexico Department of Game and Fish
PO Box 25112
Santa Fe NM 87504

Ms. Jennifer L. Hower
Office of General Counsel & Environmental Policy
New Mexico Environment Department
1190 St. Francis Drive, Suite N4050
Santa Fe NM 87505

Mr. Jeff M. Witte, Director/Secretary
New Mexico Department of Agriculture
3190 S. Espina
Las Cruces NM 88003

Cabinet Secretary Sarah Cottrell Propst
New Mexico Energy, Minerals and Natural Resources Department
1220 South St Francis Drive
Santa Fe NM 87505

Board of Directors
Mid-Region Council of Governments
809 Copper Avenue NW
Albuquerque NM 87102

Ms. Julie Morgas Baca, Bernalillo County Manager
Bernalillo County Manager's Office
One Civic Plaza NW, 10th Floor
Albuquerque NM 87102

Ms. Alicia Manzano, Director of Communications
City of Albuquerque Office of the Mayor
PO Box 1293
Albuquerque NM 87103

Bernalillo County Board of Commissioners
One Civic Plaza NW, 10th Floor
Albuquerque NM 87102

Albuquerque City Councilmembers
One Civic Plaza NW, 9th Floor - Suite 9087
Albuquerque NM 87102

Example Federal, State, and Local Agencies Scoping Letter

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

JAN 2 8 2019

Colonel Richard W. Gibbs, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland Air Force Base NM 87117

Ms. Danita T. Burns, District Manager
Bureau of Land Management
New Mexico State Office
Albuquerque District Office
Pan American Building
100 Sun Avenue NE, Suite 330
Albuquerque NM 87109-4676

Dear Ms. Burns

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF is preparing an Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB). The Proposed Action includes construction of a 48,000 square foot addition on the northern end of an existing AFRL facility (building 323) and a combined 18,300 square feet of renovations at buildings 322 and 323. In order to meet Federal footprint reduction initiatives, construction of a new facility necessitates the demolition or divestment of up to fifteen facilities unsuitable for AFRL use.

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

If you have additional information regarding impacts of the Proposed Action on the natural environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA compliance process. A copy of the Final Description of the Proposed Action and Alternatives for the EA of the AFRL HPEM Laboratory at Kirtland AFB, New Mexico is available at *http://www.kirtland.af.mil* under the "Environment" button at the bottom of the webpage. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to the NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117 or via email to KirtlandNEPA@us.af.mil.

Sincerely

Richard W. Gibbs

RICHARD W. GIBBS, Colonel, USAF
Commander

Federal, State and Local Agencies – Scoping Letter Responses

United States Department of the Interior
Bureau of Indian Affairs
Southwest Region
1001 Indian School Road N.W.
Albuquerque, New Mexico 87104-2303

TAKE PRIDE IN AMERICA

In Reply Refer To:
620-Division of Environmental, Safety,
and Cultural Resources Management

MAR 14 2019

National Environmental Policy Act (NEPA) Program Manager
377 MSG/CEIEC
2050 Wyoming Boulevard SE, Suite 116
Kirtland Air Force Base (AFB), New Mexico 87117

Dear NEPA Program Manager,

Our office has received your request for information regarding the preparation of an Environmental Assessment to evaluate the proposal to construct a High-Powered Electromagnetic laboratory/research facility for use by the Air Force Research laboratory at Kirtland AFB. We appreciate that the United States Air Force (USAF) acknowledges its trust responsibility in contacting the Bureau of Indian Affairs (BIA) on a government-to-government basis regarding environmental issues for the fore mentioned proposed project. It is our understanding that the Section 106 of the National Historic Preservation Act (NHPA) compliance will be completed for the proposed action.

As is, the proposed action does not impact any trust resources under the jurisdiction of the BIA. Therefore, at this time we do not have any comments. However, we do request that USAF consult with any local Pueblo or Tribe regarding Section 106 consultation of NHPA.

Thank you for the opportunity to participate and comment on the proposed action. If you have any questions or concerns, please contact Mrs. Priscilla J Avila at (505) 563-3417.

Sincerely,

Patricia K. Mattingly

Acting Regional Director

USDA United States Department of Agriculture

March 4, 2019

NEPA Program Manager
Department of the Air Force
377 MSG/CEIEC
2050 Wyoming Boulevared SE, Suite 116,
Kirkland AFB, New Mexico 87117

Dear Sirs:

Thank you for providing the Natural Resources Conservation Service (NRCS) the opportunity to review the HPEM Laboratory Construction Project, Bernilillo County, New Mexico.

The Farmland Protection Policy Act (FPPA) authorizes the NRCS to provide review of proposed projects that have the potential to irreversibly convert farmlands to non-farmland or irreversibly converting hydric areas to non-hydric uses as the result of programs funded by the federal government. In review of the information provided on the project, it is determined that the entire project is located in an urban or development area in an existing easement, or is in an area not designated as Prime or Important Farmland. The FPPA rules define farmland conversion to be "to the extent that it irreversibly converts farmland to other purposes", this project is not expected to have that effect. With this acknowledged, the proposed project will not cause Prime or Important Farmlands or hydric soils to be converted to non-agricultural or non-hydric uses, and is not subject to the Act.

If you have any questions concerning soils information, please contact Richard Strait, State Soil Scientist, at (505) 761-4433 or email at Richard.Strait@nm.usda.gov.

Sincerely,

J. XAVIER MONTOYA
State Conservationist

cc:
Pearl Armijo, District Conservationist for Team 2, NRCS, Los Lunas, NM
Richard Strait, State Soil Scientist, NRCS, Albuquerque, NM

Natural Resources Conservation Service
New Mexico State Office
100 Sun Avenue NE, Suite 602, Albuquerque, New Mexico 87109
Voice: (505) 761-4400 Fax: (855) 538-6003

Mid-Region Council of Governments

February 21, 2019

Colonel Richard W. Gibbs, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland Airforce Base NM 87117

Dear Colonel Gibbs:

On behalf of the Mid-Region Council of Governments (MRCOG), I would like to give the United States Air Force my support for its Environmental Assessment to evaluate the proposal to construct a High-Powered Electromagnetic laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base.

It is my understanding that this Proposed Action includes construction of a 48,000 square foot addition to an existing facility, and combined renovations of 18,300 square feet of other existing buildings. This will help to meet the Federal footprint reduction initiatives. This new facility is needed to meet the needs of AFRL mission requirements. This application for funding in no way conflicts with local or regional plans.

Please let me know if my staff or I can support you further.

Sincerely,

Dewey V. Cave
Executive Director

DC/PS

809 Copper Ave. NW, Albuquerque, NM 87102
Phone: (505) 247-1750 Fax (505) 247-1753 Web: www.mrcog-nm.gov

NEW MEXICO
ENVIRONMENT DEPARTMENT

Harold Runnels Building
1190 Saint Francis Drive, PO Box 5469
Santa Fe, NM 87502-5469
Telephone (505) 827-2855
www.env.nm.gov

Michelle Lujan Grisham
Governor

Howie C. Morales
Lt. Governor

James C. Kenney
Cabinet Secretary

Jennifer J. Pruett
Deputy Secretary

April 23, 2019

NEPA Program Manager
377 MSG/CEIEC
2050 Wyoming Blvd SE, Suite 116
Kirtland AFB NM 87117
Via email: KirtlandNEPA@us.af.mil

Dear Mr. Colonel Gibbs,

The New Mexico Environment Department (NMED) has reviewed the scoping letter for the proposed KAFB High-Powered Electromagnetic laboratory and offers the following comments:

NMED Ground Water Quality Bureau Comments

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

If domestic wastewater is to be discharged to an on-site wastewater disposal system, then the on-site system must operate under the appropriate permit from the NMED (either a liquid waste permit issued pursuant to 20.7.3 NMAC or a ground water discharge permit issued pursuant to 20.6.2 NMAC) depending upon the daily discharge volume. The developer is encouraged to contact NMED's Liquid Waste Program Albuquerque Office at (505) 222-9500 for assistance in determining the appropriate permit for the proposed project. However, if domestic wastewater is to be delivered offsite to a municipal or regional wastewater treatment system, then a permit for the discharge domestic wastewater will not be required.

The proposed project is not expected to have any adverse impacts on ground water quality in the area of the project. However, implementation of the project may involve the use of heavy equipment, thereby leading to a possibility of contaminant releases (e.g., fuel, hydraulic fluid, etc.) associated with equipment malfunctions. The GWQB advises all parties involved in the project to be aware of notification requirements for accidental discharges contained in 20.6.2.1203 NMAC. Compliance with the notification and response requirements will further ensure the protection of ground water quality in the vicinity of the project.

A copy of the Ground and Surface Water Protection Regulations, 20.6.2 NMAC, is available at http://164.64.110.239/nmac/parts/title20/20.006.0002.pdf.

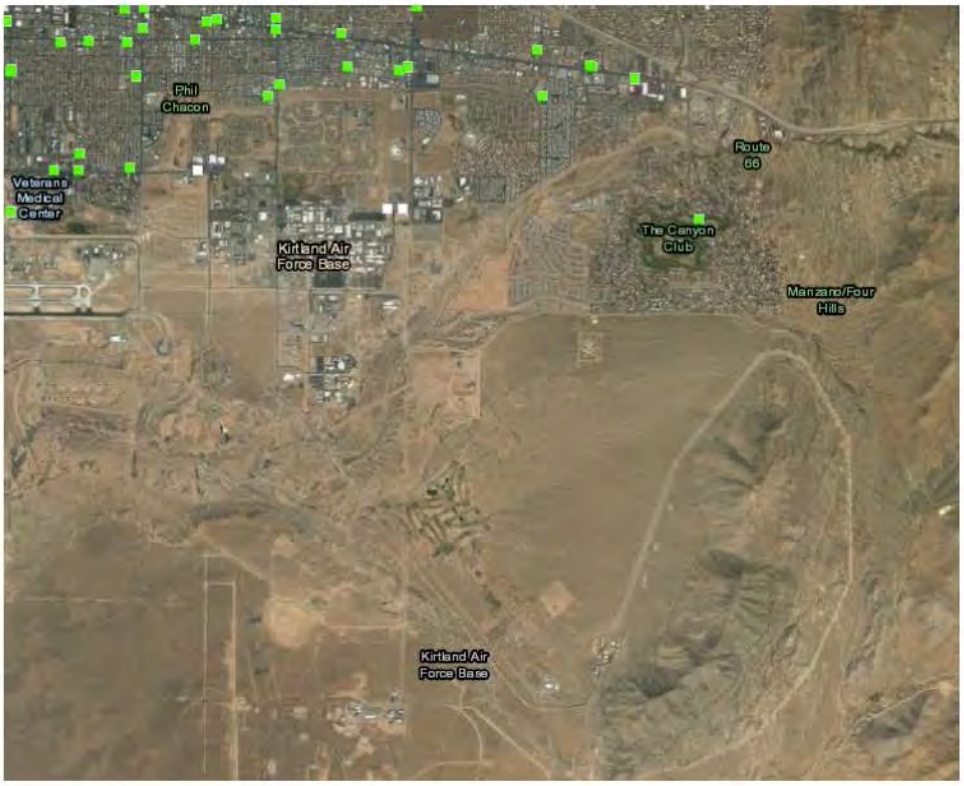
NMED Petroleum Storage Tank Bureau Comments

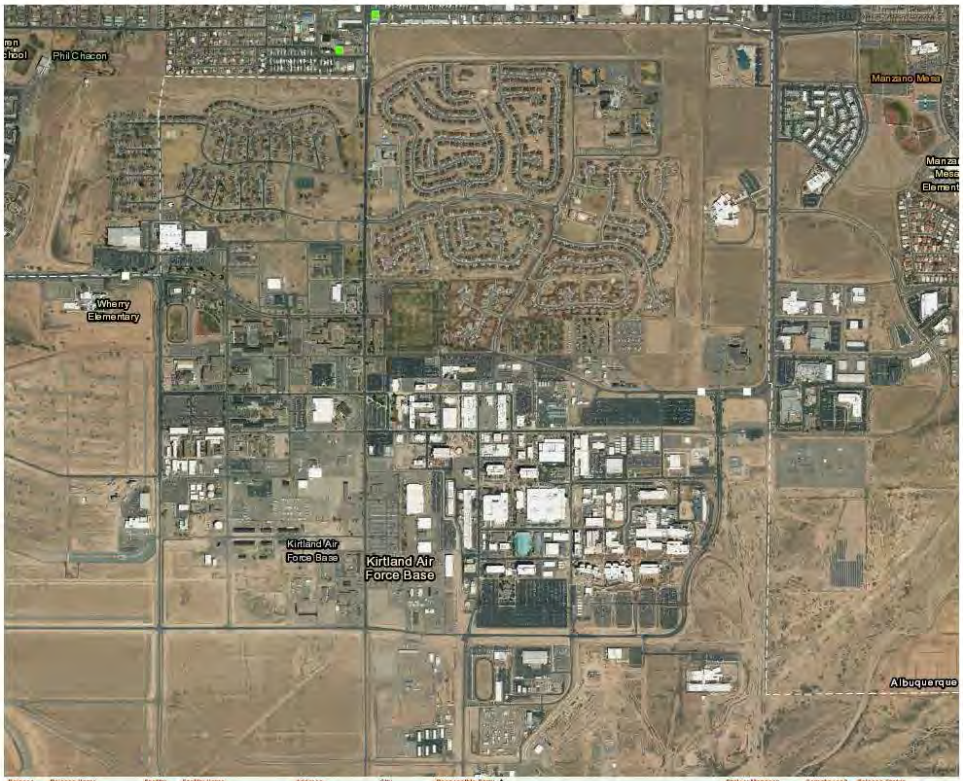
There is one active facility near the proposed site.

PSTB Release Sites:

GoNM – OpenEnviroMap https://gis.web.env.nm.gov/oem/?map=gonm

Legend:


Phil
Chacon
Veterans
Medical
Center
Kirtland Air
Force Base
Route
66
The Canyon
Club
Manzano/Four
Hills
Kirtland Air
Force Base



Several confirmed release sites have a "no further action" status. A list of the confirmed release sites shows what the current status is and the address of the release. Not all sites are depicted on the map.
Facilities for which PSTB records show there are no longer petroleum storage tanks that we regulate and there has not been a release are not included in these comments. There are a number of reasons that there could be tanks present or a release, but the Petroleum Storage Tank Bureau does not have a record of it in our database. For further information, please consult our online resources. Many of the records requested from the Petroleum

Storage Tank Bureau are available online, and you can access them quickly yourself by following the directions below.

If you'd like a further response from this bureau, please reply with the information you find (say no information if none; say whether you found info on leaks or not; and if possible, say whether there are tanks and whether they are underground or aboveground). In addition, please use any FID's (facility identification numbers) or RID's (release identification numbers) you've found in these searches for the facilities or releases you are seeking information on, and please state specifically which records you're looking for. If you want to see all records for a facility, you're welcome to arrange a time with us to come look at the files. If you need any help using the online resources, please let me know.

Please review the lists on the webpage, https://www.env.nm.gov/ust/lists.html. Click on the Active Leaking and NFA Sites link. The first document lists NFA sites (sites for which no further action is currently required) by county and city. The third document lists active sites alphabetically by priority (the second and fourth documents are pdfs). Click on the document you need, then click Download for the option you choose in the window that opens. You can search the Active Leaking or NFA Sites spreadsheets (or any other spreadsheet) by holding down the ctrl key on your keyboard and then hitting the F key, or by going to Find & Select (all the way to the right) on the Home tab of the spreadsheet, selecting Find, and entering an address or part of an address, a name, or any information you'd like to search on and then clicking on Find Next repeatedly to find all records that fit your search. You can download the No Further Action letter for many of these records by clicking the link in the last column of the NFA spreadsheet. If the No Further Action letter is not online and you need it or any other information, let us know.

If you are looking for information about the presence of underground or aboveground storage tanks at an address, please download the All Storage Tank list, also at https://www.env.nm.gov/ust/lists.html. This lists all storage tanks in the state that fall or fell under our regulations and have been registered with us, whether they are still present or not. This spreadsheet can be searched the same way as the above ones. If you only need to know about tanks that are currently in use or temporarily out of use, download the Active Storage Tank list.

The GoNM map link also enables you to locate quite a bit of information that will facilitate your search, including NFA letters. Not all information about each site has been uploaded there, but *recently many site documents have been added*. Instructions for Go NM: Go to https://www.env.nm.gov/ust/lists.html. Click on the GoNM link at the bottom left of the page. Documents may download more easily if you use Internet Explorer. When you are in the GoNM Mapper, you can use the zoom slider at the upper left of the map to zoom in. Colored and white shapes represent facilities that have or had tanks and/or have been involved in a release. To find out more about a facility, click on the white i inside the blue circle at top of the screen and then click on the shape that represents that facility. When the dialog box pops up, you can click on either the Report or any link under Documents If it is a leaking site, there will usually be a link under Documents. Many No Further Action letters and other documents are accessible and downloadable this way. If you click on the icon under Report at the left of the dialogue box, there is also quite a bit of information there. If there is a triangle (like a "play" symbol on a media player) at the top right of the dialog box, click on it, and a second page of information will open.

If you have questions or need further information, please call the Petroleum Storage Tank Bureau at 505-476-4397.

NMED Solid Waste Bureau Comments

The Solid Waste Bureau (SWB) reminds that in accordance with the New Mexico Solid Waste Rules (SWR), 20.9.2-10 NMAC, that the renovation of Buildings 322 and 323, as well as the demolition of up to 15 additional structures, has high potential to result in the generation of regulated asbestos waste. Such waste is a special waste requiring the use of a registered commercial hauler specifically authorized to transport regulated asbestos waste. This will assure regulatory compliance regarding proper containerization, labeling, manifesting, transport

and disposal at a solid waste facility permitted to accept regulated asbestos waste.

NMED Surface Water Quality Bureau Comments

The U.S. Environmental Protection Agency (USEPA) requires National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) coverage for storm water discharges from construction ***projects*** or ***common plans of development***, for sites that are greater than **one (1) acre**. It is unclear if this project will be a new construction site or a remodel of an exiting building. However, if there is a disturbance, permit coverage may be needed.

The CGP requires that a SWPPP be prepared for the site and that appropriate Best Management Practices (BMPs) be installed and maintained both during and after construction to prevent, to the extent practicable, pollutants (primarily sediment, oil & grease and construction materials from construction sites) in storm water runoff from entering waters of the U.S. This permit also requires that permanent stabilization measures (revegetation, paving, etc.), and permanent storm water management measures (storm water detention/retention structures, velocity dissipation devices, etc.) be implemented post construction to minimize, in the long term, pollutants in storm water runoff from entering these waters. In addition, permittees must ensure that there is no increase in sediment yield and flow velocity from the construction site (both during and after construction) compared to pre-construction, undisturbed conditions (see Subpart 10.C.1.b)

You should also be aware that EPA requires that all "operators" (see Appendix A) obtain NPDES permit coverage for construction projects. Generally, this means that at least two parties will require permit coverage. The owner/developer of this construction project who has operational control over project specifications, and the general contractor who has day-to-day operational control of those activities at the site, which are necessary to ensure compliance with the storm water pollution plan and other permit conditions, and possibly other "operators" will require appropriate NPDES permit coverage for this project.

The USEPA Construction General Permit can be found at:
https://www.epa.gov/npdes/epas-2017-construction-general-permit-cgp-and-related-documents

Thank you for providing NMED with the opportunity to review and comment on this proposed project.

Sincerely,

Michaelene Kyrala
Director of Policy
New Mexico Environment Department
Office: 505.827.2892
E-mail: michaelene.kyrala@state.nm.us

Example Federal, State, and Local Agencies Public Notice Letter

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

Colonel Richard W. Gibbs, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland Air Force Base NM 87117

Ms. Danita Burns, District Manager
Bureau of Land Management
New Mexico State Office
Albuquerque District Office
Pan American Building
100 Sun Avenue NE, Suite 330
Albuquerque NM 87109-4676

Dear Ms. Burns

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF is preparing an Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB). The Proposed Action includes construction of a 48,000 ft^2 addition on the northern end of an existing AFRL facility (Building 323) and a combined 18,300 ft^2 of renovations at Buildings 322 and 323. In order to meet Federal footprint reduction initiatives, construction of a new facility necessitates the demolition or divestment of up to fifteen facilities unsuitable for AFRL use.

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

If you have additional information regarding impacts of the Proposed Action on the natural environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA compliance process. A copy of the Final Description of the Proposed Action and Alternatives for the EA of the AFRL HPEM Laboratory at Kirtland AFB, New Mexico is available at *http://www.kirtland.af.mil* under the "Environment" button at the bottom of the webpage. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to the NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117 or via email to KirtlandNEPA@us.af.mil.

Sincerely

Richard W. Gibbs

RICHARD W. GIBBS, Colonel, USAF
Commander

Federal, State and Local Agencies – Public Notice Letter Responses

United States Department of the Interior
Bureau of Indian Affairs
Southwest Region
1001 Indian School Road N.W.
Albuquerque, New Mexico 87104-2303

TAKE PRIDE IN AMERICA

In Reply Refer To:
620-Division of Environmental, Safety,
and Cultural Resources Management

AUG 23 2019

National Environmental Policy Act (NEPA) Program Manager
377 MSG/CEIEC
2050 Wyoming Boulevard SE, Suite 116
Kirtland Air Force Base (AFB), NM 87117

Dear NEPA Program Manager:

Our office has received your request for information regarding the preparation of an Environmental Assessment to evaluate the proposal to construct a High-Powered Electromagnetic laboratory/research facility for use by the Air Force Research laboratory at Kirtland AFB. We appreciate that the United States Air Force (USAF) acknowledges its trust responsibility in contacting the Bureau of Indian Affairs (BIA) on a government-to-government basis regarding environmental issues for the fore mentioned proposed project. It is our understanding that the Section 106 of the National Historic Preservation Act (NHPA) compliance will be completed for the proposed action.

As is, the proposed action does not impact any trust resources under the jurisdiction of the BIA. Therefore, at this time we do not have any comments. However, we do request that USAF consult with any local Pueblo or Tribe regarding Section 106 consultation of NHPA.

Thank you for the opportunity to participate and comment on the proposed action. If you have any questions or concerns, please contact Mrs. Priscilla J Avila at (505) 563-3417.

Sincerely,

Patricia D. Martinez

Acting Regional Director

National Historic Preservation Act Section 106 Consultation Letter and State Historic Preservation Officer Scoping Letter

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

JAN 2 8 2019

Colonel Richard W. Gibbs, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Dr. Jeff Pappas, PhD
State Historic Preservation Officer and Director
New Mexico Historic Preservation Division
Department of Cultural Affairs
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe NM 87501

Dear Dr. Pappas

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF is preparing an Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB). The Proposed Action includes construction of a 48,000 square foot addition on the northern end of an existing AFRL facility (building 323) and a combined 18,300 square feet of renovations at buildings 322 and 323. In order to meet Federal footprint reduction initiatives, construction of a new facility necessitates the demolition or divestment of up to fifteen facilities unsuitable for AFRL use, several of which are eligible for inclusion in the National Register of Historic Places (NRHP).

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

Pursuant to Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations Part 800), the USAF would like to initiate consultation concerning the Proposed Action to allow you the opportunity to identify any comments, concerns, and suggestions you might have. A copy of the Final Description of the Proposed Action and Alternatives for the EA of the AFRL HPEM Laboratory at Kirtland AFB, New Mexico is available at *http://www.kirtland.af.mil* under the "Environment" button at the bottom of the webpage. As we move forward through this process, we welcome your participation and input.

Please contact my office at (505) 846-7377 if you would like to discuss the Proposed Action or proceed with Section 106 consultation.

Sincerely

Richard W. Gibbs

RICHARD W. GIBBS, Colonel, USAF
Commander

State Historic Preservation Officer Scoping Letter Response

Michelle Lujan Grisham
Governor

STATE OF NEW MEXICO
DEPARTMENT OF CULTURAL AFFAIRS
HISTORIC PRESERVATION DIVISION

BATAAN MEMORIAL BUILDING
407 GALISTEO STREET, SUITE 236
SANTA FE, NEW MEXICO 87501
PHONE (505) 827-6320 FAX (505) 827-6338

March 18, 2019

Colonel Richard W. Gibbs, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base, NM 87117

Dear Colonel Gibbs:

Thank you for your letter of February 20, 2019, in which you describe a large-scale undertaking (HPEN) by AFREL at Kirltand Air Force Base. As you explain in your letter, this undertaking has the potential to effect historic properties. To complete our review, the New Mexico State Historic Preservation Officer will need the following:

1. a sketch plan that shows National Register-eligible buildings and their location on the installation. Also, include a detailed map that includes the building numbers on the buildings and their locations in reference to new construction.

2. HCPI forms that include photos of the exterior and interior of each National Register-eligible. Please include photos that capture character-defining features.

3. historic context to assist in our evaluations. This may include the history of the buildings at Kirtland and how many similar-type historic properties remain on the installation.

We look forward to working with you on this nomination. If you have any questions, please contact me at 505-476-0444 or steven.moffson@state.nm.us.

Best regards,

Steven Moffson
State and National Register Coordinator

Cc: David Reynolds

HPD Log 109892

National Historic Preservation Act Section 106 Consultation Letter and State Historic Preservation Officer Public Notice Letter

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

Colonel David S. Miller, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Jeff Pappas, PhD
State Historic Preservation Officer and Director
New Mexico Historic Preservation Division
Department of Cultural Affairs
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe NM 87501

Dear Dr. Pappas

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF has prepared an Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB). The Proposed Action includes construction of a 48,000 square-foot addition on the northern end of an existing AFRL facility (building 323) and a combined 18,300 square-feet of renovations at buildings 322 and 323. In order to meet Federal footprint reduction initiatives, construction of a new facility necessitates the demolition or divestment of up to 17 facilities unsuitable for AFRL use, several of which are eligible for inclusion in the National Register of Historic Places (NRHP).

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

In accordance with Section 106 of the National Historic Preservation Act of 1966 (36 Code of Federal Regulations Part 800), as amended, Kirtland AFB transmitted a letter to the SHPO to initiate consultation. In response, the SHPO requested the following information for the historic properties that could be negatively impacted by the project (HPD Log 109892):

- A sketch plan that shows National Register-eligible buildings and their location on the installation, to include a detailed map that indicates building numbers and their locations relative to the proposed construction sites.

- Historic Cultural Property Inventory (HCPI) forms that include photos of the exterior and interior of each National Register-eligible facility, ensuring that character-defining features are well captured.

- Historic context of each National Register-eligible facility, which may include history of the buildings and how many similar-type historic properties remain on Kirtland AFB.

Upon documentation of each affected facility and subsequent completion of a Memorandum of Agreement between the SHPO and Kirtland AFB, potential adverse impacts would be resolved prior to project implementation in 2022.

In addition, any ground-disturbing activities would take into consideration the potential for the discovery of previously undiscovered cultural resources. Should an inadvertent discovery of human or cultural remains occur during construction, all project activities would stop, the Kirtland AFB Cultural Resources Program Manager would be notified, and operational procedures outlined in the Installation Cultural Resources Management Plan would be followed.

Copies of the Draft EA and the proposed Finding of No Significant Impact (FONSI) are available at *http://www.kirtland.af.mil* under the "Environment" button at the bottom of the webpage. If, after review of the Draft EA and proposed FONSI, you have additional information regarding impacts of the Proposed Action on the natural environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA process. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to the NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117, or via email to *KirtlandNEPA@us.af.mil*.

Sincerely

DAVID S. MILLER, Colonel, USAF
Commander

United States Fish & Wildlife Scoping Letter

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

JAN 2 8 2019

Colonel Richard W. Gibbs, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Ms. Amy Leuders, Regional Director
US Fish & Wildlife Service
Southwest Regional Office
PO Box 1306
Albuquerque NM 87103-1306

Dear Ms. Leuders

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF is preparing an Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB). The Proposed Action includes construction of a 48,000 square foot addition on the northern end of an existing AFRL facility (building 323) and a combined 18,300 square feet of renovations at buildings 322 and 323. In order to meet Federal footprint reduction initiatives, construction of a new facility necessitates the demolition or divestment of up to fifteen facilities unsuitable for AFRL use.

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

Pursuant to Section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 United States Code 1531 et seq.), the USAF is requesting concurrence from the United States Fish and Wildlife Service that the Proposed Action is not likely to adversely affect any species or critical habitat. We reviewed your agency's Section 7 Consultation website for a list of species and critical habitat that "may be present" within the project area and have found none. For these reasons, we conclude that the Proposed Action is not likely to adversely affect any species or critical habitat and we request your concurrence with our determination. A copy of the Final Description of the Proposed Action and Alternatives for the EA of the AFRL HPEM Laboratory at Kirtland AFB, New Mexico is available at *http://www.kirtland.af.mil* under the "Environment" button at the bottom of the webpage. As we move forward through this process, we welcome your participation and input.

Please send your written responses to the NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB, NM 87117 or via email to KirtlandNEPA@us.af.mil.

Sincerely

Richard W. Gibbs

RICHARD W. GIBBS, Colonel, USAF
Commander

United States Fish & Wildlife Scoping Letter Response

From: 377 MSG/CEIE NEPA Environmental
To: Danny Taylor
Subject: FW: AFRL High-Powered Electromagnetic Laboratory Construction
Date: Thursday, February 28, 2019 1:47:16 PM
Attachments: image001.png
image002.png
image003.png
image004.png

From: Prewitt, Cheryl -FS <cprewitt@fs.fed.us>
Sent: Thursday, February 28, 2019 2:43 PM
To: 377 MSG/CEIE NEPA Environmental <KirtlandNEPA@us.af.mil>
Cc: Prewitt, Cheryl -FS <cprewitt@fs.fed.us>
Subject: [Non-DoD Source] AFRL High-Powered Electromagnetic Laboratory Construction

Good Afternoon,

I have reviewed the Description of the Proposed Action and Alternatives for the EA the AFRL High-Powered Electromagnetic Laboratory Construction. I have no additional information regarding impacts of the proposed action on the natural environment nor any environmental aspects.

Cheryl Prewitt
Regional Environmental Coordinator
Forest Service
Southwestern Region
p: **505-842-3454**
cherylprewitt@usda.gov
333 Broadway Blvd SE
Albuquerque, NM 87102
www.fs.fed.us
Caring for the land and serving people

United States Fish & Wildlife Public Notice Letter

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

JUL 2 2 2019

Colonel David S. Miller, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland Air Force Base NM 87117

Ms. Amy Leuders, Southwest Regional Director
US Fish & Wildlife Service
Southwest Regional Office
PO Box 1306
Albuquerque NM 87103-1306

Dear Ms. Leuders

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF has prepared an Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB). The Proposed Action includes construction of a 48,000 square-foot addition on the northern end of an existing AFRL facility (building 323) and a combined 18,300 square-feet of renovations at buildings 322 and 323. In order to meet Federal footprint reduction initiatives, construction of a new facility necessitates the demolition or divestment of up to 17 facilities unsuitable for AFRL use.

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

Pursuant to Section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 United States Code 1531 et seq.), Kirtland AFB conducted an effect determination for this project. All interrelated and interdependent actions were analyzed during that review. The USFWS Information for Planning and Consultation Official Species and Habitat List was received on 9 May 2019 under Consultation Code 02ENNM00-2019-SLI-0752. It was determined that there are no federally listed threatened or endangered species or critical habitat and no state-listed threatened or endangered species occurring within the project area. However, to ensure no impact, an updated species list from the USFWS would be obtained within 90 days of the start of construction activities. There are no wetlands within the project area.

In accordance with Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416, *Intergovernmental Review of Federal Programs*, I am

requesting your participation in the NEPA document review and comment process. Copies of the Draft EA and the proposed Finding of No Significant Impact (FONSI) are available at *http://www.kirtland.af.mil* under the "Environment" button at the bottom of the webpage. If, after review of the Draft EA and proposed FONSI, you have additional information regarding impacts of the Proposed Action on the natural environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA process. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to the NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117, or via email to *KirtlandNEPA@us.af.mil*.

Sincerely

DAVID S. MILLER, Colonel, USAF
Commander

Joint Land Use Study Agencies

Mr. Clyde Ward
Assistant Commissioner for Commercial Resources
New Mexico State Land Office
PO Box 1148
Santa Fe NM 87504

Development Management/Department Director
Bernalillo County Planning Section
111 Union Square SE, Suite 100
Albuquerque NM 87102

Department Director
City of Albuquerque Planning Department PO
Box 1293
Albuquerque NM 87103

Example Joint Land Use Study Scoping Letter

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

JAN 2 8 2019

Colonel Richard W. Gibbs, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Mr. Clyde Ward
Assistant Commissioner for Commercial Resources
New Mexico State Land Office
PO Box 1148
Santa Fe NM 87504

Dear Mr. Ward

As set forth in the Kirtland Air Force Base (AFB) – New Mexico State Land Office Joint Land Use Study Memorandum of Understanding, and as required by the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF is preparing an Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB). The Proposed Action includes construction of a 48,000 square foot addition on the northern end of an existing AFRL facility (building 323) and a combined 18,300 square feet of renovations at buildings 322 and 323. In order to meet Federal footprint reduction initiatives, construction of a new facility necessitates the demolition or divestment of up to fifteen facilities unsuitable for AFRL use. Construction and demolition activities are not expected to impact any major roadways at Kirtland AFB, though several entrances to new and existing parking lots may be required. Should this project be approved, construction would begin no sooner than Fiscal Year 2022.

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

In accordance with Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended, by EO 12416, *Intergovernmental Review of Federal Programs*, I am requesting your participation in the NEPA document review and comment process. A copy of the Final Description of the Proposed Action and Alternatives for the EA of the AFRL HPEM Laboratory at Kirtland AFB, New Mexico is available at *http://www.kirtland.af.mil* under the "Environment" button at the bottom of the webpage. If you have additional information regarding impacts of the Proposed Action on the natural environment or other environmental aspects of which we are unaware, we would appreciate receiving such information for inclusion

and consideration during the NEPA process. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to the NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117, or via email to KirtlandNEPA@us.af.mil.

Sincerely

Richard W. Gibbs

RICHARD W. GIBBS, Colonel, USAF
Commander

Example Joint Land Use Study Public Notice Letter

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

JUL 2 2 2019

Colonel David S. Miller, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland Air Force Base NM 87117

Mr. Craig Johnson
Assistant Commissioner for Commercial Resources
New Mexico State Land Office
PO Box 1148
Santa Fe NM 87504

Dear Mr. Johnson

As set forth in the Kirtland Air Force Base (AFB) – New Mexico State Land Office Joint Land Use Study Memorandum of Understanding, and as required by the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF has prepared an Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB). The Proposed Action includes construction of a 48,000 square-foot addition on the northern end of an existing AFRL facility (building 323) and a combined 18,300 square-feet of renovations at buildings 322 and 323. In order to meet Federal footprint reduction initiatives, construction of a new facility necessitates the demolition or divestment of up to 17 facilities unsuitable for AFRL use. Construction and demolition activities are not expected to impact any major roadways at Kirtland AFB, though several entrances to new and existing parking lots may be required. Should this project be approved, construction would begin no sooner than Fiscal Year 2022.

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

In accordance with Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended, by EO 12416, *Intergovernmental Review of Federal Programs*, I am requesting your participation in the NEPA document review and comment process. Copies of the Draft EA and the proposed Finding of No Significant Impact (FONSI) are available at *http://www.kirtland.af.mil* under the "Environment" button at the bottom of the webpage. If, after review of the Draft EA and proposed FONSI, you have additional information regarding impacts of the Proposed Action on the natural environment or other environmental aspects of which we

are unaware, we would appreciate receiving such information for inclusion and consideration during the NEPA process. Please respond within 30 days of receipt of this letter to ensure your concerns are adequately addressed in the EA.

Please send your written responses to the NEPA Program Manager, 377 MSG/CEIEC, 2050 Wyoming Boulevard SE, Suite 116, Kirtland AFB NM 87117, or via email to *KirtlandNEPA@us.af.mil*.

Sincerely

DAVID S. MILLER, Colonel, USAF
Commander

Native American Tribe and Pueblo Contacts

Governor Brian Vallo
Pueblo of Acoma
PO Box 309
Acoma Pueblo NM 87034

Governor Eugene Herrera
Pueblo of Cochiti
PO Box 70
Cochiti Pueblo NM 87072

Chairman Timothy L. Nuvangyaoma
Hopi Tribal Council
PO Box 123
Kykotsmovi AZ 86039

Governor Max A. Zuni
Pueblo of Isleta
PO Box 1270
Isleta NM 87022

Governor David M. Toledo
Pueblo of Jemez
PO Box 100
Jemez Pueblo NM 87024

President Levi Pesata
Jicarilla Apache Nation
PO Box 507
Dulce NM 87528

Governor Wilfred Herrera, Jr.
Pueblo of Laguna
PO Box 194
Laguna NM 87026

President Arthur "Butch" Blazer
Mescalero Apache Tribe
PO Box 227
Mescalero NM 88340

Governor Phillip A. Perez
Pueblo of Nambe
Route 1 PO Box 177-BB
Santa Fe NM 87506

President Jonathan Nez
Navajo Nation
PO Box 7440
Window Rock AZ 86515

Governor Ron Lovato
Ohkay Owingeh Pueblo
PO Box 1099
San Juan Pueblo NM 87566

Governor Craig Quanchello
Pueblo of Picuris
PO Box 127
Peñasco NM 87553

Governor Joseph M. Talachy
Pueblo of Pojoaque
78 Cities of Gold
Santa Fe NM 87506

Governor Issac Lujan
Pueblo of Sandia
481 Sandia Loop
Bernalillo NM 87004

Governor James Candelaria
Pueblo of San Felipe
PO Box 4339
San Felipe Pueblo NM 87001

Governor Perry Martinez
Pueblo of San Ildefonso
02 Tunyo Po
Santa Fe NM 87506

Governor Timothy Menchego
Pueblo of Santa Ana
2 Dove Road
Santa Ana Pueblo NM 87004

Governor J. Michael Chavarria
Pueblo of Santa Clara
PO Box 580
Española NM 87532

Governor Joseph Aquilar
Pueblo of Santo Domingo
PO Box 99
Santo Domingo Pueblo NM 87052

Governor Richard Aspenwind
Pueblo of Taos
PO Box 1846
Taos NM 87571

Governor Milton Herrera
Pueblo of Tesuque
Route 42 Box 360-T
Santa Fe NM 87506

Chairwoman Gwendena Lee-Gatewood
White Mountain Apache Tribe
PO Box 700
Whiteriver AZ 85941

Governor E. Michael Silvas
Ysleta Del Sur Pueblo
117 S Old Pueblo Road
PO Box 17579
El Paso TX 79907

Chairman Harold Cuthair
Ute Mountain Ute Tribe
PO Box JJ
Towaoc CO 81334-0248

President Bruce Pratt
Pawnee Nation of Oklahoma
PO Box 470
Pawnee OK 74058

Chairwoman Christine Sage
Southern Ute Indian Tribe
PO Box 737
Ignacio CO 81137

Chairman Matthew Komalty
Kiowa Tribe of Oklahoma
PO Box 369
Carnegie OK 73015

Governor Antonio Medina
Pueblo of Zia
135 Capitol Square Drive
Zia Pueblo NM 87053-6013

Governor Val R. Panteah, Sr.
Pueblo of Zuni
PO Box 339
Zuni NM 87327

Chairwoman Lori Gooday-Ware
Fort Still Apache Tribe of Oklahoma
Rt 2, Box 121
Apache OK 73006

President Terri Parton
Wichita & Affiliated Tribes
Wichita Executive Committee
PO Box 729
Anadarko OK 73005

Chairman Terry Rambler
San Carlos Apache Tribe
PO Box 0
San Carlos AZ 85550

Chairman William Nelson
Comanche Nation of Oklahoma
PO Box 908
Lawton OK 73502

Example Native American Tribes Scoping Letter

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

JAN 2 8 2019

Colonel Richard W. Gibbs, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Governor Carlos Hisa
Ysleta del Sur Pueblo
117 S Old Pueblo Road
PO Box 17579
El Paso TX 79907

Dear Governor Hisa

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF is preparing an Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB). The Proposed Action includes construction of a 48,000 square foot addition on the northern end of an existing AFRL facility (building 323) and a combined 18,300 square feet of renovations at buildings 322 and 323. In order to meet Federal footprint reduction initiatives, construction of a new facility necessitates the demolition or divestment of up to fifteen facilities unsuitable for AFRL use, several of which are eligible for inclusion in the National Register of Historic Places (NRHP).

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

Pursuant to Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations Part 800) and Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*, the USAF would like to initiate government-to-government consultation to allow you and your designee the opportunity to identify any comments, concerns, and suggestions relevant to the NEPA compliance process concerning the Proposed Action. A copy of the Final Description of the Proposed Action and Alternatives for the EA of the AFRL HPEM Laboratory at Kirtland AFB, New Mexico is available at *http://www.kirtland.af.mil* under the "Environment" button at the bottom of the webpage. For technical information, please contact my NEPA Program Manager, Ms. Martha E. Garciá, directly at martha.garcia.3@us.af.mil or (505) 846-6446.

Please contact my office at (505) 846-7377 if you would like to meet to discuss the proposed project or proceed with Section 106 consultation.

Sincerely

Richard W. Gibbs

RICHARD W. GIBBS, Colonel, USAF
Commander

Native American Tribes - Scoping Letter Responses

COMANCHE NATION

Department of the Air Force-377th Air Base Wing (AFGSC)
Attn: Mr. Richard W. Gibbs, Colonel, USAF
2000 Wyoming Boulevard SE
New Mexico 87117

May 7, 2019

Re: Proposal to Construct a High-Powered Electromagnetic (HPEM) Laboratory/Research Facility

Dear Mr. Gibbs:

In response to your request, the above reference project has been reviewed by staff of this office to identify areas that may potentially contain prehistoric or historic archeological materials. The location of your project has been cross referenced with the Comanche Nation site files, where an indication of ***"No Properties"*** have been identified. (IAW 36 CFR 800.4(d)(1)).

Please contact this office at (580) 595-9960/9618) if you require additional information on this project.

This review is performed in order to identify and preserve the Comanche Nation and State cultural heritage, in conjunction with the State Historic Preservation Office.

Regards

Comanche Nation Historic Preservation Office
Theodore E. Villicana , Technician
#6 SW "D" Avenue, Suite C
Lawton, OK. 73502

Pawnee Nation of Oklahoma

Tuesday, March 26, 2019

Colonel Richard W. Gibbs
377th Air Base Wing
2000 Wyoming Boulevard Southeast
Kirtland Air Force Base, New Mexico 87117

RE: Section 106 Consultation and Review on *Environmental Assessment - High-Powered Electromagnetic Laboratory/Research Facility for use by AFRL*

Dear *Colonel Gibbs,*

The Pawnee Nation Office of Historic Preservation has received your letter regarding the government-to-government consultation with the USAF at Kirtland AFB.

We do not have any concerns or comments regarding the environmental assessment for this project. Based on our records and research, your project should have no adverse effect on our cultural landscape. Thank you for notifying this office and requesting our input on the EA.

This information is provided to assist you in complying with 36 CFR Part 800 for Section 106 Consultation procedures. Should you have questions, please do not hesitate to contact me at jreed@pawneenation.org or by phone at 918-762-2180. Thank you for your time and consideration.

Sincerely,

Matt Reed
Historic Preservation Officer
Pawnee Nation of Oklahoma

Historic Preservation Office
Matt Reed
Phone: 918.762.2180 Fax: 918.762.3662
E-mail: jreed@pawneenation.org
P.O. Box 470
Pawnee, Oklahoma 74058

Example Native American Tribes Public Notice Letter

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

JUL 22 2019

Colonel David S. Miller, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Governor E. Michael Silvas
Ysleta del Sur Pueblo
117 S Old Pueblo Road
PO Box 17579
El Paso TX 79907

Dear Governor Silvas

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF has prepared an Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB). The Proposed Action includes construction of a 48,000 square-foot addition on the northern end of an existing AFRL facility (building 323) and a combined 18,300 square-feet of renovations at buildings 322 and 323. In order to meet Federal footprint reduction initiatives, construction of a new facility necessitates the demolition or divestment of up to 17 facilities unsuitable for AFRL use, several of which are eligible for inclusion in the National Register of Historic Places (NRHP).

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements. archaeological sites or traditional cultural properties have been identified in the project areas. Should an inadvertent discovery of human or cultural remains occur during construction, all project activities would stop, the Kirtland AFB Cultural Resources Program Manager would be notified, and operational procedures outlined in the Installation Cultural Resources Management Plan would be followed.

Pursuant to Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations Part 800), the USAF would like to initiate government-to-government consultation to allow you and your designee the opportunity to identify any comments, concerns, and suggestions relevant to the NEPA compliance process concerning the Proposed Action. Copies of the Draft EA and proposed Finding of No Significant Impact (FONSI) are available at

http://www.kirtland.af.mil under the "Environment" button at the bottom of the webpage. For technical information, please contact my NEPA Program Manager, Ms. Martha E. Garciá, directly at martha.garcia.3@us.af.mil or (505) 846-6446.

Please contact my office at (505) 846-7377 if you would like to meet to discuss the proposed project or proceed with the Section 106 consultation.

Sincerely

DAVID S. MILLER, Colonel, USAF
Commander

Native American Tribes – Public Notice Letter Responses

Pawnee Nation of Oklahoma

Friday, September 06, 2019

Martha E. Garcia
NEPA Program Manager
Department of the Air Force
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base, New Mexico 87117

RE: Section 106 Consultation and Review on:
Environmental Assessment for proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility

Dear Ms. Garcia,

The Pawnee Nation Office of Historic Preservation has received the information and materials requested for our Section 106 Review and Consultation. Consultation with the Pawnee Nation is required by Section 106 of the National Historic Preservation Act of 1966 (NHPA), and 36 CFR Part 800.

Given the information provided, you are hereby notified that the proposed project/s will not adversely affect the cultural landscape of the Pawnee Nation. Therefore, in accordance with 36 CFR 800.4(d) (1), you may proceed with your proposed project/s.

This information is provided to assist you in complying with 36 CFR Part 800 for Section 106 Consultation procedures. Should you have questions, please do not hesitate to contact me at jreed@pawneenation.org or by phone at 918-762-2180 ext 220. Thank you for your time and consideration.

Sincerely,
Matt Reed
Historic Preservation Officer
Pawnee Nation of Oklahoma

Historic Preservation Office
Matt Reed
Phone: 918.762.2180 Fax: 918.762.3662
E-mail: jreed@pawneenation.org
P.O. Box 470
Pawnee, Oklahoma 74058

White Mountain Apache Tribe

Office of Historic Preservation
PO Box 1032
Fort Apache, AZ 85926
Ph: (928) 338-3033 Fax: (928) 338-6055

To: David S. Miller, Colonel, USAF Commander

Date: August 28, 2019

Re: *Proposed Construction of a High-Powered Electromagnetic Laboratory Facility*

The White Mountain Apache Tribe Historic Preservation Office appreciates receiving information on the project, dated August 27, 2019 . In regards to this, please attend to the following statement below.

Thank you for allowing the White Mountain Apache tribe the opportunity to review and respond to the above proposed new construction of the High-Powered Electromagnetic laboratory and research facility for use by the Air Force at Kirtland Air Force base, Albuquerque, New Mexico. Upon reviewing the document/reports we concur the proposed project plans will ***"Not have Adverse Effect"*** on the White Mountain Apache tribe's historic properties and/or traditional cultural properties.

Thank you for your continued collaborations in protecting and preserving places of cultural and historical importance.

Sincerely,

Mark T. Altaha

White Mountain Apache Tribe – THPO
Historic Preservation Office

Ysleta del Sur Pueblo
Tribal Council

119 South Old Pueblo Road * P.O. Box 17579 * El Paso, Texas 79917 * (915) 859-8053 * Fax: (915) 859-4252

August 14, 2019,

Colonel David S. Miller, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Dear Colonel, David S. Miller, USAF Commander,

This letter is in response to the correspondence received in our office in which you provide Ysleta del Sur Pueblo the opportunity to comment on the Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB).

While we do not have any comments on the proposed undertaking and believe that this project will not adversely affect traditional, religious or culturally significant sites of our Pueblo and have no opposition to it; we would like to request consultation should any human remains or artifacts unearthed during this project be determined to fall under NAGPRA guidelines. Copies of our Pueblo's Cultural Affiliation Position Paper and Consultation Policy are available upon request.

Thank you for allowing us the opportunity to comment on the proposed project.

Sincerely,

Omar Villanueva
Tribal Council Assistant
Ysleta del Sur Pueblo
119 S. Old Pueblo Rd.
(915) 342-2557

ovillanueva@ydsp-nsn.gov

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

RECEIVED
AUG 13 2019
BY:

Colonel Richard W. Gibbs, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Governor E. Michael Silvas
Ysleta Del Sur Pueblo
117 S Old Pueblo Road
PO Box 17579
El Paso TX 79907

Dear Governor Silvas

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF has prepared an Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB). The Proposed Action includes construction of a 48,000 ft^2 addition on the northern end of an existing AFRL facility (Building 323) and a combined 18,300 ft^2 of renovations at Buildings 322 and 323. In order to meet Federal footprint reduction initiatives, construction of a new facility necessitates the demolition or divestment of up to seventeen facilities unsuitable for AFRL use, several of which are eligible for inclusion in the National Register of Historic Places (NRHP).

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements. archaeological sites or traditional cultural properties have been identified in the project areas. Should an inadvertent discovery of human or cultural remains occur during construction, all project activities would stop, the Kirtland AFB Cultural Resources Program Manager would be notified, and operational procedures outlined in the Installation Cultural Resources Management Plan would be followed.

Pursuant to Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations Part 800), the USAF would like to initiate government-to-government consultation to allow you and your designee the opportunity to identify any comments, concerns, and suggestions relevant to the NEPA compliance process concerning the Proposed Action. Copies of the Draft EA and proposed Finding of No Significant Impact (FONSI) are available at

Ysleta del Sur Pueblo
Tribal Council

119 South Old Pueblo Road * P.O. Box 17579 * El Paso, Texas 79917 * (915) 859-8053 * Fax: (915) 859-4252

August 14, 2019,

Colonel David S. Miller, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Dear Colonel, David S. Miller, USAF Commander,

This letter is in response to the correspondence received in our office in which you provide Ysleta del Sur Pueblo the opportunity to comment on the Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB).

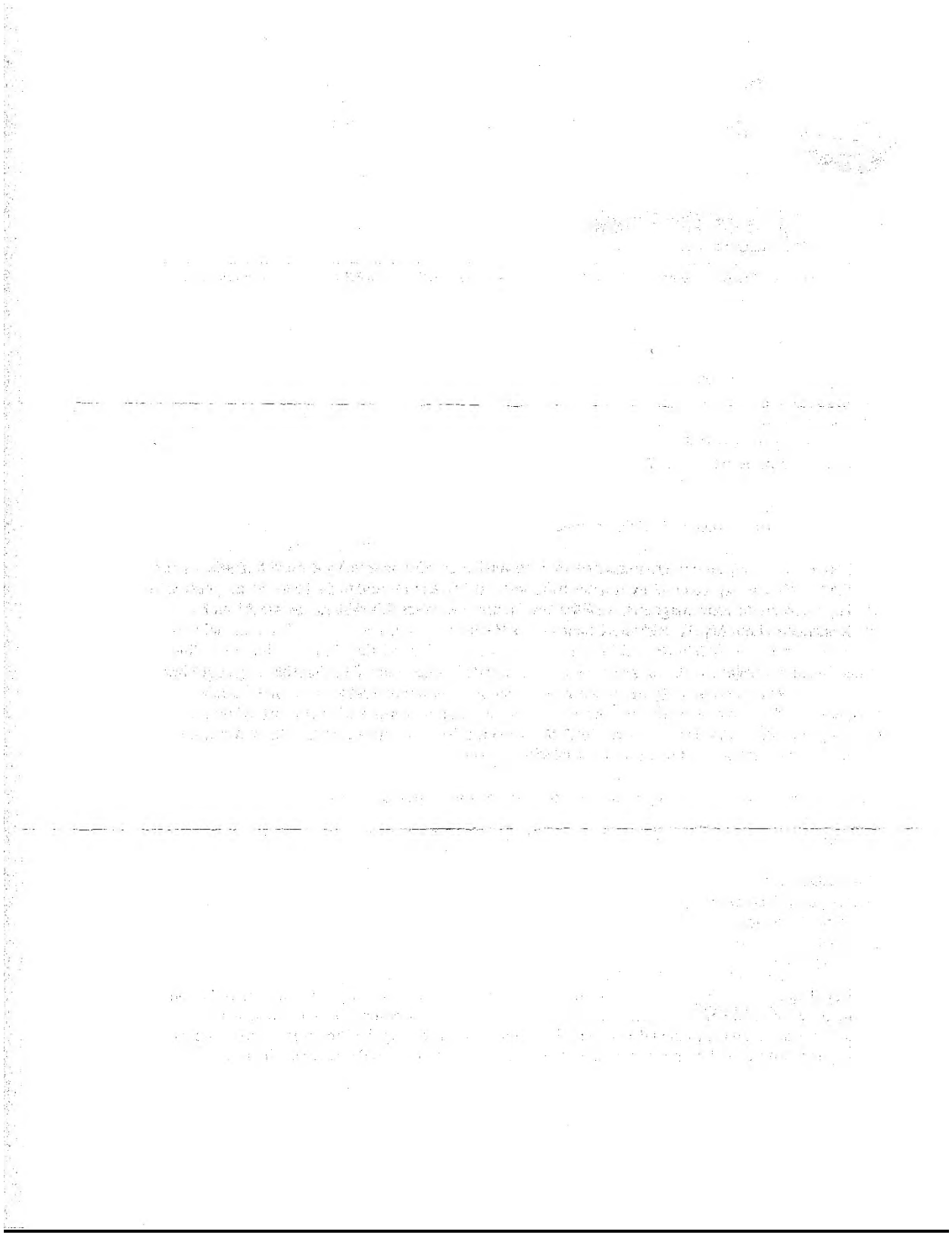
While we do not have any comments on the proposed undertaking and believe that this project will not adversely affect traditional, religious or culturally significant sites of our Pueblo and have no opposition to it; we would like to request consultation should any human remains or artifacts unearthed during this project be determined to fall under NAGPRA guidelines. Copies of our Pueblo's Cultural Affiliation Position Paper and Consultation Policy are available upon request.

Thank you for allowing us the opportunity to comment on the proposed project.

Sincerely,

Omar Villanueva
Tribal Council Assistant
Ysleta del Sur Pueblo
119 S. Old Pueblo Rd.
(915) 342-2557

ovillanueva@ydsp-nsn.gov



DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

RECEIVED
AUG 13 2019
BY:

Colonel Richard W. Gibbs, USAF
Commander
377th Air Base Wing
2000 Wyoming Boulevard SE
Kirtland Air Force Base NM 87117

Governor E. Michael Silvas
Ysleta Del Sur Pueblo
117 S Old Pueblo Road
PO Box 17579
El Paso TX 79907

Dear Governor Silvas

In accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations, and the United States Air Force (USAF) NEPA regulations, the USAF has prepared an Environmental Assessment (EA) to evaluate the proposal to construct a High-Powered Electromagnetic (HPEM) laboratory/research facility for use by the Air Force Research Laboratory (AFRL) at Kirtland Air Force Base (AFB). The Proposed Action includes construction of a 48,000 ft^2 addition on the northern end of an existing AFRL facility (Building 323) and a combined 18,300 ft^2 of renovations at Buildings 322 and 323. In order to meet Federal footprint reduction initiatives, construction of a new facility necessitates the demolition or divestment of up to seventeen facilities unsuitable for AFRL use, several of which are eligible for inclusion in the National Register of Historic Places (NRHP).

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements. archaeological sites or traditional cultural properties have been identified in the project areas. Should an inadvertent discovery of human or cultural remains occur during construction, all project activities would stop, the Kirtland AFB Cultural Resources Program Manager would be notified, and operational procedures outlined in the Installation Cultural Resources Management Plan would be followed.

Pursuant to Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations Part 800), the USAF would like to initiate government-to-government consultation to allow you and your designee the opportunity to identify any comments, concerns, and suggestions relevant to the NEPA compliance process concerning the Proposed Action. Copies of the Draft EA and proposed Finding of No Significant Impact (FONSI) are available at

http://www.kirtland.af.mil under the "Environment" button at the bottom of the webpage. For technical information, please contact my NEPA Program Manager, Ms. Martha E. Garciá, directly at martha.garcia.3@us.af.mil or (505) 846-6446.

Please contact my office at (505) 846-7377 if you would like to meet to discuss the proposed project or proceed with the Section 106 consultation.

Sincerely

DAVID S. MILLER, Colonel, USAF
Commander

This page intentionally left blank.

APPENDIX B
AIR QUALITY SUPPORT DOCUMENTATION

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

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 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): NOT IN A REGULATORY AREA

b. Action Title: Air Force Research Laboratory High-Powered Electromagnetic Laboratory at Kirtland AFB, NM

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2022

e. Action Description:

The United State Air Force (USAF) proposes to construct a modern, flexible High-Powered Electromagnetic (HPEM) laboratory space for development of advanced High-Power Microwave (HPM) systems and High Energy Density Physics (HEDP) research, as operated by the Air Force Research Laboratory (AFRL) Directed Energy Directorate (RD), High-Powered Electromagnetics Division (RDH). The Proposed Action would include construction of a 48,000 ft2 addition to the north side of Building 323 and renovation of 19,970 ft2 of existing laboratory space in Buildings 322 and 323. This project would also include removal of several other facilities to meet USAF space requirements. This laboratory is essential for research and development of several new technologies in support of national defense, including Counter Electronics, Cyber Electronic Warfare, Precision Delivery of Non-Lethal Weapons, Aircraft Self Defense, Tactical HPM Weapons, and Active Denial Technologies, among many more.

f. Point of Contact:

Name: Danny Taylor
Title: Contractor
Organization: HazAir, Inc.
Email: danny.taylor@hazair.com
Phone Number: 5206645878

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

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.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

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

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.594	100	No
NOx	3.660	100	No
CO	4.268	100	No
SOx	0.010	100	No
PM 10	5.478	100	No
PM 2.5	0.150	100	No
Pb	0.000	25	No
NH3	0.003	100	No
CO2e	934.5		

2023

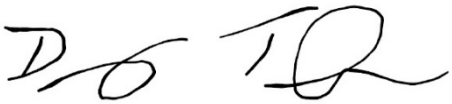
Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.627	100	No
NOx	2.782	100	No
CO	3.379	100	No
SOx	0.007	100	No
PM 10	1.505	100	No
PM 2.5	0.117	100	No
Pb	0.000	25	No
NH3	0.003	100	No
CO2e	705.4		

2024 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	-0.001	100	No
NOx	-0.021	100	No
CO	-0.018	100	No
SOx	0.000	100	No
PM 10	-0.002	100	No
PM 2.5	-0.002	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	-25.7		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

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



7/3/2019

Danny Taylor, Contractor — DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: KIRTLAND AFB
State: New Mexico
County(s): Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Air Force Research Laboratory High-Powered Electromagnetic Laboratory at Kirtland AFB, NM

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2022

- Action Purpose and Need:

The purpose of the Proposed Action is to provide AFRL with laboratory facilities that feature the infrastructure necessary for research and development in support of future weapons programs and national defense systems. The Proposed Action is needed because currently available facilities are incapable of supporting the full scope of AFRL mission requirements.

- Action Description:

The United State Air Force (USAF) proposes to construct a modern, flexible High-Powered Electromagnetic (HPEM) laboratory space for development of advanced High-Power Microwave (HPM) systems and High Energy Density Physics (HEDP) research, as operated by the Air Force Research Laboratory (AFRL) Directed Energy Directorate (RD), High-Powered Electromagnetics Division (RDH). The Proposed Action would include construction of a 48,000 ft2 addition to the north side of Building 323 and renovation of 19,970 ft2 of existing laboratory space in Buildings 322 and 323. This project would also include removal of several other facilities to meet USAF space requirements. This laboratory is essential for research and development of several new technologies in support of national defense, including Counter Electronics, Cyber Electronic Warfare, Precision Delivery of Non-Lethal Weapons, Aircraft Self Defense, Tactical HPM Weapons, and Active Denial Technologies, among many more.

- Point of Contact

Name: Danny Taylor
Title: Contractor
Organization: HazAir, Inc.
Email: danny.taylor@hazair.com
Phone Number: 5206645878

- Activity List:

	Activity Type	Activity Title
2.	Construction / Demolition	Demolition - B243
3.	Construction / Demolition	Construction - HPEM Laboratory
4.	Construction / Demolition	Demolition - B324
5.	Construction / Demolition	Demolition - B326
6.	Construction / Demolition	Demolition - B430
7.	Construction / Demolition	Demolition - B906
8.	Construction / Demolition	Demolition - B907
9.	Construction / Demolition	Demolition - B908
10.	Construction / Demolition	Demolition - B909
11.	Construction / Demolition	Demolition - B910
12.	Construction / Demolition	Demolition - B911
13.	Construction / Demolition	Demolition - B912
14.	Construction / Demolition	Demolition - B913

15.	Construction / Demolition	Demolition - B57012
16.	Heating	Heating - New 48,000 sqft HPEM Laboratory
17.	Heating	Heating Emissions from Demolished Facilities
18.	Construction / Demolition	Renovation - B322 and B323
19.	Construction / Demolition	Demolition - B57003
20.	Construction / Demolition	Demolition - B57004

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

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B243

- Activity Description:
Demolition of Building 243 and basic grading of the surrounding area.

- Activity Start Date
Start Month: 7
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 8
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.020684
SO_x	0.000327
NO_x	0.131580
CO	0.149560
PM 10	0.269347

Pollutant	Total Emissions (TONs)
PM 2.5	0.005474
Pb	0.000000
NH_3	0.000114
CO_2e	32.6

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 9700
Height of Building to be demolished (ft): 12

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

2.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0410	0.0006	0.2961	0.3743	0.0148	0.0148	0.0037	58.556
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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
$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 10

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 73000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

2.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

2.2.4 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): NOT IN A REGULATORY AREA

- Activity Title: Construction - HPEM Laboratory

- Activity Description:
Construction of a 48,000 sq ft laboratory addition to adjacent to building 323. This construction is anticipated to commence in January 2023, and complete towards the end of calendar year 2024. While construction of this faicility necessitates demolition of two other facilities, those emission estimates are considered separately. Excavated material from trenching and drilled piers is assumed to stay on site for the purposes of grading to level either this construction site or one of the demolition sites.

- Activity Start Date
Start Month: 2
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 8
End Month: 2023

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.792720
SO_x	0.009870
NO_x	3.779102
CO	4.464168
PM 10	3.243296

Pollutant	Total Emissions (TONs)
PM 2.5	0.158829
Pb	0.000000
NH_3	0.003693
CO_2e	957.8

3.1 Site Grading Phase

3.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 2
Number of Days: 0

3.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 150000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

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

- 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): 20 (default)

- 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) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

3.2 Trenching/Excavating Phase

3.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 2
Number of Days: 0

3.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 5000
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: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

3.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

3.2.4 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

3.3 Building Construction Phase

3.3.1 Building Construction Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 18
Number of Days: 0

3.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 48000
Height of Building (ft): 40
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- 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): 40 (default)

- Vendor Trips Vehicle Mixture (%)

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

3.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0340	0.0006	0.2783	0.2694	0.0116	0.0116	0.0030	61.069
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0260	0.0003	0.1557	0.1772	0.0077	0.0077	0.0023	25.661

- 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

3.3.4 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

3.4 Architectural Coatings Phase

3.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
Start Quarter: 1
Start Year: 2023

- Phase Duration

Number of Month: 3
Number of Days: 0

3.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft^2): 100000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

3.4.3 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

3.4.4 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

3.5 Paving Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

3.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 3
Number of Days: 0

3.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 80000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

3.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**

Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

3.5.4 Paving 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

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / $acre)^2$ / acre)

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B324

- Activity Description:
Demolition for Building 324. Grading is not included in this calculation since the new construction occurs on the same plot of land - grading of this plot is included in the construction activity.

- Activity Start Date
Start Month: 1
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.011544
SO_x	0.000178
NO_x	0.072262
CO	0.097269
PM 10	0.007352

Pollutant	Total Emissions (TONs)
PM 2.5	0.003147
Pb	0.000000
NH_3	0.000062
CO_2e	17.5

4.1 Demolition Phase

4.1.1 Demolition Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

4.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 2000
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

4.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0410	0.0006	0.2961	0.3743	0.0148	0.0148	0.0037	58.556
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

4.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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
$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B326

- Activity Description:
Demolition for Building 326. Grading is not included in this calculation since the new construction occurs on the same plot of land - grading of this plot is included under the construction activity.

- Activity Start Date
Start Month: 1
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.011532
SO_x	0.000177
NO_x	0.072147
CO	0.097230
PM 10	0.006929

Pollutant	Total Emissions (TONs)
PM 2.5	0.003144
Pb	0.000000
NH_3	0.000062
CO_2e	17.5

5.1 Demolition Phase

5.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2022

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Duration
Number of Month: 1
Number of Days: 0

5.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 1800
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

5.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0410	0.0006	0.2961	0.3743	0.0148	0.0148	0.0037	58.556
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

5.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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
$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B430

- Activity Description:
Demolition of Building 430 and basic grading of the surrounding area.

- Activity Start Date
Start Month: 2
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 3
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.020127
SO_x	0.000314
NO_x	0.126059
CO	0.147693
PM 10	0.180277

Pollutant	Total Emissions (TONs)
PM 2.5	0.005322
Pb	0.000000
NH_3	0.000084
CO_2e	31.2

6.1 Demolition Phase

6.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

6.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 2100
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

6.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0410	0.0006	0.2961	0.3743	0.0148	0.0148	0.0037	58.556
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

6.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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
$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

6.2 Site Grading Phase

6.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 10

6.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 52000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

6.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

6.2.4 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

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B906

- Activity Description:
Demolition of Building 906 and basic grading of the surrounding area.

- Activity Start Date
Start Month: 3
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 4
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.020039
SO_x	0.000312

Pollutant	Total Emissions (TONs)
PM 2.5	0.005298
Pb	0.000000

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

NO_x	0.125191
CO	0.147400
PM 10	0.144305

NH_3	0.000080
CO_2e	30.9

7.1 Demolition Phase

7.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

7.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 600
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

7.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.0410	0.0006	0.2961	0.3743	0.0148	0.0148	0.0037	58.556
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

7.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

7.2 Site Grading Phase

7.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 10

7.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 42000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

7.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

7.2.4 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

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location

County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B907

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Description:
Demolition of Building 907 and basic grading of the surrounding area.

- Activity Start Date
Start Month: 4
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.020143
SO_x	0.000315
NO_x	0.126221
CO	0.147748
PM 10	0.167751

Pollutant	Total Emissions (TONs)
PM 2.5	0.005327
Pb	0.000000
NH_3	0.000085
CO_2e	31.2

8.1 Demolition Phase

8.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

8.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 1700
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

8.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0410	0.0006	0.2961	0.3743	0.0148	0.0148	0.0037	58.556
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

8.2 Site Grading Phase

8.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
Start Quarter: 1
Start Year: 2022

- Phase Duration

Number of Month: 0
Number of Days: 10

8.2.2 Site Grading Phase Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- General Site Grading Information

Area of Site to be Graded (ft^2): 48000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

8.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

8.2.4 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

9. Construction / Demolition

9.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B908

- Activity Description:
Demolition of Building 908 and basic grading of the surrounding area.

- Activity Start Date
Start Month: 5
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.020025
SO_x	0.000312
NO_x	0.125052
CO	0.147353
PM 10	0.137238

Pollutant	Total Emissions (TONs)
PM 2.5	0.005295
Pb	0.000000
NH_3	0.000079
CO_2e	30.9

9.1 Demolition Phase

9.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

9.1.2 Demolition Phase Assumptions

- General Demolition Information

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Area of Building to be demolished (ft^2): 400
Height of Building to be demolished (ft): 9

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

9.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0410	0.0006	0.2961	0.3743	0.0148	0.0148	0.0037	58.556
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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 Demolition Phase Formula(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

9.2 Site Grading Phase

9.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 10

9.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 40000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

9.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

9.2.4 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

10. Construction / Demolition

10.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B909

- Activity Description:
Demolition of Building 909 and basic grading of the surrounding area.

- Activity Start Date
Start Month: 6
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 11
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.110093
SO_x	0.001749
NO_x	0.711289
CO	0.814001

Pollutant	Total Emissions (TONs)
PM 2.5	0.029413
Pb	0.000000
NH_3	0.000758
CO_2e	175.2

PM 10	1.392982		

10.1 Demolition Phase

10.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 6
Number of Days: 0

10.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 27300
Height of Building to be demolished (ft): 40

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

10.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0410	0.0006	0.2961	0.3743	0.0148	0.0148	0.0037	58.556
Rubber Tired Dozers Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

10.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

10.2 Site Grading Phase

10.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 11
Start Quarter: 1
Start Year: 2022

- Phase Duration

Number of Month: 1
Number of Days: 0

10.2.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft^2): 114000
Amount of Material to be Hauled On-Site (yd^3): 500
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

10.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

10.2.4 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

11. Construction / Demolition

11.1 General Information & Timeline Assumptions

- Activity Location

County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B910

- Activity Description:

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Demolition of Building 910 and basic grading of the surrounding area.

- Activity Start Date
Start Month: 1
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 2
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.019265
SO_x	0.000317
NO_x	0.117929
CO	0.147002
PM 10	0.187823

Pollutant	Total Emissions (TONs)
PM 2.5	0.004714
Pb	0.000000
NH_3	0.000091
CO_2e	31.5

11.1 Demolition Phase

11.1.1 Demolition Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 1
Number of Days: 0

11.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 2600
Height of Building to be demolished (ft): 17

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

11.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0382	0.0006	0.2766	0.3728	0.0127	0.0127	0.0034	58.549
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

11.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

11.2 Site Grading Phase

11.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 10

11.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 53000

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

11.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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

11.2.4 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

12. Construction / Demolition

12.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B911

- Activity Description:
Demolition of Building 911 and basic grading of the surrounding area.

- Activity Start Date
Start Month: 2
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 3
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.019280
SO_x	0.000318
NO_x	0.118079
CO	0.147053
PM 10	0.214610

Pollutant	Total Emissions (TONs)
PM 2.5	0.004718
Pb	0.000000
NH_3	0.000092
CO_2e	31.6

12.1 Demolition Phase

12.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

12.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 3600
Height of Building to be demolished (ft): 13

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

12.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0382	0.0006	0.2766	0.3728	0.0127	0.0127	0.0034	58.549
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

12.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

12.2 Site Grading Phase

12.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 10

12.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 61000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

12.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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

12.2.4 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

13. Construction / Demolition

13.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B912

- Activity Description:
Demolition of Building 912 and basic grading of the surrounding area.

- Activity Start Date
Start Month: 3
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 4
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.019082
SO_x	0.000313
NO_x	0.116123
CO	0.146392
PM 10	0.161539

Pollutant	Total Emissions (TONs)
PM 2.5	0.004664
Pb	0.000000
NH_3	0.000082
CO_2e	31.0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

13.1 Demolition Phase

13.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

13.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 1300
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

13.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0382	0.0006	0.2766	0.3728	0.0127	0.0127	0.0034	58.549
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

13.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

13.2 Site Grading Phase

13.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 10

13.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 47000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

13.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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

13.2.4 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

14. Construction / Demolition

14.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B913

- Activity Description:
Demolition of Building 913 and basic grading of the surrounding area.

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Start Date
Start Month: 4
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.019082
SO_x	0.000313
NO_x	0.116123
CO	0.146392
PM 10	0.161539

Pollutant	Total Emissions (TONs)
PM 2.5	0.004664
Pb	0.000000
NH_3	0.000082
CO_2e	31.0

14.1 Demolition Phase

14.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

14.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 1300
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

14.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0382	0.0006	0.2766	0.3728	0.0127	0.0127	0.0034	58.549
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

14.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

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

BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

14.2 Site Grading Phase

14.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 10

14.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 47000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Site Grading Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

14.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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

14.2.4 Site Grading Phase Formula(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- 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

15. Construction / Demolition

15.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B57012

- Activity Description:
Demolition of Building 57012 and basic grading of the surrounding area.

- Activity Start Date
Start Month: 5
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.019212
SO_x	0.000316
NO_x	0.117408
CO	0.146826
PM 10	0.179358

Pollutant	Total Emissions (TONs)
PM 2.5	0.004699
Pb	0.000000
NH_3	0.000089
CO_2e	31.4

15.1 Demolition Phase

15.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

15.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 2200
Height of Building to be demolished (ft): 16

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

15.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0382	0.0006	0.2766	0.3728	0.0127	0.0127	0.0034	58.549
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

15.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)

BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

15.2 Site Grading Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

15.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 10

15.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 51000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

15.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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

15.2.4 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

16. Heating

16.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Heating - New 48,000 sqft HPEM Laboratory

- Activity Description:
Heating associated with the new HPEM facility.

- Activity Start Date
Start Month: 9
Start Year: 2023

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

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.008725
SO_x	0.000952
NO_x	0.158629
CO	0.133248
PM 10	0.012056

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.012056
Pb	0.000000
NH_3	0.000000
CO_2e	191.0

16.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 48000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value ($MMBtu/ft^3$): 0.00105
Energy Intensity ($MMBtu/ft^2$): 0.0694

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

16.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

16.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year
HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

17. Heating

17.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Heating Emissions from Demolished Facilities

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Description:

Estimated annual heating emissions from all demolished facilities. While demolition of these facilities is likely to be performed over a period of time in a tiered fashion, this calculation is set to coincide with the planned start date of the new facility.

- Activity Start Date

Start Month: 9
Start Year: 2023

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	-0.009897
SO_x	-0.001080
NO_x	-0.179945
CO	-0.151154
PM 10	-0.013676

Pollutant	Emissions Per Year (TONs)
PM 2.5	-0.013676
Pb	0.000000
NH_3	0.000000
CO_2e	-216.6

17.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft^2): 55900
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value ($MMBtu/ft^3$): 0.00105
Energy Intensity ($MMBtu/ft^2$): 0.0676

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

17.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

17.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

18. Construction / Demolition

18.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Renovation - B322 and B323

- Activity Description:
Interior renovations to Buildings 322 and 323.

- Activity Start Date
Start Month: 1
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 8
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.027979
SO_x	0.000468
NO_x	0.162886
CO	0.212858
PM 10	0.006100

Pollutant	Total Emissions (TONs)
PM 2.5	0.005881
Pb	0.000000
NH_3	0.000928
CO_2e	50.0

18.1 Building Construction Phase

18.1.1 Building Construction Phase Timeline Assumptions

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

- Phase Duration
Number of Month: 6
Number of Days: 0

18.1.2 Building Construction Phase Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 19970
Height of Building (ft): 40
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
Air Compressors Composite	1	4
Forklifts Composite	1	1
Welders Composite	1	0.5

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20

- 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): 40

- Vendor Trips Vehicle Mixture (%)

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

18.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Air Compressors Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0389	0.0007	0.2458	0.3034	0.0119	0.0119	0.0035	63.695
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0242	0.0003	0.1487	0.1761	0.0067	0.0067	0.0021	25.657

- 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

18.1.4 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

19. Construction / Demolition

19.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B57003

- Activity Description:
Demolition of Building 57003 and basic grading of the surrounding area.

- Activity Start Date
Start Month: 7
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.035554
SO_x	0.000588
NO_x	0.215034
CO	0.247113
PM 10	0.210152

Pollutant	Total Emissions (TONs)
PM 2.5	0.008594
Pb	0.000000
NH_3	0.000119
CO_2e	58.4

19.1 Demolition Phase

19.1.1 Demolition Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

19.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 771
Height of Building to be demolished (ft): 16

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

19.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0382	0.0006	0.2766	0.3728	0.0127	0.0127	0.0034	58.549
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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

	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

19.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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
$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1 yd^3 / 27 ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

19.2 Site Grading Phase

19.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

19.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 20000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

19.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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

19.2.4 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

20. Construction / Demolition

20.1 General Information & Timeline Assumptions

- Activity Location
County: Bernalillo
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Demolition - B57004

- Activity Description:
Demolition of Building 57004 and basic grading of the surrounding area.

- Activity Start Date
Start Month: 7
Start Month: 2023

- Activity End Date

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Indefinite: False
End Month: 8
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.035668
SO_x	0.000591
NO_x	0.216172
CO	0.247498
PM 10	0.313795

Pollutant	Total Emissions (TONs)
PM 2.5	0.008625
Pb	0.000000
NH_3	0.000125
CO_2e	58.7

20.1 Demolition Phase

20.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

20.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 2000
Height of Building to be demolished (ft): 16

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

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

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC

POVs	50.00	50.00	0	0	0	0	0

20.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0382	0.0006	0.2766	0.3728	0.0127	0.0127	0.0034	58.549
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

20.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
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

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
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

20.2 Site Grading Phase

20.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

20.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 30000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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): 20 (default)

- Worker Trips Vehicle Mixture (%)

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

20.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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

20.2.4 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