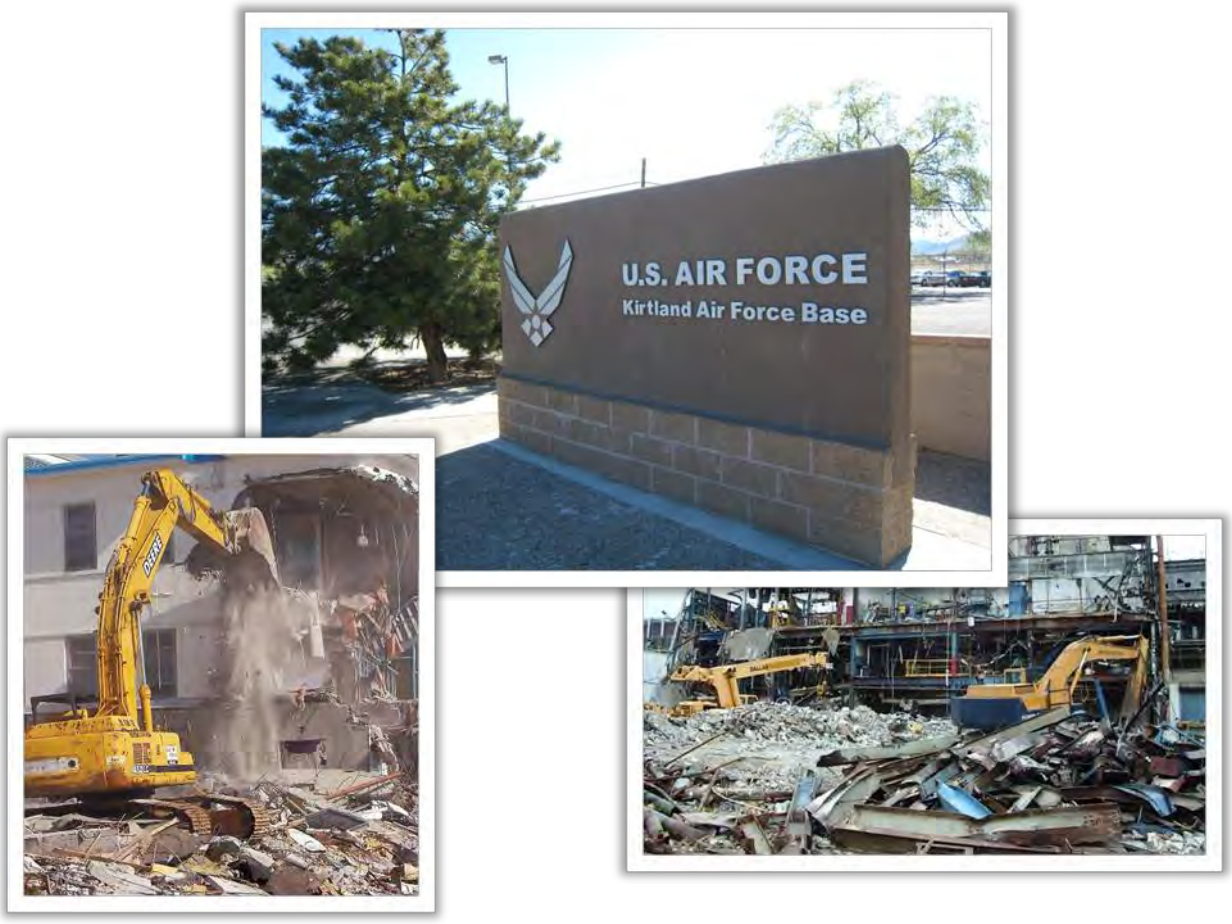
FINDING OF NO SIGNIFICANT IMPACT
For
ENVIRONMENTAL ASSESSMENT
ADDRESSING BUILDING DEMOLITION
AT
KIRTLAND AIR FORCE BASE, NEW MEXICO



APRIL 2010

FINDING OF NO SIGNIFICANT IMPACT (FONSI) for Building Demolition at Kirtland Air Force Base, New Mexico

Introduction

The U.S. Air Force (USAF) prepared an Environmental Assessment (EA) to identify and evaluate potential environmental effects from demolition of up to 20 buildings at Kirtland Air Force Base (AFB), New Mexico. The USAF prepared the EA in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code [U.S.C.] Section 4321–4347) and the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508).

1. Description of Proposed Action and Alternatives

The USAF proposes to demolish up to 20 buildings on Kirtland AFB 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. Up to six buildings would be demolished per year over the next 5 years. In addition to the Proposed Action, the No Action Alternative of not demolishing the buildings was analyzed in the EA.

2. Environmental Analysis

Based on the analysis contained in the EA, which is herewith incorporated by reference, the USAF has determined that the Proposed Action has the potential to result in less-than-significant adverse environmental impacts. The following summarizes the results of the EA.

Land Use. The Proposed Action would not require changes to be made to land use designations; therefore, the proposed demolition of up to 20 buildings under the Proposed Action would be consistent with the existing installation land use designation at the location of each building. The Proposed Action would comply with the *Kirtland AFB General Plan*. No impacts on municipal or installation land use plans or policies would be expected. No impacts on existing land use viability or continued land occupation would be anticipated.

Noise. Noise generation from the implementation of the Proposed Action would last only for the duration of demolition activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Noise effects from increased traffic due to construction vehicles would be temporary in nature. Consequently, the demolition activities at Kirtland AFB and subsequent hauling of debris would result in impacts on the noise environment associated with demolition, equipment use, and traffic levels at any of the demolished facilities; however, these impacts would be expected to be less than significant.

Visual Resources. Demolition activities would result in a temporary impact on the installation's overall aesthetic appeal; however, the impacts would be less than significant. Building removal would enhance the aesthetic appearance of the installation. Therefore, the building demolition under the Proposed Action would result in a beneficial impact on visual resources.

Air Quality. Implementation of the Proposed Action would result in temporary impacts from slightly elevated air pollutant concentrations. The Proposed Action would generate emissions

below 10 percent of the emissions inventory for the Albuquerque-Mid Rio Grande Intrastate Air Quality Control Board and the emissions would be short-term. However, Kirtland AFB is in attainment for all criteria pollutants and the Proposed Action would only generate slightly increased air pollutant concentration. The demolition activities associated with the Proposed Action would not have significant effects on air quality at Kirtland AFB or on regional or local air quality.

Geology and Soils. Under the Proposed Action, no significant impacts on geological resources or soils would be expected. Proposed demolition activities would occur predominantly on previously disturbed lands. Loss of soil structure due to compaction from vehicle traffic could result in changes in drainage patterns. However, as most of the area of each building site has been disturbed previously, it is anticipated that implementation of the Proposed Action would have a minimal impact on previously undisturbed or compacted soil structure. Potential impacts on the soils surrounding the buildings proposed for demolition would be minimal. Through the use of best management practices (BMPs) (e.g., minimization of soil exposure through revegetation), the impacts of demolition activities on soils would be expected to be localized and less than significant.

Water Resources. The Proposed Action would create ground disturbance on a small scale, which could in turn increase erosion potential and runoff during heavy precipitation events. Post-demolition restabilization and revegetation would reduce erosion potential and runoff; therefore, short-term and long-term, adverse effects on surface waters would be less than significant. Additionally, less than significant beneficial effects on water resources would be expected from decreasing the amount of impervious surfaces on Kirtland AFB.

Less-than-significant adverse impacts on water quality would be expected from implementation of the Proposed Action. BMPs would be implemented to protect against potential petroleum or hazardous materials spills. In the event of a spill, procedures outlined in Kirtland AFB's *Hazardous Materials and Emergency Planning and Response Plan* would be followed to quickly contain and clean up the spill. Less-than-significant impacts on floodplains would be expected. All buildings proposed for demolition are outside of the 100-year floodplain of the Tijeras Arroyo and the Arroyo del Coyote.

Biological Resources. Implementation of the Proposed Action would not result in significant impacts on vegetation species, wildlife species and habitat, wetlands, or threatened or endangered species. Site locations for the Proposed Action are previously disturbed, existing buildings; therefore, there is only limited vegetation and wildlife inhabiting the sites. No federally or state-listed threatened or endangered species are known to inhabit the project area, nor is there potential habitat nearby. No wetlands are found within the footprint of the proposed demolition sites.

Cultural Resources. All 20 buildings proposed for demolition have been previously inventoried according to Section 110 of the National Historic Preservation Act, as amended 1966 (NHPA). Of these, five buildings (Buildings 605, 614, 1013, 37505, and 30143) have been determined eligible for the National Register of Historic Places (NRHP) through consultation with the New Mexico State Historic Preservation Office (SHPO). Accordingly, the Proposed Action would have a significant impact on these NRHP-eligible historic properties. Mitigation of adverse effects through Historic American Buildings Survey (HABS) documentation of Buildings 614, 1013, 37505, and 30143 is required prior to any ground-disturbing activity. It should be noted that HABS documentation has been completed for Building 605. The remaining 15 buildings proposed for demolition have been determined not eligible for listing to the NHPA through

consultation with SHPO. The demolition of these buildings would not constitute significant impacts on historic properties. As such, no further documentation of these buildings is recommended.

Infrastructure. Implementation of the Proposed Action would result in less-than-significant impacts on electrical systems, natural gas systems, liquid fuel supply, central heating and cooling systems, water supply systems, sanitary sewer and wastewater systems, storm water systems, and communications systems. Interruptions of service from these systems might be expected during demolition activities; however, these interruptions would be temporary. Negligible reductions in the demand for these systems would occur following demolition activities. A temporary increase in demand on the solid waste management system would occur during building demolition; however, this demand is not expected to overburden the system and no significant impacts would be expected.

Hazardous Materials and Waste. Buildings proposed for demolition could contain asbestos-containing materials (ACM), lead-based paint (LBP), and polychlorinated biphenyls (PCB). Sampling for LBP and ACM would occur prior to demolition activities and any materials discovered would be handled in accordance with Kirtland AFB's *Lead-Based Paint Management Plan* and *Asbestos Management Plan.* PCBs could be found in light ballasts at the buildings proposed for demolition. Light fixtures would be removed prior to demolition and handled in accordance with Kirtland AFB's *Hazardous Waste Management Plan.* Sampling, removal, and disposal of any of these materials would be short-term in duration and would result in less than significant impacts.

No impacts on hazardous materials management during demolition activities would be expected. Hazardous materials could be encountered during demolition and petroleum products would be used by construction equipment; however, no significant impacts are anticipated. Additionally, no new chemicals or toxic substances would be used or stored at the installation in conjunction with the Proposed Action.

Safety. Demolition activities at Kirtland AFB would result in effects on contractor safety; however, these effects are expected to be less than significant due to implementation of effective health and safety programs. All personnel involved with building demolition would be trained to eliminate potential exposure to, and release of, asbestos and lead. No effects are anticipated on military personnel or the public. All of the buildings proposed for demolition are currently vacant. Work areas surrounding demolition sites would be fenced and appropriate signs posted to reduce risks to installation personnel and the public. No impacts on explosives and munitions safety are anticipated.

Socioeconomics and Environmental Justice. Less than significant impacts would be expected on socioeconomics and environmental justice. The number of new residents who move to the Albuquerque area as a result of the Proposed Action would be negligible. Demolition activities would require 48 workers, which would not outstrip the supply of the local industry and would result in indirect, beneficial impacts from the increase in payroll tax revenues, purchase of materials, and purchases of good and services in the local area. No impacts would result on the facilities (e.g., housing and transportation) required for workers at Kirtland AFB. The Proposed Action would not negatively impact minority populations or children as 85 percent of all demolition debris would be disposed of at the landfill on Kirtland AFB.

BMPs/Mitigation. BMPs for the Proposed Action are discussed throughout the EA. Potential BMPs include revegetating and restabilizing the post-demolition sites to prevent soil erosion and

minimize runoff, protecting storm water inlets in the project area during demolition activities with hay bales and sand bags to prevent sediment from entering local waterways, and implementing measures to protect against potential petroleum and hazardous materials releases during demolition activities.

3. Regulations

The Proposed Action would not violate NEPA; CEQ regulations; or any other Federal, state, or local environmental regulations.

4. Commitment to Implementation

The USAF affirms their commitment to implement this Proposed Action in accordance with NEPA. Implementation is dependent on funding. The USAF would ensure that adequate funds are requested in future years' budgets to achieve the goals and objectives set forth in this EA.

5. Public Review and Comment

The Draft EA was available for public review and comment from 19 February 2010 to 22 March 2010 at Central New Mexico Community College, Montoya Campus and the Kirtland AFB library. No public comments were received during this review period. Four responses were received from local Federal, state, and local agencies and Native American Tribes. Their comments were incorporated into the analysis of potential environmental impacts performed as part of this EA, where applicable.

6. Finding of No Significant Impact

After reviewing the EA, the USAF believes that the Proposed Action would not generate significant controversy or have a significant impact on the quality of the human or natural environment. The Draft EA and proposed FONSI were made available for a 30-day public review and comment period. After reviewing the comments, the USAF has determined that the Proposed Action would not have a significant impact on the quality of the human or natural environment and, therefore, an environmental impact statement does not need to be prepared. This analysis fulfills the requirements of NEPA and the CEQ Regulations.

Signature on file, Signed 12 April 2010

Date

MICHAEL S. DUVALL, Colonel, USAF
Commander

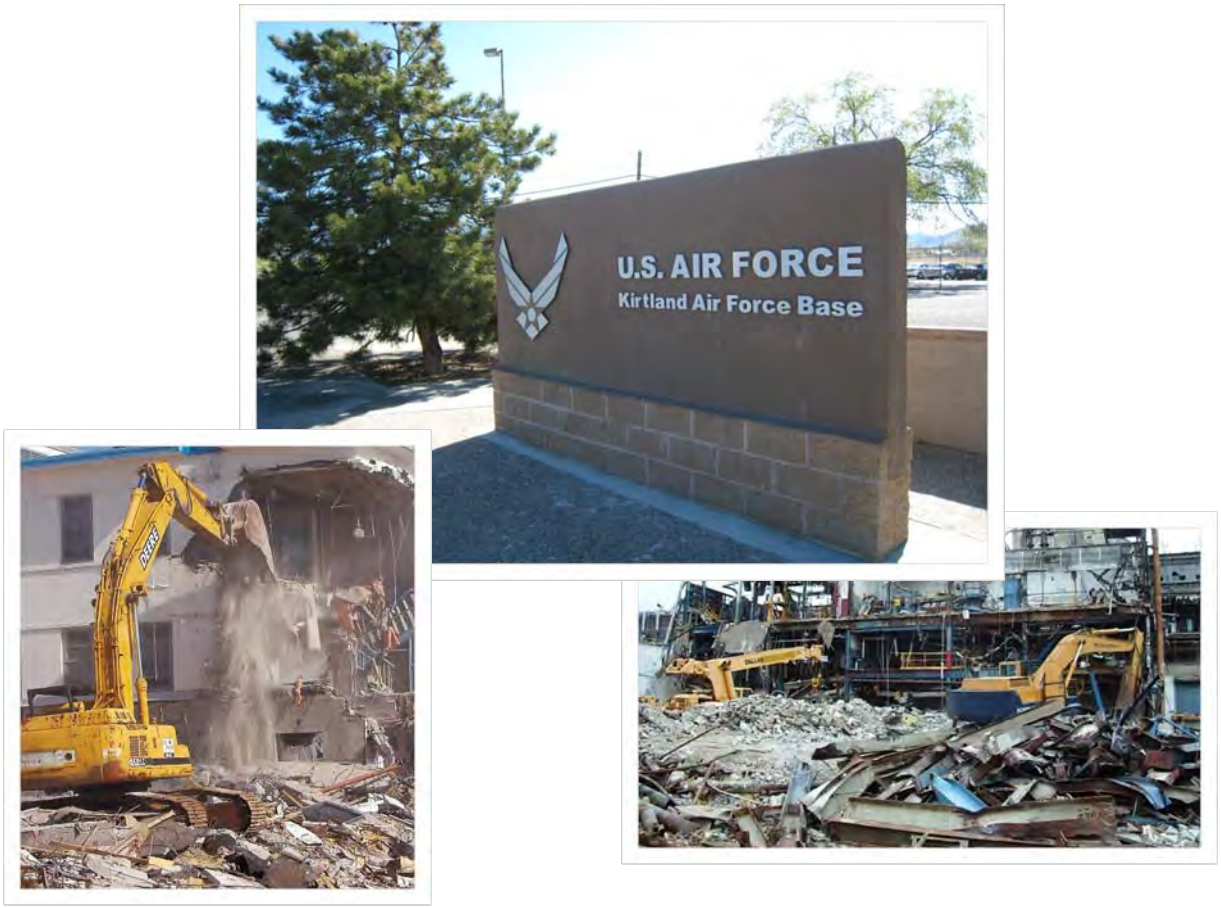
FINAL

ENVIRONMENTAL ASSESSMENT

ADDRESSING BUILDING DEMOLITION

AT

KIRTLAND AIR FORCE BASE, NEW MEXICO



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ACRONYMS AND ABBREVIATIONS

377 ABW	377th Air Base Wing
AAFES	Army and Air Force Exchange Service
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
AFB	Air Force Base
AFI	Air Force Instruction
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AFPD	Air Force Policy Directive
AMRGI	Albuquerque-Mid Rio Grande Intrastate
APE	Area of Potential Effect
AQCB	Air Quality Control Board
AQCR	Air Quality Control Region
BMP	Best management practice
Btu	British thermal unit
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CWA	Clean Water Act
dBA	A-weighted decibel
DERP	Defense Environmental Restoration Program
DNL	Day-night average sound level
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
EA	Environmental Assessment
EISA	Energy Independence and Security Act
EO	Executive Order
ERP	Environmental Restoration Program
ESP	Explosives Site Plan
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FY	Fiscal Year
HABS	Historic American Building Survey
HAP	Hazardous Air Pollutant
HCPI	Historic Cultural Properties Inventory
HMMS	Hazardous Materials Management System
HUD	U.S. Department of Housing and Urban Development
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
LA	Laboratory of Anthropology
LBP	lead-based paint
$\mu g/m^3$	Micrograms per cubic meter
mg/ m^3	Milligrams per cubic meter
MBTA	Migratory Bird Treaty Act

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MGD	million gallons per day
MMRP	Military Munitions Response Program
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
MSA	Metropolitan Statistical Area
MVA	million-volt amperes
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFA	No Further Action
NHPA	National Historic Preservation Act
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NOA	Notice of Availability
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
Pb	lead
PCB	polychlorinated biphenyls
percent g	percentage of the force of gravity
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
PM_{10}	particulate matter equal to or less than 10 microns in diameter
PPE	personal protective equipment
ppm	parts per million
PSD	Prevention of Significant Deterioration
QD	Quantity-Distance
RCRA	Resource Conservation and Recovery Act
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasures
SWPPP	Storm Water Pollution Prevention Plan
tpy	tons per year
TSCA	Toxic Substances Control Act
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
U.S.C.	United States Code
VOC	Volatile Organic Compound

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AT
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377th Air Base Wing
Kirtland Air Force Base, New Mexico

APRIL 2010

COVER SHEET

FINAL ENVIRONMENTAL ASSESSMENT ADDRESSING BUILDING DEMOLITION AT KIRTLAND AIR FORCE BASE, NEW MEXICO

Proposed Action: The 377th Air Base Wing (377 ABW) proposes to demolish 20 buildings on Kirtland Air Force Base (AFB).

Report Designation: Final Environmental Assessment (EA)

Responsible Agency: U.S. Air Force (USAF), 377 ABW, Kirtland AFB

Affected Location: Kirtland AFB, New Mexico

Abstract: The 377 ABW proposes to demolish 20 buildings on Kirtland AFB to make space available for future construction, to help comply with USAF direction to reduce Kirtland AFB's physical presence by 20 percent by 2020, 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. The analysis in this EA addresses the Proposed Action, the No Action Alternative, and alternatives considered but eliminated from detailed analysis.

For additional information, contact Kirtland AFB NEPA Program Manager, 377 MSG/CEANQ, 2050 Wyoming Boulevard SE, Suite 125, Kirtland AFB, NM 87117-5270, NEPA@kirtland.af.mil.

Executive Summary

Introduction

This Environmental Assessment (EA) describes the 377th Air Base Wing's (377 ABW) proposal to demolish 20 buildings on Kirtland Air Force Base (AFB) to make space available for future construction, to help comply with U.S. Air Force (USAF) direction to reduce Kirtland AFB's physical presence by 20 percent by 2020, and to fulfill its mission as installation host through better site utilization.

Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to remove unsafe, high maintenance structures at Kirtland AFB to make space available for future construction projects and to fulfill the 377 ABW's mission as installation host through improved site utilization. The buildings proposed for demolition are in deteriorating condition, detract from overall installation appearance, and are no longer feasible to maintain and repair. In addition, because of their deteriorated condition and the presence of hazardous building materials used in their construction, these buildings pose a safety hazard to staff working at Kirtland AFB. In some cases, these buildings contain asbestos-containing materials (ACM) and lead-based paint (LBP). To the extent possible, ACM and LBP would be removed and properly disposed of before demolition occurs. The Proposed Action also helps Kirtland AFB move towards compliance with the Air Force Memorandum entitled Space Utilization Guidance, which states that the USAF has a goal to reduce their physical presence by 20 percent by 2020 (USAF 2009).

The need for the Proposed Action is to enable the 377 ABW to fulfill its mission as installation host through better site utilization, compliance with long-range comprehensive planning efforts, and compliance with current health and safety standards. Many of these facilities, some constructed as early as the 1950s, have exceeded their design lives and are considered to be unsafe and beyond feasible repair.

Description of the Proposed Action and No Action Alternative

Proposed Action. The 377 ABW proposes to demolish 20 buildings on Kirtland AFB 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. Up to six buildings would be demolished per year over the next 5 years.

No Action Alternative. Under the No Action Alternative, the 377 ABW would not demolish the buildings identified for demolition under the Proposed Action. Selection of this alternative would result in continued deterioration of the facilities and continued safety issues due to the presence of unsafe buildings, and would not make space available for future construction activities. Furthermore, the costs associated with maintaining these buildings would continue to rise.

Summary of Environmental Effects

Implementation of the Proposed Action or No Action Alternative would result in less-than-signficant impacts on the human and natural environment at Kirtland AFB. These environmental impacts are summarized in **Table ES-1**.

Table ES-1. Environmental Impacts of Implementing the Proposed Action or No Action Alternative

Resource Area	Impacts of the Proposed Action	Impacts of the No Action Alternative
Land Use	The Proposed Action would comply with the General Plan and would not result in any impacts on municipal land use plans or policies. No impacts on land use plans or policies would be expected. The Proposed Action would result in no impacts on existing land use viability or continued land occupation. No adverse impacts would be expected on future land use	Under the No Action Alternative, the Proposed Action would not be implemented and existing land use conditions would remain the same. No impacts on land use would be expected.
Noise	Noise generation would last only for the duration of demolition activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Consequently, demolition activities at Kirtland AFB would result in impacts on the noise environment; however, these impacts would be expected to be less than significant.	Under the No Action Alternative, the Proposed Action would not be implemented. There would not be an increase in construction activities, or vehicle operations; consequently, the ambient noise environment would not change from existing conditions.
Visual Resources	Although the demolition process would impact the installation's overall aesthetic appeal, the impacts would be temporary and, therefore, would be less than significant. In addition to the building removal, overhead electricity and communications utility wires would be removed as part of the Proposed Action. Their removal would further enhance the aesthetic appearance. Therefore, the building demolition under the Proposed Action would result in a beneficial impact on visual resources.	The No Action Alternative would result in continuation of the existing visual and aesthetic conditions.
Air Quality	Demolition activities at Kirtland AFB under the Proposed Action would result in impacts on air quality resources; however these impacts are expected to be less than significant. The Proposed Action would result in air quality impacts during construction activities, primarily from site-disturbing activities and operation of construction equipment. All emissions associated with demolition operations would be temporary in nature.	Under the No Action Alternative, Kirtland AFB would not demolish and remove the proposed buildings, which would result in the continuation of the existing condition. Therefore, no direct or indirect environmental effects would be expected on local or regional air quality from implementation of the No Action Alternative.

Resource Area	Impacts of the Proposed Action	Impacts of the No Action Alternative
Geology and Soils	Under the Proposed Action no significant impacts on geological resources or soils would be expected. Proposed demolition activities would occur predominantly on previously disturbed lands. As a result of demolition activities, soils would be compacted and soil structure disturbed and modified. Potential impacts on the soils surrounding the buildings proposed for demolition would be minimal. Through the use of best management practices (BMPs) (e.g., minimization of soil exposure through revegetation), the impacts of demolition activities on soils would be expected to be localized and less than significant.	Under the No Action Alternative, the buildings proposed for demolition at Kirtland AFB would not be demolished and existing conditions would remain. No effects on geological resources or soils would be anticipated.
Water Resources	Under the Proposed Action, less than significant impacts on water resources would be expected. Groundwater might be temporarily used for dust suppression during demolition activities, depending on site conditions. Proper housekeeping and retention of debris within the site boundaries would prevent construction debris from entering waterways. Therefore, short-term and long-term, adverse effects on surface waters would be less than significant.	Under the No Action Alternative, demolition activities would not take place and there would be no changes to current water resources. Therefore, no new impacts on water resources would be expected as a result of the No Action Alternative.
Biological Resources	Site locations for the Proposed Action are either currently occupied by existing buildings or are located in semi-improved areas that consist largely of annual weeds, early successional perennials, and some native grasses and shrubs with areas of bare ground. Because of the disturbed nature of the project sites, few wildlife currently inhabit the area. No federally or state-listed threatened or endangered species are known to inhabit the project area. No wetlands are located on the proposed project sites within the cantonment area of the installation. Therefore, impacts on biological resources would be less than significant.	Under the No Action Alternative building demolition would not occur. Removal of existing degraded structures would allow for future new development to occur in these already disturbed locations. This would be expected to reduce the need for future development in currently undisturbed or less-disturbed habitats that could support native vegetation and wildlife.

Resource Area	Impacts of the Proposed Action	Impacts of the No Action Alternative
Cultural Resources	All 20 buildings proposed for demolition have been previously inventoried according to Section 110 of the National Historic Preservation Act, as amended 1966 (NHPA).Of these, five buildings (Buildings 605, 614, 1013, 37505, and 30143) have been determined eligible for the National Register of Historic Places (NRHP) through consultation with the State Historic Preservation Office (SHPO). Accordingly, the Proposed Action would have a significant impact on these NRHP-eligible historic properties. Mitigation of adverse effects through Historic American Buildings Survey (HABS) documentation of Buildings 614, 1013, 37505, and 30143 is required prior to any ground-disturbing activity. The remaining 15 buildings proposed for demolition have been determined not eligible for listing to the NHPA through consultation with SHPO. The demolition of these buildings would not constitute significant impacts on historic properties. As such no further documentation of these buildings is recommended.	No significant impacts on cultural resources would occur as a result of the implementation of the No Action Alternative.
Infrastructure	No significant impacts on electrical systems, natural gas systems, liquid fuels supply, central heating and cooling systems, water supply systems, sanitary sewer and wastewater systems, storm water systems, communications systems, or solid waste management would be expected from implementation of the Proposed Action.	The No Action Alternative would result in continuation of the existing conditions of infrastructure resources. No additional effects on infrastructure resources would be expected as a result of the Proposed Action not being implemented.
Hazardous Materials and Waste	No significant impacts on hazardous materials and waste would be expected from implementation of the Proposed Action.	No effects on hazardous materials or waste management would be expected as a result of the Proposed Action not being implemented.

Resource Area	Impacts of the Proposed Action	Impacts of the No Action Alternative
Safety	Implementation of the Proposed Action would slightly increase the health and safety risk to contractors performing demolition work at the project sites during the normal workday because the level of such activity would increase. No effects on military personnel safety, public safety, or explosives and munitions safety would be expected.	The No Action Alternative would result in continuation of the existing safety conditions and their associated impacts.
Socioeconomics and Environmental Justice	The number of new residents who would move to the Albuquerque area as result of the Proposed Action would be negligible; therefore, less than significant impacts would be expected. Indirect beneficial impacts would result from the increase in payroll tax revenues, purchase of materials, and purchase of goods and services in the area resulting in less than significant impacts on the construction industry. Changes to employment and expenditures resulting from the Proposed Action would be negligible; less than significant impacts would be expected. Indirect disproportionate negative impacts on minority, low income, and youth populations would not be expected as result of the Proposed Action and less than significant impacts would be expected.	Under the No Action Alternative the demolition of buildings of Kirtland AFB would not occur and no impacts on socioeconomics would be expected as no additional jobs would be created, and there would be no increase in tax revenue as a result of employee wages and sales receipts.

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ADDRESSING BUILDING DEMOLITION
AT KIRTLAND AIR FORCE BASE, NEW MEXICO

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1. Purpose and Need for Action

1.1 Introduction

This section describes the purpose and need for the Proposed Action at Kirtland Air Force Base (AFB), provides summaries of the scope of the environmental review process and the 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 decisionmaking process under the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] Sections 4321 to 4370d) and the Council on Environmental Quality's (CEQ) implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500–1508). This Environmental Assessment (EA) for Building Demolition at Kirtland AFB was prepared in accordance with NEPA. This EA evaluates the potential environmental impacts associated with demolishing up to 20 buildings at Kirtland AFB.

Kirtland AFB is southeast of Albuquerque, New Mexico (see **Figure 1-1**), at the foot of the Manzano Mountains. These mountains define the eastern boundary of an area called East Mesa. Kirtland AFB encompasses approximately 51,606 acres of the East Mesa and has an average elevation of 5,400 feet above mean sea level. Land use for areas adjacent to the installation includes Cibola National Forest to the northeast and east, the Isleta Indian Reservation and Cibola National Forest (including Manzano Wilderness Area) to the south, and residential and business areas of the City of Albuquerque to the west and north.

Kirtland AFB was established in the late 1930s as a training base for the Army Air Corps. In 1941, construction of permanent barracks, warehouses, and a chapel was completed; and a B-18 bomber, Kirtland AFB's first military aircraft, arrived. Troops soon followed, and Kirtland AFB grew rapidly with U.S. involvement in World War II. The installation served as a training site for air crews for many of the country's bomber aircraft, including the B-17, B-18, B-24, and the B-29. After World War II, Kirtland AFB shifted from a training facility to a test and evaluation facility for weapons delivery, working closely with both Los Alamos National Laboratory and Sandia National Laboratories. In 1971, Kirtland AFB and its adjoining neighbor to the east, Sandia Army Base, were combined. The two divisions of the installation are still referred to as Kirtland West and Kirtland East, respectively. Kirtland AFB is now operated by the 377th Air Base Wing (377 ABW) of the U.S. Air Force (USAF).

The 377 ABW's prime mission, as the host unit at Kirtland AFB, is to support more than 150 tenant organizations with personnel, resources, equipment, and facilities. Kirtland AFB serves as a center for research and development for Sandia National Laboratories. The installation functions as a test and evaluation center for the Space and Missile Systems Center and Air Force Operational Test and Evaluation Center; and it is the headquarters for operational organizations, such as the Air Force Security Police Agency, Air Force Inspection Agency, and Albuquerque Service Center for the U.S. Department of Energy (DOE). Kirtland AFB also functions as a training base for the 58th Special Operations Wing of Air Education and Training Command's 19th Air Force. The 150th Fighter Group of the New Mexico Air National Guard is also stationed at the installation. The 377 ABW provides fire protection (including crash and rescue) for Albuquerque International Airport.

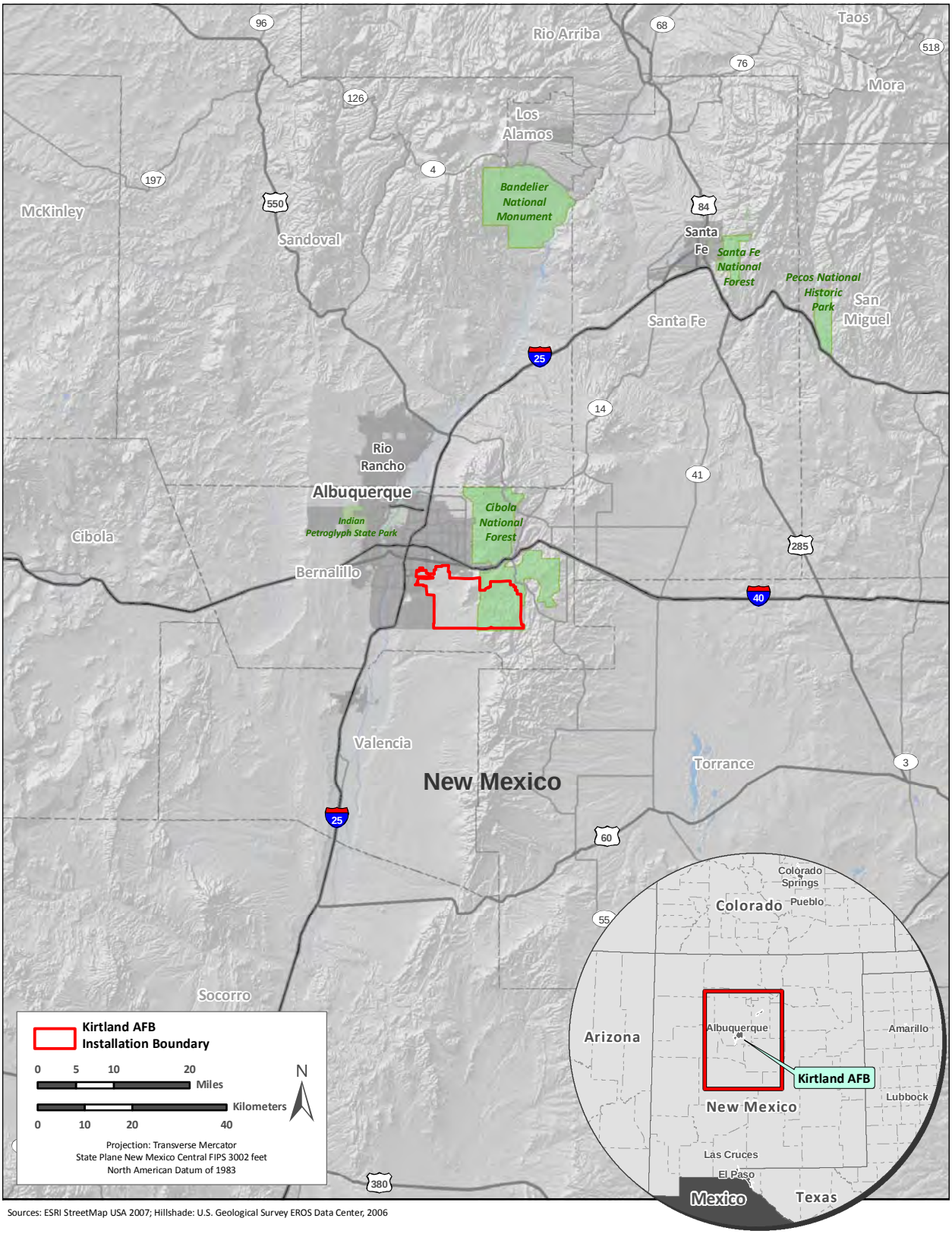

Figure 1-1. Kirtland AFB Location Map

This EA is organized into seven sections and appendices. **Section 1** states the purpose, need, scope, and public involvement efforts for the Proposed Action. **Section 2** contains a detailed description of the Proposed Action and the alternatives considered. **Section 3** describes the existing conditions of the potentially affected environment. **Section 4** identifies the environmental consequences of implementing all reasonable alternatives, including direct, indirect, and cumulative impacts. **Section 5** provides the names of those persons and agencies consulted and the list of preparers for this EA. **Section 6** lists the references used to support the analyses. Publication of this Final EA will also include a signed Finding of No Significant Impact (FONSI) for the Proposed Action.

1.2 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to remove unsafe, high maintenance structures at Kirtland AFB to make space available for future construction projects and to fulfill the 377 ABW's mission as installation host through improved site utilization. The buildings proposed for demolition are in deteriorating condition, detract from overall installation appearance, and are no longer feasible to maintain and repair. In addition, because of their deteriorated condition and the presence of unsafe materials, these buildings pose a safety hazard to staff working at Kirtland AFB. In some cases, these buildings contain asbestos-containing materials (ACM) and lead-based paint (LBP). To the extent possible, ACM and LBP would be removed and properly disposed of before demolition occurs. The Proposed Action also helps Kirtland AFB move towards compliance with the Air Force Memorandum entitled Space Utilization Guidance, which states that the USAF has a goal to reduce their physical presence by 20 percent by 2020 (USAF 2009).

The need for the Proposed Action is to enable the 377 ABW to fulfill its mission as installation host through better site utilization, compliance with long-range comprehensive planning efforts, and compliance with current health and safety standards. Many of these facilities, some constructed as early as the 1950s, have exceeded their design lives and are considered to be unsafe and beyond feasible repair.

1.3 Scope of the EA

Scope consists of the range of actions, alternatives, and impacts to be considered. The scope of the Proposed Action and the range of alternatives to be considered are presented in detail in **Section 2**. In accordance with CEQ regulations implementing NEPA (40 CFR §§1500–1508), the No Action Alternative is analyzed to provide the baseline against which the environmental impacts of implementing the range of alternatives addressed can be compared. This EA identifies appropriate mitigation measures that are not already included in the Proposed Action or alternatives in order to avoid, minimize, reduce, or compensate for adverse environmental impacts. This EA examines the environmental impacts of the Proposed Action and reasonable alternatives on the following resource areas: land use; noise; air quality; geological and soil resources; water resources; biological resources; cultural resources; infrastructure; transportation; hazardous materials and wastes; aesthetics; and socioeconomics, protection of children, and environmental justice. The affected environment for all resource areas is discussed in **Section 3**; however, only those resource areas that apply to the Proposed Action are analyzed in **Section 4**. Those resource areas that do not apply were eliminated from further analysis.

1.3.1 Environmental Laws, Regulations, and Executive Orders

To comply with NEPA (Public Law 91-190, 42 U.S.C. §4321 et. seq.), the planning and decisionmaking process involves a study of other relevant environmental laws, regulations, and Executive Orders (EOs). The NEPA process does not replace procedural or substantive requirements of other environmental laws; it addresses them collectively in an analysis, which enables decisionmakers to have a comprehensive view

of major environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated "with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently rather than consecutively" (40 CFR 11 1500.2).

As required in 40 CFR 1500.2(c), the EA contains a list of Federal permits, licenses, and coordination that might be required in implementing the Proposed Action or alternatives (see **Table 1-1**).

Table 1-1. List of Coordination and Permits Associated with the Proposed Action

Agency	Permit/Approval/Condition
U.S. Fish and Wildlife Service (USFWS)	• Endangered Species Act (ESA) Section 7 Coordination • Migratory Bird Treaty Act (MBTA) Coordination
U.S. Army Corps of Engineers (USACE)	• Clean Water Act (CWA) Section 404 Permit
U.S. Environmental Protection Agency (USEPA)	• National Pollutant Discharge Elimination System (NPDES) permit
Albuquerque Environmental Health Department	• Applicable air quality permits • Title V Permit
New Mexico Historic Preservation Division	• National Historic Preservation Act (NHPA) Section 106 Consultation

Appendix A contains summaries of the environmental laws, regulations, and EOs that might apply to this project. Where relevant, these laws are described in more detail in the appropriate resource areas presented in **Section 3**. The scope of the analysis of potential environmental consequences in **Section 4** considers direct and indirect impacts; cumulative impacts are discussed in **Section 4**.

1.4 Interagency Coordination and Public Involvement

NEPA requirements help ensure that environmental information is made available to the public during the decisionmaking process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions would be enhanced if proponents provide information to the public and involve the public in the planning process. The Intergovernmental Coordination Act and EO 12372, Intergovernmental Review of Federal Programs, require Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal. Air Force Instruction (AFI) 32-7060, Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), requires the USAF to implement an agency coordination process, which is used for the purpose of facilitating and receiving agency input coordination and implements scoping requirements.

Through the IICEP process, Kirtland AFB provided the Draft EA to relevant Federal, state, and local agencies to share the analyses of the Proposed Action and alternatives and provided them sufficient time to make known their environmental concerns specific to the action. The IICEP process also provided Kirtland AFB the opportunity to coordinate with and consider state and local views in implementing the Federal proposal. All IICEP material related to this EA is included in **Appendix B**. The agencies contacted during the IICEP process are listed in **Appendix B**.

A Notice of Availability (NOA) for the Draft EA was published in *The Albuquerque Journal* on February 19, 2010. This initiated the 30-day public review period. At the closing of the review period, no public

comments had been received. Four responses from relevant Federal, State, Tribal, and local agencies were received and their comments were incorporated into the analysis of potential environmental impacts performed as part of this EA, where applicable. **Appendix B** contains additional details about the about the public comment period.

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2. Description of Proposed Action and Alternatives

2.1 Proposed Action

The Air Force Materiel Command's 377 ABW at Kirtland AFB, New Mexico, is proposing to demolish approximately 20 buildings at Kirtland AFB. This section describes the Proposed Action and alternatives considered. As discussed in **Section 1-1**, the NEPA process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. Reasonable alternatives must satisfy the purpose of and need for a proposed action, as defined in **Section 1-2**. In addition, CEQ regulations also specify 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 CEQ regulations.

The 377 ABW proposes to demolish 20 buildings on Kirtland AFB to make space available for future construction and to fulfill its mission as installation host through better site utilization. The buildings proposed for demolition are listed in **Table 2-1** and the locations on the installation are depicted on **Figures 2-1** through **2-7**. None of the buildings proposed for demolition are currently occupied or used by installation personnel. Up to six buildings would be demolished per year over the next 5 years.

Table 2-1. Buildings Proposed for Demolition

Building Number	Size (Square feet)	Year Built	Building Number	Size (Square feet)	Year Built
605	500	1963	48058	1,986	1968
613	11,048	1964	48059	1,586	1970
614	4,254	1944	48061	864	1983
736	4,000	1968	48062	1,134	1967
1003	120	1968	48063	480	1967
1013	5,747	1952	48064	2,040	1956
30143	59,840	1950	48066	2,880	1973
37505	629	1951	48067	2,880	1973
48055	684	1952	48068	1,812	1956
48056	573	1952	48069	1,920	1984

2.2 Demolition Activities

2.2.1 General Demolition Activities

A 100-foot buffer would be established around each building to account for general demolition activities and storage of construction equipment. General demolition activities would include removal of foundations, floors, walls, ceilings, roofing, and the electrical substations providing power to these facilities; and removing, capping, and rerouting of sewer, gas, water, and steam lines outside of the work areas. Equipment such as bulldozers, backhoes, front-end loaders, water trucks and sprayers (for dust control), dump trucks, tractor-trailers, and generators would be required to support the proposed

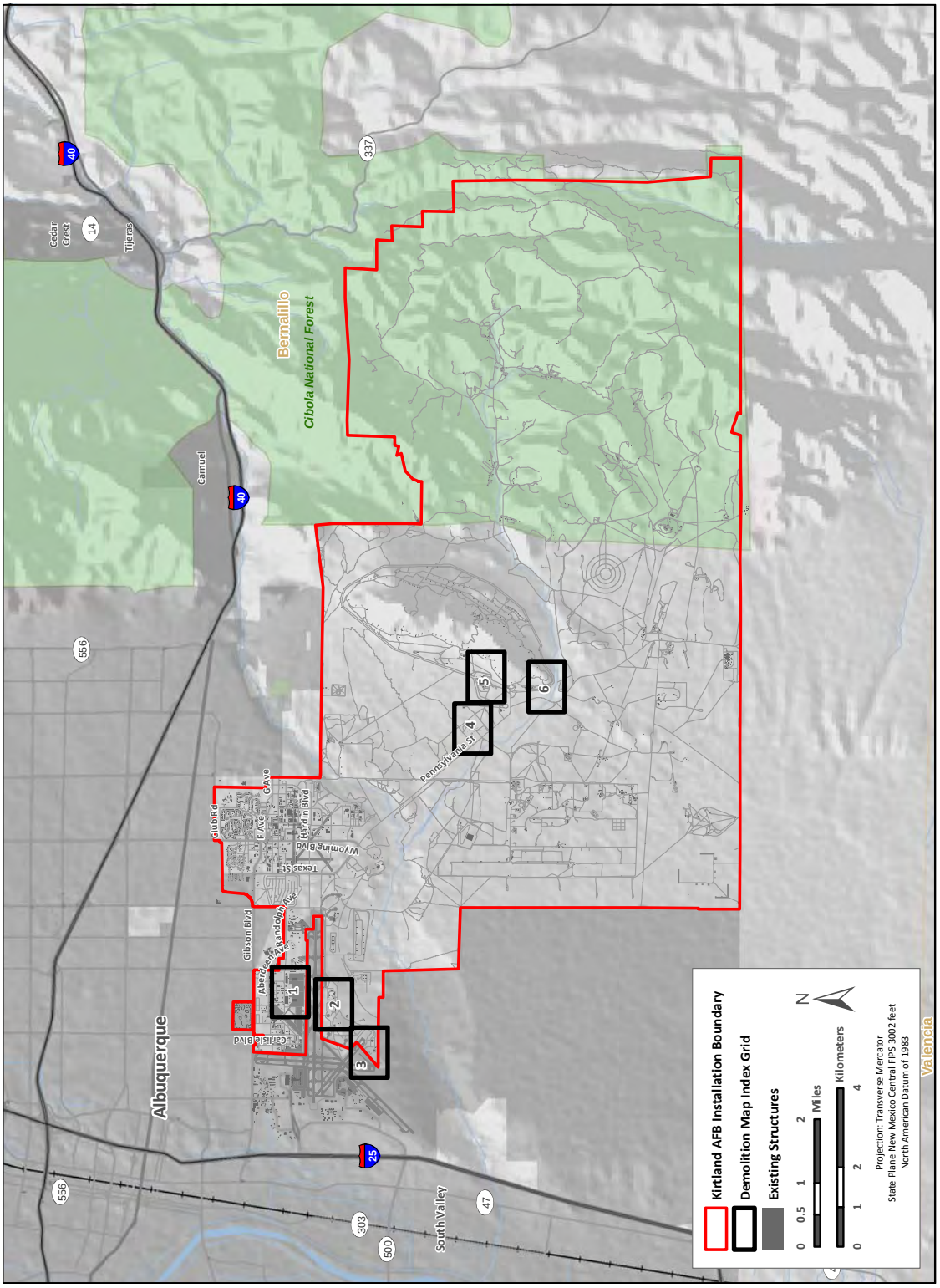


Figure 2-1. Locations of Areas Containing Proposed Building Demolition Projects

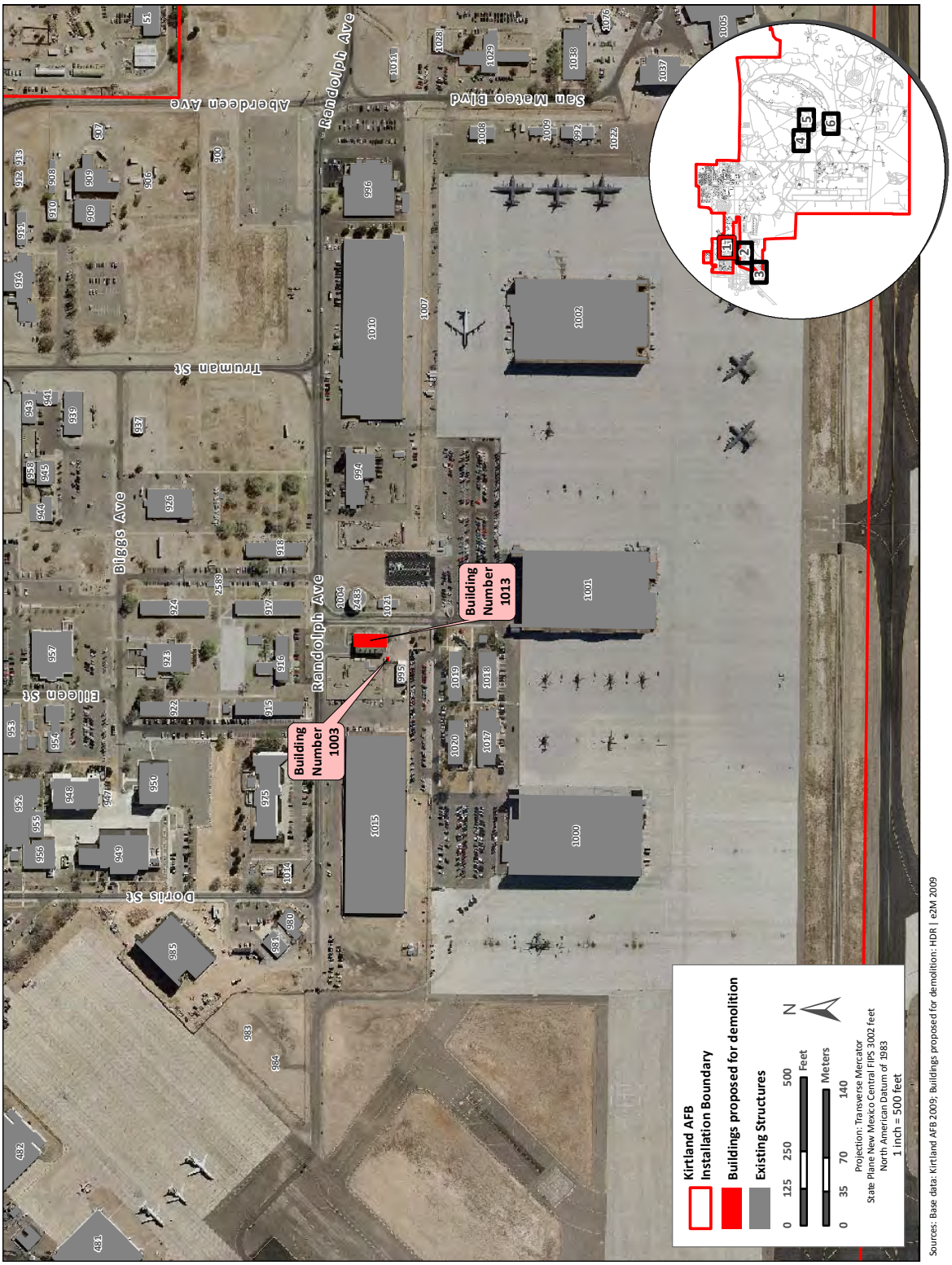


Figure 2-2. Proposed Buildings for Demolition in Map Area 1

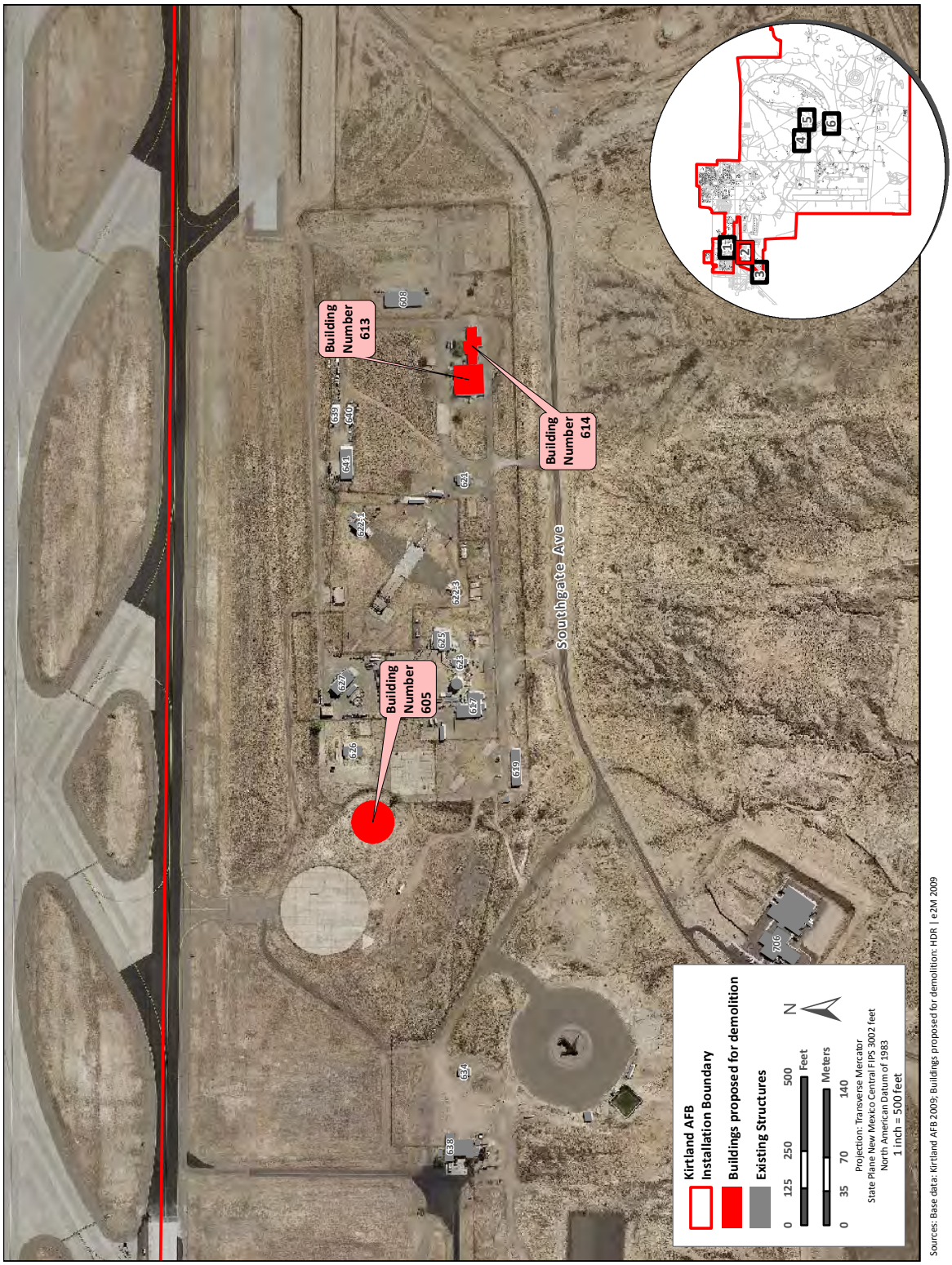


Figure 2-3. Proposed Buildings for Demolition in Map Area 2

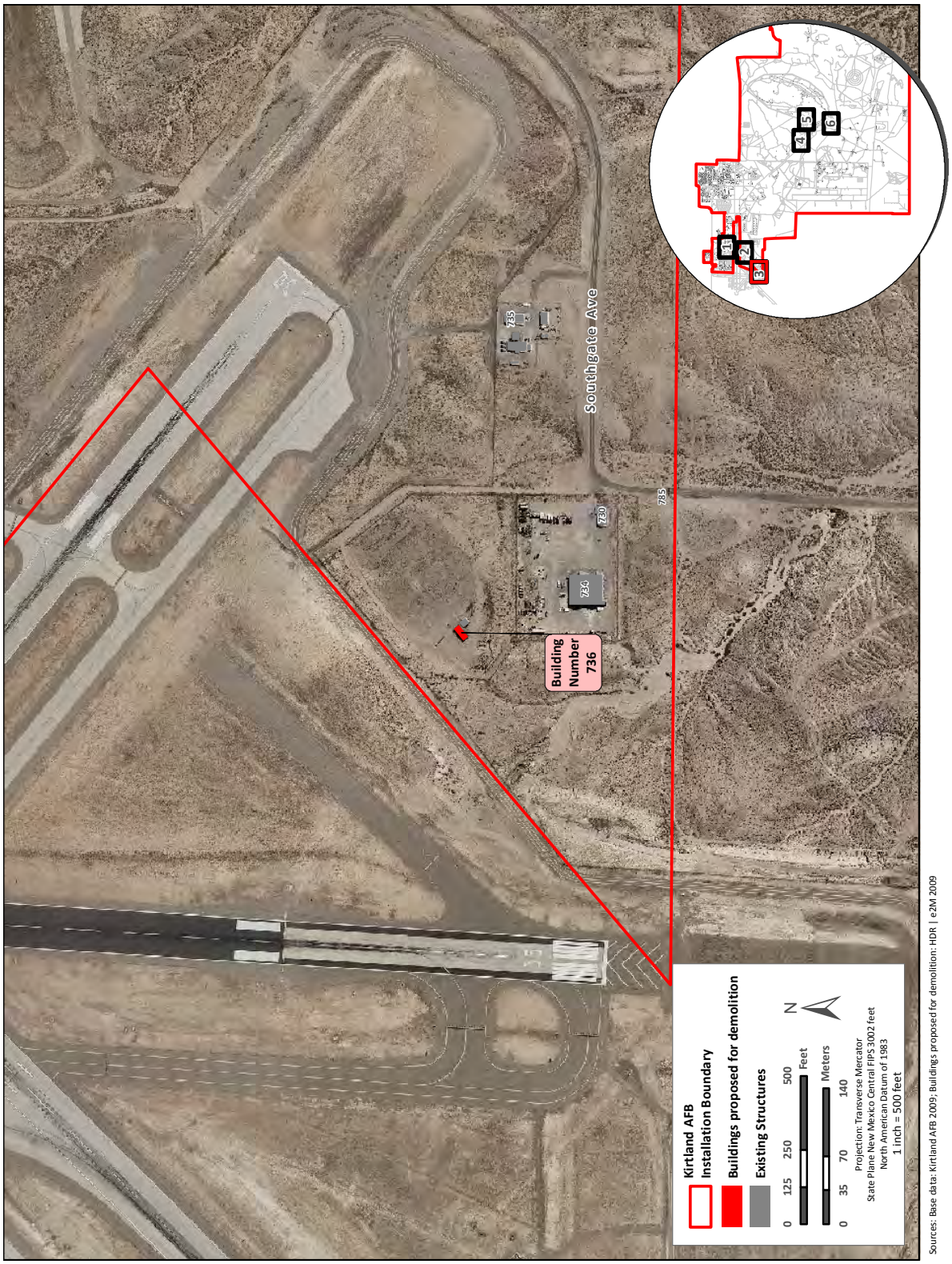


Figure 2-4. Proposed Buildings for Demolition in Map Area 3

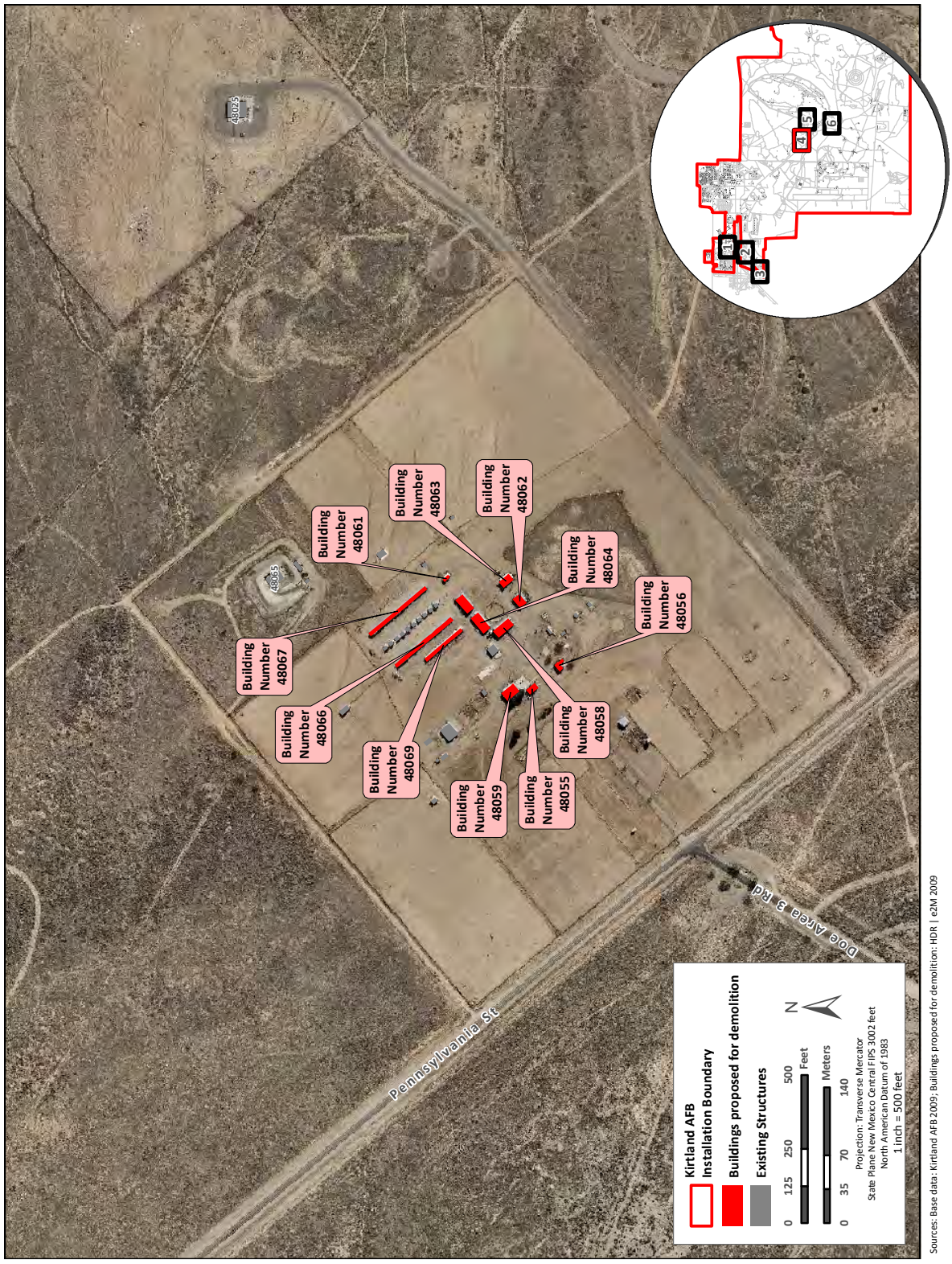


Figure 2-5. Proposed Buildings for Demolition in Map Area 4

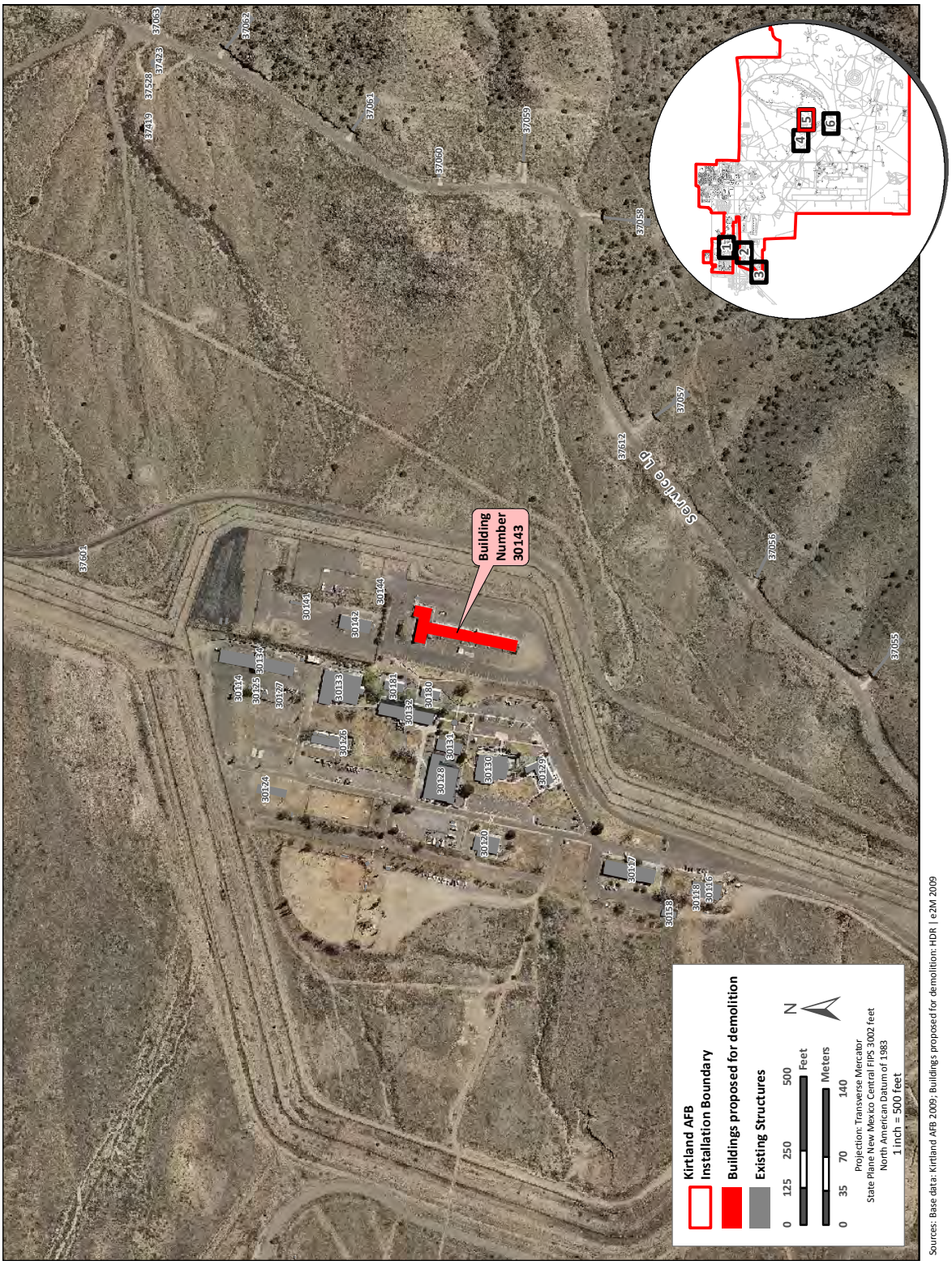


Figure 2-6. Proposed Buildings for Demolition in Map Area 5

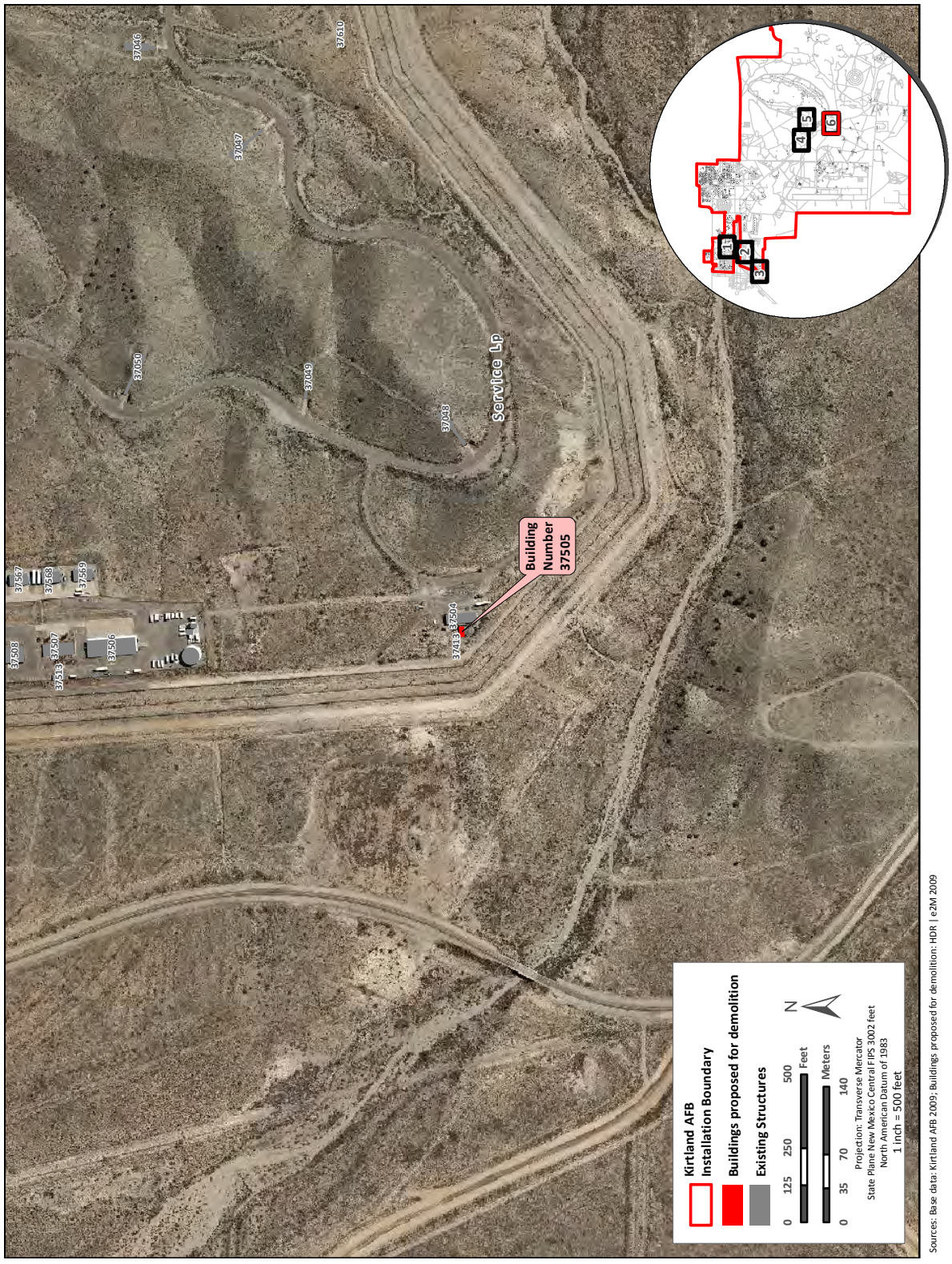


Figure 2-7. Proposed Buildings for Demolition in Map Area 6

demolition activities. Nonhazardous demolition waste, such as asphalt, concrete, wood, and nonrecyclable metals, would be transported to the Kirtland AFB landfill for recycling or disposal. Dumpsters would be provided for municipal solid waste generated by worker activity at each of the project sites.

To the extent possible, materials would be diverted from landfills and either recycled or reused. Site-generated scrap metals, wiring, clean duct work, and structural steel would be separated and recycled offsite. Cardboard wastes would be separated for pickup and would be recycled as a function of the Kirtland AFB Qualified Recycling Program. Miscellaneous salvageable metals would be transported to the Defense Reutilization and Marketing Office for recycling or reuse. In addition, clean fill material, ground up asphalt, and broken up cement would be diverted from landfill and reused whenever possible. For the purpose of analysis, it is assumed that approximately 85 percent of the waste destined for disposal at a landfill would be sent to the Kirtland AFB landfill and 15 percent would be transported to a landfill offsite. Following demolition, site restoration for each of the projects would include backfill and final grading of the disturbed areas, and seeding as applicable.

Prior to demolition, buildings would be screened and sampling would occur for the presence of LBP and asbestos. Asbestos and lead abatement would take place as part of the demolition activities, as appropriate. Asbestos- and lead-containing wastes would be managed in accordance with Kirtland AFB's Asbestos Management Plan, Lead-Based Paints Management Plan, and Hazardous Waste Management Plan. **Table 2-2** provides a brief description of wastes anticipated to be generated as a result of the proposed demolition activities.

Table 2-2. Types of Demolition Wastes Generated by the Proposed Action

Potential Asbestos-Containing Materials		Potential Lead-Based Paint	Nonhazardous Materials
• Pipe insulation • Shingles • Siding • Ceiling tiles • Vinyl floor tiles • Carpet and mastic • Windows • Doors • Steam valves • Fittings • Flanges • Unions • Plenums	• Castings • Trim • Molding • Water and steam supply elbows • Elbow insulation • Air conditioning duct insulation • Hot water tank insulation • Corrugated board • Fume hood conduits • Ducts	• Painted plastic windows and doors • Interior wall and ceiling paint • Painted rafters • Painted wood • Painted exterior pipe stacks • Painted metal vents • Painted air conditioners	• Concrete • Sheetrock • Wood • Glass • Metal • Masonry

2.2.2 Demolition Staffing, Equipment, and Materials

Up to eight workers would be required for the demolition of each building. Bulldozers, backhoes, dump trucks, and front-end loaders would be on site throughout periods of demolition and site restoration. Sufficient amounts of fuels, hydraulic fluids, oils, and lubricants would be stored on site during the

project to support contractor vehicles and machinery. No other hazardous materials would be stored on site. No natural gas or steam would be required for demolition or restoration. If a dust nuisance or hazard occurs during demolition, Kirtland AFB would supply water to be used for dust control.

2.3 No Action Alternative

CEQ regulations specify the inclusion of the No Action Alternative in the alternatives analysis (40 CFR 1502.14). The No Action Alternative is analyzed to provide a baseline of the existing conditions against which the potential environmental and socioeconomic impacts of the Proposed Action and alternative actions can be compared. Under the No Action Alternative, the 377 ABW would not demolish the buildings identified for demolition under the Proposed Action. Selection of this alternative would result in continued deterioration of the facilities and continued safety issues due to the presence of unsafe buildings, and would not make space available for future construction activities. Furthermore, costs of maintaining these buildings would continue to rise.

2.4 Alternatives Considered but Eliminated from Detailed Analysis

The 377 ABW considered one additional alternative to the Proposed Action. This alternative called for repairing or renovating the existing facilities to acceptable standards that would allow them to be used again. It was determined that this alternative would not meet the purpose and need of the Proposed Action to comply with long-range comprehensive planning efforts, comply with health and safety standards, and fulfill 377 ABW's mission as installation host through improved site utilization. In addition, repair or renovation was determined to be not feasible economically since all of the facilities proposed for demolition have deteriorated to the point that it would be more expensive to renovate these buildings for reuse than it would be to replace them. Therefore, this alternative was not carried forward for further detailed analysis in this EA.

3. Affected Environment

All potentially relevant resource areas were initially considered for analysis in this EA. In compliance with NEPA and CEQ guidelines, the discussion of the affected environment in **Section 3** and the environmental consequences in **Section 4** focuses only on those resource areas considered potentially subject to impacts and with potentially significant environmental issues. This section includes land use, noise, air quality, geology and soils, water resources, biological resources, cultural resources, infrastructure, hazardous materials and wastes, noise, safety, and socioeconomics and environmental justice. Airspace is not addressed in this EA because the Proposed Action does not involve any resources that would impact airspace.

3.1 Land Use

3.1.1 Definition of the Resource

The term "land use" refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws. However, there is no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, "labels," and definitions vary among jurisdictions. Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational. USAF installation land use planning commonly utilizes 12 general land use classifications: Airfield, Aircraft Operations and Maintenance, Industrial, Administrative, Community (Commercial), Community (Service), Medical, Housing (Accompanied), Housing (Unaccompanied), Outdoor Recreation, Open Space, and Water (USAF 1998).

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. According to Air Force Pamphlet 32-1010, *Land Use Planning*, land use planning is the arrangement of compatible activities in the most functionally effective and efficient manner (USAF 1998). Compatibility among land uses fosters the societal interest of obtaining the highest and best uses of real property. Tools supporting land use planning within the civilian sector include written master plans/management plans, policies, and zoning regulations. The USAF comprehensive planning process also utilizes functional analysis, which determines the degree of connectivity among installation land uses and between installation and off-installation land uses, to determine future installation development and facilities planning.

In appropriate cases, the location and extent of a proposed action needs to be evaluated for its potential effects on a project site and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its "permanence."

3.1.2 Existing Conditions

Surrounding Land Use. Kirtland AFB is in the southwestern portion of Bernalillo County, New Mexico (see **Figure 1-1**). It is bounded on the west and north by the city of Albuquerque, on the northeast and east by the Cibola National Forest, and on the south by Isleta Indian Reservation (Isleta Pueblo). The Albuquerque International Airport abuts Kirtland AFB's northwestern border and allows use of its

runways by the installation. The region surrounding Kirtland AFB includes both urban and rural areas, including generalized land uses of residential (single and multi-family), parks/recreation, and pockets of industrial/manufacturing, public/institutional (hospital and medical center), and commercial (retail and service) to the north; open space (vacant/other and low-impact recreation) to the northeast and east; open space and forest or vacant land to the south; and a mixture of open space (vacant/other and parks/recreation), transportation/utilities, and public/institutional (Zia Rifle and Pistol Club) to the west (KAFB 2002, City of Albuquerque 2008a, City of Albuquerque 2008b).

Several proposed developments within the City of Albuquerque pose constraints to future development at Kirtland AFB, including residential projects and improvement/extension of area roadway corridors. An approximately 13,000-acre mixed-use master planned community, known as Mesa del Sol, is proposed at an area adjacent to the southwestern boundary of Kirtland AFB. In order to prevent land use incompatibility issues and avoid future conflicts from this development on the installation's operational effectiveness, it will be separated from Kirtland AFB by La Semilla, a 2,700-acre, 1-mile-wide nature refuge and environmental education campus, that will be controlled by DOE and have minimal structures and limited land uses (Forest City 2005). A second planned mixed-use community, Valle del Sol, is proposed for an area within Tijeras Arroyo, southwest of Kirtland AFB, in unincorporated Bernalillo County (KAFB 2002). While providing a limitation to installation expansion, the extension of Eubank Boulevard and improvement to the Gibson Boulevard corridor will also improve vehicle access and movement for Kirtland AFB employees (KAFB 2002).

On-Installation Land Use. Kirtland AFB consists of approximately 51,606 acres, making it the third largest installation in the Air Force Material Command, and the sixth largest installation in the USAF (KAFB 2002). The 377 ABW is the host organization at Kirtland AFB and provides installation operations support to approximately 200 associate organizations in more than 2,000 buildings (KAFB 2002, KAFB 2007a). The land at Kirtland AFB is primarily owned by the USAF, but several other ownerships and leases also apply. The DOE occupies the largest amount of land area of any associate units at Kirtland AFB. The DOE owns and operates facilities on approximately 7,500 acres, primarily in the eastern portion of the cantonment area, and the southwestern and northeastern portion of the installation.

The most heavily developed area of Kirtland AFB is the cantonment area in the northwestern portion of the installation. The cantonment area is commonly referred to in terms of its east or west sides; the west side is the site of the original Kirtland AFB while the east side included Sandia and Manzano Bases. Recent installation planning and infrastructure efforts have focused on unifying the formerly segregated western and eastern portions of the cantonment area into a more unified installation (KAFB 2002).

Airfield operations and aircraft support facilities are concentrated in the airfield complex area, which is in the western portion of the cantonment area adjacent to and surrounding the Albuquerque Internatonal Airport and runways. Several associate organizations, including the Air Force Research Laboratory, the New Mexico Air National Guard, the Space and Missiles Systems Center/Test and Evaluation, and the 58th Special Operations Wing, are also in this area. In addition, there are two housing areas in the western cantonment area along the northern border of the installation. The remaining intensive development at Kirtland AFB, including administrative, housing, medical, recreation and commercial services uses, is in the eastern portion of the cantonment area. A majority of the 377 ABW's buildings are in this area, as well as the facilities of other major associate organizations, including Sandia National Laboratories, the DOE Albuquerque Office, the Air Force Operational Test and Evaluation Center, the Defense Threat Reduction Agency, and the Air Force Safety Center. Most military family housing and their associated community uses are at the northeastern border of the cantonment area, adjacent to existing neighborhoods outside the installation.

The southern and western portions of Kirtland AFB, which represent approximately 80 percent of the installation's total land area, are largely dedicated to military training and operational facilities. Some facilities in this area include the Star Fire Optical Range, High Energy Research Test Facility, and the Lovelace Respiratory Research Institute in the southern portion. Sandia National Laboratories also operates and maintains several facilities on the installation for research, testing, and evaluation of various weapons, communication, and energy systems. While most recreational facilities are in the cantonment area, the golf course is in the southwestern portion of the installation. No outdoor recreation is permitted in the eastern portion of the installation (KAFB 2007a).

Kirtland AFB has 10 land use designations: Aircraft Operations/Maintenance, Airfield, Administration and Research, Community (includes commercial and service functions), Military Family Housing, Industrial, Medical, Outdoor Recreation, Open Space, and Associate-Owned (see **Figure 3-1** [KAFB 2002]). The installation is a closed base; therefore, hunting, trapping, fishing, and commercial forestry operations are prohibited (KAFB 2007a). In Kirtland AFB Future Land Use Plan, presented in the *Kirtland Air Force Base General Plan*, land use zones that mirror the existing land use designations have been established with the exception that Military Family Housing is changed to Housing to guide the type and location of development at the installation. Future land use plans include the following general land use recommendations:

- Expand and concentrate Airfield uses along the flightline. Industrial and Aircraft Operations/Maintenance land uses would also be appropriate along or near the flightline.
- Concentrate Administration and Research land uses in the western portion of the cantonment area (surrounding the Air Force Research Laboratory campus) and in the eastern portion of the cantonment area (north of Sandia National Laboratories and DOE).
- Concentrate Community land uses in the northeastern portion of the cantonment area, adjacent to Administration and Research land uses, with the intention of creating a mixed use "town site" that would become the functional and symbolic center of the installation.
- Privatize existing housing inventory and associated improvements with the intention of removing west side housing areas and consolidating military family housing in the eastern portion of the cantonment area. Consolidation and migration of the housing areas can be accompanied by the consolidation of Community uses.
- Implement several transportation-related projects, including establishment of a new arterial between the western and eastern portions of the cantonment area, extension of Eubank Boulevard onto the installation, and construction of a new entry gate on Eubank Boulevard, to improve circulation (KAFB 2002).

As presented in **Section 2.1**, none of the buildings proposed for demolition are currently occupied or used by installation personnel. Six of the buildings (605, 613, 614, 736, 1003, and 1013) are in the airfield complex area within the western portion of the cantonment area, while the remaining 14 buildings are in the south-central portion of the installation (see **Figure 2-1**). The land use designations for the six buildings within the cantonment area include the following: Building 605 (Airfield, and Administration and Research), Buildings 613 and 614 (Administration and Research), Building 736 (Airfield), and Buildings 1003 and 1013 (Aircraft Operations/Maintenance). Most of the land in the southern portion of Kirtland AFB, the location of the other 14 buildings, is designated as Open Space.

The buildings proposed to be demolished are primarily within the interior of Kirtland AFB; however, Buildings 605, 613, 614, 736, 1003, and 1013 are adjacent to Albuquerque International Airport and portions of the Proposed Action would be within airport's dual-use noise zones (see **Section 3.2.2**).

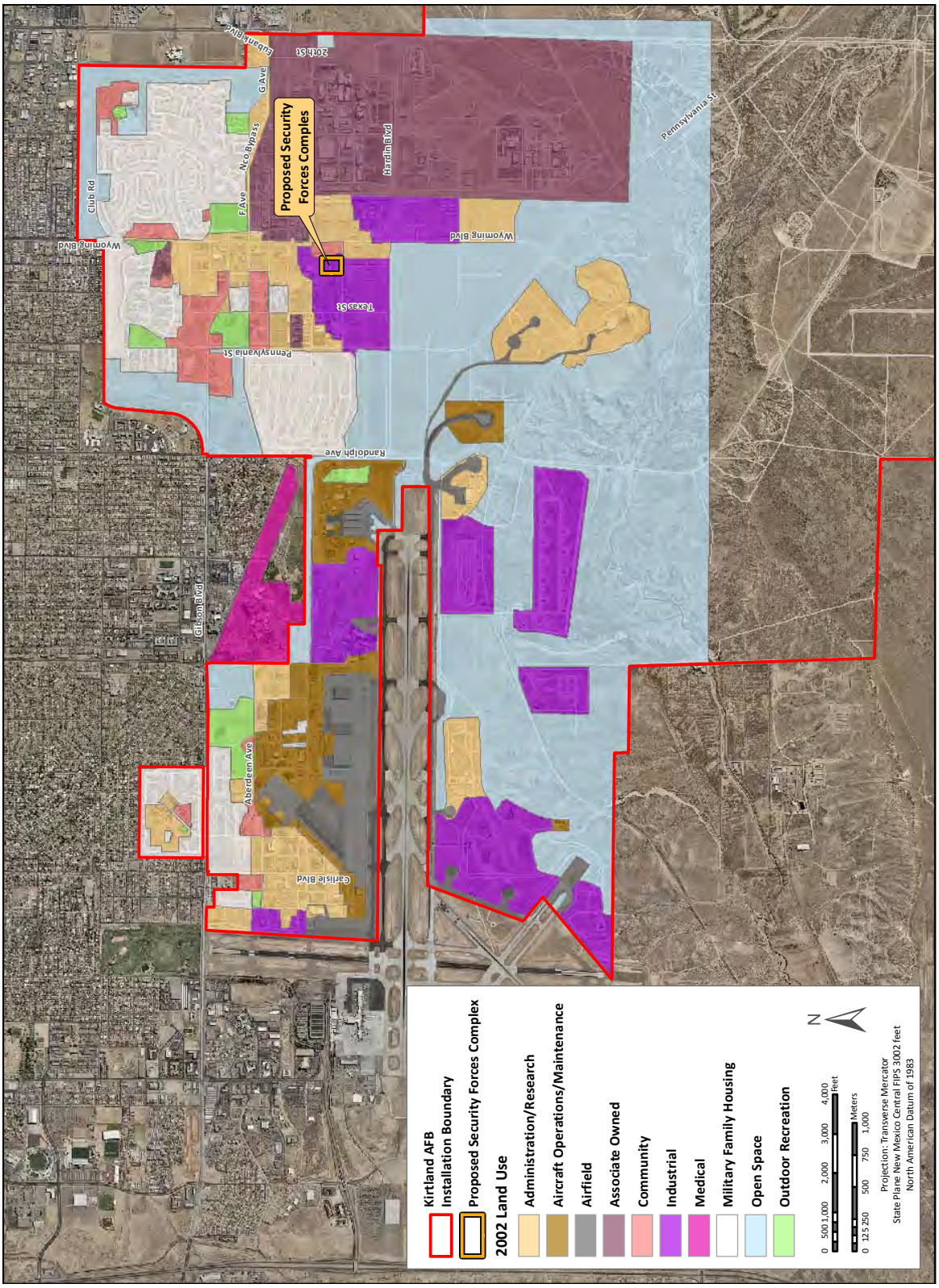


Figure 3-1. Land Use Map for Kirtland AFB

3.2 Noise

3.2.1 Definition of the Resource

Sound is defined as a particular auditory effect produced by a given source, for example the sound of rain on a rooftop. Sound is measured with instruments that record instantaneous sound levels in decibels. A-weighted decibel (dBA) is used to characterize sound levels (measured in dBA) that can be sensed by the human ear. "A-weighted" denotes the adjustment of the frequency range to what the average human ear can sense when experiencing an audible event.

Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory effect. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. It 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 source and receptor, receptor sensitivity, and time of day. How an individual responds to the sound source will determine if the sound is viewed as music to one's ears or as annoying noise. Affected receptors are specific (e.g., schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists.

Noise Metrics and Regulations. Sound levels, resulting from multiple single events, are used to characterize community noise effects from aircraft or vehicle activity and are measured in day-night average sound level (DNL). The DNL noise metric incorporates a "penalty" for evening and nighttime noise events to account for increased annoyance. DNL is the energy-averaged sound level measured over a 24-hour period, with a 10-dBA penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. DNL values are obtained by averaging single event values for a given 24-hour period. DNL is the preferred sound level metric used to characterize noise impacts of the Federal Aviation Administration (FAA), U.S. Department of Housing and Urban Development (HUD), U.S. Environmental Protection Agency (USEPA), and Department of Defense (DOD) for modeling airport environments.

DNL is the metric recognized by the U.S. government for measuring noise and its impacts on humans. According to the USAF, the FAA, and the HUD criteria, residential units and other noise-sensitive land uses are "clearly unacceptable" in areas where the noise exposure exceeds a DNL of 75 dBA, "normally unacceptable" in regions exposed to noise between 65 dBA and 75 dBA, and "normally acceptable" in areas exposed to noise of 65 dBA or under. The Federal Interagency Committee on Noise developed land use compatibility guidelines for noise in terms of a DNL sound level (FICON 1992). For outdoor activities, the USEPA recommends a DNL sound level of 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).

Noise levels vary depending on the population density and proximity to land uses such as parks, schools, or industrial facilities. As shown on **Table 3-1**, noise levels in a suburban residential area are a DNL of about 55 dBA, which increases to 60 dBA for an urban residential area, and to 80 dBA in the downtown section of a city (FHWA 1980).

Most people are exposed to sound levels of DNL of 50 to 55 dBA or higher on a daily basis. Studies specifically conducted to determine noise effects on various human activities show that about 90 percent of the population is not significantly bothered by outdoor sound levels below a DNL of 65 dBA

Table 3-1. Typical Outdoor Noise Levels

DNL (dBA)	Location
50	Residential area in a small town or quiet suburban area
55	Suburban residential area
60	Urban residential area
65	Noisy urban residential area
70	Very noisy urban residential area
80	City noise (downtown of major metropolitan area)
88	3rd floor apartment in a major city next to a freeway

Source: FHWA 1980

(FICON 1992). Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with effect assessments and that there is a consistent relationship between DNL and the level of annoyance.

Demolition Sound Levels. Building demolition work can cause an increase in sound that is well above the ambient level. A variety of sounds are emitted from graders, loaders, trucks, generators, and other work activities and processes. **Table 3-2** lists noise levels associated with common types of construction equipment that are likely to be used under the Proposed Action. These sound levels were predicted 100, 200, 800, 1,200, and 1,500 feet from the source of the noise. Construction equipment usually exceeds the ambient sound levels by 20 to 25 dBA in an urban environment and up to 30 to 35 dBA in a quiet suburban area.

Table 3-2. Predicted Noise Levels for Construction Equipment

Construction Equipment	Predicted Noise Level at 50 Feet
Bulldozer	80 dBA
Dump Truck	83–94 dBA
Backhoe	72–93 dBA
Front-End Loaders	72–82 dBA
Generators	71–80 dBA
Tractor Trailer	78–88 dBA

Sources: USEPA 1971, Close and Wesler 1975

3.2.2 Existing Conditions

Ambient Noise Environment. The ambient noise environment at Kirtland AFB is affected mainly by USAF and civilian aircraft operations and military vehicles. The commercial and military aircraft operations at Albuquerque International Airport are the primary source of noise in the northern and northwestern areas of the installation.

Noise from aircraft operations is present throughout the northwestern portion of Kirtland AFB as a result of operations at the Albuquerque International Airport. The DNL of 65 to 80+ dBA noise contours from

aircraft operations at Albuquerque International Airport were plotted on an aerial map (see **Figure 3-2**). The plotted contours from aircraft operations extend along the runways to the east, west, and southwest, and encompass Buildings 605, 613, 614, 736, and 1013 (see **Figure 3-2**). Since the remaining buildings proposed for demolition are outside of the noise contours associated with the Albuquerque International Airport, it is not likely that land use at and immediately adjacent to these buildings contributes significantly to the ambient noise environment.

Vehicle use associated with military operations at Kirtland AFB consists of passenger vehicles, delivery trucks, and military off- and on-road vehicles. Passenger vehicles compose most of the vehicles present at Kirtland AFB and the surrounding community roadways.

Noise Zones. Buildings 605, 613, 614, 736, 1003, and 1013 are adjacent to Albuquerque International Airport. Portions of the Proposed Action would be within airport's noise zones. **Table 3-3** identifies the buildings associated with the Proposed Action that are within the noise zones.

Table 3-3. Buildings within Airport-associated Noise Zones

Building Number	DNL[a] Noise Zones
605	70–74 dBA[b]
613	70–74 dBA[b]
614	70–74 dBA[b]
736	65–69 dBA[b]
1003	65–69 dBA[b]
1013	65–69 dBA[b]

Source: KAFB 2002

Notes:

a. DNL = day-night average sound level

b. dBA = A-weighted decibel

Due to the location of Buildings 605, 613, 614, 736, 1003, and 1013 within the 65 to 69 dBA and 70 to 74 dBA noise zones, the buildings would all be within the AP-2 Airport Protection Overlay Zone (the area on or within the 65 to 69 dBA noise contour but outside of the 75 to 79 dBA contour) (City of Albuquerque 2009a). Land uses within the AP-2 Airport Overlay Zone are restricted to certain permissive and conditional uses. In addition, Building 736 is within the Runway 30 Clear Zone and defined airport zones in the Albuquerque Airport Zoning Ordinance, which both restrict certain land uses and actions (KAFB 2002, City of Albuquerque 2009b).

3.3 Visual Resources

3.3.1 Definition of the Resource

Visual resources include the natural and man-made physical features that give a particular landscape its character. The features that form the overall visual impression a viewer receives include landforms, vegetation, water, color, adjacent scenery, scarcity, and man-made modifications.

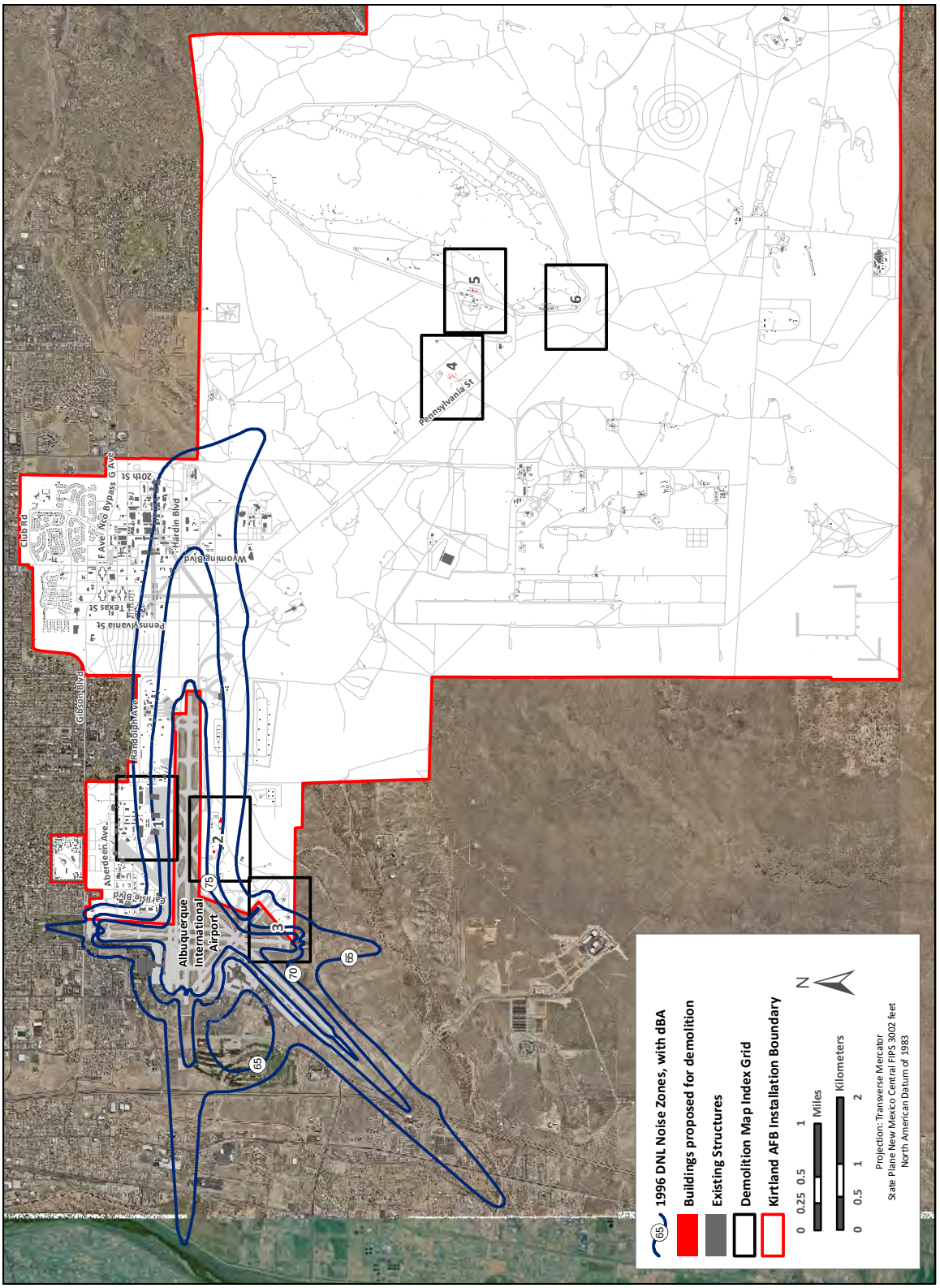


Figure 3-2. Noise Contours for Kirtland AFB

3.3.2 Existing Conditions

Military and civilian airfields compose much of the visual environment of Kirtland AFB. The prominent visual features of the installation include hangars, maintenance and support facilities, and aircraft. Off installation, the visual environment varies from urban to rangeland to forest. To the north and west of Kirtland AFB are urban areas at the City of Albuquerque; to the northeast and east, open spaces, forests, and rangeland are the prominent visual features; south of Kirtland AFB is Isleta Pueblo lands, which are generally open space, forests, or vacant land (KAFB 2003).

The buildings proposed for demolition are mostly older, unoccupied structures that are in deteriorating condition. Most buildings proposed for demolition have visible rust, chipped and peeling paint, and rotted wood. As such, their appearance detracts from the overall installation aesthetic appearance. **Figure 3-3** contains recent photographs that show the current visual conditions at some of the buildings proposed for demolition.

3.4 Air Quality

3.4.1 Definition of the Resource

In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm), milligrams per cubic meter (mg/m^3), or micrograms per cubic meter ($\mu g/m^3$). The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions.

The CAA directed the USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to impact human health and the environment. USEPA established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [PM_{10}] and particulate matter equal to or less than 2.5 microns in diameter [$PM_{2.5}$]), and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources along with maintaining visibility standards. **Table 3-4** presents the primary and secondary USEPA NAAQS.

Although ozone is considered a criteria air pollutant and is measurable in the atmosphere, it is not often considered a regulated air pollutant when calculating emissions because ozone is typically not emitted directly from most emissions sources. Ozone is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or "ozone precursors." These ozone precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to limit atmospheric ozone concentrations by controlling VOC pollutants (also identified as reactive organic gases) and NO_2.

Figure 3-3. Current Visual Conditions at Four of the Buildings Proposed for Demolition

Table 3-4. National Ambient Air Quality Standards

Pollutant	Averaging Time	National Standard	
		Primary	**Secondary**
Ozone	1 Hour [a]	0.12 ppm	Same as Primary Standard
	8 Hours [b]	0.08 ppm ($157\ \mu g/m^3$)	
	8 Hours	0.075 ppm[g]	
PM_{10}	24 Hours [c]	$150\ \mu g/m^3$	Same as Primary Standard
	Annual Arithmetic Mean [d]	----	
$PM_{2.5}$	24 Hours [e]	$35\ \mu g/m^3$	Same as Primary Standard
	Annual Arithmetic Mean [f]	$15\ \mu g/m^3$	
CO	8 Hours [c]	9.0 ppm (10 mg/m^3)	None
	1 Hour [c]	35 ppm (40 mg/m^3)	
NO_2	Annual Arithmetic Mean	0.053 ppm ($100\ \mu g/m^3$)	Same as Primary Standard
SO_2	Annual Arithmetic Mean	0.03 ppm ($80\ \mu g/m^3$)	0.5 ppm 1,300 $\mu g/m^3$, 3-Hour averaging time
	24 Hours [c]	0.14 ppm ($365\ \mu g/m^3$)	
Pb	Quarterly Average	$1.5\ \mu g/m^3$	Same as Primary Standard

Source: USEPA 2009a

Notes: Parenthetical values are approximate equivalent concentrations.

a. (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1. (b) As of June 15, 2005, USEPA revoked the 1-hour ozone standard in all areas except the 14 8-hour ozone nonattainment Early Action Compact Areas.

b. (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm. (b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as USEPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.

c. Not to be exceeded more than once per year.

d. To attain this standard, the expected annual arithmetic mean PM_{10} concentration at each monitor within an area must not exceed $50\ \mu g/m^3$.

e. To attain this standard, the 3-year average of the 98^{th} percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed $35\ \mu g/m^3$.

f. To attain this standard, the 3-year average of the annual arithmetic mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed $15.0\ \mu g/m^3$.

g. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008)

As authorized by the CAA, USEPA has delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. These programs are detailed in State Implementation Plans (SIPs) that must be developed by each state or local regulatory agency and approved by USEPA. An SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by USEPA.

In 1997, USEPA initiated work on new General Conformity rules and guidance to reflect the new 8-hour ozone, $PM_{2.5}$, and regional haze standards that were promulgated in that year. The 1-hour ozone standard will no longer apply to an area 1 year after the effective date of the designation of that area for the 8-hour ozone NAAQS. The effective designation date for most areas was June 15, 2004. USEPA designated $PM_{2.5}$ nonattainment areas in December 2004, and finalized the $PM_{2.5}$ implementation rule in January 2005.

On September 22, 2009, the USEPA issued a final rule for mandatory greenhouse gas reporting from large greenhouse gas emissions sources in the United States. The purpose of the rule is to collect comprehensive and accurate data on carbon dioxide (CO_2) and other greenhouse gas emissions that can be used to inform future policy decisions. In general, the threshold for reporting is 25,000 metric tons or more of CO_2 equivalent per year. The first emissions report is due in 2011 for 2010 emissions. Although greenhouse gases are not currently regulated under the CAA, the USEPA has clearly indicated that greenhouse gas emissions and climate change are issues that need to be considered in future planning. Greenhouse gases are produced by the burning of fossil fuels and through industrial and biological processes.

Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A major stationary source is a facility (i.e., plant, installation, or activity) that has the potential to emit more than 100 tons per year (tpy) of any one criteria air pollutant, 10 tpy of a hazardous air pollutant, or 25 tpy of any combination of hazardous air pollutants (HAPs).

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be "significant" if (1) a proposed project is within 10 kilometers of any Class I area, and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more [40 CFR 52.21(b)(23)(iii)]. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III [40 CFR 52.21(c)]. Because Kirtland AFB is not within 10 kilometers of a Class I area, PSD regulations do not apply and are not discussed further in this EA.

3.4.2 Existing Conditions

Kirtland AFB is located in Bernalillo County which is within The Albuquerque-Mid Rio Grande Intrastate (AMRGI) Air Quality Control Region (AQCR) 152 (40 CFR 81.83). The AMRGI AQCR consists of portions of Sandoval and Valencia counties, and Bernalillo County in its entirety. The City of Albuquerque and Bernalillo County, where Kirtland AFB is located, have been designated as being in maintenance status for CO effective 15 July 1996 (USEPA 1996). Kirtland AFB and the surrounding area are in attainment for all criteria pollutants.

The most recent emissions inventories for Bernalillo County and the AMRGI AQCR are shown in **Table 3-5**. Bernalillo County is considered the local area of influence, and the AMRGI AQCR is considered the regional area of influence for the air quality analysis.

Table 3-5. Local and Regional Air Emissions Inventory for 2002

Location	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Bernalillo County, New Mexico	24,930	24,310	185,250	1,568	61,892	8,183
AMRGI AQCR	36,778	31,651	245,346	2,619	137,376	16,676

Source: USEPA 2009b

The DOE, Energy Information Administration states that in 2005, gross CO_2 emissions in New Mexico were 59.5 million metric tons (DOE 2009).

The Albuquerque-Bernalillo County Air Quality Control Board (AQCB) is the air pollution control authority for Bernalillo County while the Albuquerque Environmental Health Department Air Quality Division handles air quality management functions. There are various sources on the installation that emit criteria and HAPs, including emergency generators, boilers, hot water heaters, fuel storage tanks, gasoline service stations, surface coating, aircraft engine testing, and miscellaneous chemical usage. As required by the Albuquerque-Bernalillo County AQCB regulations, Kirtland AFB estimates annual emissions from stationary sources and provides this information to the Albuquerque Environmental Health Department Air Quality Division. **Table 3-6** summarizes the calendar year 2008 air emissions inventory for Kirtland AFB.

Table 3-6. Calendar Year 2008 Air Emissions Inventory for Kirtland AFB

	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
2008 Actual Emissions	12.8	60.0	13.0	1.1	8.1

Source: KAFB 2008a

The Albuquerque Environmental Health Department Air Quality Division has fugitive dust control requirements in 20.11.20 New Mexico Administrative Code *Fugitive Dust Control*. A fugitive dust control construction permit is required for projects disturbing 0.75 acres or more, as well as the demolition of buildings containing more than 75,000 cubic feet of space. As stated in 20.11.20.12 New Mexico Administrative Code *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 New Mexico Administrative Code to obtain a fugitive dust-control permit. This regulation also contains a provision for buildings containing ACM as stated in 20.11.20.22 New Mexico Administrative Code *Demolition and Renovation Activities; Fugitive Dust Control Construction Permit and Asbestos Notification Requirements*: "All demolition and renovation activities shall employ reasonably available control measures at all times, and, when removing ACM, shall also comply with the Federal standards incorporated in 20.11.64 New Mexico Administrative Code, *Emission Standards for Hazardous Air Pollutants for Stationary Sources*. A person who demolishes or renovates any commercial building, residential building containing five or more dwellings, or a residential structure that will be demolished in order to build a nonresidential structure or building shall file an asbestos notification with the department no fewer than 10 calendar days before the start of such activity. Written asbestos notification certifying to

the presence of ACM is required even if regulated ACM is not or may not be present in such buildings or structures."

3.5 Geology and Soils

3.5.1 Definition of the Resource

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 and paleontology. Topography and physiography pertain to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features. Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition.

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 Farmland Protection Policy Act (FPPA) of 1981. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The soil qualities, growing season, and moisture supply are needed for a well-managed soil to produce a sustained high yield of crops in an economic manner. The land could be cropland, pasture, rangeland, or other land, but not urban developed land or water. The intent of the FPPA is to minimize the extent that Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. The Act also ensures that Federal programs are administered in a manner that, to the extent practicable, will be compatible with private, state, and local government programs and policies to protect farmland.

The implementing procedures of the FPPA and Natural Resources Conservation Service (NRCS) require Federal agencies to evaluate the adverse effects (direct and indirect) of their activities on prime and unique farmland, and farmland of statewide and local importance, and to consider alternative actions that could avoid adverse effects. Determination of whether an area is considered prime or unique farmland and potential impacts associated with a proposed action is based on preparation of the farmland conversion impact rating form AD-1006 for areas where prime farmland soils occur and by applying criteria established at Section 658.5 of the FPPA (7 CFR 658). The NRCS is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementation of the Act (see 7 CFR Part 658, 5 July 1984).

3.5.2 Existing Conditions

Regional Geology. Albuquerque and Kirtland AFB are near the junction of five physiographic provinces: the Colorado Plateau, the Basin and Range, the Southern Rocky Mountains, the Rio Grande rift, and the Great Plains (Grant 1981). Kirtland AFB is located in the eastern margin of the Albuquerque Basin, a major feature of the Rio Grande rift. The Rio Grande rift is approximately 620 miles long and is bordered on the west by the Colorado Plateau and on the east by the Great Plains. The Albuquerque Basin is north-trending and is approximately 90 miles long and 31 miles wide. It extends from near the Rio Grande to the foothills of the Sandia and Manzano mountains (KAFB 2007a). The Albuquerque Basin is defined to the south by the Socorro Channel, to the north by the Nacimiento Uplift, to the west by the

Puerco Plateau and Lucero Uplift, and to the east by the Sandia and Manzanita mountains. Its widest point is near Kirtland AFB and it tapers off gradually towards its north and south ends. The basin was deepened and local mountain ranges were tilted by large-scale faulting that occurred approximately 11.2 to 5.3 million years ago (ERDA 1977). Geologic formations found within Kirtland AFB range in age from Precambrian granites to present day windblown sands.

Topography. Most of Kirtland AFB is situated on a relatively flat mesa. This mesa is cut by the east-west trending Tijeras Arroyo, which drains into the Rio Grande. Elevations at Kirtland AFB range from 5,200 feet in the west to almost 8,000 feet in the Manzanita Mountains. In addition, several canyons (i.e., Lurance, Sol se Mete, Bonito, Otero, and Madera) are located on Kirtland AFB.

Soils. Most of the Albuquerque Basin consists of poorly consolidated sediments that eroded from the surrounding mountains. These sediments, known as the Santa Fe Group, are overlain in places by the 5.3 to 1.6 million year old Ortiz gravel deposits. Rio Grande soil types and volcanic deposits are also interspersed. The dominant soils of the Albuquerque Basin are well-drained and loamy, with minor amounts of gravelly and stony soils also found along the mountains and arroyos. Twenty-five soil types have been identified on Kirtland AFB. Of these 25 soil types, 7 have been mapped at the sites proposed for demolition (see **Figures 3-4** and **3-5**). **Table 3-7** provides general characteristics and limitations associated with soils mapped within the proposed project sites.

Prime Farmland. Of the 25 soil units mapped at Kirtland AFB, none are considered prime farmland soils or farmland soils of statewide importance (NRCS 2009). Kirtland AFB is not currently used for agricultural purposes, nor is any agricultural use planned for the future.

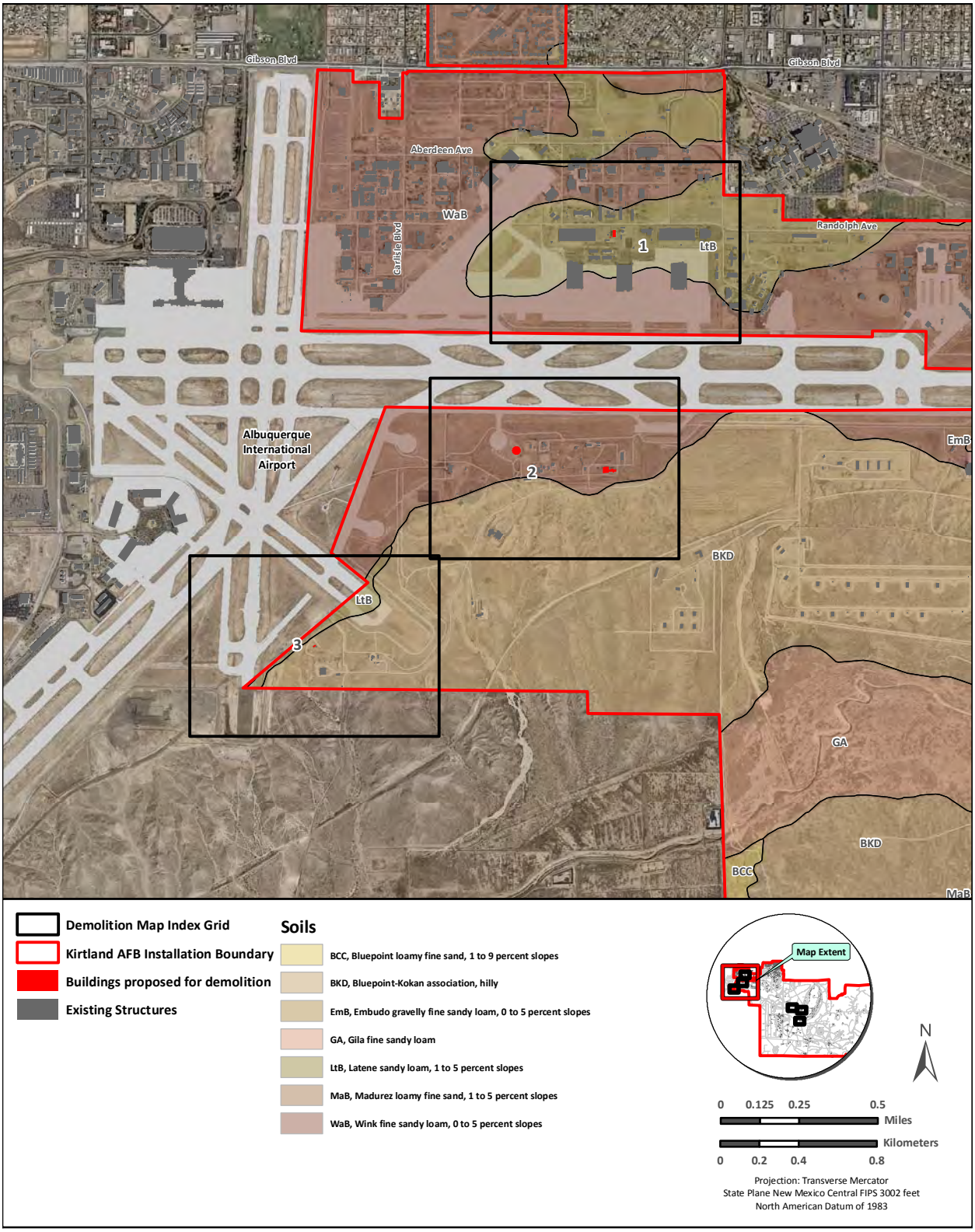
Geologic Hazards. Geologic hazards are defined as a natural geologic event that can endanger human lives and threaten property. This includes earthquakes, landslides, sinkholes, tsunamis, and volcanoes. In Albuquerque, the primary geologic hazard that could potentially endanger lives or threaten property is earthquakes.

The Albuquerque area is characterized by a series of faults on the east side of the Sandia and Manzano mountains. Movement on these faults has not occurred within the past 10,000 years; however, the Albuquerque area in general has a history of relatively frequent, but low magnitude and intensity, earthquakes (KAFB 1997a). The U.S. Geological Survey has produced seismic hazards maps based on current information about the rate at which earthquakes occur in different areas and on how far strong shaking extends from the quake source. The hazard maps show the levels of horizontal shaking that have a 2 in 100 chance of being exceeded in a 50-year period. Shaking is expressed as a percentage of the force of gravity (percent g) and is proportional to the hazard faced by a particular type of building. In general, little or no damage is expected at values less than 10 percent g, moderate damage could occur at 10 to 20 percent g, and major damage could occur at values greater than 20 percent g. The region of Kirtland AFB has a seismic hazard rating of approximately 16 to 20 percent g (USGS 2009).

3.6 Water Resources

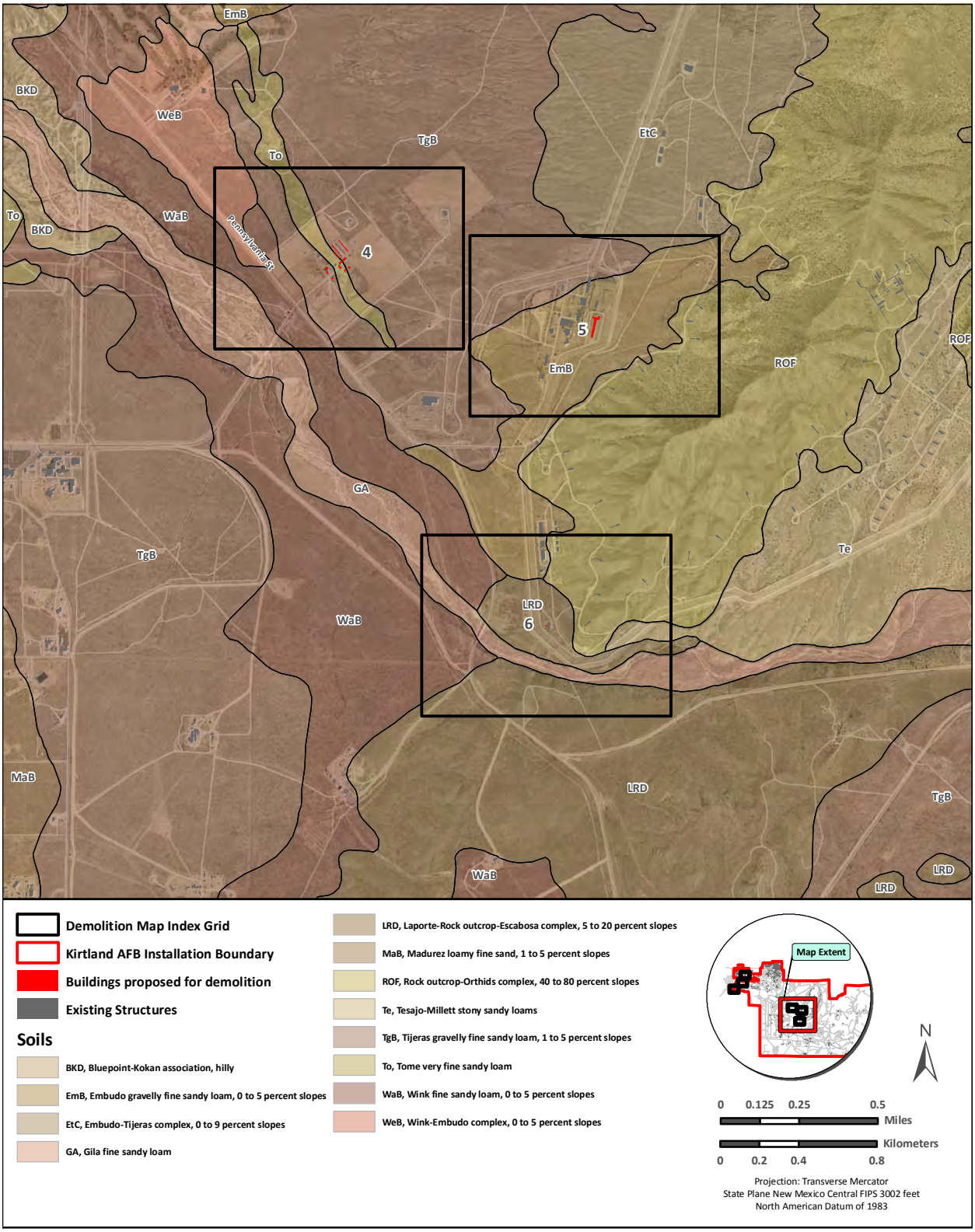
3.6.1 Definition of the Resource

Water resources include groundwater, surface water, and floodplains. Evaluation of water resources examines the quantity and quality of the resource and demand for its various purposes. Groundwater consists of subsurface hydrologic resources. It is an essential resource that functions to recharge surface water and is often used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater typically can be described in terms of its depth from the surface, aquifer or well capacity, water quality, surrounding geologic composition, and recharge rate.



Source of Soil data: Kirtland AFB 10/2009

Figure 3-4. Mapped Soil Units at the Proposed Demolition Sites (Map 1 of 2)



Source of Soil data: Kirtland AFB 10/2009

Figure 3-5. Mapped Soil Units at the Proposed Demolition Sites (Map 2 of 2)

Table 3-7. Soil Properties of Mapped Soils found at Kirtland AFB

Map Unit Name	Slope (percent)	Farmland Classification	Drainage	Road Limitations	Building Limitations	Excavation Limitations
Bluepoint-Kokan Association	--	Not prime farmland soil	Not rated	Somewhat limited	Very limited	Very limited
Embudo gravelly fine sandy loam	0 to 5	Not prime farmland soil	Well-drained	Somewhat limited	Very limited	Very limited
Laporte-Rock Outcrop-Escabosa Complex	5 to 20	Not prime farmland soil	Not rated	Somewhat limited	Very limited	Very limited
Latene sandy loam	1 to 5	Not prime farmland soil	Well-drained	Not limited	Not limited	Very limited
Tijeras gravelly fine sandy loam	1 to 5	Not prime farmland soil	Well-drained	Not limited	Not limited	Very limited
Tome very fine sandy loam	--	Not prime farmland soil	Well-drained	Somewhat limited	Very limited	Somewhat limited
Wink fine sandy loam	0 to 5	Not prime farmland soil	Well-drained	Not limited	Not limited	Somewhat limited

Source: NRCS 2009

Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. The Clean Water Act (CWA) (33 U.S.C. 1251 et. seq., as amended) establishes Federal limits, through the National Pollutant Discharge Elimination System (NPDES), on the amounts of specific pollutants that are discharged to surface waters in order to restore and maintain the chemical, physical, and biological integrity of the water. The NPDES program regulates the discharge of point (end of pipe) and nonpoint sources (storm water) of water pollution. Section 404 of the CWA regulates the discharge of fill material into waters of the United States, which includes wetlands. Waters of the United States are defined within the CWA, as amended, and jurisdiction is addressed by the USEPA and the U.S. Army Corps of Engineers (USACE). These agencies assert jurisdiction over (1) traditional navigable waters, (2) wetlands adjacent to navigable waters, (3) nonnavigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months), and (4) wetlands that directly abut such tributaries.

Storm water is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade surface waters. Proper management of storm water 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. Prolonged increases in storm water volume and velocity associated with development and increased impervious surfaces have the potential to impact adjacent streams as a result of stream bank erosion and channel widening or down cutting associated with the adjustment of the stream to the change in flow characteristics. Storm water management systems are typically designed to contain runoff onsite during construction and to maintain predevelopment storm water flow characteristics following development, through either the application of infiltration or retention practices. Failure to size storm water systems appropriately to hold or delay conveyance of the largest predicted precipitation event often leads to downstream flooding and the environmental and economic damages associated with flooding.

In 2010, the USEPA issued a Final Rule for the CWA concerning technology-based Effluent Limitations Guidelines and New Source Performance Standards for the Construction and Development point source category. All NPDES storm water permits issued by the USEPA or states must incorporate requirements established in the Final Rule. As of February 1, 2010, all new construction (or demolition) sites that disturb one or more acres of land are required to meet the non-numeric effluent limitations and effective erosion and sedimentation controls must be designed, installed, and maintained. These include:

- Control storm water volume and velocity to minimize erosion
- Control storm water discharges including both peak flow rates and total storm water volume
- Minimize the amount of soil exposed during construction activities
- Minimize the disturbance of steep slopes
- Minimize sediment discharges from the site using controls that address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting storm water runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site
- Provide and maintain natural buffers around surface waters, direct storm water to vegetated areas to increase sediment removal and maximize storm water infiltration where feasible
- Minimize erosion at outlets and downstream channel and stream bank erosion
- Minimize soil compaction and preserve topsoil where feasible.

In addition, construction site owners and operators that disturb one or more acres of land are required to use BMPs to ensure that soil disturbed during construction activities does not pollute nearby water bodies.

Effective August 1, 2011, construction activities disturbing a total of 20 or more acres at one time, including non-contiguous land disturbances that take place at the same time and are part of a larger common plan of development, must comply with the numeric effluent limitation for turbidity in addition to the non-numeric effluent limitations. The maximum daily turbidity limitation will be 280 nephelometric turbidity units.

Section 438 of the Energy Independence and Security Act (EISA) (42 U.S.C. Section 17094) establishes into law new storm water design requirements for Federal construction projects that disturb a footprint of greater than 5,000 ft^2 of land. EISA Section 438 requirements are independent of storm water requirements under the CWA. The project footprint consists of all horizontal hard surfaces and disturbed areas associated with project development. Under these requirements, predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Predevelopment hydrology shall be modeled or calculated using recognized tools and must include site-specific factors such as soil type, ground cover, and ground slope. Site design shall incorporate storm water retention and reuse technologies such as bioretention areas, permeable pavements, cisterns/recycling, and green roofs to the maximum extent technically feasible. Post-construction analyses shall be conducted to evaluate the effectiveness of the as-built storm water reduction features. As stated in a DOD memorandum dated January 19, 2010, these regulations will be incorporated into applicable DOD Unified Facilities Criteria within 6 months (DOD 2010). Additional guidance is provided in the USEPA's *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*.

Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters that are subject to periodic or infrequent inundation due to rain or melting snow. Floodplain ecosystem functions

include natural moderation of floods, flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and habitat for a diversity of plants and animals. Flood potential is evaluated by the Federal Emergency Management Agency, 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. Risk of flooding is influenced by local topography, the frequency 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 recreational and preservation activities, to reduce the risks to human health and safety. EO 11988, Floodplain Management, directs Federal agencies to avoid siting within floodplains unless the agency determines that there is no practicable alternative.

3.6.2 Existing Conditions

Groundwater. Kirtland AFB is within the limits of the Rio Grande Underground Water Basin, which is defined as a natural resource area and is designated as a "declared underground water basin" by New Mexico. The Basin is regulated by the state as a sole source of potable water, although the Albuquerque area will be supplemented in the future with surface water diverted from the San Juan and Chama rivers to the Rio Grande (KAFB 2007a). Two aquifers, a regional and a perched aquifer, underlie Kirtland AFB. The regional aquifer is present under all of Kirtland AFB and ranges in depth from near surface to depths of 200 feet below grade surface east of the major fault zones in the eastern portion of Kirtland AFB, and to depths of 350 to 500 feet below grade surface west of the fault zone. The regional aquifer is used for the installation's water supply. The perched aquifer is limited in area, straddling Tijeras Arroyo northeast of the confluence of Tijeras Arroyo and Arroyo del Coyote, and occurs at depths of 200 to 400 feet below grade surface. The perched aquifer is a result of infiltration of water from both man-made and natural origins, with a flow direction to the southeast, and is not used for any purpose. The presence of faults has a direct bearing on the movement and occurrence of groundwater in the vicinity of Kirtland AFB. The groundwater flow direction is down basin (south), with local variations and even reversals due to groundwater pumping, specific geologic structures, or shallow influences near the river (KAFB 2002).

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 5 miles west of Kirtland AFB (KAFB 2007a). Water resources on Kirtland AFB reflect its dry climate. The average annual precipitation in Albuquerque is 9 inches, with half of the average annual precipitation occurring from July to October during heavy thunderstorms (KAFB 2007a). Surface water generally occurs in the form of storm water sheet flow that drains into small gullies during heavy precipitation (KAFB 2007a). Surface water generally flows across Kirtland AFB in a western direction toward the Rio Grande.

The two main surface water drainage channels on Kirtland AFB are Tijeras Arroyo and the smaller Arroyo del Coyote, which joins Tijeras Arroyo about 1 mile west of the Tijeras Arroyo Golf Course (see **Figure 3-6**). Although Tijeras Arroyo and Arroyo del Coyote are tributaries to the Rio Grande, these arroyos and their tributaries have not yet been classified as waters of the United States. If a jurisdictional determination was made, they would be regulated under Section 404 of the CWA (**Section 3.7.2.5** discusses jurisdictional wetlands on Kirtland AFB).

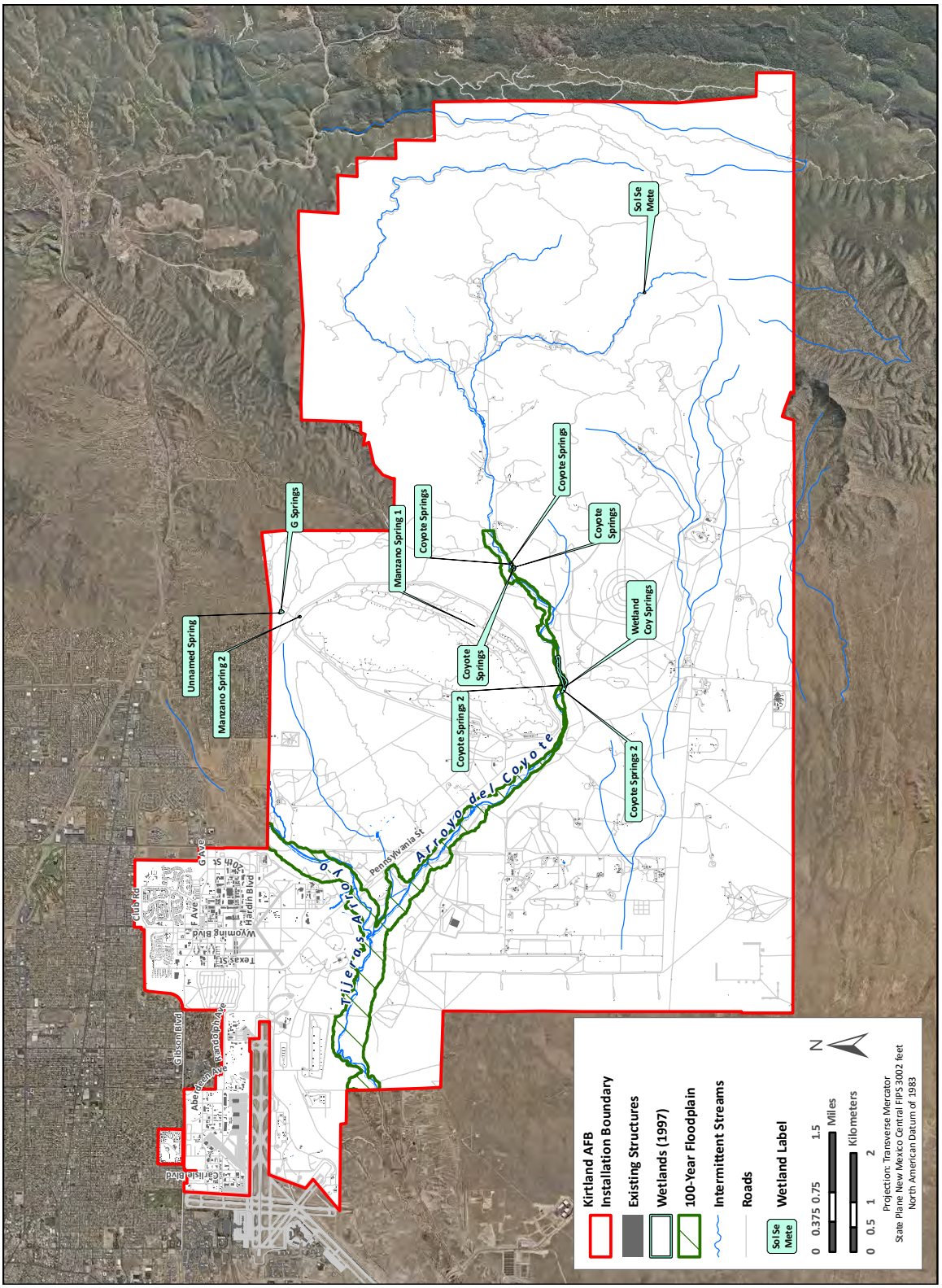


Figure 3-6. Surface Water, Floodplains, and Wetlands on Kirtland AFB

Both arroyos flow intermittently during heavy thunderstorms and spring snowmelt, but most of the water percolates into alluvial deposits or is lost to the atmosphere via evapotranspiration (KAFB 2002). 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. Tijeras Arroyo is a designated open space by the City of Albuquerque. Precipitation reaches Tijeras Arroyo through a series of storm drains, flood canals, and small, mostly unnamed arroyos. Nearly 95 percent of the precipitation that flows through Tijeras Arroyo evaporates before it reaches the Rio Grande. The remaining 5 percent is equally divided between groundwater recharge and runoff (KAFB 2002). There are no natural lakes or rivers on Kirtland AFB. Six man-made ponds are on Tijeras Golf Course. At least 12 naturally occurring springs have been found on the installation (KAFB 2007a).

Storm water runoff on Kirtland AFB 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. Kirtland AFB has a Storm Water Municipal Separate Storm Sewer System (MS4), which collects and conveys storm water from storm drains, pipes, and ditches, and discharges storm water into Tijeras Arroyo. Storm water in the developed area of Kirtland AFB drains into small culverts. There are also four storm water detention ponds within the cantonment area. Storm water in the industrial/laboratory areas of Kirtland AFB discharges via surface runoff or three large culverts that drain toward the Tijeras Arroyo. Kirtland AFB has an NPDES General Storm Water Permit for industrial activities and an active program for construction projects that require an NPDES permit. Kirtland AFB must also comply with MS4 permit requirements and has developed a Storm Water Management Plan as required by the MS4 permit (KAFB 2002).

Floodplains. A 100-year floodplain encompasses Tijeras Arroyo and Arroyo del Coyote (see **Figure 3-6**). These are the only two arroyos with a floodplain on the installation. Vegetation can encroach on the Tijeras Arroyo channel and obstruct the flow of water, which can cause flooding, especially during high-intensity thunderstorms between May and October. Tijeras Arroyo and Arroyo del Coyote floods occur infrequently and are characterized by high peak flows, small volumes, and short durations (KAFB 2007a).

3.7 Biological Resources

3.7.1 Definition of the Resource

Biological resources include native or naturalized plants and animals and the habitats in which they occur, and native or introduced species found in landscaped or disturbed areas. Protected species are defined as those listed as threatened, endangered, or proposed or candidate for listing by the USFWS; New Mexico Energy, Minerals, and Natural Resources Department; or New Mexico Department of Game and Fish (NMDGF). Federal species of concern are not protected by law; however, these species could become listed, and therefore are given consideration when addressing biological resource impacts of an action.

Sensitive habitats include those areas designated by the USFWS as critical habitat protected by the Endangered Species Act (ESA) and sensitive ecological areas as designated by state or Federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer/winter habitats).

Wetlands are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat provision, and erosion protection. Wetlands have been defined as areas that are “inundated or saturated by surface or groundwater at a

frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (USACE 1987). Wetlands are protected as a subset of the waters of the United States under Section 404 of the CWA. The term "waters of the United States" has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats, including wetlands. Wetlands are considered waters of the United States if wetlands are "adjacent" to or part of tidal waters, navigable waterways, lakes, rivers, streams, intermittent streams, mudflats, sloughs, wet meadows, natural ponds, playa lakes, and other wetlands. For regulatory purposes, wetlands are defined by three factors: vegetation, hydrologic regime, and soil characteristics. In addition, many states have local regulations governing wetlands and their buffer areas.

3.7.2 Existing Conditions

Kirtland AFB lies at the intersection of four major North American physiographic and biotic provinces: the Great Plains, Great Basin, Rocky Mountains, and Chihuahuan Desert. Vegetation and wildlife found within Kirtland AFB are influenced by each of these provinces, the Great Basin being the most dominant. Elevations at Kirtland AFB range from approximately 5,000 feet in the west to almost 8,000 feet in the Manzanita Mountains, providing a variety of ecosystems. Several canyons (Lurance, Sol se Mete, Bonito, Otero, and Madera) are on Kirtland AFB; a few smaller canyons occur on Manzano Base. This installation is located near three regional natural areas: Sandia Mountain Wilderness Area, Sandia Foothills Open Space, and the Rio Grande Valley State Park. The Sandia Mountain Wilderness Area, encompassing 37,877 acres, is approximately 5 miles north of the installation. This area is home to many plant and animal species and is also on an important raptor migration route (KAFB 2007a).

Applicable Laws, Regulation, and Policies

The ESA establishes a Federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. The ESA specifically charges Federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All Federal agencies must ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction of critical habitat for these species, unless the agency has been granted an exemption. The Secretary of the Interior, using the best available scientific data, determines which species are officially endangered or threatened, and the USFWS maintains the list.

The New Mexico Wildlife Conservation Act of 1974 declared that native wildlife found to be threatened or endangered should be managed to maintain and, to the extent possible, enhance their numbers. Responsibility for implementing the Act was given to the NMDGF.

The Bald Eagle Protection Act of 1940 (16 U.S.C. 668), as amended, prohibits the take, possession, and commerce of bald and golden eagles except under certain specified conditions. Amendments to this Act have led to increased penalties for violations and have strengthened enforcement measures.

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, implements treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Unless otherwise permitted by regulations, the MBTA makes it unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture, or kill; possess, offer to or sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. The MBTA also makes it unlawful to ship, transport, or carry from one state, territory, or district to another, or through a foreign country, any bird, part, nest, or egg that was captured, killed, taken, shipped, transported, or carried contrary to the laws from where it was obtained; and import from Canada any bird, part, nest, or egg obtained contrary to the laws of the

province from which it was obtained. The U.S. Department of the Interior has authority to arrest, with or without a warrant, a person violating the MBTA.

EO 13186, *Conservation of Migratory Birds* (January 10, 2001) creates a more comprehensive strategy for the conservation of migratory birds by the Federal government. EO 13186 provides a specific framework for the Federal government's compliance with its treaty obligations to Canada, Mexico, Russia, and Japan. EO 13186 provides broad guidelines on conservation responsibilities and requires the development of more detailed guidance in a Memorandum of Understanding (MOU). EO 13186 will be coordinated and implemented by the USFWS. The MOU will outline how Federal agencies will promote conservation of migratory birds. EO 13186 requires the support of various conservation planning efforts already in progress; incorporation of bird conservation considerations into agency planning, including NEPA analyses; and reporting annually on the level of take of migratory birds.

EO 11514, *Protection and Enhancement of Environmental Quality* (March 5, 1970) states that the President, with assistance from the CEQ, will lead a national effort to provide leadership in protecting and enhancing the environment for the purpose of sustaining and enriching human life. Federal agencies are directed to meet national environmental goals through their policies, programs, and plans. Agencies should also continually monitor and evaluate their activities to protect and enhance the quality of the environment. Consistent with NEPA, agencies are directed to share information about existing or potential environmental problems with all interested parties, including the public, in order to obtain their views.

EO 11990, *Protection of Wetlands* (May 24, 1977) directs agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands.

Wetlands are regulated pursuant to Section 404 of the CWA. The USACE is responsible for regulating wetlands under Section 404 of the CWA. Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill materials into the waters of the United States, including wetlands. In addition, Section 404 of the CWA also grants states with sufficient resources the right to assume these responsibilities in certain waters within state jurisdiction. In order to assume the Section 404 program, states need to develop a wetlands permit program similar to the Federal program, which must include the following procedures:

- Include an equivalent scope of jurisdiction as the Federal program
- Regulate at least the same activities as the Federal program
- Provide for sufficient public participation
- Ensure compliance with the Section 404(b)(l) guidelines, which provide environmental criteria for permit decisions
- Have adequate enforcement authority (USEPA 2009c).

Section 401 of the CWA gives the state board and regional boards the authority to regulate through water quality certification any proposed federally permitted activity that could result in a discharge to water bodies, including wetlands.

Vegetation

Four main plant communities are found on Kirtland AFB: grassland (includes sagebrush steppe and juniper woodlands), pinyon-juniper woodlands, ponderosa pine woodlands, and riparian/wetland/arroyo (see **Table 3-8**). Grassland and pinyon-juniper woodlands are the dominant vegetative communities at Kirtland AFB. The riparian/wetland/arroyo community is confined to drainages and isolated areas inundated by surface water during at least some part of the year. The ponderosa pine woodland community is found along the eastern boundary of the Kirtland AFB (KAFB 2007a).

Table 3-8. Kirtland AFB Vegetation Communities

Vegetation Community Type	Elevation (feet)
Grassland (including sagebrush steppe and juniper woodlands)	5,200–5,700
Pinyon-Juniper Woodlands	6,300–7,500
Ponderosa Pine Woodlands	7,600–7,988
Riparian/Wetland/Arroyo	variable

Source: KAFB 2007a

Grassland Community. This community is found between elevations of 5,200 and 5,700 feet at Kirtland AFB. The grassland community at Kirtland AFB was further delineated into two more community types, including sagebrush steppe in the western portion of the installation and juniper woodlands in the eastern portion. In the sagebrush steppe the understory is less dense, with cryptogamic crust covering areas of exposed ground. Juniper woodlands are similar to the grasslands to the east except for the greater abundance of one seeded juniper. The presence of this shrubby tree creates a savanna-like habitat in an otherwise treeless area. Juniper woodlands are found at a slightly higher elevation then the surrounding grassland. This habitat type provides a transition into pinyon-juniper woodlands (KAFB 2007a).

Pinyon-Juniper Woodland Community. The pinyon-juniper woodland community ranges in elevation from 6,300 to 7,500 feet. This plant community is composed primarily of Colorado pinyon pine and one seeded juniper, with an understory of shrubs and grasses (KAFB 2007a).

Ponderosa Pine Woodland Community. The ponderosa pine woodland community is found in the highest elevations of Kirtland AFB. It is typically found between 7,600 to 7,988 feet (KAFB 2007a).

Riparian/Wetland/Arroyo Community. The riparian/wetland/arroyo community consists of species that have a greater moisture requirement than species common to the other communities on the installation. These plant communities are found along Tijeras Arroyo, Arroyo del Coyote, and at the various springs located throughout Kirtland AFB. Most of the small, scattered wetlands on Kirtland AFB are in good condition and occur in conjunction with other plant communities (KAFB 2007a).

Turf and Landscaped Areas. Kirtland AFB promotes water conservation landscaping by using xeriscape methods combined with native plant materials (KAFB 2007a).

Site locations for the Proposed Action are either currently occupied by existing buildings or are located in semi-improved areas that consist largely of annual weeds, early successional perennials, and some native grasses and shrubs with areas of bare ground. Vegetation typical of the surrounding grassland community includes broom snakeweed (*Gutierrezia sarothrae*), Great Plains yucca (*Yucca glauca*), Indian ricegrass (*Oryzopsis hymenoides*), purple three-awn (*Artemisia pupurea*), black grama (*Bouteloua eriopoda*), blue

grama (*Bouteloua gracilis*), galleta (*Hilaria jamesii*), foxtail barley (*Hordeum jubatum*), four-wing saltbush (*Atriplex canescens*), sand sagebrush (*Artemisia filifolia*), needle-and-thread grass (*Stipa comata*), globemallows (*Sphaeralcea* spp.), Siberian elm (*Ulmus pumila*), Mormon tea (*Ephedra viridis*), New Mexican bitterweed (*Senecio neomexicanus*), ring muhly (*Muhlenbergia torreyi*), plains prickly-pear (*Opuntia polyacantha*), and bottlebrush squirrel tail (*Elymus longifolius*) (KAFB 2003).

Wildlife Species and Habitat

Wildlife management falls under the jurisdiction of the NMDGF and the USFWS for migratory birds and federally threatened and endangered species. Threatened and endangered species are addressed in this document under **Section 3.7.2.4**. Other laws protecting wildlife include the Bald Eagle Protection Act of 1940 (protects bald and golden eagles), the MBTA (protects neotropical migrants), and the ESA. Refer to **Appendix A** for additional laws and regulations (KAFB 2007a).

Wildlife species found at Kirtland AFB are representative of the species diversity common to the regional ecosystem (grassland, juniper woodland, pinyon-juniper woodland, and ponderosa pine woodlands) and species common to semideveloped grassland areas. Species can be transient and travel or inhabit several communities, or exist in transitional areas between vegetation communities.

The Proposed Action lies within the grassland association of Kirtland AFB. Common birds associated with the grassland association at Kirtland AFB include horned lark (*Eremophila alpestris*), scaled quail (*Callipepia squamata*), mourning dove (*Zenaida macroura*), greater roadrunner (*Geococcyx californianus*), American crow (*Cowus brachyrhynchos*), northern mockingbird (*Mimus polyglottos*), curved-billed thrasher (*Toxostoma curvirostre*), lark sparrow (*Chordestes grammacus*), black-throated sparrow (*Amphispiza bilineata*), western meadowlark (*Sturnella neglecta*), brown-headed cowbird (*Molothrus ater*), and house finch (*Carpodacus mexicanus*). The birds of prey, or raptors, most commonly found in the grassland association include northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), prairie falcon *(F. mexicanus*), long-eared owl (*Asio otus*), and great horned owl (*Bubo virginianus*). A common scavenger in this habitat type is the turkey vulture (*Cathartes aura*) (KAFB 2003).

The grassland association has a mammal community dominated by rodents, rabbits, and hares. These include the desert cottontail (*Sylvilagus audubonii*), Gunnison's prairie dog (*Cynomys gunnisoni*), white-footed deer mouse (*Peromyscus maniculatus*), silky pocket mouse (*Perognathus flavus*), Merriam's kangaroo rat (*Dipodomys merriami*), and the northern grasshopper mouse (*Onychomys leucogaster*). Mammalian predators found in the grassland association include the coyote (*Canis latrans*), badger (*Taxidea taxus*), kit fox (*Vulpes macrotis*), striped skunk (*Mephitis mephitis*) and bobcat *(Lynx rufus*) (KAFB 2003).

Amphibians and reptiles found on the grasslands at Kirtland AFB include the following: Woodhouse's toad (*Bufo woodhousii*), New Mexico spadefoot (*Spea multiplicata*), coachwhip snake (*Masticophis flagellum*), whiptail lizards (*Cnemidophorus* spp.), lesser earless lizard (*Holbrookia maculata*), and the western rattlesnake (*Crotalus viridis*). Many of these species have extensive periods of dormancy during dry conditions and rapid breeding cycles when temporary ponds occur after rains (KAFB 2003).

Threatened and Endangered Species

The agencies that have primary responsibility for the conservation of plant and animal species in New Mexico are the USFWS, the NMDGF, and the New Mexico Energy, Minerals, and Natural Resources Department. These agencies maintain lists of plant and animal species that have been classified, or are potential candidates for classification, as threatened or endangered in Bernalillo County. Of those species

known to occur in the county, one state threatened species and three Federal species of concern have the potential to occur in the project area.

Gray vireo. The gray vireo (*Vireo vicinior*), a state threatened species, as listed by the NMDGF, is the only federally or state-listed species known to occur on the installation. The USFWS considers the gray vireo a sensitive species. In 2003, an installationwide gray vireo survey was conducted in which 53 territories were mapped (KAFB 2004a). Territories were found throughout the juniper woodland community in an elevational belt of 5,850 to 6,600 feet (see **Figure 3-7**). Gray vireos occupied areas with an open canopy (i.e., less than 25 percent) with one seeded juniper as the dominate tree/shrub species (KAFB 2007a).

Western burrowing owl. The western burrowing owl (*Athene cunicularia hypugaea*), a Federal species of concern, is a common resident at Kirtland AFB. It is very closely associated with the prairie dog colonies on the installation, as they use abandoned prairie dog burrows for nesting during summer months. Owls generally occur on the installation between March and October before migrating south, although a few birds might occur on the installation during mild winters. Burrowing owl inventories have been conducted every year since 1994, and in 2005 a migration study was initiated to identify where nesting owls at Kirtland AFB go to winter. Since burrowing owls use old prairie dog burrows for nesting, a Prairie Dog Management Plan was developed for the installation, which takes into account burrowing owl habitat requirements (KAFB 2007a).

Mountain plover. Mountain plovers (*Charadrius montanus*), a Federal species of concern, are not known to occur on the installation. However, in 2003, an adult with two chicks was observed just south of the installation on the Isleta Pueblo Indian Reservation (KAFB 2004a). Appropriate nesting habitat for this species is limited on the installation; therefore, it is unlikely that the mountain plover uses Kirtland AFB during the nesting season. However, the southern grasslands of the installation could potentially be used as brood-rearing habitat or during migration (KAFB 2007a).

Santa Fe milkvetch. Santa Fe milkvetch (*Astragalus feensis*), a rare plant in New Mexico, is known or expected to occur on Kirtland AFB (KAFB 2008b). Santa Fe milkvetch is found on gravelly hillsides in pinyon-juniper woodland or plains-mesa grassland (5,100 to 6,000 feet) (NMRPTC 1999).

Desert massasagua rattlesnake. The desert massasauga rattlesnake (*Sistrurus catenatus edwardsii)*, a New Mexico Animal Species of Concern, was identified during 2009 surveys near building demolition sites 4, 5, and 6. The desert massasauga is a diminutive rattlesnake species typically found in xeric grasslands in the southwestern United States and Mexico. Surveys for the desert massasauga would be conducted prior to any demolition activities. If individuals are encountered, proper conservation measures will be developed.

Critical Habitat

Critical habitats are those areas of land, air, or water that are essential for maintaining or restoring threatened or endangered plant or animal populations. Neither the NMDGF nor the USFWS has designated or identified any critical habitat on Kirtland AFB. Surveys and literature indicate that important habitats on the installation include the wetlands, which are rare in this region, providing water in an otherwise arid environment. Other important habitats on the installation include prairie dog towns, which provide nesting habitat for the burrowing owl, and areas between 5,900 and 6,600 feet containing open juniper woodlands, which are used as nesting habitat by the gray vireo (KAFB 2007a).

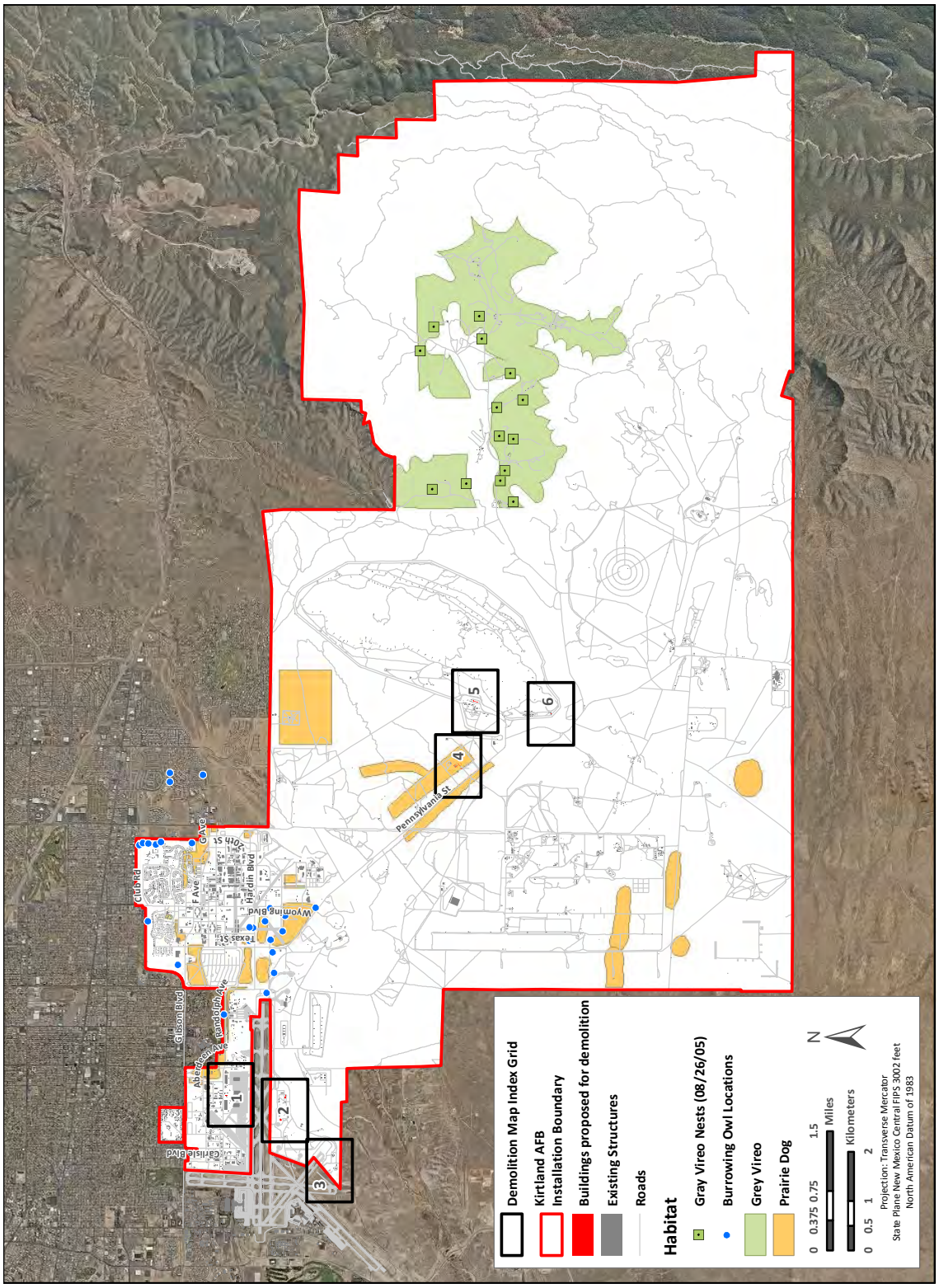


Figure 3-7. Potential Gray Vireo Habitat, Prairie Dog Colonies, and Burrowing Owl Nest Locations on Kirtland AFB

Wetlands

Wetlands provide an important function in recharging aquifers and buffering streams by filtering sediment and nutrients. Wetlands have been defined by agencies responsible for their management. The term "wetland" used herein, is defined using USACE conventions. The USACE has jurisdiction to protect wetlands under Section 404 of the CWA using the following definition:

> . . . areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR 328.3[b]). Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands have three diagnostic characteristics that include: (1) over 50 percent of the dominant species present must be classified as obligate, facultative wetland, or facultative, (2) the soils must be classified as hydric, and (3) the area is either permanently or seasonally inundated, or saturated to the surface at some time during the growing season of the prevalent vegetation (USACE 1987).

Wetlands are considered waters of the United States if they are determined to be jurisdictional by the USACE and USEPA. Wetlands and other waters of the United States typically include, but are not limited to, tidal waters, navigable waterways, lakes, rivers, streams, intermittent streams, mudflats, sloughs, wet meadows, natural ponds, playa lakes, and other wetlands. An area designated as a jurisdictional wetland under Section 404 must demonstrate the hydrology, soils, and vegetation characteristics of wetlands. The 1987 USACE Wetland Delineation Manual is the governing guide to wetland identification.

There are 9 wetlands supplied by 15 active springs on Kirtland AFB. The largest and most well-known location is the Coyote Springs and Wetlands complex that includes 4 semi-discrete wetlands and 9 springs (see **Figure 3-6)**. All other wetlands included in this project are much smaller; in some, an actual spring is visible but at others there is no obvious point source of water irrigating the surrounding wetland. Nearly all the springs and wetlands are in or immediately adjacent to an arroyo or other small ephemeral drainages (KAFB 2008c). A summary of the wetland acreages is presented in **Table 3-9**.

Table 3-9. Acreages of Wetlands on Kirtland AFB

Site Name	Square Feet	Acres
Coyote wetland 1	21,206	0.487
Coyote wetland 2	4,178	0.096
Coyote wetland 3	463	0.011
Coyote wetland 4	1,968	0.045
Coyote pond	6,671	0.153
New wetland	133	0.003
Cattail wetland	509	0.012
Homestead wetland	215	0.005
G Spring	2,066	0.047
Total	**37,409**	**0.859**

Source: KAFB 2009a

Since 2004, Kirtland AFB has been working to characterize, create, and enhance approximately 3 acres of degraded wetland habitat. Much of this work has focused in and around a set of artesian perennial springs called Coyote Springs. The area was once a recreational site for military personnel, but has since undergone restoration and enhancement. A permanent wetland pond, a naturalized overflow stream from the pond, and a small wet meadow have been constructed at this site (KAFB 2009a).

3.8 Cultural Resources

3.8.1 Definition of the Resource

Cultural resources include prehistoric and historic archaeological sites, structures, districts, or areas containing physical evidence of human activity. These resources are protected and identified under several Federal Laws and EOs. The Federal Laws include the National Historic Preservation Act (NHPA) (1966), the Archaeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990).

The NHPA requires that Federal agencies assume the responsibility for the preservation of historic and prehistoric resources located on lands owned or controlled by that agency. Section 110 (a)(2) of the NHPA requires that "...each Federal agency shall establish a program to locate, inventory, and nominate to the Secretary all properties under the agency's ownership or control...that appear to qualify for inclusion on the National Register…." Section 110 (a)(2) further requires that "Each agency shall exercise caution to assure that any property that might qualify for inclusion is not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly." These requirements are also included in DOD Directive 4710.1.

Under NHPA guidelines, cultural resources, including building, structures, objects, sites, and districts, are to be evaluated for National Register of Historic Places (NRHP) eligibility using the NRHP Criteria for Evaluation, as listed in 36 CFR 60.4. To be listed in, or considered eligible for the NRHP, a cultural resource must be 50 years or older and possess at least one of the four following criteria:

- The resource is associated with events that have made a significant contribution to the broad pattern of history (criterion A)
- The resource is associated with the lives of people significant in the past (criterion B)
- The resource embodies distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic value; or represents a significant and distinguishable entity whose components may lack individual distinction (criterion C)
- The resource has yielded, or may be likely to yield, information important in prehistory or history (criterion D).

In addition to meeting at least one of the above criteria, a cultural resource must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. Integrity is defined as the authenticity of a property's historic identity, as evidenced by the survival of physical characteristics it possessed in the past and its capacity to convey information about a culture or group of people, a historic pattern, or a specific type of architectural or engineering design or technology. Location refers to the place where an event occurred or a property was originally built. Design considers elements such as plan, form, and style of a property. Setting is the physical environment of the property. Materials refer to the physical elements used to construct the property. Workmanship refers to the craftsmanship of the creators

of a property. Feeling is the ability of the property to convey its historic time and place. Association refers to the link between the property and a historically significant event or person.

Cultural resources meeting these standards (i.e., age, eligibility, and integrity) are termed "historic properties" under the NHPA. Sites or structures that are not considered individually significant can be considered eligible for listing in the NRHP as part of a historic district. 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.

Typically, cultural resources are grouped into three separate categories, archaeological, architectural, or sites that have a traditional religious or cultural significance to Native American tribes. Archaeological resources are defined as areas that have altered the landscape. Architectural resources are built structures of significance. In general, these architectural resources are typically more than 50 years old but newer structures can be evaluated under the entire above criterion. Resources of traditional, religious, or cultural significance to Native American tribes can include architectural or archaeological resources, sacred sites, neighborhoods, geographic landmarks, flora or faunal habitats, mineral localities, or sites considered essential for the preservation of traditional culture.

The EA process requires the assessment of potential impacts on cultural resources. In addition, under Section 106 of the NHPA, Federal agencies must take into account the effect of their undertakings on historic properties and allow the Advisory Council on Historic Preservation (ACHP) an opportunity to comment. Under this process, the Federal agency 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 historic resources in consultation with the State Historic Preservation Officer 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." Under Section 110 of the NHPA, Federal agencies are required to establish programs to inventory and nominate cultural resources under their purview to the NRHP.

3.8.2 Existing Conditions

Our current understanding of Kirtland AFB history and prehistory reflects archival data, data collected during surveys, limited test and block excavations, and information derived from comparisons with archaeological sequences developed for the middle Rio Grande. The prehistoric chronological sequence used at Kirtland AFB is based primarily on projectile point forms and supported in part by radiocarbon age estimates available for the Holocene and the discovery of early projectile point types in a stratified context. In general, the prehistory and history of Central New Mexico, including Kirtland AFB, is divided into four basic periods: Paleoindian, Archaic, Pueblo, and Historic. Numerous Kirtland AFB reports review the general cultural chronology and the history of prehistoric settlement and subsistence patterns of the Middle Rio Grande.

The Paleoindian occupation dates between 11,500 and 8,000 years before present (10,500 to 6,000 BC) and is typically divided into three distinct periods: Clovis, Folsom/Midland, and Late Paleoindian. Paleoindian sites are identified by distinctive projectile point styles and characteristic debitage and other chipped stone tools. The Late Paleoindian phase includes the Plainview/Belen, Agate Basin, and Cody periods. These early hunter-gatherers were highly mobile megafauna hunters that also exploited available wild plants. The most indicative of the projectile point styles is the lanceolate point which is often fluted. The sites are usually associated with current or former water sources (Judge 1973).

The Archaic period at Kirtland AFB, is generally split into three broad time periods, the Early Archaic Period (6,000 BC to 3200 BC), The Middle Archaic Period (3200 BC to 1800 BC), and the Late Archaic

(1800 BC to AD 600). The Archaic time period in general is marked by a rapid climate shift necessitating human environmental adaptation. Megafauna was no longer available during the Archaic period and people supplemented their hunting activities with the exploitation of plants in the region. Archaic sites are characterized by a marked increase in plant processing artifacts such as ground stone tools, a shift to smaller projectile points, and a much more diverse faunal assemblage.

Early Archaic assemblages typically are defined by two projectile point styles of the Oshara tradition (Irwin-Williams 1973): the Jay and the later Bajada points. The two point styles, 5500 to 4800 BC and 4800 to 3200 BC, for the Jay and Bajada respectively, represent the point typologies for the Early Archaic tradition (5500 to 3000 BC). Early Archaic sites tend to show up on several varying landscapes, representing the shifting and increasing diversity of subsistence. This patterning continues throughout the Archaic period. The Middle Archaic period is typically represented by a variety of side-notched and stemmed points including the San Jose Phase and the Chiricahua. This period is often represented archaeologically by an increase in the number and size of campsites. The Late Archaic period shows a marked increase in reliance on domesticated food resources, including the beginning of maize production (Cordell 1997). Sites from this period typically contain storage features for cultivated plants. Projectile points from this time period have a great deal of variability and range from corner-notched and side-notched to stemmed points. This Late Archaic phase also partially coincides with the Basketmaker II period and the variety of point types is analogous to this period.

The Pueblo period (AD 400 to 1540) is marked by an increasing reliance on agriculture, particularly maize, reflected in increased sedentism, greater architectural formality, and the introduction of pottery. The earliest ceramics were undecorated utility wares. Later ceramics included prominent use of mineral paints. For the general region in the project area, the material culture, subsistence, and settlement patterns are described as an interface of Mogollon and Anasazi influences (Cordell 1997). The puebloan occupation of the Southwest is traditionally divided into the five periods of the Pecos Classification: Pueblo I (AD 400 to 900), Pueblo II (AD 900 to 1200), Pueblo III (AD 1200 to 1300), and Pueblo IV and Pueblo V (AD 1300 to 1600). Realizing that the characteristics of this chronology relate better to the Colorado Plateau than to the Rio Grande region, the Northern Rio Grande developmental sequence developed by Wendorf and Reed is increasingly utilized in the latter area (Cordell 1997). This sequence is divided into three prehistoric periods: Developmental (AD 600 to 1200), Coalition (AD 1200 to 1325), and Classic (AD 1325 to 1600). These periods are marked by a shift in cultivation from canyon floodplains to broad valley bottoms and by increasing sedentism, reliance on agriculture, and regional trade.

The Historic period in New Mexico is separated into five general time periods: Spanish Contact/Colonial Pueblo Revolt (AD 1540 to 1692), Post Pueblo Revolt – Mexican Santa Fe Trail (AD 1692 to 1846), U.S. Territorial (AD 1846 to 1912), Statehood to World War II (AD 1912 to 1945), and Recent (1945 to Present). European presence began in the mid 16th century when, in 1541, Francisco Vazquez de Coronado led an expedition to the Middle Rio Grande area. The earliest written accounts of indigenous peoples are provided during this expedition describing the Native Americans and offering broad generalizations of land use, settlement patterns, and distinctions between native groups. However the historic period is typically seen as beginning around AD 1600, when major reorganization of Native American communities resulted from the European interaction, specifically from Spanish military and missionary explorations. The Spanish colonial practices included the encomienda and repartimiento systems, extracting tribute from the Pueblos and conscripting labor for farming and mining. Spanish colonists continued to pursue total conversion resulting in sharply declining Native populations, due in part to European-introduced disease and armed conflict. The problems between the Pueblo Indians and the Spanish Colonists continued to escalate culminating in the Pueblo Revolt on August 10, 1680. In the Albuquerque area, the Manzanita Mountains marked a boundary between Plains Indians and Pueblo trading contacts. It is probable that the Comanche and Apache occasionally crossed these mountains to

raid Puebloan and Spanish communities in the Middle Rio Grande Valley. Tijeras Pueblo, east of Albuquerque, was abandoned by the late 16th century (Pratt and Snow 1988).

The town of Albuquerque was founded in 1706 and experienced a long and rich history. The decades following the U.S. Civil War witnessed a period of western settlement, encouraged in part by the Homestead Act of 1862. The Rio Grande saw an increase in settlement, with farming and ranching becoming the major economic activities. Substantial economic development followed the arrival of the Atchison, Topeka, and Santa Fe Railroad in 1879 and soon Albuquerque became the largest city in New Mexico.

As Spanish, and later Mexican, populations expanded, the Albuquerque area's population continued to shift outward and the foothills provided areas to graze cattle and sheep. In the late 1800s, mineable sources of coal, copper, lead, and zinc were discovered near the city. Fluorspars were mined in the Manzanita region as fluorite in the 1930s and 1940s (Voynick 1997). The upland forest attracted colonial woodcutters. Roads were later built to gain access to timber along the upper canyons and ridge tops during the late 1800s and early 1900s.

Archaeological Resources

There have been more than 150 cultural resources projects undertaken at Kirtland AFB. These projects have resulted in the identification of 661 archaeological sites and the NRHP evaluations of more than 2,000 facilities. Of the 661 archaeological sites recorded within the boundaries of Kirtland AFB, most are located in the eastern portion of Kirtland AFB. Laboratory of Anthropology (LA) numbers have been assigned for each of these archaeological resources. NRHP eligibility evaluations are generally complete for the sites located on the lower piedmonts and drainages of the western portions of Kirtland AFB and the eastern Manzanita Mountains.

There have been no archaeological sites identified within the APE of the 20 buildings proposed for demolition. There have, however, been four previously recorded archeological sites identified within an approximate 0.125-mile radius of the buildings in the Proposed Action (see **Table 3-10**). None of these archaeological resources are within the 100-foot demolition footprint of the Proposed Action and the resources will not be adversely affected. The sites have all been designated not eligible for listing for the NRHP.

Table 3-10. Known Archaeological Sites within a 0.125-mile radius of the Buildings Proposed for Demolition

Site LA Number	Description	NRHP Eligibility	Map Area
71432	Historic, military related site	Not Eligible	3
127813	Unknown prehistoric lithic artifact scatter	Not Eligible	3
89854	Historic, nonmilitary site	Not Eligible	4
88089	Prehistoric lithic and ceramic scatter	Not Eligible	5

Two of the four known archaeological sites are within the vicinity of Building 736 (see **Figure 2-4**). These sites include an unknown prehistoric lithic artifact scatter (LA 127813) and a historic military-related site (LA 71432) respectively. Both sites however, are not within the APE and will not be affected by the Proposed Action. There is one known archaeological site (LA 89854) within the vicinity of Buildings 48055 to 48064, and Buildings 48066 to 48069 (see **Figure 2-5**). The site, a historic

nonmilitary artifact site, is not, however, within the APE and will not be affected by the Proposed Action. The final site that occurs within the vicinity of buildings within the Proposed Action is near Building 30143 (see **Figure 2-5**). The site is a prehistoric lithic artifact and ceramic scatter that was recommended not eligible for the NRHP.

None of the archaeological resources occur within the footprint of the Proposed Action nor are any of the archaeological resources eligible for listing for the NRHP.

Architectural Resources

The inventory and assessment of architectural resources at Kirtland AFB has been ongoing since 1984. To date, 2,183 structures have been evaluated for NRHP eligibility. Of these, 244 buildings and structures have been determined eligible through consultation with the New Mexico State Historic Preservation Office (SHPO). The Proposed Action involves the demolition of 20 historic buildings, all of which have been previously inventoried to the New Mexico Historic Cultural Properties Inventory (HCPI).

Of the 20 buildings proposed for demolition by the 377 ABW, 15 have been recommended not eligible to the NRHP under any criteria, five (Buildings 605, 614, 1013, 37505, and 30143) have been recommended eligible to the NRHP and one has been evaluated exempt from survey and listing. All eligibility recommendations have been concurred by the New Mexico SHPO. The lone building that has been evaluated exempt from NRHP listing and survey, Building 1003, is a small 120-square-foot storage facility built in 1968. This hazardous materials storage facility does not meet NRHP eligibility criteria and is not considered a built structure of significance (Van Citters 2003). There have been New Mexico HCPI Forms completed for each building within the Proposed Action. Summary data for all architectural resources within the footprints of the proposed undertaking are provided in **Table 3-11**.

Buildings 605 and 614 are situated within Area 600 of Kirtland AFB. The area, often referred to as the Ordinance Area, includes buildings that were constructed during World War II for munitions assembly (Van Citters 2003). Building 614 was constructed in 1944 and was used as a maintenance shop and for the assembly of munitions for the nearby bomb loading pit. The building is listed eligible for the NRHP under Criterion A for its association with the atomic bomb and its use during the Cold War. Area 600 from the 1960s to the mid 1980s was used as an electromagnetic pulse test facility. The second NRHP-eligible building proposed for demolition, Building 605, was constructed in 1971 and was one of these electromagnetic pulse test structures. The site, VPD-I, the first version of a Vertically Polarized Dipole simulator, also known as ACHILLES I, AFWL Characterization Interim Low Level electromagnetic pulse simulator, is essentially an antenna structure supported by telephone poles and a two-wire transmission line (the latter constructed in 1986). The structure, a vertical radiating simulator, was used to produce an environment replicating high-altitude nuclear bursts (Van Citters 2003). The facility was listed eligible for the NRHP under Criterion A for its role in electromagnetic pulse testing during the Cold War. Area 600 was later used for the development and research of chemical lasers. During a 2003 assessment of Area 600, Van Citters (2003) noted that the area retains “little integrity” and that many of the original buildings have since been demolished or undergone significant alterations. Area 600 is not considered a Historic District due to the compromised integrity of the structures.

Building 1013 is a Heating Plant that was constructed in 1952. The building is within the Flightline Hangar Area that was created from 1952 to 1955. The Flightline Hanger Area served as support facilities for the Air Force Special Weapons Center and the Naval Air Special Weapons Facility. Building 1013 provided the heat for the hangars nearby and was recommended eligible under Criterion C as it exemplifies a distinctive method of construction within the International Style (Van Citters 2003). The building, one of the taller buildings on Kirtland AFB, was constructed using a concrete masonry unit style

which utilizes concrete block. Though the concrete masonry unit style of construction was generally

Table 3-11. Architectural Resources within the Project Area

Building Number	Description	Construction Date	NRHP Eligibility	NRHP Criterion	Historic District
605	Vertically Polarized Dipolar Simulator Site (VPD I)	1963	Y	A	None
613	Weapons Support Training Building	1964	N	n/a	None
614	Maintenance Shop and Munitions Assembly Facility	1944	Y	A	None
736	Nuclear Engineering Test Building	1968	N	n/a	None
1003	Storage Facility for Hazardous Materials	1968	N	n/a	None
1013	Heating Plant for the Flight line Hangar Area	1952	Y	C	None
30143	Enlisted Men's Barracks/ Manzano Dormitory Buildings	1950	Y	A/C	Manzano
37505	Heating Plant for the Manzano Base Area	1950	Y	A	Manzano
48055	Science Radiation Laboratory Building	1952	N	n/a	None
48056	Science Radiation Laboratory Building	1952	N	n/a	None
48058	Farm Facility	1968	N	n/a	None
48059	Support Structure for the Kirtland AFB Riding Club	1970	N	n/a	None
48061	Support Structure for the Kirtland Ionization Radiation Annex	1983	N	n/a	None
48062	Farm Facility	1967	N	n/a	None
48063	Farm Facility	1967	N	n/a	None
48064	Sheep Shelter, Farm Facility	1956	N	n/a	None
48066	Riding Stables	1973	N	n/a	None
48067	Riding Stables	1973	N	n/a	None
48068	Sheep Shelter, Farm Facility	1956	N	n/a	None
48069	Riding Stables	1984	N	n/a	None

more expensive and labor intensive than steel frame or stick frame construction, these buildings were typically built because of its fire resistance and durability. This particular example retains much of its

original style and its façade has never been stuccoed. The Flightline Hangar Area is not considered a Historic District.

The final two NRHP-eligible buildings within the project area, Buildings 37505 and 30143, are within the Manzano Base Historic District. The Manzano Base was utilized as a nuclear weapons storage stockpile facility during the Cold War. Building 37505 is a heating plant that was constructed in 1951 for the facilities. The building was one of the earliest buildings constructed on the Manzano Base and was listed on the NRHP under Criterion A for its association with the district. The Manzano Base's security concern necessitated continual surveillance and support facilities. Building 30143, served as one of these support facilities. The building, known as the Enlisted Men's Barracks or the Manzano Dormitory building, was constructed in 1950 utilizing the International Style of architecture like Building 1013. The former barracks are eligible to the NRHP under Criterion C as it exemplifies a distinctive method of construction. The building is also eligible to the NRHP under Criterion A for its association with the nuclear weapons stockpiling program and its association with the Manzano District as a whole.

Traditional Cultural Properties

No traditional cultural properties or sacred sites have been identified at Kirtland AFB.

3.9 Infrastructure

3.9.1 Definition of the Resource

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as "urban" or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to the economic growth of an area. The infrastructure information provided below was primarily obtained from the *Kirtland Air Force Base New Mexico General Plan 2002* (KAFB 2002) and provides a brief overview of each infrastructure component and comments on its existing general condition. The infrastructure components to be discussed in this section include utilities and solid waste management.

Utilities include electrical, natural gas, liquid fuel, central heating and cooling, water supply, sanitary sewage/wastewater, storm water handling, and communications systems. Solid waste management primarily relates to the availability of landfills to support a population's residential, commercial, and industrial needs. Alternative means of waste disposal might involve waste-to-energy programs or incineration. In some localities, landfills are designed specifically for, and limited to, disposal of construction and demolition debris. Recycling programs for various waste categories (e.g., glass, metals, papers, asphalt, and concrete) reduce reliance on landfills for disposal.

3.9.2 Existing Conditions

Electrical Systems. Kirtland AFB purchases electrical power from Western Area Power Administration. All electricity to the installation comes through the Sandia Switching Station on an approximately 80 million-volt amperes (MVA) capacity electrical circuit. The estimated normal electrical load for Kirtland AFB is approximately 35 MVA, and the estimated historical maximum electrical load is approximately 76 MVA (KAFB 2008c).

Natural Gas Systems. Coral Energy supplies Kirtland AFB with natural gas. Natural gas enters the installation through a 60 pound-per-square-inch pipeline just east of Pennsylvania Boulevard. There are approximately 70 miles of natural gas mains at Kirtland AFB that provide natural gas service to multiple

buildings on the installation. The primary buildings that receive natural gas service are in the industrial complex, family housing areas, and the Sandia Steam Plant. Natural gas demand depends on weather conditions; however, the approximate consumption for 2006 was 1,100,000 million British thermal units (Btus) (KAFB 2008c).

Liquid Fuel. Liquid fuels are supplied to Kirtland AFB by contractors. The primary liquid fuels supplied include JP-8 (jet fuel), diesel, and gasoline. All of these fuels are purchased in bulk, delivered to the installation by tanker truck, and stored in various sized storage tanks scattered across the installation. The primary use for liquid fuels at Kirtland AFB is to power military aircraft and land-based vehicles; however, it is also used to a lesser extent to heat select buildings on the installation (KAFB 2002).

Central Heating and Cooling Systems. Kirtland AFB has approximately 20 miles of steam mains that provide heating service to select buildings on the installation. The steam system is powered by three central heating plants; however, only one, the Sandia Steam Plant, is currently in service. Natural gas is the fuel source for the Sandia Steam Plant. Kirtland AFB does not have a centralized cooling system (KAFB 2002).

Water Supply Systems. Water is supplied to Kirtland AFB by seven groundwater wells that have a collective water-pumping maximum of 9.3 million gallons per day (MGD). Kirtland AFB also purchases water from the City of Albuquerque to meet demand during peak periods; however, the amount of water purchased from the city has been negligible since 1998. The maximum water supply capacity from the City of Albuquerque is 8.6 MGD, which results in a maximum total water supply to Kirtland AFB of 17.9 MGD (KAFB 2008c). Water is stored in approximately 24 water storage tanks at Kirtland AFB, which have a collective storage capacity of approximately 5.5 million gallons. Water is transported throughout Kirtland AFB by two separate but interconnected water distribution systems. There are approximately 160 miles of potable water supply piping and approximately 50 miles of nonpotable water supply piping. Nonpotable water is primarily used for golf course irrigation and in fire protection systems. In general, the water supply piping is properly sized and is in good condition despite being approximately 45 years of age on average (KAFB 2002).

Current water demand at Kirtland AFB is approximately 6 to 10 MGD during the summer and 2 to 4 MGD during the winter. As such, the groundwater wells generally have sufficient pumping capacity to meet current water demand. Several water supply system improvement projects are planned for the next few years to increase groundwater pumping capacity as well as water storage capacity (KAFB 2002).

Sanitary Sewer/Wastewater Systems. Kirtland AFB does not have its own sewage treatment facility. Instead, the sanitary sewer system of Kirtland AFB, which consists of approximately 92 miles of collection mains, transports wastewater to the city of Albuquerque treatment facility. Kirtland AFB is permitted a fixed amount of 70,805,000 gallons of sewer discharge per month. Currently, Kirtland AFB discharges an average of 901,000 gallons per day and a maximum of 1,149,000 gallons per day (Segura 2010). Kirtland AFB utilizes approximately 40 oil/water separators to collect greases and oils before they enter the wastewater collection system. Some facilities in remote portions of the installation are not serviced by the sanitary sewer system; these facilities instead utilize isolated, onsite septic systems to dispose of wastewater (KAFB 2002).

Storm Water Systems. Man-made storm water drainage systems, which include gutters, culverts, ditches, and underground piping, direct storm water to receiving channels and basins in developed portions of Kirtland AFB. In less-developed portions of Kirtland AFB, man-made storm water drainage systems have not been installed, and storm water drains by sheet flow to various natural drainageways. Most storm water at Kirtland AFB that does not get absorbed into the ground drains into the Rio Grande, which eventually discharges in the Gulf of Mexico (KAFB 2002).

Communications Systems. Kirtland AFB utilizes copper and fiber optic cable for the telephone and data transmission services. Kirtland AFB operates its own telephone switching system, which is adequately sized to support the current needs of the installation. The data transmission system has been designed to accommodate future growth of the installation (KAFB 2002).

Solid Waste Management. Solid waste generated at Kirtland AFB is collected by contractors and disposed of at the off-installation landfill for the City of Rio Rancho operated by Waste Management. In 2008, the Rio Rancho Landfill received a 10-year permit renewal and approval for a permit modification that allows for an increase of approximately 1,179,600 cubic yards of capacity over the amount approved in its 1998 New Mexico Environment Department permit (Permit Number 231402), but anticipates closure in 2019 (Waste Management 2010, NMED undated). Kirtland AFB operates a construction-and-demolition-only landfill on the installation. This landfill accepts only construction and demolition waste from permitted contractors working on the installation. The maximum capacity of the Kirtland AFB landfill is 10,164,000 cubic yards (4,065,676 tons) and the remaining capacity is 5,017,316 cubic yards (2,006,964 tons) (Kitt 2010). Kirtland AFB manages a recycling program to reduce the amount of solid waste sent to landfills. The Kirtland AFB Qualified Recycling Program is operated by contractors and collects office paper, cardboard, and aluminum from pick-up points scattered across the installation (KAFB 2002). Additional recycling efforts are oftentimes included in specific construction and demolition projects.

3.10 Hazardous Materials and Waste

3.10.1 Definition of the Resource

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

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) at 42 U.S.C. §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 Part 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 in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances. Special hazards include ACMs, polychlorinated biphenyls (PCBs), and LBPs. The USEPA is given authority to regulate these special hazard substances by the Toxic Substances Control Act (TSCA) Title 15 U.S.C. Chapter 53. TSCA Subchapter I identifies PCBs, Subchapter II ACMs and Subchapter IV LBP. USEPA has established regulations regarding asbestos abatement and worker safety under 40 CFR part 763 with additional regulation concerning emissions (40 CFR 61). Whether from lead abatement or other activities, depending on the quantity or concentration the disposal of the LBP waste is potentially regulated by RCRA at 40 CFR 260. The disposal of PCBs is addressed in

40 CFR 750 and 761. The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a proposed action.

DOD has developed the Environmental Restoration Program (ERP), intended to facilitate thorough investigation and cleanup of contaminated sites on military installations. Through the ERP, DOD evaluates and cleans up sites where hazardous wastes have been spilled or released to the environment. 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 identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be restricted until remediation of a groundwater contaminant plume has been completed).

The information provided in this section will focus on the presence and management of hazardous materials and wastes associated with the proposed demolition activities only. Evaluation will extend to generation, storage, transportation, and disposal of hazardous wastes generated through implementation of the Proposed Action.

For the USAF, AFPD 32-70, *Environmental Quality*, and the AFI 32-7000 series incorporate the requirements of all Federal regulations, and other AFIs and DOD Directives for the management of hazardous materials, hazardous wastes, and special hazards.

3.10.2 Existing Conditions

Hazardous Materials and Petroleum Products. AFI 32-7086, Hazardous Materials Management, establishes procedures and standards that govern management of hazardous materials throughout the USAF. It 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. As directed by AFI 32-7086, Kirtland AFB has established the Hazardous Material Management Process Team; a collaborative team composed of individuals from the Environmental Protection Committee, Fuels Management Officer, Civil Engineering Division, Bioenvironmental Engineering, Safety, and Fire (KAFB 2004b).

The buildings proposed for demolition are reportedly vacant and potentially contain hazardous materials and petroleum products. It is assumed that any hazardous materials contained within the buildings will be removed prior to the demolition in accordance with Federal, state, and Air Force regulations.

Hazardous and Petroleum Wastes. The 377 ABW maintains a Hazardous Waste Management Plan (KAFB 2004b) as directed by AFI 32-7042, Waste Management. This plan prescribes the roles and responsibilities of all members of Kirtland AFB with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The plan 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 hazardous waste generator (Handler Identification NM9570024423). Kirtland AFB has several 90-day hazardous waste accumulation areas.

The buildings proposed for demolition are reportedly vacant and potentially contain hazardous wastes. It is assumed that any hazardous wastes contained within the buildings would be removed prior to demolition in accordance with Federal, state, and Air Force regulations. Any fluorescent light bulbs found within the buildings proposed for demolition would be treated as universal waste and disposed of accordingly.

Environmental Restoration Program. The Defense Environmental Restoration Program (DERP) was formally established by Congress in 1986 to provide for the cleanup of DOD sites. The ERP and the Military Munitions Response Program (MMRP) are components of the DERP. The ERP requires each DOD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The MMRP addresses nonoperational range lands that are suspected or known to contain unexploded ordnance, discarded military munitions, or munitions constituent contamination. There were no MMRP sites identified.

Several of the proposed building demolition project areas are near identified ERP sites that have been determined to require No Further Action (NFA).

Asbestos-Containing Material. Asbestos is regulated by USEPA under the CAA, TSCA, and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). USEPA has established that any material containing more than 1 percent asbestos is considered an ACM. Friable ACM is any material containing more than 1 percent asbestos, and that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable ACM is any ACM that does not meet the criteria for friable ACM.

Guidelines and procedures for recordkeeping, removal, encapsulation, enclosure, and repair activities associated with ACM-abatement projects are specified in the installation's Asbestos Management Plan. Asbestos is considered to be a hazardous waste and must be disposed of accordingly. The buildings proposed for demolition potentially contain ACM. Any ACM removed from buildings proposed for demolition would be disposed at the Keers Special Waste Landfill in Mountainair, New Mexico; the City of Rio Rancho landfill; or another approved permitted site.

Lead-Based Paint. The Residential Lead-Based Paint Hazard Reduction Act of 1992, Subtitle B, Section 408 (commonly called Title X) regulates the use and disposal of LBP on Federal facilities. Federal agencies are required to comply with applicable Federal, state, and local laws relating to LBP activities and hazards. Kirtland AFB has a Lead-Based Paint Management Plan that establishes the roles, responsibilities, and guidelines for activities involving the surveying and removal of LBP. The buildings proposed for demolition potentially contain LBP.

Polychlorinated Biphenyls. PCBs are a group of chemical mixtures used as insulators in electrical equipment such as transformers and fluorescent light ballasts. Federal regulations govern items containing 50 to 499 ppm PCBs. Chemicals classified as PCBs were widely manufactured and used in the United States throughout the 1950s and 1960s. PCB-containing oil is typically found in older electrical transformers and light fixtures (ballasts). Transformers containing greater than 500 ppm PCBs, between 50 and 500 ppm PCBs, and less than 50 ppm PCB are considered PCB, PCB-contaminated, and non-PCB, respectively.

The fluorescent light ballasts in the buildings and pad-mounted transformers near buildings proposed for demolition might contain PCBs. Other items that might contain PCBs include capacitors and surge protectors. Any pad-mounted transformers outside the buildings would be tested for PCBs prior to altering the utility and treated in accordance with Federal, state, and Air Force regulations.

Pollution Prevention. AFI 32-7080, Pollution Prevention Program, implements the regulatory mandates in the Emergency Planning and Community Right-to-Know Act, Pollution Prevention Act of 1990; EO 12873, Federal Acquisition, Recycling, and Waste Prevention; and EO 12902, Energy Efficiency and Water Conservation at Federal Facilities. AFI 32-7080 prescribes the establishment of Pollution Prevention Management Plans, which have management and minimization strategies for ozone-depleting substances, USEPA 17 industrial toxics, hazardous wastes, municipal solid wastes, affirmative

procurement of environmentally friendly products, energy conservation, and air and water pollutant reduction. The 377 ABW fulfills this requirement with the following plans.

- Pollution Prevention Management Action Plan (KAFB 1999)
- Final Management Action Plan (KAFB 1997b)
- Hazardous Waste Management Plan (KAFB 2004b)
- Asbestos Management Plan (KAFB undated)
- Lead Based Paint Management Plan (KAFB 1995)
- Spill Prevention Control and Countermeasures (SPCC) Plan (KAFB 2009c).

3.11 Safety

3.11.1 Definition of the Resource

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 addresses workers' health and safety during demolition activities as well as public health and safety during and following demolition activities.

Demolition site safety requires adherence to regulatory requirements imposed for the benefit of employees. It 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 regulations designed to comply with standards issued by the Federal Occupational Safety and Health Administration (OSHA), USEPA, and state occupational safety and health 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. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. 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 noisy environments 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.

3.11.2 Existing Conditions

Contractor Safety. All contractors performing demolition activities are responsible for following Federal and State of New Mexico OSHA regulations and are required to conduct 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 program according to the provisions of the Federal Occupational Safety and Health Act of 1970, which permits a state to administer its own occupational safety and health program if it meets all of the Federal requirements regarding the program's structure and operations. The purpose of the New Mexico Occupational Health and Safety Bureau program is to ensure employees not exclusively covered by Federal regulations are provided safe and healthful working conditions (NMED 2009).

Occupational safety and health programs address exposure to hazardous and toxic substances, safety hazards, use of PPE, and use and availability of Material Safety Data Sheets. Occupational health and safety is the responsibility of each employer, as applicable. Employer responsibilities are to review potentially hazardous workplaces; 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; 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, engaged in hazardous waste work, asbestos, lead, or other work requiring medical monitoring.

Based on the age of many of the buildings proposed for demolition, ACMs and LBPs might be present. Kirtland AFB maintains an asbestos management plan and a lead-based paint management plan.

Military Personnel Safety. Each branch of the military has its own policies and regulations that act to protect its workers, despite their work location. USAF personnel are protected from occupational hazards by AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health* (AFOSH) *Program*, which implements Air Force Policy Directive (AFPD) 91-3, *Occupational Safety and Health*. The purpose of the AFOSH Program is to minimize the loss of USAF resources and to protect USAF personnel from occupational deaths, injuries, or illnesses by managing risks.

Public Safety. Kirtland AFB has its own emergency services department. The emergency services department provides Kirtland AFB with not only fire suppression, crash-response, rescue, emergency medical, and hazardous substance protection but also provides emergency response planning and community health and safety education through the dissemination of public safety information to the installation. A Veterans Administration hospital and the 377th Medical Group's Outpatient Clinic are the primary military medical facilities at Kirtland AFB (KAFB 2009d). A number of other hospitals and clinics, which are devoted to the public, are off-installation in the City of Albuquerque. These facilities include the University of New Mexico Hospital, the Kindred Hospital, and Kaseman Presbyterian Hospital (Google 2009).

The Fire and Rescue Emergency Services Division for the City of Albuquerque provides fire suppression, crash-response, rescue, emergency medical, and hazardous substance response. The Fire and Rescue Emergency Services Division includes 23 fire engine companies, 7 fire ladder companies, 3 hazardous materials response units, and 18 medical response ambulances (City of Albuquerque 2009c). The City of Albuquerque also has an approximately 500-person police force available to provide law enforcement services (City of Albuquerque 2009d). A mutual service agreement is in place between the City of Albuquerque and Kirtland AFB.

Explosives and Munitions Safety. Explosives, munitions, and ordnance are stored and used as part of military training programs at Kirtland AFB; however, they are not currently stored within the buildings proposed for demolition. No MMRP sites have been documented at or near any of the buildings proposed for demolition (see **Section 3.10.2**).

Explosives Quantity-Distance (QD) Clear Zone. Explosives QD clear zones are established to safeguard the public and installation personnel against possible injury from fires and explosions from the storage of munitions. Clear zones established surrounding potential explosion sites are defined by the explosive limits of the potential explosion site. Building 37505 is within an explosives QD clear zone on Kirtland AFB (KAFB 2002).

3.12 Socioeconomics and Environmental Justice

3.12.1 Definition of the Resource

Socioeconomics. Socioeconomics is the relationship between economies and social elements such as population levels and economic activity. Factors that describe the socioeconomic environment represent a composite of several interrelated and nonrelated attributes. There are several factors that can be used as indicators of economic conditions for a geographic area, such as demographics, median household income, unemployment rates, percentage of families living below the poverty level, employment, and housing data. Data on employment identifies gross numbers of employees, employment by industry or trade, and unemployment trends. Data on personal income in a region is used to compare the before and after effects of any jobs created or lost as a result of a proposed action. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region.

Environmental Justice. EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, pertains to environmental justice issues and relates to various socioeconomic groups and the disproportionate effects that could be imposed on them. This EO requires that Federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO was enacted to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of a proposed action.

Children's Environmental Health and Safety Risks. EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that each Federal agency "(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

3.12.2 Existing Conditions

Demographics. The population of the Albuquerque Metropolitan Statistical Area (MSA) defined by the U.S. Census Bureau as Bernalillo, Sandoval, and Valencia counties was 829,644 people in 2008. The 2008 estimate represents a 16 percent increase or 2 percent annual increase over the 2000 Census estimate of 712,738 (U.S. Census Bureau 2000, U.S. Census Bureau 2008).

The population of Bernalillo County alone was 635,139 representing 32 percent of the State of New Mexico population, which totaled nearly 2,000,000 in 2008. Bernalillo County grew 14 percent from 2000 to 2008 while Sandoval County experienced a 36 percent increase in population. During this same time period Valencia County grew by 9 percent. The growth rate of population in the Albuquerque MSA was much greater than the growth rate of the United States or the State of New Mexico over the same time period. See **Table 3-12** for population estimates (U.S. Census Bureau 2000, U.S. Census Bureau 2008).

Table 3-12. 2000 and 2008 Population Estimates

Location	2000	2008	Percentage Change
USA	281,421,906	304,059,724	8.0%
New Mexico	1,819,046	1,984,356	9.1%
Albuquerque MSA	712,738	829,644	16.4%
Bernalillo County	556,678	635,139	14.1%
Sandoval County	89,908	122,298	36.0%
Valencia County	66,152	72,207	9.2%

Sources: U.S. Census Bureau 2000, U.S. Census Bureau 2008

According to the U.S. Census Bureau the State of New Mexico contains one of the largest percentages of minorities in the United States. The Hispanic population is the largest by percentage in the United States, 44 percent, and the Native American Population is the second largest by percentage in the United States, 10 percent. The non-Hispanic White population in New Mexico is one of the smallest in the country as well at 45 percent (U.S. Census Bureau 2000). The Black or African American population in New Mexico is 2 percent and the Asian or Pacific Islander population is 1 percent, much less than the national averages of 12 percent and 4 percent respectively (U.S. Census Bureau 2000).

Employment Characteristics. Approximately 1 percent of the Albuquerque MSA population is employed within the armed forces (U.S. Census Bureau 2000). The three largest industries and the corresponding percentage of the workforce employed by the industry are the educational, health, and social services industry (21 percent); the professional, scientific, management, administrative, and waste management services industry (13 percent); and the retail trade industry (12 percent). The average median household income for the Albuquerque MSA is $39,088, slightly less than the United States average of $41,994.

Unemployment in the Albuquerque MSA from 1999 to 2008, ranged from 3.9 to 5.3 percent annually. In 2009 the unemployment rate climbed steadily to 7.9 percent, a 20-year high for the monthly unemployment rate in the MSA (BLS 2009).

Kirtland AFB. Employment on Kirtland AFB is greater than 31,000, making it the single largest employer in the Albuquerque MSA. On installation there are 1,170 active-duty personnel. Direct payroll expenditures from Kirtland AFB exceed $2 billion annually. When non-payroll expenditures associated with Kirtland AFB are included total expenditures sum $4.6 billion. The number of indirect jobs that are created as a result of Kirtland AFB expenditures and employment are estimated at 23,500 jobs (KAFB 2002).

Environmental Justice and Protection of Children. To provide a baseline measure for environmental justice an area around the installation must be established to examine the impacts on minority and low-income populations. For the purpose of this analysis a 50-mile radius around Kirtland AFB was evaluated to identify minority and low-income populations. This 50-mile radius includes numerous towns, villages, census-designated places, and cities. The largest of these is the City of Albuquerque with a population of 448,607. In the City of Albuquerque, 40 percent of the population is Hispanic and 4 percent is Native American, see **Table 3-13**. The City of Rio Rancho is on the northwestern side of Albuquerque and has a population of 60,312 and is the second largest city within 50 miles of Kirtland AFB. The Hispanic population represents 28 percent of the total population in Rio Rancho and the Native American population represents 2 percent of the total population. The third largest population center within 50 miles of Kirtland AFB is South Valley, situated to the west of Kirtland AFB, containing

38,869 persons. In South Valley the Hispanic population is 78 percent of the total population and the Native American population is 2 percent of the total population

Table 3-13. Minority and Low-Income Characteristics, 2000.

Race and Origin	City of Albuquerque	City of Rio Rancho	South Valley	New Mexico	United States
Total Population	**448,607**	**51,765**	**39,060**	**1,819,046**	**281,421,906**
Percent Under 5 Years of Age	6.9	7.5	7.9	7.2	6.8
Percent Over 65 Years of Age	12.0	11.8	10.0	11.7	12.4
Percent White	71.6	78.4	57.2	66.8	75.1
Percent Black or African American	3.1	2.7	1.1	1.9	12.3
Percent American Indian and Alaska Native	3.9	2.4	2.0	9.5	12.3
Percent Asian	2.2	1.5	0.3	1.1	12.3
Percent Native Hawaiian and Other Pacific Islander	0.1	0.2	0.1	0.1	0.1
Percent Other Race	14.8	10.9	35.0	17.0	5.5
Percent Two or More Races	4.3	4.1	4.2	3.6	2.4
Percent Hispanic or Latino	39.9	27.7	77.6	42.1	12.5
Median Household Income	$38,272	$47,169	$30,879	$34,133	$41,994
Percent of Families Living Below Poverty	10.0	3.7	32.1	14.5	9.2

Source: U.S. Census Bureau 2008

Note: Hispanic denotes a place of origin.

The percentage of families living below the poverty level varies greatly throughout the metropolitan area of Albuquerque, with the City of Albuquerque having poverty levels similar to the State of New Mexico and the United States, while South Valley has elevated levels compared to the State of New Mexico and the United States and Rio Rancho levels less than the State of New Mexico and the United States.

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4. Environmental Consequences

This section describes the potential environmental consequences on the affected environment of implementing the Proposed Action and the No Action Alternative. In Sections 4.1 to 4.12, each alternative is evaluated for its potential to affect physical, biological, and socioeconomic resources in accordance with 40 CFR 1508.8. Potential impacts for each resource area are described in terms of their significance. 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.

4.1 Land Use

4.1.1 Evaluation Criteria

The significance of potential land use impacts is based on the level of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. In general, a land use impact would be significant if it were to cause the following:

- Be inconsistent or in noncompliance with existing land use plans or policies
- Preclude the viability of existing land use
- Preclude continued use or occupation of an area
- Be incompatible with adjacent land use to the extent that public health or safety is threatened
- Conflict with planning criteria established to ensure the safety and protection of human life and property.

4.1.2 Environmental Consequences

Proposed Action

The Proposed Action would be in compliance with the land use policies presented in the *Kirtland Air Force Base General Plan*, including the main goals of providing operational support for missions; ensuring the management of resources; promoting the health, safety, and quality of life of Kirtland AFB's personnel; and continuing to improve the visual appearance of Kirtland AFB. The Proposed Action would specifically satisfy several general development objectives identified in the General Plan to achieve these goals, such as siting facilities for maximum efficiency, and ensuring the efficient use of facilities and resources by redeveloping vacant property through demolition of selective buildings. The General Plan specifically identifies Building 1013 as a candidate for demolition, and the Chemical Oxygen Iodine Laser area (location of Buildings 613 and 614) and the "South Forty area" (location of Buildings 30143, 37505, 48055, 48056, 48058, 48059, 48061 to 48064, and 48066 to 48069) as opportunities for development. Furthermore, the act of building demolition does not require changes to be made to land use designations; therefore, the proposed demolition of 20 buildings under the Proposed Action would be consistent with the existing installation land use designation at the location of each building. The Proposed Action would comply with the General Plan, and no impacts on land use plans or policies would be expected.

The Proposed Action would also be consistent with zoning designations in surrounding off-installation areas, which consists primarily of designations relating to the Albuquerque International Airport. In

addition, the Proposed Action would not violate local zoning ordinances because municipal zoning regulations do not apply to Federal property. Therefore, the Proposed Action would not result in any impacts on municipal land use plans or policies.

The Proposed Action would not preclude the viability of existing installation and off-installation land uses, or the continued use and occupation of areas surrounding the proposed building demolition sites, either on Kirtland AFB or off-installation areas. Therefore, the Proposed Action would result in no impacts on existing land use viability or continued land occupation. In addition, no adverse impacts would be expected on future land use. Future growth would not be limited by implementation of the Proposed Action.

No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and existing land use conditions would remain the same as discussed in **Section 3.1.2**. No impacts on land use would be expected.

4.2 Noise

4.2.1 Evaluation Criteria

Noise impact analyses typically evaluate potential changes to the existing noise environment that would result from implementation of a proposed action. Potential changes in the acoustical environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels or reduce the ambient sound level), negligible (i.e., if the total number of sensitive receptors to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased sound exposure to unacceptable noise levels or ultimately increase the ambient sound level). Projected noise effects were evaluated qualitatively for the alternatives considered.

4.2.2 Environmental Consequences

Proposed Action

The sources of noise under the Proposed Action that could impact populations include demolition activities and vehicle operations. These sources are addressed as follows.

Demolition Activities. Numerous buildings would be demolished under the Proposed Action as discussed in **Section 2.1.1**. Noise from construction activities varies depending on the type of construction equipment being used, the area that the action would occur in, and the distance from the noise source. To predict how construction activities would impact adjacent populations, noise from the probable construction was estimated. For example, as shown in **Table 3-1**, demolition usually involves several pieces of equipment (e.g., bulldozers and loaders) that can be used simultaneously. Under the Proposed Action, the cumulative noise from the construction equipment, during the busiest day, was estimated to determine the total impact of noise from construction activities at a given distance. Examples of expected cumulative construction noise during daytime hours at specified distances are shown in **Table 4-1**.

Table 4-1. Predicted Cumulative Noise Levels from Demolition Activities

Distance from Noise Source	Predicted Cumulative Noise Level
100 feet	85 dBA
200 feet	79 dBA
800 feet	67 dBA
1,200 feet	63 dBA
1,500 feet	61 dBA

Two of the 20 buildings proposed for demolition fall within the noise contours from aircraft operations at Albuquerque International Airport. Buildings 736 and 1013 are within the DNL of 65 to 80+ dBA noise contours. Since multiple single-noise events create the cumulative DNL value, the actual sound levels that a person hears within the area of the 65 to 80+ dBA noise contours fluctuates throughout a 24-hour period. Consequently, populations within this region are accustomed to fluctuations of noise levels in the 70 to 90 dBA range. The demolition activities proposed at the remaining buildings within and beyond the noise contours would not affect the ambient noise environment beyond the installation boundary. Noise generation would last only for the duration of demolition activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Consequently, demolition activities at Kirtland AFB would result in impacts on the noise environment; however, these impacts would be expected to be less than significant.

Vehicle Operations. Under the Proposed Action, tractor trailers would be used to haul large quantities of debris, recyclable materials, or hazardous waste. The tractor trailers would travel back and forth between the demolition sites and the Kirtland AFB landfill, the City of Rio Rancho landfill, the Defense Reutilization and Marketing Office, or offsite recycling facilities. Noise levels from the tractor trailers would likely range from 78 to 88 dBA (92 dBA at highway speeds) at a distance of 50 feet adjacent to the vehicle (Close and Wesler 1975). Noise effects from increased traffic due to construction vehicles would be temporary in nature. Consequently, the demolition activities and subsequent hauling would result in impacts on the noise environment associated with traffic levels at any of the above-mentioned facilities; however, these impacts would be expected to be less than significant.

Noise Zones. Building demolition would produce noise levels that could be heard by persons immediately surrounding each demolition site. The noise produced at the demolition sites would be compatible with the immediately surrounding installation land uses (i.e., Airfield, Aircraft Operations/Maintenance, Administration and Research, Open Space [vacant], and Outdoor Recreation), and off-installation land uses (Transportation/Utilities). The noise levels heard in these areas would not be at levels that would threaten public health and safety, and would be short-term lasting only for the duration of building demolition. Building demolition is permitted within the airport's noise contours and the City of Albuquerque's AP-2 Airport Protection Overlay zone; however, municipal zoning regulations do not apply to Federal property. The Proposed Action would not result in any impacts on land use from noise issues.

No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. There would not be an increase in construction activities, or vehicle operations; consequently, the ambient noise environment would not change from existing conditions.

4.3 Visual Resources

4.3.1 Evaluation Criteria

The potential for significant impacts on visual resources has been assessed based on whether the Proposed Action results in the following:

- Adversely influence a national, state, or local park or recreation area
- Degrade or diminish a Federal, state, or local scenic resource
- Create adverse visual intrusions or visual contrasts affecting the quality of a landscape.

4.3.2 Environmental Consequences

Proposed Action

During the building demolition process, each demolition site would have little aesthetic appeal. Demolition equipment including bulldozers, backhoes, front-end loaders, dump trucks, and tractor-trailers would be visible from the areas adjoining the project sites. Demolition wastes temporarily stored for disposal would be visible in piles and in dumpsters at the demolition projects sites, and demolition wastes would be seen in trucks on installation and public roadways being transported to landfills. Although the demolition process would impact the installation's overall aesthetic appeal, the impacts would be temporary and, therefore, would be less than significant.

Following the building demolition process, the conversion of these demolition sites to unoccupied land would enhance the overall visual conditions of the installation. Currently, the buildings proposed for demolition detract from the overall aesthetic appearance of the installation; therefore, their removal would enhance the aesthetics of the installation. In addition to the building removal, overhead electricity and communications utility wires would be removed as part of the Proposed Action. Their removal would further enhance the aesthetic appearance. Therefore, the building demolition under the Proposed Action would result in a beneficial impact on visual resources.

No Action Alternative

The No Action Alternative would result in continuation of the existing visual and aesthetic conditions, as discussed in **Section 3.3.** Demolition activities would not take place and the deteriorating buildings would continue to detract from the installation's overall current aesthetic appearance.

4.4 Air Quality

4.4.1 Evaluation Criteria

The Federal *de minimis* threshold emissions rates were established by USEPA in the General Conformity Rule to focus analysis requirements on those Federal actions with the potential to substantially affect air quality. **Table 4-2** presents these thresholds, by regulated pollutant. As shown in **Table 4-2**, *de minimis* thresholds vary depending on the severity of the nonattainment area classification.

The environmental consequences to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality.

Table 4-2. Conformity *de minimis* Emissions Thresholds

Pollutant	Status	Classification	*de minimis* Limit (tpy)
Ozone (measured as NO_x or VOCs)	Nonattainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO_x)
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO_x)
		Outside ozone transport region	100
CO	Nonattainment/ maintenance	All	100
PM_{10}	Nonattainment / maintenance	Serious	70
		Moderate	100
		Not Applicable	100
$PM_{2.5}$ (measured directly, as SO_2, or as NO_x)	Nonattainment/ maintenance	All	100
SO_2	Nonattainment/ maintenance	All	100
NO_x	Nonattainment/ maintenance	All	100

Source: 40 CFR 93.153

Specifically, the impact in NAAQS "attainment" areas would be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Represent an increase of 10 percent or more in an affected AQCR emissions inventory
- Exceed any Evaluation Criteria established by a SIP.

Effects on air quality in NAAQS "nonattainment" areas are considered significant if the net changes in project-related pollutant emissions result in any of the following scenarios:

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

With respect to the General Conformity Rule, effects on air quality would be considered significant if the proposed Federal action would result in an increase of a nonattainment or maintenance area's emissions inventory by 10 percent or more for one or more nonattainment pollutants, or if such emissions exceed *de minimis* threshold levels established in 40 CFR 93.153(b) for individual nonattainment pollutants or for pollutants for which the area has been redesignated as a maintenance area.

In addition to the *de minimis* emissions thresholds, Federal PSD regulations define air pollutant emissions to be significant if the source is within 10 kilometers of any Class I area, and emissions would cause an increase in the concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more (40 CFR 52.21(b)(23)(iii)).

4.4.2 Environmental Consequences

Proposed Action

Demolition activities at Kirtland AFB under the Proposed Action would result in impacts on air quality resources; however these impacts are expected to be less than significant. The Proposed Action would result in air quality impacts during construction activities, primarily from site-disturbing activities and operation of construction equipment. All emissions associated with demolition operations would be temporary in nature. The proposed project includes demolition and removal of buildings, foundations, and electrical power substations providing power to the facilities. The project will also involve removing, capping, and rerouting sewer, gas, water, and steam lines outside of the work areas. It is not expected that emissions from the Proposed Action would contribute to or affect local or regional attainment status with the NAAQS. Emissions from the proposed project are summarized in **Table 3-6**. Emissions estimation spreadsheets and methodology are included in **Appendix C**.

The project would generate particulate matter emissions as fugitive dust from ground-disturbing activities, specifically building demolition and removal. Appropriate fugitive dust-control measures would be employed during demolition activities to suppress emissions. A fugitive dust-control construction permit prescribing fugitive dust-minimization procedures would be required for any ground disturbance of greater than 0.75 acres. Combustion emissions of all criteria pollutants would result from the operation of construction equipment and portable generators during demolition activities, hauling demolition wastes from each project site, and construction workers commuting to each project site. Fugitive dust and combustion emissions associated with construction equipment would produce slightly elevated air pollutant concentrations. However, the effects would be temporary, fall off rapidly with distance from the proposed project sites, and would not result in any long-term impacts. In addition, no air quality impacts from removal of ACM would be expected. Building demolition activities would follow regulations as described in New Mexico Administrative Code 20.11.20.22 for the removal of ACM; therefore, no air quality impacts from the removal of ACM would be expected.

Specific information describing the types of construction equipment required for a specific task, the hours the equipment is operated, and the operating conditions vary widely from project to project. For purposes of analysis, these parameters were estimated using established methodologies for construction and experience with similar types of construction projects. Detailed assumptions used for estimating emissions are included in **Appendix C**.

Fugitive dust emissions would vary from day to day depending on the level of activity and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity. Fugitive dust emissions for various construction activities were calculated using emissions factors and methodology published by the USEPA. These estimates assume that the project duration is 12 months, 240 working days. Fugitive dust emissions estimations and methodology are included in **Appendix C**.

For the purposes of this analysis it is assumed that the proposed demolition projects would occur over a 4-year period beginning in fiscal year (FY) 2010. A total of six buildings are scheduled for demolition in FY 2010. The estimated emissions presented in **Table 4-3** reflect the proposed demolition projects for FY 2010 as presented in **Appendix C**. For the 14 remaining buildings, it is assumed that approximately

an equal number (square footage) will be demolished each year over the next 3 years. Although it is not anticipated to occur, a worst-case scenario has been evaluated to assume that all 20 buildings are demolished in 1 year. The total estimated emissions from the worst-case scenario are presented at the bottom of **Table 4-3** which reflects the sum of emissions for all 4 project years**.**

Since Kirtland AFB is in attainment for all criteria pollutants, General Conformity Rule requirements are not applicable. In addition, the Proposed Action would generate emissions below 10 percent of the emissions inventory for the AMRGI AQCR and the emissions would be short-term. Therefore, the construction activities associated with the Proposed Action would not have significant effects on air quality at Kirtland AFB or on regional or local air quality. **Appendix C** includes the air emissions estimation spreadsheets.

Greenhouse Gases

The Energy Information Administration states that in 2005, gross CO_2 emissions in New Mexico were 59.5 million metric tons of CO_2 (DOE 2009). Approximately 3,850 metric tons of CO_2 (4,245 tons) were estimated to be emitted by the worst-case scenario, assuming all buildings are demolished in one year. The CO_2 emitted is approximately 0.006 percent of the New Mexico statewide CO_2. Therefore, the worst-case scenario associated with the proposed project would have negligible contribution towards the New Mexico statewide greenhouse gas inventory. CO_2 emission estimates are included in **Appendix C**.

No Action Alternative

Under the No Action Alternative, Kirtland AFB would not demolish and remove the proposed buildings, which would result in the continuation of the existing condition. Therefore, no direct or indirect environmental effects would be expected on local or regional air quality from implementation of the No Action Alternative.

4.5 Geology and Soils

4.5.1 Evaluation Criteria

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating the potential impacts of a proposed action on geological resources. Generally, adverse impacts can be avoided or minimized if proper construction techniques, erosion-control and storm water management measures, and structural engineering design are incorporated into project development.

Table 4-3. Estimated Air Emissions Resulting from Construction Activities

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
2010							
Construction Combustion	10.546	0.625	4.170	0.211	0.638	0.619	1,228
Construction Fugitive Dust	--	--	--	--	14.939	1.494	--
Stationary Generator Combustion	0.486	0.627	0.295	0.025	0.030	0.030	46.126

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
Haul Truck On-Road	0.032	0.023	0.094	0.003	0.038	0.010	8.074
Construction Commuter	1.418	1.804	19.731	0.060	0.762	0.208	293.250
Total Proposed Action Emissions in 2010	**12.48**	**3.08**	**24.29**	**0.30**	**16.41**	**2.36**	**1,575**
Percent of AMRGI Inventory	0.0339%	0.0097%	0.0099%	0.0114%	0.0119%	0.0142%	NA
2011							
Construction Combustion	4.723	0.280	1.867	0.094	0.286	0.277	550.011
Construction Fugitive Dust	--	--	--	--	6.651	0.665	--
Stationary Generator Combustion	0.486	0.627	0.295	0.025	0.030	0.030	46.126
Haul Truck On-Road	0.002	0.002	0.006	0.0002	0.002	0.001	0.528
Construction Commuter	1.418	1.804	19.731	0.060	0.762	0.208	293.250
Total Proposed Action Emissions in 2011	**6.63**	**2.71**	**21.90**	**0.18**	**7.73**	**1.18**	**890**
Percent of AMRGI Inventory	0.0180%	0.0086%	0.0089%	0.0068%	0.0056%	0.0071%	NA
2012							
Construction Combustion	4.723	0.280	1.867	0.094	0.286	0.277	550.011
Construction Fugitive Dust	--	--	--	--	6.651	0.665	--
Stationary Generator Combustion	0.486	0.627	0.295	0.025	0.030	0.030	46.126
Haul Truck On-Road	0.002	0.002	0.006	0.0002	0.002	0.001	0.528
Construction Commuter	1.418	1.804	19.731	0.060	0.762	0.208	293.250
Total Proposed Action Emissions in 2012	**6.63**	**2.71**	**21.90**	**0.18**	**7.73**	**1.18**	**890**
Percent of AMRGI Inventory	0.0180%	0.0086%	0.0089%	0.0068%	0.0056%	0.0071%	NA
2013							
Construction Combustion	4.723	0.280	1.867	0.094	0.286	0.277	550.011
Construction Fugitive Dust	--	--	--	--	6.651	0.665	--
Stationary Generator Combustion	0.486	0.627	0.295	0.025	0.030	0.030	46.126
Haul Truck On-Road	0.002	0.002	0.006	0.0002	0.002	0.001	0.528

Activity	NO_x tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
Construction Commuter	1.418	1.804	19.731	0.060	0.762	0.208	293.250
Total Proposed Action Emissions in 2013	**6.63**	**2.71**	**21.90**	**0.18**	**7.73**	**1.18**	**890**
Percent of AMRGI Inventory	0.0180%	0.0086%	0.0089%	0.0068%	0.0056%	0.0071%	NA
Worst-Case Scenario							
Construction Combustion	24.714	1.466	9.770	0.494	1.495	1.450	2,878.045
Construction Fugitive Dust	--	--	--	--	34.893	3.489	--
Stationary Generator Combustion	1.945	2.506	1.182	0.100	0.119	0.119	184.504
Haul Truck On-Road	0.038	0.028	0.112	0.003	0.045	0.012	9.657
Construction Commuter	5.674	7.216	78.925	0.238	3.049	0.830	1,173
Total Proposed Action Emissions for Worst-Case Scenario	**32.27**	**11.22**	**89.99**	**0.84**	**39.60**	**5.90**	**4,245**
Percent of AMRGI Inventory	0.0880%	0.0354%	0.0367%	0.0319%	0.0288%	0.0354%	NA

Effects on geology and soils would be significant if they would alter the lithology, stratigraphy, and geological structures that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability; or change the soil composition, structure, or function (including prime farmland and other unique soils) within the environment.

4.5.2 Environmental Consequences

Proposed Action

Under the Proposed Action no significant impacts on geological resources or soils would be expected. Proposed demolition activities would occur predominantly on previously disturbed lands. As a result of demolition activities, soils would be compacted and soil structure disturbed and modified. Loss of soil structure due to compaction from vehicle traffic could result in changes in drainage patterns. However, as most of the area of each building site has been disturbed previously, it is anticipated that implementation of the Proposed Action would have a minimal impact on previously undisturbed or compacted soil structure.

Potential impacts on the soils surrounding the buildings proposed for demolition would be minimal. Through the use of best management practices (BMPs) (e.g., minimization of soil exposure through revegetation), the impacts of demolition activities on soils would be expected to be localized and minimal. In addition, soil erosion and sediment production and off-site transport would be minimized for all demolition activities as a result of following an approved sediment-and-erosion-control and storm water management plan (see **Section 4.6.2.1** for additional discussion of permitting and planning). Use of

storm water control measures that favor reinfiltration would minimize the potential for erosion and sediment production resulting from future storm events.

Since there would be no new construction, no impacts from geologic hazards would be expected. In addition, no indirect impacts would be anticipated. Demolition activities would not result in any conditions which would result in future impacts on geology and soils.

No Action Alternative

Under the No Action Alternative, the buildings proposed for demolition at Kirtland AFB would not be demolished and existing conditions would remain. No effects on geological resources or soils would be anticipated.

4.6 Water Resources

4.6.1 Evaluation Criteria

Evaluation of impacts on water resources is based on water availability, quality, and use; existence of floodplains; and associated regulations. A proposed action would be adverse if it were to substantially affect water quality; substantially reduce water availability or supply to existing users; threaten or damage hydrologic characteristics; or violate established Federal, state, or local laws and regulations. The potential impact of flood hazards on a proposed action is important if such an action occurs in an area with a high probability of flooding.

4.6.2 Environmental Consequences

Proposed Action

Under the Proposed Action, less than significant impacts on water resources would be expected. Groundwater might be temporarily used for dust suppression during demolition activities, depending on site conditions. If water application was required for dust suppression, sufficient water resources are available on the installation; therefore, less than significant adverse impacts on groundwater availability would be expected.

The NPDES storm water program requires construction site operators engaged in clearing, grading, and excavating activities that disturb 1 acre or more, including smaller sites in a larger common plan of development, to obtain coverage under an NPDES permit for their storm water discharges. The USEPA's Construction General Permit outlines a set of provisions that construction operators must follow to comply with the requirements of the NPDES storm water regulations. Kirtland AFB manages an active program for tracking and inspecting large (greater than 5 acres) and small (1 to 5 acres) construction activities that require coverage under the NPDES storm water program (KAFB 2002). The USEPA is the permitting authority in New Mexico. A series of smaller sites in a larger common plan require coverage under an NPDES permit if the sites are located less than 0.25 miles apart and the area between the sites is being disturbed. Under the Proposed Action, each of the map areas can therefore constitute an individual project area since the distance between each of the groups of buildings is greater than 0.25 miles and the area between each group of buildings is not being disturbed. However, based on these criteria, the buildings in Map Areas 4 and 5 would each require a Construction General Permit because the buildings within those map areas would collectively disturb greater than 1 acre.

For those sites disturbing greater than 1 acre (buildings in Map Areas 4 and 5), Kirtland AFB would also be required to meet the non-numeric effluent limitations of the CWA and design, install, and maintain effective erosion and sedimentation controls as described in **Section 3.6.1**. In addition, Kirtland AFB would be subject to the new storm water design requirements of Section 438 of the EISA that require Federal construction projects that disturb 5,000 ft^2 or more of land to maintain or restore predevelopment site hydrology to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. All demolition projects are anticipated to disturb 5,000 ft^2 or greater (see assumptions in **Appendix C**) and, therefore, are subject to the storm water design requirements of Section 438 of the EISA. No significant short-term or long-term, adverse impacts on water resources would be expected from the Proposed Action.

Over a 4 year period, the Proposed Action has the potential to result in approximately 30.6 acres (1.33 million ft^2) of total ground disturbance. Therefore, Kirtland AFB could also subject to the regulations within the CWA final rule requiring monitoring of discharges from the site and the numeric effluent limitations for turbidity. However, it is anticipated that the various demolition projects under the Proposed Action would occur over a 4-year period and any simultaneous demolition projects would not equal a land disturbance of 20 acres or greater. Therefore, it is unlikely that Kirtland AFB would be subject to the new numeric effluent limitations applicable to sites with disturbances of 20 or more acres at a time.

Construction or demolition that requires permit coverage requires preparation of a Notice of Intent to discharge storm water and a Storm Water Pollution Prevention Plan (SWPPP) that is implemented during construction. Kirtland AFB's MS4 permit requires that all construction activities, regardless of size, implement BMPs to ensure that storm water pollutants do not enter the storm drainage system and that storm water pollutants are contained within the project area. An SWPPP would identify BMPs, such as protecting storm water inlets in the project area with hay bales and sand bags, to reduce erosion and runoff from the proposed demolition sites (KAFB 2002).

The Proposed Action would create ground disturbances on a small scale, which could in turn increase erosion potential and runoff during heavy precipitation events. Construction debris could reach waterways through wind or surface runoff if measures were not taken to keep debris onsite, particularly in those sites closest to Arroyo del Coyote (e.g., map areas 4 and 6 [see **Figures 2-5** and **2-7**]). BMPs would be developed as part of the SWPPP to manage storm water both during and after construction. Restablization and revegetation of the area following construction along with other BMPs to abate runoff and wind erosion would reduce the impacts of erosion and runoff on the arroyos on Kirtland AFB. Proper housekeeping and retention of debris within the site boundaries would prevent construction debris from entering waterways. Therefore, short-term and long-term, adverse effects on surface waters would be less than significant.

Less than significant beneficial effects on water resources would be expected from decreasing the amount of impervious surfaces on Kirtland AFB. Under the Proposed Action, approximately 106,232 square feet (2.4 acres) of impervious surfaces would be removed from Kirtland AFB. The reduction in impervious surfaces would be expected to improve natural groundwater recharge and reduce occurrence and intensity of flashy flows associated with storm events in proximity to the project sites.

Demolition equipment (e.g., bulldozers, backhoes, dump trucks, cranes) would be on site throughout periods of demolition and site restoration. Fuels, hydraulic fluids, oils, and lubricants would be stored on site during the project to support contractor vehicles and machinery. No other hazardous materials are anticipated to be stored on site. It is assumed that construction personnel would follow appropriate BMPs to protect against potential petroleum or hazardous material spills. Proper housekeeping, maintenance of equipment, and containment of fuels and other potentially hazardous materials would be conducted to

minimize the potential for a release of fluids into groundwater or surface waters. In the event of a spill, procedures outlined in Kirtland AFB's SPCC Plan would be followed to quickly contain and clean up a spill (see **Sections 3.10** and **4.10,** Hazardous Materials and Wastes). Therefore, less than significant adverse impacts on water quality would be expected as a result of the Proposed Action.

All buildings proposed for demolition, including their 100-foot buffers, are outside the Tijeras Arroyo and Arroyo del Coyote 100-year floodplains. Although the quantity of storm water sheet flow from disturbed sites to the intermittent streams on Kirtland AFB could increase during demolition activities, this increase would not be significant. Therefore, the Proposed Action would have less than significant impacts on floodplains.

No indirect impacts would be anticipated. Demolition activities would not result in any conditions which would result in future adverse impacts on water resources.

No Action Alternative

Under the No Action Alternative, demolition activities would not take place and there would be no changes to current water resources. Therefore, no new impacts on water resources would be expected as a result of the No Action Alternative.

4.7 Biological Resources

4.7.1 Evaluation Criteria

The level of impact on biological resources is based on (1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource, (2) the proportion of the resource that would be affected relative to its occurrence in the region, (3) the sensitivity of the resource to the proposed activities, and (4) the duration of ecological ramifications. Impacts on biological resources are considered significant if species or habitats of high concern are adversely affected over relatively large areas, or disturbances cause reductions in population size or distribution of a species of special concern. A habitat perspective is used to provide a framework for analysis of general classes of effects (i.e., removal of critical habitat, noise, human disturbance).

Determination of the significance of wetland impacts is based on (1) the function and value of the wetland, (2) the proportion of the wetland that would be affected relative to the occurrence of similar wetlands in the region, (3) the sensitivity of the wetland to proposed activities, and (4) the duration of ecological ramifications. Impacts on wetland resources are considered significant if high-value wetlands would be adversely affected.

Ground disturbance and noise associated with demolition activities might directly or indirectly cause potential effects on biological resources. Direct effects from ground disturbance were evaluated by identifying the types and locations of potential ground-disturbing activities in correlation to important biological resources. Mortality of individuals, habitat removal, and damage or degradation of habitats might be effects associated with ground-disturbing activities.

Noise associated with a proposed action might be of sufficient magnitude to result in the direct loss of individuals and reduce reproductive output within certain ecological settings. Ultimately, extreme cases of such stresses could have the potential to lead to population declines or local or regional extinction. To evaluate effects, considerations were given to the number of individuals or critical species involved, amount of habitat affected, relationship of the APE to total available habitat within the region, type of stressors involved, and magnitude of the effects.

As a requirement under the ESA, Federal agencies must provide documentation that ensures that agency actions do not adversely affect the existence of any threatened or endangered species. The ESA requires that all Federal agencies avoid "taking" threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with the USFWS that ends with USFWS concurrence or a determination of the risk of jeopardy from a Federal agency project.

4.7.2 Environmental Consequences

Proposed Action

Vegetation

Site locations for the Proposed Action are either currently occupied by existing buildings or are located in semi-improved areas that consist largely of annual weeds, early successional perennials, and some native grasses and shrubs with areas of bare ground. Therefore, impacts on vegetation would be less than significant.

Wildlife Species and Habitat

Because of the heavily disturbed nature of the sites within the cantonment area of Kirtland AFB, there is little wildlife currently inhabiting the sites.

Wetlands are attractive to wildlife as water sources and areas of forage. The presence of ephemeral or permanent water sources and the greater diversity of trees and shrubs in these habitats provide microhabitats that are unique in comparison to the surrounding landscape. Canyons that contain riparian or wetland habitat are important to wildlife, providing food, water, and cover for many species. The Coyote Springs are permanent sources of water in the canyon areas. During demolition, there is the possibility that wildlife in the riparian areas could be disturbed. There are no permanent water sources within the footprint of the proposed demolition sites; however, there are several intermittent streams adjacent to these sites. Wildlife species, especially herpetiles associated with wetland areas could be permanently displaced if activities occur during their breeding season or cause a long-term disturbance of breeding habitats. There are no wetlands within the footprint of the proposed demolition sites; therefore, impacts on wildlife would be less than significant.

Noise created during demolition activities could result in adverse effects on wildlife. These effects would include subtle, widespread effects from the overall elevation of ambient noise levels. This would result in reduced communication ranges, interference with predator/prey detection, or habitat avoidance. More intense effects would include behavioral change, disorientation, or hearing loss. Predictors of wildlife response to noise include noise type (i.e., continuous or intermittent), prior experience with noise, proximity to a noise source, stage in the breeding cycle, activity, age, and sex composition. Prior experience with noise is the most important factor in the response of wildlife to noise, because wildlife can become accustomed (or habituate) to the noise. The rate of habituation to short-term demolition is not known. Wildlife could be permanently displaced from the areas where the habitat is cleared and temporarily dispersed from areas adjacent to the project areas during demolition periods. Wildlife species inhabiting these sites might be displaced as the sites are demolished, but would be expected to temporarily move to adjacent less-utilized habitat and then potentially return to the area. Increased mortality of less-mobile species would be expected as the result of unavoidable direct impacts associated with demolition activities. Overall, impacts on wildlife would be less than significant.

Threatened and Endangered Species

No federally or state-listed threatened or endangered species are known to inhabit the project area. Future construction or alteration of potential habitat of threatened and endangered species within the project area would require consultation with the USFWS and NMDGF.

Because of the heavily disturbed nature of the sites within the cantonment area of Kirtland AFB, there is little wildlife currently inhabiting the sites. No federally or state-listed threatened or endangered species inhabit the sites and no potential habitat is located nearby. The proposed sites are not suitable for quality wildlife habitat and consequences for threatened and endangered species from demolition would be less than significant.

Proposed demolition of Buildings 30143 and 37505 has the potential to impact gray vireos inhabiting the installation. The project sites are within 0.5 miles of potential gray vireo habitat (see **Figure 3-7**). Gray vireo territories are located throughout the juniper woodland community in an elevational belt of 5,850 to 6,600 feet (KAFB 2007a). The gray vireo has been observed in the juniper woodlands along the eastern installation boundary, several miles from the proposed sites. Due to the vegetation community differences between the project site (grassland) and the potential gray vireo habitat (juniper grassland and woodland), impacts on this species are expected to be less than significant.

Although there are no burrowing owl nests currently located on the proposed demolition sites, the owls do vary their nesting sites from year to year. During demolition, there is the possibility that a nest could be disturbed. The category of species of concern, which applies to the burrowing owl, carries no legal requirement, but identifies those species that deserve special consideration in management and planning. To avoid disturbances to potential nesting burrowing owls, a survey would be conducted prior to any construction activities. If owls are present, construction and demolition activities would only commence after the owls have migrated from the area (i.e., October 15 to March 15). Additionally, nesting burrows would be flagged and avoided during demolition activities, so that the nesting sites could still be viable after activities are completed. Kirtland AFB has standard mitigation procedures in conformance with the MBTA, should it be necessary to relocate an owl during demolition. Thus any impacts on burrowing owls would be expected to be less than significant.

Based on the results of recent surveys, there is the possibility that the desert assasagua rattlesnake could be found at demolition areas 4, 5, and 6. Prior to commencing any demolition activities, areas 4, 5, and 6 would be surveyed for the prescence of desert assasagua. If individuals are encountered, proper conservation measures would be developed.

Wetlands

The USACE and USEPA regulate and permit dredge and fill activities within the waters of the United States, including wetlands under the authority of Section 404 of the CWA. The USFWS reviews and provides input to the permit applications.

No wetlands are located on the proposed project sites within the cantonment area of the installation. There is an intermittent stream and 100-year floodplain southeast of Building 20612 (see **Section 3.6**); however, there are no wetlands associated with these surface water features.

Based on the USACE delineation, a large wetland exists to the east of Buildings 37505 and to the west of Buildings 29071. However, there are no wetlands within the footprints of the proposed demolition projects (see **Figure 3-6**). There is an intermittent stream immediately north of Building 29071 and

another stream southwest of the 48000 series buildings; however, there are no wetlands associated with these streams.

No Action Alternative

Under the No Action Alternative building demolition would not occur. Removal of existing degraded structures would allow for future new development to occur in these already disturbed locations. This would be expected to reduce the need for future development in currently undisturbed or less-disturbed habitats that could support native vegetation and wildlife.

4.8 Cultural Resources

4.8.1 Evaluation Criteria

Adverse impacts on cultural resources can 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 that alter its setting; general neglect of the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the property out of the agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

For this Proposed Action, ground-disturbing activities associated with the demolition of 20 buildings listed on the New Mexico HCPI constitute the most relevant potential effects on cultural resources.

4.8.2 Environmental Consequences

Proposed Action

The Air Force Materiel Command's 377 ABW is proposing to demolish 20 buildings at Kirtland AFB to make space available for future construction and to fulfill its mission as installation host through better site utilization. The existing structures proposed for demolition have exceeded their design lives and are deteriorating rapidly. All 20 buildings have been previously inventoried to the New Mexico HCPI. Of these, five buildings (Buildings 605, 614, 1013, 37505, and 30143) have been determined eligible for the NRHP through consultation with SHPO. Accordingly, the Proposed Action would have a significant impact on these NRHP-eligible historic properties. Mitigation of adverse effects through Historic American Buildings Survey (HABS) documentation of Buildings 614, 1013, 37505, and 30143 is recommended prior to any ground-disturbing activity. It should be noted that HABS documentation has been completed for Building 605.

The remaining 16 buildings proposed for demolition under this EA have been determined **not eligible** for listing to the NRHP through consultation with SHPO. The demolition of these buildings would not constitute significant impacts on historic properties. As such no further documentation of these buildings is recommended.

No Action Alternative

Under the No Action Alternative, the buildings identified for demolition under the Proposed Action would not be demolished. The baseline condition described in **Section 3.8** would remain unchanged. Therefore, no significant impacts on cultural resources would occur as a result of the implementation of the No Action Alternative.

4.9 Infrastructure

4.9.1 Evaluation Criteria

Effects on infrastructure are evaluated for their potential to disrupt or improve existing levels of service and create additional needs for energy (electric, natural gas, and liquid fuels), central heating and cooling, potable water, sanitary sewer, storm water systems, communications, and solid waste management. Impacts might arise from energy needs created by either direct or indirect workforce and population changes related to installation activities. An impact would be significant if implementation of the Proposed Action resulted in the following effects on electrical power, natural gas, liquid fuels, central heating and cooling, potable water, sanitary sewer/wastewater, storm water, communications, and solid waste systems:

- Exceeded capacity of a utility
- A long-term interruption of the utility
- A violation of a permit condition
- A violation of an approved plan for that utility.

4.9.2 Environmental Consequences

Proposed Action

Electrical Systems. Electrical transmission lines connecting buildings proposed for demolition to the Kirtland AFB electrical grid would be removed prior to the start of building demolition activities. The removal of older and outdated electrical systems from many of these buildings would also occur. Electrical interruptions might be experienced when the buildings are disconnected from the Kirtland AFB electrical distribution system. Following the proposed building demolitions, the overall electrical demand at Kirtland AFB would be reduced by a negligible amount due to the removal of these buildings. Demolition activities at Kirtland AFB would result in effects on electrical resources; however, these effects would be expected to be less than significant.

Natural Gas Systems. Should any of the buildings proposed for demolition be connected to the natural gas system, natural gas service interruptions might be experienced when the buildings proposed for demolition are disconnected. The demolition of any building connected to the Kirtland AFB natural gas distribution system would reduce the overall natural gas demand at Kirtland AFB by a negligible amount. Demolition activities at Kirtland AFB might result in effects on natural gas resources; however, these effects would be expected to be less than significant.

Liquid Fuel. Implementation of the Proposed Action would not alter the quantities of most liquid fuels (JP-8, diesel, gasoline) used at Kirtland AFB nor would it affect their handling and storage. The proposed demolition of any buildings that use heating oil would result in a negligible reduction in heating oil demand for the installation. Demolition activities at Kirtland AFB would result in effects on liquid fuel resources; however, these effects would be expected to be less than significant.

Central Heating and Cooling Systems. Should any of the buildings proposed for demolition be connected to the Kirtland AFB central heating system, service interruptions might be experienced when the buildings proposed for demolition are disconnected. The demolition of any building connected to the Kirtland AFB central heating system would reduce the overall heating demand by a negligible amount. Demolition activities at Kirtland AFB might result in effects on central heating resources; however, these effects would be expected to be less than significant.

Water Supply Systems. Water service interruptions might be experienced when the buildings proposed for demolition are disconnected from the Kirtland AFB water supply system. Water service within the demolition zones would be shut off prior to the start of building demolition activities. Water supplies required for the demolition process, such as for dust control, would be obtained from the Kirtland AFB water supply system. Due to the proposed staggered implementation of each demolition project, water demand during demolition processes would be limited in volume. Following the proposed building demolitions, the overall water demand at Kirtland AFB would be reduced by a negligible amount due to the removal of these buildings. Demolition activities at Kirtland AFB would result in effects on water supply systems; however, these effects would be expected to be less than significant.

Sanitary Sewer and Wastewater Systems. Sanitary sewer interruptions might be experienced when the buildings proposed for demolition are disconnected from the Kirtland AFB sanitary sewer system. Any onsite septic systems used at the buildings proposed for demolition would be closed down and removed in accordance with state and local regulations. Following the proposed building demolitions, the amount of wastewater generated at Kirtland AFB would be reduced by a negligible amount due to the loss of these buildings. Demolition activities at Kirtland AFB would result in effects on sanitary sewer and wastewater systems; however, these effects would be expected to be less than significant.

Storm Water Systems. Implementation of the Proposed Action would require ground disturbance as heavy equipment would fill in foundations and contour land surfaces. These activities would temporarily disrupt natural and man-made storm water drainage methods, increase sedimentation in runoff, and increase the potential for storm water runoff to erode soil during demolition activities. Soil erosion and sediment production would be minimized during demolition periods by following erosion- and sediment-control plans in addition to using demolition BMPs that would minimize ground surface disturbance and attempt to provide adequate temporary storm water management techniques. Following the proposed demolition of these buildings, the amount of impervious surface at Kirtland AFB would be reduced by approximately 106,000 square feet. This reduction in impervious surface would allow additional quantities of storm water to permeate into the ground and reduce the amount of storm water runoff, resulting in a beneficial effect. Demolition activities at Kirtland AFB would result in both adverse and beneficial effects on storm water systems; however, these effects would be expected to be less than significant.

Communications Systems. Communications service interruptions might be experienced when the buildings proposed for demolition are disconnected from the Kirtland AFB telephone and data transmission systems. Following the proposed building demolition, the overall telephone and data transmission demand at Kirtland AFB would be reduced by a negligible amount due to the removal of these buildings. Demolition activities at Kirtland AFB would result in effects on the communication systems; however, these effects would be expected to be less than significant.

Solid Waste Management. The proposed building demolition would generate approximately 8,135 tons of demolition waste (USEPA 1998). Nonhazardous demolition waste, such as asphalt, concrete, wood, and nonrecyclable metals, would be transported to the Kirtland AFB landfill for disposal. Dumpsters would be provided for municipal solid waste generated by worker activity at each of the project sites. Municipal solid waste would be transported to the City of Rio Rancho landfill, because the Kirtland AFB landfill accepts only nonhazardous construction and demolition waste. It is anticipated that 85 percent of demolition waste would go the Kirtland AFB landfill, while the remaining 15 percent would be disposed of at the City of Rio Rancho landfill.

To reduce the amount of landfill waste, materials that could be recycled or reused would be diverted from landfills to the greatest extent possible. Site-generated scrap metals, wiring, clean ductwork, and structural steel would be separated and recycled offsite. Cardboard wastes would be recycled as a

function of the Kirtland AFB Qualified Recycling Program. Miscellaneous salvageable metals would be transported to the Defense Reutilization and Marketing Office for recycling or reuse. Clean fill material, ground-up asphalt, and broken-up cement would be diverted from landfills and reused whenever possible.

Following the proposed building demolitions, the amount of solid waste generated at Kirtland AFB would be reduced by a negligible amount because of the loss of these buildings. Demolition activities at Kirtland AFB would result in effects on solid waste resources; however, these effects would be expected to be less than significant.

No Action Alternative

The No Action Alternative would result in continuation of the existing conditions of infrastructure resources, as discussed in **Section 3.9.2**. No additional effects on infrastructure resources would be expected as a result of the Proposed Action not being implemented.

4.10 Hazardous Materials and Waste

4.10.1 Evaluation Criteria

Impacts would be considered significant if a proposed action resulted in worker, resident, or visitor exposure to hazardous materials, or if the action generated quantities of these materials beyond the capability of current management procedures. Impacts on hazardous materials management would be considered significant if the Federal action resulted in noncompliance with applicable Federal and New Mexico Environment Department (NMED) regulations, or increased the amounts generated or procured beyond current Kirtland AFB waste management procedures and capacities. Impacts on the ERP would be considered significant if the Federal action disturbed (or created) contaminated sites resulting in adverse effects on human health or the environment.

4.10.2 Environmental Consequences

Proposed Action

Hazardous Materials and Petroleum Products. Demolition activities would require the use of petroleum products for construction equipment. Hazardous materials could also be encountered in the buildings scheduled for demolition. It is anticipated that the quantity of products containing hazardous materials used during the demolition activities would be minimal and their use would be of short duration. There would be no new chemicals or toxic substances used or stored at the installation in conjunction with the Proposed Action. No significant impacts are anticipated.

No effects on hazardous materials management during demolition would be expected. Contractors would be responsible for the management of hazardous materials and petroleum product usage, which would be handled in accordance with Federal, state, and Air Force regulations. Contractors must report the use of hazardous materials to the Hazardous Materials Management System (HMMS), including pertinent information (e.g., Materials Safety Data Sheets). If a material that is less hazardous can be used, the HMMS should make these recommendations. Use of the HMMS system would also ensure that ozone-depleting substances are not available for use. Use of ozone-depleting substances in such products as certain refrigerants, aerosols, and fire suppression systems is not permitted by the DOD without a formal request by waiver.

Hazardous and Petroleum Waste. No significant impacts would be expected from the generation of hazardous wastes during demolition activities. It is anticipated that the quantity of hazardous wastes generated from proposed demolition activities would be negligible. No effects on the installation's hazardous waste management program would be expected from the demolition activities. Contractors would be responsible for the disposal of hazardous wastes in accordance with Federal and state laws and regulations, as well as the installation's Hazardous Waste Management Plan. BMPs would be followed to ensure that contamination from a spill would not occur. If, however, a spill would occur, the Hazardous Materials Emergency Planning and Response Plan outlines the appropriate measures for spill situations.

Installation Restoration Program. Several of the proposed building demolition project areas are within proximity of identified NFA ERP sites. No impacts on the identified NFA ERP sites would be expected from the demolition activities.

Asbestos-Containing Materials. The buildings proposed for demolition could contain ACM. Sampling for ACMs would occur prior to demolition and would be handled in accordance with the installation's Asbestos Management Plan and be disposed of at the Keers Special Waste landfill, the City of Rio Rancho landfill, or another permitted site. Sampling, removal, and disposal of any ACMs would be short-term in duration and would result in less than significant impacts. In accordance with the Asbestos Management Plan, all buildings would be surveyed prior to demolition and any identified asbestos would be separated from the remainder of the demolition materials as required and remediated in accordance with Federal, state, and Air Force regulations (KAFB undated).

Lead-Based Paint. The buildings proposed for demolition could contain LBP. Sampling for LBP would occur prior to demolition and would be handled in accordance with the installation's Lead-Based Paint Management Plan and be disposed of at a hazardous waste disposal facility. Sampling, removal, and disposal of any LBP would be short-term in duration and would result in less than significant impacts. In accordance with the Lead-Based Paint Management Plan, all buildings would be surveyed prior to demolition and any identified LBP would be separated from the remainder of the demolition materials as required and remediated in accordance with Federal, state, and Air Force regulations.

Polychlorinated Biphenyls. The buildings proposed for demolition could contain light ballasts containing PCBs. The light fixtures within the buildings would be removed prior to demolition and would be handled in accordance with Federal and state regulations and the installation's Hazardous Waste Management Plan and is disposed of at a hazardous waste disposal facility. Sampling, removal, and disposal of any light ballast would be short-term in duration and would result in less than significant impacts.

In addition, the proposed demolition project could include the removal of pad-mounted transformers. Those identified as containing PCBs would be handled in accordance with Federal and state regulations and the installation's Hazardous Waste Management Plan and the PCBs would be disposed of at a hazardous waste disposal facility. Sampling, removal, and disposal of any PCBs would be short-term in duration and would result in less than significant impacts.

Pollution Prevention. Less than significant impacts on the Pollution Prevention Program at Kirtland AFB would be expected from implementation of the Proposed Action. Most demolition practices do not call for the use of hazardous materials; however, an incremental increase would be expected during this time. The Pollution Prevention Program and its associated plans at Kirtland AFB would accommodate the Proposed Action. Adherence to these plans, in particular the Hazardous Materials Emergency Planning and Response Plan, would reduce adverse impacts resulting from the Proposed Action. BMPs utilized at construction sites would minimize impacts on the natural environment.

No Action Alternative

The No Action Alternative would result in no change to the existing hazardous materials or waste management conditions, as discussed in **Section 3.10**. No effects on hazardous materials or waste management would be expected as a result of the Proposed Action not being implemented.

4.11 Safety

4.11.1 Evaluation Criteria

If implementation of the Proposed Action were to increase risks associated with the safety of demolition personnel, contractors, military personnel, or the local community, or hinder the ability to respond to an emergency, it would represent an adverse effect. An effect would be significant if implementation of the Proposed Action were to substantially increase risks associated with the safety of demolition personnel, contractors, military personnel, or the local community; substantially hinder the ability to respond to an emergency; or introduce a new health or safety risk for which the installation is not prepared or does not have adequate management and response plans in place.

4.11.2 Environmental Consequences

Proposed Action

Contractor Safety. Implementation of the Proposed Action would slightly increase the health and safety risk to contractors performing demolition work at the project sites during the normal workday because the level of such activity would increase. Contractors would be required to establish and maintain health and safety programs for their employees. All personnel involved with proposed building demolition would be trained to eliminate potential exposure to, and release of, asbestos and lead. Adherence to Kirtland AFB's Asbestos Management Plan and Lead-Based Paint Management Plan would reduce asbestos and lead safety hazards to contractors working as part of the demolition efforts (see **Section 4.10.2**). Demolition activities at Kirtland AFB would result in effects on contractor safety; however, these effects would be expected to be less than significant due to the implementation of effective health and safety programs.

Military Personnel Safety. No effects on military personnel health and safety would be expected. All of the buildings proposed for demolition are vacant and are not used by installation personnel. Adherence to Kirtland AFB's Asbestos Management Plan and Lead-Based Paint Management Plan by contractors during demolition activities would prevent the potential exposure of military personnel to asbestos and lead wastes. Additionally, the removal of buildings containing ACM and LBP would be beneficial to the health and safety of military personnel.

Public Safety. No effects on public health and safety would result from implementation of the Proposed Action. Demolition processes would not pose a safety risk to the public or to off-installation areas. Work areas surrounding demolition sites would be fenced and appropriate signs posted to further reduce safety risks to other installation personnel and the public. Adherence to Kirtland AFB's Asbestos Management Plan and Lead-Based Paint Management Plan by contractors during demolition activities would prevent potential exposure of the public to asbestos and lead wastes. The removal of buildings containing ACM and LBP would be beneficial to the health and safety of the public.

Explosives and Munitions Safety. No effects on explosives and munitions safety would be expected from implementation of the Proposed Action. No explosives or munitions are currently stored within the buildings proposed for demolition. Explosives would not be used in the demolition process. Changes in

the use or storage of explosives or munitions at Kirtland AFB would not be expected following the implementation of the Proposed Action.

Explosives QD Clear Zone. Infringement upon explosives QD clear zones is a violation of the explosives QD siting of the potential explosion site, and waivers or exemptions are required. Prior to commencement of any work within explosives QD clear zones, all facility and roadway construction, utilities, and electromagnetic radiation sources must be coordinated with 377 ABW Weapons Safety to determine if an explosives site plan (ESP) is required; and if an ESP is required, work cannot start until approval is granted by DOD Explosives Safety Board or Major Command. Compliance with this policy would ensure that the Proposed Action would not result in any health and safety impacts.

Airport Zones. A portion of the project area would be within one of the airport's Clear Zones and one of the Albuquerque Airport Zones. Building demolition is permitted within the airport's Clear Zone and City of Albuquerque's Airport Zones. Generally, uses or actions within a Clear Zone must not create a substance (e.g., dust) that would impair visibility, produce light that would distract pilots, or produce electrical emissions that would interfere with aircraft or communications and navigational aid systems (USAF 2005). Similar restrictions are included in the Albuquerque Airport Zoning Ordinance for uses or actions within defined airport zones (City of Albuquerque 2009b). However, municipal zoning regulations do not apply to Federal property. Therefore, the Proposed Action would not result in impacts on land use compatibility as it relates to health and safety.

No Action Alternative

The No Action Alternative would result in continuation of the existing safety conditions and their associated impacts, as discussed in **Section 3.11.2.**

4.12 Socioeconomics and Environmental Justice

4.12.1 Evaluation Criteria

Socioeconomics. This section addresses the potential for direct and indirect impacts that the Proposed Action could have on local or regional socioeconomics. Impacts on local or regional socioeconomics are evaluated according to their potential to stimulate the economy through the purchase of goods or services and increases in employment. Similarly, impacts are evaluated to determine if overstimulation of the economy (e.g., the construction industry's inability to comfortably meet the demands of a project) could occur as a result of the Proposed Action.

Environmental Justice and Protection of Children. Ethnicity and poverty data are examined for the Albuquerque metropolitan area and compared to the State of New Mexico and the United States to determine if a low-income or minority population could be disproportionately affected by the Proposed Action.

4.12.2 Environmental Consequences

Proposed Action

Under the Proposed Action up to 20 buildings are scheduled for demolition. Using the assumptions defined above, up to 6 buildings would be demolished per year with up to 8 workers required for each site for a maximum of 48 workers. For analysis of impacts on socioeconomics and environmental justice, it will be assumed that the maximum number of workers (i.e., 48) will be employed throughout the project.

Demographics. The 48 workers who would be hired for the Kirtland AFB building demolition are most likely living within the greater Albuquerque area. No relocation of workers to the area would be expected to meet the demands of the Proposed Action. The number of new residents who would move to the Albuquerque area as result of the Proposed Action would be negligible; therefore, less than significant impacts would be expected.

Employment Characteristics. The construction industry within the Albuquerque MSA should adequately provide the 48 demolition employees required for the Proposed Action. The number of construction workers necessary for the Proposed Action is not large enough to outstrip the supply of the industry as the 48 positions represents 0.2 percent of the industry. Indirect beneficial impacts would result from the increase in payroll tax revenues, purchase of materials, and purchase of goods and services in the area resulting in less than significant impacts on the construction industry.

Kirtland AFB. The temporary increase of 48 employees at Kirtland AFB would represent less than a 0.2 percent increase in the total number of persons employed at Kirtland AFB and no additional facilities (e.g., housing and transportation) would be necessary to accommodate the workforce. Changes to employment and expenditures resulting from the Proposed Action would be negligible; less than significant impacts would be expected.

Environmental Justice and Protection of Children. The Albuquerque metropolitan area contains an elevated minority and low-income population in comparison to the United States, but similar to the State of New Mexico, see **Section 3.12.2**. The Proposed Action would not negatively impact minority populations or children as 85 percent of all demolished materials would be disposed of at the landfill on Kirtland AFB. Indirect disproportionate negative impacts on minority, low-income, and youth populations would not be expected as result of the Proposed Action and less than significant impacts would be expected.

No Action Alternative

Under the No Action Alternative the demolition of buildings of Kirtland AFB would not occur and no impacts on socioeconomics would be expected as no additional jobs would be created, and there would be no increase in tax revenue as a result of employee wages and sales receipts.

4.13 Cumulative Impacts

CEQ defines cumulative impacts as the "impacts on the environment that result 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 (Federal, state, and local) or individuals. Informed decisionmaking 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 respect to their effects.

This section briefly summarizes past, current, and reasonably foreseeable future projects within the same general geographic and time scope as the Proposed Action. The geographic scope of the analysis varies by resource area. For example, the geographic scope of cumulative impacts on noise, geology and soils, and safety is very narrow and focused on the location of the resource. The geographic scope of land use, air quality, infrastructure, transportation, and socioeconomics is much broader and considers more county or regionwide activities.

The past, current, and reasonably foreseeable projects, identified below, make up the cumulative impact scenario for the Proposed Action. The cumulative impact scenario is then added to the Proposed Action's impacts on the individual resource areas analyzed in **Section 4** to determine the cumulative impacts of the Proposed Action. In accordance with CEQ guidance, the current effects of past actions are considered in aggregate as appropriate for each resource area without delving into the historical details of individual past actions.

4.13.1 Impact Analysis

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 effects, too, have resulted from the operation and management of Kirtland AFB including increased employment and income for Bernalillo County, the City of Albuquerque, and its surrounding communities; restoration and enhancement of sensitive resources such as the Coyote Springs wetland area; consumptive and nonconsumptive recreation opportunities; and increased knowledge of the history and pre-history of the region through numerous cultural resources surveys and studies.

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 4-4**.

4.13.2 Cumulative Impact Analysis by Resource Area

Land Use

A significant impact on land use would occur if any action is inconsistent with adopted land use plans or action would substantially alter those resources required for supporting or benefiting the current use of the site and adjacent property. The Proposed Action is consistent with the installation's general plan. This action, when considered with other potential alterations of land use, would not be expected to result in a significant cumulative adverse effect. All reasonable past, present, and foreseeable actions on Kirtland are consistent with the installation Master Plan.

Noise

The noise generated by the Proposed Action, when considered with other existing and proposed projects on Kirtland AFB, would not be considered a significant cumulative impact. The cumulative effect of the proposed and future project would result in only temporary increases in ambient noise levels during construction activities.

Visual Resources

Although the collective implementation of various projects at Kirtland AFB could result in cumulative impacts on visual resources at Kirtland AFB, impacts would not be significant. Cumulative impacts would be controlled by following the *Kirtland Air Force Base Architectural Compatibility Plan* (KAFB 2007b). This architectural compatibility plan attempts to ensure that future development is performed in a way that limits effects on visual resources and is consistent with existing architectural and visual

standards (AAFES 2008). Adherence to the architectural compatibility plan would prevent significant visual cumulative impacts from occurring in the future.

Air Quality

The Proposed Action would result in low levels of air emissions below *de minimus* thresholds and would not be regionally significant. The Proposed Action would generate emissions below 10 percent of the emissions inventory for the AMRGI AQCR and the emissions would be short-term. Therefore, the Proposed Action would not contribute significantly to adverse cumulative impacts on air quality at Kirtland AFB or regionally.

Table 4-4. Present and Reasonably Foreseeable Actions at Kirtland AFB

Project Name	Description
HC-130 and MC-130 Aircraft Simulator Facilities	The 58th Special Operations Wing proposes to construct new HC-130 and MC-130 simulator facilities at Kirtland AFB. The proposed construction will include one-story facilities located in the southwestern section of Kirtland AFB.
Heavy Weapons Range	The 377 ABW is proposing to establish and use a heavy weapons range in the southeastern section of Kirtland AFB, approximately 0.25 miles east of the Starfire Optical Range facilities along Mount Washington Road. The proposed range will encompass the existing M60 range. It would include two firing positions and firing lines and would use the existing targets at the M60 range. Firing distance would be approximately 7,300 feet. Firing position two would be used for sniper heavy weapons (0.50 caliber) and would fire in a more southerly direction to the existing target area, approximately 3,800 feet.
Construct New Hot Cargo Pad	The 377 ABW proposes to construct, operate, and maintain a hot cargo pad at Kirtland AFB to ensure reliable support and backup for the existing hot cargo pad (Pad 5). Other components include construction of a new taxiway to the proposed hot cargo pad; replacement of the deteriorating taxiway to Pad 5; addition of new and relocation of existing anti-ram barriers, defensive fighting positions, and personal shelters surrounding the proposed hot cargo pad and Pad 5; addition of new lighting at the proposed hot cargo pad and Pad 5; and removal of existing lighting at Pad 5. The new pad will consist of 18-inch Portland cement concrete and will add additional 6-inch asphalt taxiway to the existing taxiway at Pad 5. The new pad will adjoin the existing Pad 5 to minimize enlargement of the clear zone and effects on other critical facilities.
Construction and Demolition of Military Support Facilities	Kirtland AFB proposes to demolish and construct several military personnel support facilities in the developed area in the northwestern portion of the installation. The areas include the VOQ Complex, the Main Enlisted Dormitory Campus, the NCO Academy, and Dormitory Campus 2. Approximately 36 acres would be included in the construction and demolition activities. Kirtland AFB currently has a surplus of old substandard dormitory spaces that this project would help eliminate.

Project Name	Description
Army and Air Force Exchange Service (AAFES) Base Exchange Shopping Center	AAFES proposes to construct and operate a new 95,421-square-foot Shopping Center on an approximately 2.3-acre developed site located between the existing Commissary (Building 20180) and existing Base Exchange (Building 20170) on Pennsylvania Street. The project also includes demolition of the 1,540-square-foot existing satellite pharmacy (Building 20167), closure of a portion (approximately 345 feet) of Pennsylvania Street, and construction of approximately 492 feet of new road to connect Texas Street with Pennsylvania Street north of the new Shopping Center. The new Shopping Center would include a new Base Exchange, pharmacy, and retail laundry/dry cleaning, a beauty/barber shop, concession kiosks, five food concepts with a food court, and other similar services.
Construct New Fire Station	Kirtland AFB proposes to replace Fire Station 3 within the Manzano Base area. The proposed structure would be approximately 7,300 square feet, one-story, with three high-bay drive-through apparatus stalls. The new structure would be located along a main road in the south-central section of Kirtland AFB. The action also includes the demolition of an approximately 4,300-square-foot fire station (Building 638) within the Manzano Base area.
498th Nuclear System Wing Facility	Kirtland AFB proposes to construct a 32,400-square-foot facility to house the newly formed 498th Nuclear Systems Wing. This facility would be a two-story, steel-framed structure with reinforced concrete foundation, floors, and reinforced masonry walls. The construction further includes tying in to utilities and communications and parking for 120 vehicles. The facility would accommodate approximately 200 personnel. The new facility location is proposed between "G" and "H" avenues west of Wyoming Blvd directly behind the Nuclear Weapons Center (Building 20325).
Air Force Nuclear Weapons Center Sustainment Center	Kirtland AFB proposes to construct a 15,946-square-foot sustainment center for the Nuclear Weapons Center. This facility would be a two-story, steel-framed structure built as a Sensitive Compartmented Information Facility with reinforced concrete foundation, floors, and reinforced masonry walls. The construction further includes tying in to utilities and communications and parking for vehicles. The facility would accommodate approximately 36 personnel. The new facility location is proposed between "G" and "H" avenues west of Wyoming Blvd directly behind the Nuclear Weapons Center (Building 20325) and south of the proposed 498th Nuclear Systems Wing facility.
Security Forces Complex	The 377 ABW proposes to construct, operate, and maintain a security forces complex at Kirtland AFB to provide adequate space and modern facilities to house all 377 security forces squadron administrative and support functions in a consolidated location. The 377 Security Forces Squadron functions that would be transferred to the new 377 security forces complex include 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 within the proposed footprint of the 377 security forces complex would be demolished.

Project Name	Description
Military Working Dog Facility	The 377 ABW proposes to construct, operate, and maintain a military working dog facility according to the Air Force "Design Guide for Military Working Dog Facilities." Building construction would be reinforced concrete foundation, and reinforced masonry walls with insulated standing seam metal roofing. The kennel building would be approximately 2,600-square-feet, with 16 indoor/outdoor kennels and 2 isolation kennels, joined to a 2,500-square-foot administrative/support building by a covered walkway. Depending on the site, construction of a new obedience course might also be required. Three alternative sites have been proposed: (1) north of the existing military working dog building near the intersection of Barrack and Manzano roads, (2) in the southern portion of the cantonment area near the intersection of Wyoming Boulevard and Pennsylvania Street, and (3) in the cantonment area at the southeastern corner of M Avenue and Pennsylvania Street.
21st Explosive Ordinance Division Expansion	The 21st Explosive Ordinance Division proposes to construction a facility expansion and site improvements for the 21st Explosive Ordinance Division Weapons of Mass Destruction Company Complex at Kirtland AFB. The 21st Explosive Ordinance Division currently operates from a 90-acre property leased by the 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 Ordinance Division proposes to expand this site to a total of 280 acres, add three permanent structures, demolish five of the six substandard structures, add two temporary storage containers, tie into nearby utilities, construct water tanks for fire suppression, and construct several concrete pads for training tasks.
Spacecraft Component Integration Lab	Proposed lease action to convert underutilized space, including a former military family housing area and a recreational use area, to use for office, commercial, and senior continuum care space at Kirtland AFB.

Geology and Soils

The Proposed Action, when combined with other reasonably foreseeable projects, would not result in significant cumulative impacts on geology and soils. The Proposed Action and other local actions would not reduce prime farmland soils or agricultural production. SWPPP measures would be implemented to control erosion during demolition and construction activities, which would minimize impacts.

Water Resources

The cumulative effects of the Proposed Action, when considered with potential disturbances on water resources from future actions would not be expected to have a significant cumulative impact on water resources. Implementation of BMPs would minimize potential for adverse effects on water resources associated with the Proposed Action and future actions.

Biological Resources

Implementation of the Proposed Action and other reasonably foreseeable projects would not result in a significant cumulative impact on biological resources. Impacts on vegetation associated with the implementation of other projects would be expected; however, the Proposed Action would not be expected to impact native vegetation. Any potential coincidence between demolition activities and construction activities from other future projects would result in temporary increases in ambient noise

levels that could impact wildlife. Wildlife could be permanently displaced from the areas and temporarily dispersed from areas adjacent to the project areas during demolition periods. Although there are no burrowing owl nests currently located on the proposed demolition sites, the owls do vary their nesting sites from year to year. Because of the lack of owl presence, and mitigation procedures in place, the Proposed Action would not result in cumulative impacts when combined with other projects.

Although growth and development can be expected to continue outside of Kirtland AFB and within the surrounding natural areas, significant cumulative adverse effects on these resources would not be expected when added to the effects of activities associated with the Proposed Action. Overall, due to the current status of the proposed sites and their locations, cumulative impacts on the biological resources of the area would be less than significant.

Cultural Resources

The cumulative impact of the Proposed Action and other reasonably foreseeable projects, when compared to the condition of the structures and the potential disturbances to cultural resources, would be considered less than significant. There are no known archaeological sites within the footprint of the project area for any of the 20 structures. The implementation of the Proposed Action is not expected to have any significant impact on cultural resources.

Infrastructure

Cumulative impacts on infrastructure have the potential to cause effects on electrical, natural gas, liquid fuel, central heating, water supply, wastewater, storm water, communications, and solid waste management services. The *Kirtland Air Force Base New Mexico General Plan 2002* (KAFB 2002) addresses the capacity and the need to upgrade all elements of the infrastructure to support additional projects at Kirtland AFB. An upgrade of any infrastructure component to support future construction at Kirtland AFB would largely result in beneficial effects for the installation.

Hazardous Materials and Waste

Implementation of the Proposed Action and other reasonably foreseeable projects would not be expected to result in a significant cumulative impact on hazardous materials and waste. The Proposed Action would result in an increase in the generation of hazardous materials; however, all materials would be handled and disposed of appropriately. Future projects would incorporate measures to limit or control hazardous materials and waste into their design and operation plans. Therefore, the effects of the Proposed Action, when combined with other ongoing and proposed projects on Kirtland AFB, would not be considered a significant cumulative effect.

Health and Safety

No cumulative impacts on health and safety would be expected. The implementation of effective health and safety plans, which follow Federal, state, and local OSHA policies, at all project sites would reduce or eliminate cumulative health and safety impacts on contractors, military personnel, and the general public.

Socioeconomics and Environmental Justice

Implementation of the Proposed Action would result in beneficial impacts on the region's economy. No impacts on residential areas, population, or minority or low-income families off the installation would

occur. These effects, when combined with the other projects currently proposed or ongoing at Kirtland AFB, would not be considered a significant cumulative impact.

4.13.3 Unavoidable Adverse Impacts

Unavoidable adverse impacts would result from implementation of the Proposed Action. None of these impacts would be significant.

Biological Resources. The Proposed Action would result in a minimal, temporary loss of vegetation and wildlife habitat. However, this unavoidable adverse impact would not be significant because demolition sites would be restored and would be expected to return to natural conditions.

Energy. The use of nonrenewable resources is an unavoidable occurrence, although not considered significant. The Proposed Action would require use of fossil fuels, a nonrenewable natural resource. Energy supplies, although relatively small, would be committed to the Proposed Action.

Geology and Soils. Demolition activities would result in temporary soil disturbance; however, implementation of BMPs and erosion-control measures would limit the environmental consequences. Although these impacts would be unavoidable, the impact on soils would not be expected to be significant.

Hazardous Materials and Waste. The generation of hazardous materials and wastes during demolition activities would be unavoidable; however, these wastes would be handled in accordance with Federal, state, and USAF policies and would not be expected to result in a significant impact.

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

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

4.13.5 Relationship Between Short-term Uses and Long-term Productivity

Short-term uses of the biophysical components of the human environment include direct construction-related disturbances and direct effects associated with an increase in population and activity that occurs over a period of less than 5 years. Long-term uses of the human environment include those effects occurring over a period of more than 5 years, including permanent resource loss.

Implementation of the Proposed Action would not require short-term resource uses that would result in long-term compromises of productivity. The Proposed Action would not result in intensification of land use at Kirtland AFB and the surrounding area. Demolition activities would result in the creation of additional open space; therefore, it is anticipated that the Proposed Action would not result in any cumulative land use or aesthetic impacts. Long-term productivity of the proposed demolition sites would be increased by implementation of the Proposed Action.

4.13.6 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources will have on future generations. Irreversible effects 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, land, and human labor resources. The use of these resources is considered to be permanent.

Material Resources. No material resources would be utilized for the Proposed Action. Demolition activities would remove existing structures and the building sites would be restored to their natural conditions.

Energy Resources. Energy resources used for the Proposed Action would be irretrievably lost. This includes petroleum-based products (such as gasoline and diesel). During demolition activities, gasoline and diesel would be used for the operation of construction vehicles. Consumption of these energy resources would not place a significant demand on their availability in the region; therefore, no significant effects would be expected.

Biological Resources. The Proposed Action would result in temporary disturbance to vegetation and wildlife habitat; however, this disturbance would be temporary and not considered significant. Restoration of building demolition sites would result in the creation of additional wildlife habitat.

Human Resources. The use of human resources for demolition 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.

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APPENDIX A

APPLICABLE LAWS, REGULATIONS, POLICIES, AND PLANNING CRITERIA

Appendix A
Applicable Laws, Regulations, Policies, and Planning Criteria

When considering the affected environment, the various physical, biological, economic, and social environmental factors must be considered. In addition to the National Environmental Policy Act (NEPA), there are other environmental laws as well as Executive Orders (EOs) to be considered when preparing environmental analyses. These laws are summarized below.

NOTE: This is not a complete list of all applicable laws, regulations, policies, and planning criteria potentially applicable to documents, however, it does provide a general summary for use as a reference.

General

EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* (January 24, 2007 [superseding EO 13123 and EO 13149]) directs Federal agencies conduct their activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner. EO 13423 sets several Federal energy and environmental management requirements in areas such as energy efficiency, greenhouse gas reduction, renewable power, building performance, water conservation, alternative fuel/hybrid vehicles, petroleum conservation, alternative fuel, pollution prevention, environmentally sound procurement, and electronics management.

EO 13514, Federal Leadership In Environmental, Energy, And Economic Performance (October 5, 2009) directs Federal agencies to improve water use efficiency and management; implement high performance sustainable Federal building design, construction, operation, and management; and advance regional and local integrated planning by identifying and analyzing impacts from energy usage and alternative energy sources. EO 13514 also directs Federal agencies to prepare and implement a Strategic Sustainability Performance Plan to manage its greenhouse gas emissions, water use, pollution prevention, regional development and transportation planning, and sustainable building design; and promote sustainability in its acquisition of goods and services. Section 2(g) requires new construction, major renovation, or repair and alteration of buildings to comply with the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings. The CEQ regulations at 40 CFR 1502.16(e) direct agencies to consider the energy requirements and conservation potential of various alternatives and mitigation measures.

Noise

The Air Installation Compatible Use Zone (AICUZ) Program, (AFI 32-7063), provides guidance to air bases and local communities in planning land uses compatible with airfield operations. The AICUZ program describes existing aircraft noise and flight safety zones on and near USAF installations. A Memorandum issued by the Under Secretary of Defense on June 16, 2009, directed all DOD components to use the 80 Day-Night A-Weighted (DNL) noise contour to identify populations at the most risk of potential hearing loss in all future environmental impact statements. Per the Memorandum, DOD components will use as a part of the analysis, as appropriate, a calculation of the Potential Hearing Loss (PHL) of the at risk population. The PHL methodology is defined in U.S. Environmental Protection Agency (USEPA) Report No. 44/9-82-105, *Guidelines for Noise Impact Analysis*.

Land Use

Land use planning in the USAF is guided by *Land Use Planning Bulletin, Base Comprehensive Planning* (HQ USAF/LEEVX, August 1, 1986). This document provides for the use of 12 basic land use types found on a USAF installation. In addition, land use guidelines established by the U.S. Department of Housing and Urban Development (HUD) and based on findings of the Federal Interagency Committee on Noise (FICON) are used to recommend acceptable levels of noise exposure for land use.

Air Quality

The Clean Air Act (CAA) of 1970, and Amendments of 1977 and 1990, recognizes that increases in air pollution result in danger to public health and welfare. To protect and enhance the quality of the Nation's air resources, the CAA authorizes the U.S. Environmental Protection Agency (USEPA) to set six National Ambient Air Quality Standards (NAAQSs) which regulate carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone, sulfur dioxide (SO_2), and particulate matter pollution emissions. The CAA seeks to reduce or eliminate the creation of pollutants at their source, and designates this responsibility to state and local governments. States are directed to utilize financial and technical assistance as well as leadership from the Federal government to develop implementation plans to achieve NAAQS. Geographic areas are officially designated by the USEPA as being in attainment or nonattainment to pollutants in relation to their compliance with NAAQS. Geographic regions established for air quality planning purposes are designated as Air Quality Control Regions (AQCRs). Pollutant concentration levels are measured at designated monitoring stations within the AQCR. An area with insufficient monitoring data is designated as unclassifiable. Section 309 of the CAA authorizes USEPA to review and comment on impact statements prepared by other agencies.

An agency should consider what effect an action might have on NAAQS due to short-term increases in air pollution during construction as well as long-term increases resulting from changes in traffic patterns. For actions in attainment areas, a Federal agency could also be subject to USEPA's Prevention of Significant Deterioration (PSD) regulations. These regulations apply to new major stationary sources and modifications to such sources. Although few agency facilities will actually emit pollutants, increases in pollution can result from a change in traffic patterns or volume. Section 118 of the CAA waives Federal immunity from complying with the CAA and states all Federal agencies will comply with all Federal- and state-approved requirements.

The General Conformity Rule requires that any Federal action meet the requirements of a State Implementation Plan (SIP) or Federal Implementation Plan. More specifically, CAA conformity is ensured when a Federal action does not cause a new violation of the NAAQS; contribute to an increase in the frequency or severity of violations of NAAQS; or delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS.

The General Conformity Rule applies only to actions in nonattainment or maintenance areas and considers both direct and indirect emissions. The rule applies only to Federal actions that are considered "regionally significant" or where the total emissions from the action meet or exceed the *de minimis* thresholds presented in 40 CFR 93.153. An action is regionally significant when the total nonattainment pollutant emissions exceed 10 percent of the AQCR's total emissions inventory for that nonattainment pollutant. If a Federal action does not meet or exceed the *de minimis* thresholds and is not considered regionally significant, then a full Conformity Determination is not required.

Safety

AFI 91-202, *USAF Mishap Prevention Program*, implements Air Force Policy Directive (AFPD) 91-2, *Safety Programs*. It establishes mishap prevention program requirements (including the Bird/Wildlife Aircraft Strike Hazard [BASH] Program), assigns responsibilities for program elements, and contains program management information. This instruction applies to all USAF personnel.

AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program*, implements AFPD 91-3, *Occupational Safety and Health*, by outlining the AFOSH Program. The purpose of the AFOSH Program is to minimize loss of USAF resources and to protect USAF personnel from occupational deaths, injuries, or illnesses by managing risks. In conjunction with the USAF Mishap Prevention Program, these standards ensure all USAF workplaces meet Federal safety and health requirements. This instruction applies to all USAF activities.

Geological Resources

Recognizing that millions of acres per year of prime farmland are lost to development, Congress passed the Farmland Protection Policy Act (FPPA) to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland (7 CFR Part 658). Prime farmland are soils that have a combination of soil and landscape properties that make them highly suitable for cropland, such as high inherent fertility, good water-holding capacity, deep or thick effective rooting zones, and are not subject to periodic flooding. Under the FPPA, agencies are encouraged to conserve prime or unique farmlands when alternatives are practicable. Some activities that are not subject to the FPPA include Federal permitting and licensing, projects on land already in urban development or used for water storage, construction for national defense purposes, or construction of new minor secondary structures such as a garage or storage shed.

Water Resources

The Clean Water Act (CWA) of 1977 is an amendment to the Federal Water Pollution Control Act of 1972, is administered by USEPA, and sets the basic structure for regulating discharges of pollutants into U.S. waters. The CWA requires USEPA to establish water quality standards for specified contaminants in surface waters and forbids the discharge of pollutants from a point source into navigable waters without a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits are issued by USEPA or the appropriate state if it has assumed responsibility. Section 404 of the CWA establishes a Federal program to regulate the discharge of dredge and fill material into waters of the United States. Section 404 permits are issued by the U.S. Army Corps of Engineers (USACE). Waters of the United States include interstate and intrastate lakes, rivers, streams, and wetlands that are used for commerce, recreation, industry, sources of fish, and other purposes. The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Each agency should consider the impact on water quality from actions such as the discharge of dredge or fill material into U.S. waters from construction, or the discharge of pollutants as a result of facility occupation.

Section 303(d) of the CWA requires states and USEPA to identify waters not meeting state water-quality standards and to develop Total Maximum Daily Loads (TMDLs). A TMDL is the maximum amount of a pollutant that a waterbody can receive and still be in compliance with state water-quality standards. After determining TMDLs for impaired waters, states are required to identify all point and nonpoint sources of pollution in a watershed that are contributing to the impairment and to develop an implementation plan that will allocate reductions to each source to meet the state standards. The TMDL program is currently the Nation's most comprehensive attempt to restore and improve water quality. The TMDL program does not explicitly require the protection of riparian areas. However, implementation of the TMDL plans

typically calls for restoration of riparian areas as one of the required management measures for achieving reductions in nonpoint source pollutant loadings.

The Coastal Zone Management Act (CZMA) of 1972 declares a national policy to preserve, protect, and develop, and, where possible, restore or enhance the resources of the Nation's coastal zone. The coastal zone refers to the coastal waters and the adjacent shorelines including islands, transitional and intertidal areas, salt marshes, wetlands, and beaches, and includes the Great Lakes. The CZMA encourages states to exercise their full authority over the coastal zone, through the development of land and water use programs in cooperation with Federal and local governments. States may apply for grants to help develop and implement management programs to achieve wise use of the land and water resources of the coastal zone. Development projects affecting land or water use or natural resources of a coastal zone, must ensure the project is, to the maximum extent practicable, consistent with the state's coastal zone management program.

The Safe Drinking Water Act (SDWA) of 1974 establishes a Federal program to monitor and increase the safety of all commercially and publicly supplied drinking water. Congress amended the SDWA in 1986, mandating dramatic changes in nationwide safeguards for drinking water and establishing new Federal enforcement responsibility on the part of USEPA. The 1986 amendments to the SDWA require USEPA to establish Maximum Contaminant Levels (MCLs), Maximum Contaminant Level Goals (MCLGs), and Best Available Technology (BAT) treatment techniques for organic, inorganic, radioactive, and microbial contaminants; and turbidity. MCLGs are maximum concentrations below which no negative human health effects are known to exist. The 1996 amendments set current Federal MCLs, MCLGs, and BATs for organic, inorganic, microbiological, and radiological contaminants in public drinking water supplies.

The Wild and Scenic Rivers Act of 1968 provides for a wild and scenic river system by recognizing the remarkable values of specific rivers of the Nation. These selected rivers and their immediate environment are preserved in a free-flowing condition, without dams or other construction. The policy not only protects the water quality of the selected rivers but also provides for the enjoyment of present and future generations. Any river in a free-flowing condition is eligible for inclusion, and can be authorized as such by an Act of Congress, an act of state legislature, or by the Secretary of the Interior upon the recommendation of the governor of the state(s) through which the river flows.

EO 11988, *Floodplain Management* (May 24, 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in floodplains. An agency may locate a facility in a floodplain if the head of the agency finds there is no practicable alternative. If it is found there is no practicable alternative, the agency must minimize potential harm to the floodplain, and circulate a notice explaining why the action is to be located in the floodplain prior to taking action. Finally, new construction in a floodplain must apply accepted floodproofing and flood protection to include elevating structures above the base flood level rather than filling in land.

Biological Resources

The Endangered Species Act (ESA) of 1973 establishes a Federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. The ESA specifically charges Federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All Federal agencies must ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction of critical habitat for these species, unless the agency has been granted an exemption. The Secretary of the Interior, using the best available scientific data, determines which species are officially endangered or threatened, and the U.S. Fish and Wildlife Service (USFWS) maintains the list. A list of Federal endangered species can be obtained from the Endangered Species Division, USFWS (505-248-6920).

States might also have their own lists of threatened and endangered species which can be obtained by calling the appropriate State Fish and Wildlife office. Some species, such as the bald eagle, also have laws specifically for their protection (e.g., Bald Eagle Protection Act).

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, implements treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Unless otherwise permitted by regulations, the MBTA makes it unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. The MBTA also makes it unlawful to ship, transport or carry from one state, territory, or district to another, or through a foreign country, any bird, part, nest, or egg that was captured, killed, taken, shipped, transported, or carried contrary to the laws from where it was obtained; and import from Canada any bird, part, nest, or egg obtained contrary to the laws of the province from which it was obtained. The U.S. Department of the Interior has authority to arrest, with or without a warrant, a person violating the MBTA.

EO 11514, *Protection and Enhancement of Environmental Quality* (March 5, 1970), states that the President, with assistance from the Council on Environmental Quality (CEQ), will lead a national effort to provide leadership in protecting and enhancing the environment for the purpose of sustaining and enriching human life. Federal agencies are directed to meet national environmental goals through their policies, programs, and plans. Agencies should also continually monitor and evaluate their activities to protect and enhance the quality of the environment. Consistent with NEPA, agencies are directed to share information about existing or potential environmental problems with all interested parties, including the public, in order to obtain their views.

EO 11990, *Protection of Wetlands* (May 24, 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands.

EO 13186, *Conservation of Migratory Birds* (January 10, 2001), creates a more comprehensive strategy for the conservation of migratory birds by the Federal government. EO 13186 provides a specific framework for the Federal government's compliance with its treaty obligations to Canada, Mexico, Russia, and Japan. EO 13186 provides broad guidelines on conservation responsibilities and requires the development of more detailed guidance in a Memorandum of Understanding (MOU). EO 13186 will be coordinated and implemented by the USFWS. The MOU will outline how Federal agencies will promote conservation of migratory birds. EO 13186 requires the support of various conservation planning efforts already in progress; incorporation of bird conservation considerations into agency planning, including NEPA analyses; and reporting annually on the level of take of migratory birds.

Cultural Resources

The American Indian Religious Freedom Act of 1978 and Amendments of 1994 recognize that freedom of religion for all people is an inherent right, and traditional American Indian religions are an indispensable and irreplaceable part of Indian life. It also recognized the lack of Federal policy on this issue and made it the policy of the United States to protect and preserve the inherent right of religious freedom for Native Americans. The 1994 Amendments provide clear legal protection for the religious use of peyote cactus as a religious sacrament. Federal agencies are responsible for evaluating their

actions and policies to determine if changes should be made to protect and preserve the religious cultural rights and practices of Native Americans. These evaluations must be made in consultation with native traditional religious leaders.

The Archaeological Resource Protection Act (ARPA) of 1979 protects archaeological resources on public and American Indian lands. It provides felony-level penalties for the unauthorized excavation, removal, damage, alteration, or defacement of any archaeological resource, defined as material remains of past human life or activities which are at least 100 years old. Before archaeological resources are excavated or removed from public lands, the Federal land manager must issue a permit detailing the time, scope, location, and specific purpose of the proposed work. ARPA also fosters the exchange of information about archaeological resources between governmental agencies, the professional archaeological community, and private individuals. ARPA is implemented by regulations found in 43 CFR Part 7.

The National Historic Preservation Act (NHPA) of 1966 sets forth national policy to identify and preserve properties of state, local, and national significance. The NHPA establishes the Advisory Council on Historic Preservation (ACHP), State Historic Preservation Officers (SHPOs), and the National Register of Historic Places (NRHP). ACHP advises the President, Congress, and Federal agencies on historic preservation issues. Section 106 of the NHPA directs Federal agencies to take into account effects of their undertakings (actions and authorizations) on properties included in or eligible for the NRHP. Section 110 sets inventory, nomination, protection, and preservation responsibilities for federally owned cultural properties. Section 106 of the act is implemented by regulations of the ACHP, 36 CFR Part 800. Agencies should coordinate studies and documents prepared under Section 106 with NEPA where appropriate. However, NEPA and NHPA are separate statutes and compliance with one does not constitute compliance with the other. For example, actions which qualify for a categorical exclusion under NEPA might still require Section 106 review under NHPA. It is the responsibility of the agency official to identify properties in the APE, and whether they are included or eligible for inclusion in the NRHP. Section 110 of the NHPA requires Federal agencies to identify, evaluate, and nominate historic property under agency control to the NRHP.

The Native American Graves Protection and Repatriation Act of 1990 establishes rights of American Indian tribes to claim ownership of certain "cultural items," defined as Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, held or controlled by Federal agencies. Cultural items discovered on Federal or tribal lands are, in order of primacy, the property of lineal descendants, if these can be determined, and then the tribe owning the land where the items were discovered or the tribe with the closest cultural affiliation with the items. Discoveries of cultural items on Federal or tribal land must be reported to the appropriate American Indian tribe and the Federal agency with jurisdiction over the land. If the discovery is made as a result of a land use, activity in the area must stop and the items must be protected pending the outcome of consultation with the affiliated tribe.

EO 11593, *Protection and Enhancement of the Cultural Environment* (May 13, 1971), directs the Federal government to provide leadership in the preservation, restoration, and maintenance of the historic and cultural environment. Federal agencies are required to locate and evaluate all Federal sites under their jurisdiction or control which might qualify for listing on the NRHP. Agencies must allow the ACHP to comment on the alteration, demolition, sale, or transfer of property which is likely to meet the criteria for listing as determined by the Secretary of the Interior in consultation with the SHPO. Agencies must also initiate procedures to maintain federally owned sites listed on the NRHP.

EO 13007, *Indian Sacred Sites* (May 24, 1996), provides that agencies managing Federal lands, to the extent practicable, permitted by law, and not inconsistent with agency functions, shall accommodate American Indian religious practitioners' access to and ceremonial use of American Indian sacred sites, shall avoid adversely affecting the physical integrity of such sites, and shall maintain the confidentiality

of such sites. Federal agencies are responsible for informing tribes of proposed actions that could restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites.

EO 13287, *Preserve America* (March 3, 2003), orders Federal agencies to take a leadership role in protection, enhancement, and contemporary use of historic properties owned by the Federal government, and promote intergovernmental cooperation and partnerships for preservation and use of historic properties. EO 13287 established new accountability for agencies with respect to inventories and stewardship.

Socioeconomics and Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), directs Federal agencies to make achieving environmental justice part of their mission. Agencies must identify and address the adverse human health or environmental effects that its activities have on minority and low-income populations, and develop agencywide environmental justice strategies. The strategy must list "programs, policies, planning and public participation processes, enforcement, and/or rulemakings related to human health or the environment that should be revised to promote enforcement of all health and environmental statutes in areas with minority populations and low-income populations, ensure greater public participation, improve research and data collection relating to the health of and environment of minority populations and low-income populations, and identify differential patterns of consumption of natural resources among minority populations and low-income populations." A copy of the strategy and progress reports must be provided to the Federal Working Group on Environmental Justice. Responsibility for compliance with EO 12898 is with each Federal agency.

Hazardous Materials and Waste

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 authorizes USEPA to respond to spills and other releases of hazardous substances to the environment, and authorizes the National Oil and Hazardous Substances Pollution Contingency Plan. CERCLA also provides a Federal "Superfund" to respond to emergencies immediately. Although the "Superfund" provides funds for cleanup of sites where potentially responsible parties cannot be identified, USEPA is authorized to recover funds through damages collected from responsible parties. This funding process places the economic burden for cleanup on polluters.

The Pollution Prevention Act (PPA) of 1990 encourages manufacturers to avoid the generation of pollution by modifying equipment and processes; redesigning products, substituting raw materials; and making improvements in management techniques, training, and inventory control. Consistent with pollution prevention principles, EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* (January 24, 2007 [revoking EO 13148]) sets a goal for all Federal agencies that promotes environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products, and use of paper of at least 30 percent post-consumer fiber content. In addition, EO 13423 sets a goal that requires Federal agencies to ensure that they reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of, increase diversion of solid waste as appropriate, and maintain cost-effective waste prevention and recycling programs in their facilities. Additionally, in *Federal Register* Volume 58 Number 18 (January 29, 1993), CEQ provides guidance to Federal agencies on how to "incorporate pollution prevention principles, techniques, and mechanisms into their planning and decisionmaking processes and to evaluate and report those efforts, as appropriate, in documents pursuant to NEPA."

The Resource Conservation and Recovery Act (RCRA) of 1976 is an amendment to the Solid Waste Disposal Act. RCRA authorizes USEPA to provide for "cradle-to-grave" management of hazardous waste and sets a framework for the management of nonhazardous municipal solid waste. Under RCRA, hazardous waste is controlled from generation to disposal through tracking and permitting systems, and restrictions and controls on the placement of waste on or into the land. Under RCRA, a waste is defined as hazardous if it is ignitable, corrosive, reactive, toxic, or listed by USEPA as being hazardous. With the Hazardous and Solid Waste Amendments (HSWA) of 1984, Congress targeted stricter standards for waste disposal and encouraged pollution prevention by prohibiting the land disposal of particular wastes. The HSWA amendments strengthen control of both hazardous and nonhazardous waste and emphasize the prevention of pollution of groundwater.

The Superfund Amendments and Reauthorization Act (SARA) of 1986 mandates strong clean-up standards and authorizes USEPA to use a variety of incentives to encourage settlements. Title III of SARA authorizes the Emergency Planning and Community Right to Know Act (EPCRA), which requires facility operators with "hazardous substances" or "extremely hazardous substances" to prepare comprehensive emergency plans and to report accidental releases. If a Federal agency acquires a contaminated site, it can be held liable for cleanup as the property owner/operator. A Federal agency can also incur liability if it leases a property, as the courts have found lessees liable as "owners." However, if the agency exercises due diligence by conducting a Phase I Environmental Site Assessment, it can claim the "innocent purchaser" defense under CERCLA. According to Title 42 United States Code (U.S.C.) 9601(35), the current owner/operator must show it undertook "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" before buying the property to use this defense.

The Toxic Substance Control Act (TSCA) of 1976 consists of four titles. Title I established requirements and authorities to identify and control toxic chemical hazards to human health and the environment. TSCA authorized USEPA to gather information on chemical risks, require companies to test chemicals for toxic effects, and regulate chemicals with unreasonable risk. TSCA also singled out polychlorinated biphenyls (PCBs) for regulation, and, as a result, PCBs are being phased out. PCBs are persistent when released into the environment and accumulate in the tissues of living organisms. They have been shown to cause adverse health effects on laboratory animals and could cause adverse health effects in humans. TSCA and its regulations govern the manufacture, processing, distribution, use, marking, storage, disposal, clean-up, and release reporting requirements for numerous chemicals like PCBs. TSCA Title II provides statutory framework for "Asbestos Hazard Emergency Response," which applies only to schools. TSCA Title III, "Indoor Radon Abatement," states indoor air in buildings of the United States should be as free of radon as the outside ambient air. Federal agencies are required to conduct studies on the extent of radon contamination in buildings they own. TSCA Title IV, "Lead Exposure Reduction," directs Federal agencies to "conduct a comprehensive program to promote safe, effective, and affordable monitoring, detection, and abatement of lead-based paint and other lead exposure hazards." Further, any Federal agency having jurisdiction over a property or facility must comply with all Federal, state, interstate, and local requirements concerning lead-based paint.

APPENDIX B

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING (IICEP) MATERIALS

Appendix B

Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) Materials

The 377 ABW solicited comments on the Draft Environmental Assessment by distributing letters (example follows) and copies of the Draft EA to potentially interested Federal, state, and local agencies; Native American tribes; and other stakeholder groups or individuals. Responses received follow the example letter in this appendix. The following is a list of the potentially interested parties that were consulted:

- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers
- New Mexico Department of Cultural Affairs
- New Mexico Environment Department
- New Mexico Department of Game and Fish
- New Mexico Environmental Health Department
- U.S. Forest Service
- Town of Mountainair
- City of Albuquerque
- City of Rio Rancho
- Pueblo of Isleta
- Pueblo of Zuni
- White Mountain Apache
- Ysleta del Sur Pueblo
- Comanche Indian Tribe
- Jicarilla Apache Nation
- Mescalero Apache Tribe
- Pueblo of Nambe
- Navajo Nation
- Ohkay Owingeh
- Pueblo of Acoma
- Pueblo of Cochiti
- Pueblo of Jemez
- Pueblo of Laguna

- Pueblo of Picuris
- Pueblo of Pojoaque
- Pueblo of San Felipe
- Pueblo of San Ildefonso
- Pueblo of Sandia
- Pueblo of Santa Ana
- Pueblo of Santa Clara
- Pueblo of Santo Domingo
- Pueblo of Taos
- Pueblo of Tesuque
- Pueblo of Zia
- Hopi Tribal Council

Example IICEP Letter

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 377TH AIR BASE WING (AFMC)

FEB 12 2010

Colonel Michael S. Duvall
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB NM 87117-5606

Mr. Robert Campellone
U.S. Fish and Wildlife Service
Division of Planning
PO Box 1306
Albuquerque NM 87103

RE: Proposed Building Demolition Activities at Kirtland AFB

Dear Mr. Campellone

The 377th Air Base Wing (377 ABW) of the U.S. Air Force has prepared a Draft Environmental Assessment (EA) addressing building demolition activities at Kirtland Air Force Base (AFB). The 377 ABW proposes to demolish up to 20 buildings on Kirtland AFB 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. The environmental impact analysis process for this proposal is being conducted in accordance with Council on Environmental Quality regulations pursuant to the requirements of the National Environmental Policy Act of 1969.

In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your participation by reviewing the Draft EA and solicit your comments concerning the proposal and any potential environmental concerns you may have. Copies of the Draft EA and the proposed Finding of No Significant Impact are available now at http://www.kirtland.af.mil under the environmental issues tab. Please provide written comments on the Draft EA or other information regarding the action at your earliest convenience but no later than 30 days from the date of this letter. Appendix B of the Draft EA contains a listing of those Federal, State, and local agencies that have been contacted. If there are any additional agencies that you feel should review and comment on the proposed activities, please include them in your distribution of this letter.

Please address questions or comments on the proposed building demolition to the Kirtland AFB National Environmental Policy Act Program Manager, 377 MSG/CEANQ, 2050 Wyoming Boulevard SE, Suite 125, Kirtland AFB, NM 87117-5270, or via email to nepa@kirtland.af.mil.

Sincerely

MICHAEL S. DUVALL, Colonel, USAF
Commander

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 377TH AIR BASE WING (AFMC)

NOV 9 2009

086224

Colonel Michael S. Duvall
377 ABW/CC
2000Wyoming Blvd SE
Kirtland AFB NM 87117-5606

Ms. Jan Biella
Acting State Historic Preservation Officer
Department of Cultural Affairs
Historic Preservation Division
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe NM 87501

Dear Ms. Biella

Kirtland Air Force Base (KAFB) is proposing to demolish several antiquated facilities within the next fiscal year and is providing formal notification of the proposed actions for your information. Two of the facilities are within the Manzano Base Historic District and are considered eligible for the National Register of Historic Places (NRHP). Building 37505 is significant to the NRHP under Criterion Consideration A. Building 30143 is considered significant to the NRHP under Criterion Consideration A, C and NRHP (see attached Historic Building Inventory Forms). We recommend completing HABS/HAER documentation level 2 with digital color photographs rather than large format photography. Van Citters Historic Preservation completed a historic context on the Manzano Historic District and Ms. Valerie Renner will submit the report, photographs and drawings to provide a comprehensive HAER document for the two buildings.

Buildings 20561 and 20563 are Electromagnetic Pulse (EMP) simulation facilities which have become a safety hazard to the area. Building 20561 is a Horizontally Polarized Dipole (HPD) and was determined individually eligible under Criteria Consideration G and as contributing to the EMP Simulation Historic District. Building 20563 is a Vertically Polarized Dipole II (VPD) and was determined individually eligible under Criteria Consideration G and as contributing to the EMP Simulation Historic District. The HPD and VPD present safety hazards due in part to the deterioration of fiberglass guide wires that hold the structures in place. As the wires fail and fall to the ground below, they present a hazard to individuals working in proximity to the facilities.

Building 736 was also used as an EMP simulation testing site and is considered eligible for the NRHP. This facility is rapidly deteriorating and has been determined to be unsafe for personnel and should be demolished. Van Citters Historic Preservation completed HAER documentation (report and photographs) on the VPD and HPD technology and the contribution to the EMP testing (SHPO signature 24 March 2003). Please see the attached Historic Building Forms for all facilities. It is recommended using the aforementioned documentation, together with digital color photography, and associated drawings to complete HAER documentation for the facilities.

Building 1013 is the remaining facility proposed for demolition. It was built as a steam plant in 1952 and was determined individually eligible under Criterion Consideration C (see attached Historic Building Form). The steam plant is no longer in use and a qualified historian (according to the Secretary of the Interior guidelines for historic preservation) will be used to complete HABS level 2 documentation with digital color photographs rather than large format photography.

We appreciate your review of these proposed demolitions and look forward to working with you on developing MOAs to complete this proposal. If you have any questions or require further information, please contact Ms. Valerie Renner, Cultural Resources Program Manager, at (505) 846-8840.

Sincerely

MICHAEL S. DUVALL, Colonel, USAF
Commander

6 Attachments:
1. Historic Building Inventory Form, Bldg 37505
2. Historic Building Inventory Form, Bldg 30143
3. Historic Building Inventory Form, Bldg 20561
4. Historic Building Inventory Form, Bldg 20563
5. Historic Building Inventory Form, Bldg 736
6. Historic Building Inventory Form, Bldg 1013

This undertaking will not have an adverse effect on registered or eligible properties.

12.16.09
for NM State Historic Preservation Officer

1 condition that archivally stable paper and ink be used & images be of high enough resolution & large enough size to discern detail.

GOVERNOR
Bill Richardson

DIRECTOR AND SECRETARY
TO THE COMMISSION
Tod Stevenson

Robert S. Jenks, Deputy Director

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

One Wildlife Way
Post Office Box 25112
Santa Fe, NM 87504
Phone: (505) 476-8101
Fax: (505) 476-8128

Visit our website at www.wildlife.state.nm.us
For information call: 505/476-8000
To order free publications call: 1-800-862-9310

STATE GAME COMMISSION

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KENT A. SALAZAR, Commissioner
Albuquerque, NM

M.H. "DUTCH" SALMON, Commissioner
Silver City, NM

THOMAS "DICK" SALOPEK, Commissioner
Las Cruces, NM

4 March 2010

Kirtland AFB NEPA Acting Program Manager
377 MSG/CEANQ
2050 Wyoming BLVD SE, Suite 125
Kirtland AFB, NM 87117-5270

Re: Kirtland AFB building demolition; NMDGF No.13214

Dear NEA Acting Program Manager,

In response to your letter dated 12 February 2010, regarding the above referenced project the Department of Game and Fish (Department) does not anticipate significant impacts to wildlife or sensitive habitats. For your information, we have enclosed a list of sensitive, threatened and endangered species that occur in Bernalillo County.

For more information on listed and other species of concern, contact the following sources:

1. BISON-M Species Accounts, Searches, and County lists: http://www.bison-m.org
2. Habitat Handbook Project Guidelines: http://wildlife.state.nm.us/conservation/habitat_handbook/index.htm
3. For custom, site-specific database searches on plants and wildlife, go to http://nhnm.unm.edu, then go to Data, then to Free On-Line Data, and follow the directions
4. New Mexico State Forestry Division (505-476-3334) or http://nmrareplants.unm.edu/index.html for state-listed plants
5. For the most current listing of federally listed species **always** check the U.S. Fish and Wildlife Service at (505-346-2525) or http://www.fws.gov/southwest/es/NewMexico/SBC.cfm.

Thank you for the opportunity to review and comment on your project. If you have any questions, please contact me at (505) 476-8114 or terra.manasco@state.nm.us.

Sincerely,

Terra Manasco
Assistant Chief, Conservation Services Division
Technical Guidance Section

TLM/mw

xc: Wally Murphy, Ecological Services Field Supervisor, USFWS
Brian Gleadle, NW Area Operations Chief, NMDGF

NEW MEXICO WILDLIFE OF CONCERN
BERNALILLO COUNTY

For complete up-dated information on federal-listed species, including plants, see the US Fish & Wildlife Service NM Ecological Services Field Office website at http://www.fws.gov/ifw2es/NewMexico/SBC.cfm. For information on state-listed plants, contact the NM Energy, Minerals and Natural Resources Department, Division of Forestry, or go to http://nmrareplants.unm.edu/. If your project is on Bureau of Land Management, contact the local BLM Field Office for information on species of particular concern. If your project is on a National Forest, contact the Forest Supervisor's office for species information.

Common Name	Scientific Name	NMGF	US FWS	critical habitat
Rio Grande Chub	Gila pandora	s		
Rio Grande Silvery Minnow	Hybognathus amarus	E	E	Y
Brown Pelican	Pelecanus occidentalis	E		
Neotropic Cormorant	Phalacrocorax brasilianus	T		
Bald Eagle	Haliaeetus leucocephalus	T	T	
Northern Goshawk	Accipiter gentilis	s	SOC	
Common Black-Hawk	Buteogallus anthracinus	T	SOC	
Aplomado Falcon	Falco femoralis	E	Exp	
Peregrine Falcon	Falco peregrinus	T	SOC	
Mountain Plover	Charadrius montanus	s	SOC	
Black Tern	Chlidonias niger surinamensis		SOC	
Yellow-billed Cuckoo	Coccyzus americanus	s	C	
Mexican Spotted Owl	Strix occidentalis lucida	s	T	Y
Burrowing Owl	Athene cunicularia		SOC	
Black Swift	Cypseloides niger	s		
Broad-billed Hummingbird	Cynanthus latirostris	T		
White-eared Hummingbird	Hylocharis leucotis	T		
Southwestern Willow Flycatcher	Empidonax traillii extimus	E	E	Y
Loggerhead Shrike	Lanius ludovicianus	s		
Bell's Vireo	Vireo bellii	T	SOC	
Gray Vireo	Vireo vicinior	T		
Baird's Sparrow	Ammodramus bairdii	T	SOC	
Western Small-footed Myotis Bat	Myotis ciliolabrum melanorhinus	s		
Yuma Myotis Bat	Myotis yumanensis yumanensis	s		
Occult Little Brown Myotis Bat	Myotis lucifugus occultus	s		
Long-legged Myotis Bat	Myotis volans interior	s		
Fringed Myotis Bat	Myotis thysanodes thysanodes	s		
Spotted Bat	Euderma maculatum	T		
Pale Townsend's Big-eared Bat	Corynorhinus townsendii pallescens	s	SOC	
Big Free-tailed Bat	Nyctinomops macrotis	s		
Gunnison's Prairie Dog	Cynomys gunnisoni	s		
New Mexican Jumping Mouse	Zapus hudsonius luteus	E	SOC	
Red Fox	Vulpes vulpes	s		
Ringtail	Bassariscus astutus	s		
Black-footed Ferret	Mustela nigripes		E	
Western Spotted Skunk	Spilogale gracilis	s		
Socorro Mountainsnail	Oreohelix neomexicana	s		
Slate Millipede	Comanchelus chihuanus		SOC	

PUEBLO OF LAGUNA
P.O. BOX 194
LAGUNA, NEW MEXICO 87026

(505) 552-6598
(505) 552-6654
(505) 552-6655

Office of:
The Governor
The Secretary
The Treasurer

March 1, 2010

Colonel Michael S. Duvall
377ABW/CC
2000 Wyoming Blvd SE
Suite E-3
Albuquerque, NM 87117-5000

Dear Colonel Duvall:

RE: Proposed Building Demolition Activities at Kirtland AFB (20 Buildings)

The Pueblo of Laguna appreciates your consideration to comment on the possible interest your projects may have on any traditional or cultural properties.

The Pueblo of Laguna has determined that the undertaking WILL NOT have a significant impact at this time. However, in the event that any new archaeological sites are discovered and any new artifacts re removed, we request to be notified to review items. We also request photographs of items. According to our unpublished migration history, our ancestors journeyed from the north through that area and settled for periods of time before traveling to our present location. Therefore, the possibilities of some findings may exist.

We thank you and your staff for the information provided.

Sincerely,

for John E. Antonio, Sr.
Governor
Pueblo of Laguna

USDA United States Department of Agriculture | Forest Service | Cibola National Forest and National Grasslands | 2113 Osuna Road NE
Albuquerque, NM 87113-1001
(505) 346-3900 FAX: 346-3901

File Code: 1950
Date: March 2, 2010

National Environmental Policy Act Manager
377 MSG/CEANQ
2050 Wyoming Boulevard SE
Suite 125
Kirtland AFB, NM 87117-5270

Dear NEPA Manager:

The Southwestern Regional Office forwarded your February 12 letter regarding the Kirtland Air Force Base Environmental Assessment for demolition activities to the Cibola National Forest for our review and comment, as appropriate. The Regional Office has indicated to me that they have no concerns. My staff has reviewed the proposal and determined that the demolition of buildings would not affect resources on the Cibola National Forest. Therefore, we have no comment on the proposed activities.

Sincerely,

Nancy Rose

NANCY ROSE
Forest Supervisor

CITY OF ALBUQUERQUE

March 9, 2010

Program Manager, KAFB
National Environmental Policy Act
377 MSG/CEANQ
2050 Wyoming Blvd. SE
Kirtland AFB, NM 87117-5270

Certified Mail No. 7007 1490 0003 5645 3022

Re: Proposed Building Demolition Activities at Kirtland AFB

KAFB NEPA Program Manager:

Thank you for providing the Air Quality Division (Division) the opportunity to review the KAFB Draft EA (EA) which proposes the demolition of up to 20 buildings on KAFB over a 4 year time period. Based on review of the EA, dated February 2010, the Division has concluded that some of the demolition activities may require notifications and permit application submittals.

The EA states that some of these buildings contain Asbestos Containing Material (ACM). Notification requirements and asbestos removal will need to be done in accordance with 20.11.20.22 NMAC – Demolition and Renovation Activities; Fugitive Dust Control Construction Permit and Asbestos Notification Requirements and Title 40 CFR Subpart M—National Emission Standard for Asbestos §61.145 – Standard for demolition and renovation.

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

The EA reports that the planned demolition will result in a surface disturbance of approximately 30.6 acres. As correctly cited in the EA report, surface disturbance of ¾ of an acre or more will require a Fugitive Dust Permit. I was unable to calculate the volume of buildings to be demolished, but it appears that they will exceed the 75,000 ft^3 threshold for requiring a fugitive dust permit. However, planned surface disturbance will exceed ¾ of an acre, so the required fugitive dust permit for surface disturbance will cover both of these actions. A Fugitive Dust Construction Permit application shall be submitted to the Division pursuant to 20.11.20 NMAC. Surface disturbance shall not occur before Division staff sign and issue a fugitive dust permit.

Under Section 2.2.1, General Demolition Activities, the first full paragraph on page 2-9 says that "…ground up asphalt, and broken up cement…" would be reused. The EA report is unclear on whether KAFB plans to use any crushing and screening equipment to meet this need. If so, please ensure that the appropriate permits are in place, and/or relocation requests have been approved before constructing crushing/screening equipment. Also, under Section 2.2.2, Demolition Staffing, equipment, and Material, it states the type of equipment that will be onsite during demolition activities. The description of equipment did not cite as to the type of equipment that will be used for water application. During demolition and surface disturbance activities, water will need to be applied in the appropriate amounts and frequency to control fugitive dust.

Section 4.4.2.1, Proposed Action, discusses combustion emissions and Section 4.5.1, Evaluation Criteria, lists combustion emissions from stationary generators. Those engines, not defined as a "Nonroad engine" under Title 40 CFR Part 89 or 90, and applicable to 20.11.41 NMAC, shall obtain a permit pursuant to Part 41. If applicable to 20.11.40 NMAC, the owner/operator shall obtain a Certificate of Registration pursuant to Part 40.

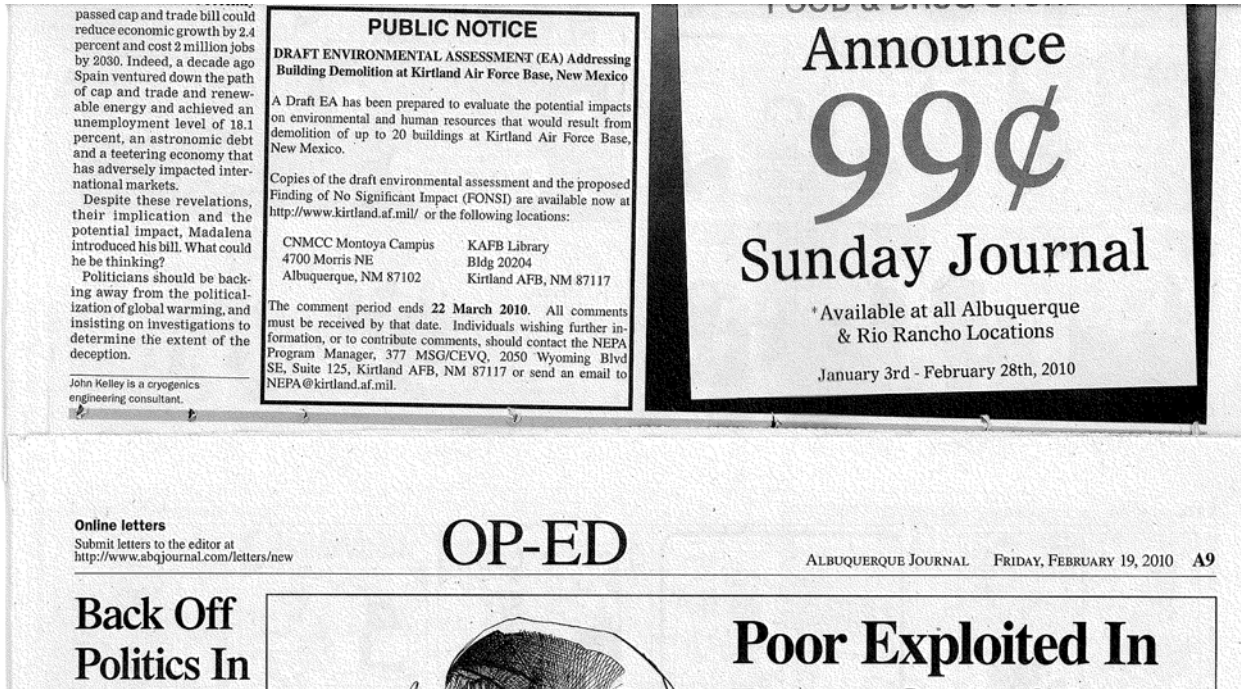
Thank you for the time and the opportunity to review the EA Draft Report. Many of the items listed above have been referenced in the draft report, and are added here for further clarification. Please do not hesitate to contact me with any questions or concerns you may have (dreyes@cabq.gov or 505-768-1958).

Sincerely,

Damon R. Reyes
Enforcement Section Supervisor
Air Quality Division
Environmental Health Department
City of Albuquerque

Xc: Mary Lou Leonard, Acting Director, Environmental Health Department
Isreal Tavarez, Environmental Engineering Manager, Air Quality Permitting Section
William Gallegos, Environmental Health Manager, Environmental Service Department

The Draft EA and FONSI were made available for a 30-day review period. The NOA was published in The *Albuquerque Journal* on February 19, 2010. No public comments were received. Responses to agency comments requiring clarification are included in **Table B-1**.



passed cap and trade bill could reduce economic growth by 2.4 percent and cost 2 million jobs by 2030. Indeed, a decade ago Spain ventured down the path of cap and trade and renewable energy and achieved an unemployment level of 18.1 percent, an astronomic debt and a teetering economy that has adversely impacted international markets.

Despite these revelations, their implication and the potential impact, Madalena introduced his bill. What could he be thinking?

Politicians should be backing away from the politicalization of global warming, and insisting on investigations to determine the extent of the deception.

John Kelley is a cryogenics engineering consultant.

PUBLIC NOTICE

DRAFT ENVIRONMENTAL ASSESSMENT (EA) Addressing Building Demolition at Kirtland Air Force Base, New Mexico

A Draft EA has been prepared to evaluate the potential impacts on environmental and human resources that would result from demolition of up to 20 buildings at Kirtland Air Force Base, New Mexico.

Copies of the draft environmental assessment and the proposed Finding of No Significant Impact (FONSI) are available now at http://www.kirtland.af.mil/ or the following locations:

CNMCC Montoya Campus
4700 Morris NE
Albuquerque, NM 87102

KAFB Library
Bldg 20204
Kirtland AFB, NM 87117

The comment period ends **22 March 2010**. All comments must be received by that date. Individuals wishing further information, or to contribute comments, should contact the NEPA Program Manager, 377 MSG/CEVQ, 2050 Wyoming Blvd SE, Suite 125, Kirtland AFB, NM 87117 or send an email to NEPA@kirtland.af.mil.

Online letters
Submit letters to the editor at http://www.abqjournal.com/letters/new

OP-ED

Back Off Politics In

Poor Exploited In

Table B-1. Response to Comments Received on the Draft Environmental Assessment

#	Section	Commenter	Comment Summary	Response
1	Air Quality	City of Albuquerque Environmental Health Department Air Quality Division	The Air Quality Division reviewed the EA and determined that some of the demolition activities may require notifications and permit application submittals. As described in the letter (included in this appendix), they describe the potential need for notification requirements for potential asbestos removal, a Fugitive Dust Construction Permit, crushing and screening equipment permits, and an air quality permit for the operation of non-road engines. They also noted that dust control equipment had not been included in the list of construction equipment necessary for demolition.	Kirtland AFB will obtain all necessary air quality permits prior to the start of construction. Section 2 of the Final EA has been updated for clarification to include dust control equipment as part of the possible construction equipment necessary for demolition activities. Concrete and asphalt will only be crushed and screened if rebar is not present. The Kirtland AFB landfill will obtain any necessary air quality permits prior to initiating crushing and screening activities.

APPENDIX C

AIR QUALITY SUPPORTING DOCUMENTATION

Summary	Summarizes total emissions by year.
Combustion	Estimates emissions from non-road equipment exhaust.
Generators	Estimates emissions from stationary generator combustion.
Fugitive	Estimates particulate emissions from construction activities including earthmoving, vehicle traffic, and windblown dust.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions.
Haul Truck On-Road	Estimates emissions from haul trucks removing materials from the job site.
Construction Commuter	Estimates emissions for construction workers commuting to the site.
AQCR Tier Report	Summarizes total emissions for the Albuquerque-Mid Rio Grande Intrastate Air Quality Control Region Tier report for 2002, to be used to compare the project to regional emissions.

Air Quality Emissions from Proposed Action

CY2010

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	10.546	0.625	4.170	0.211	0.638	0.619	1,228.012
Construction Fugitive Dust	-	-	-	-	14.939	1.494	-
Stationary Generator Combustion	0.486	0.627	0.295	0.025	0.030	0.030	46.126
Haul Truck On-Road	0.032	0.023	0.094	0.003	0.038	0.010	8.074
Construction Commuter	1.418	1.804	19.731	0.060	0.762	0.208	293.250
TOTAL CY2010	***12.48***	***3.08***	***24.29***	***0.30***	***16.41***	***2.36***	***1,575.46***

Note: Total CY2010 $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***1,428.94 metric tons***

CY2011

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	4.723	0.280	1.867	0.094	0.286	0.277	550.011
Construction Fugitive Dust	-	-	-	-	6.651	0.665	-
Stationary Generator Combustion	0.486	0.627	0.295	0.025	0.030	0.030	46.126
Haul Truck On-Road	0.002	0.002	0.006	0.0002	0.002	0.001	0.528
Construction Commuter	1.418	1.804	19.731	0.060	0.762	0.208	293.250
TOTAL CY2011	***6.63***	***2.71***	***21.90***	***0.18***	***7.73***	***1.18***	***889.91***

Note: Total CY2012 $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***807.15 metric tons***

CY2012

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	4.723	0.280	1.867	0.094	0.286	0.277	550.011
Construction Fugitive Dust	-	-	-	-	6.651	0.665	-
Stationary Generator Combustion	0.486	0.627	0.295	0.025	0.030	0.030	46.126
Haul Truck On-Road	0.002	0.002	0.006	0.0002	0.002	0.001	0.528
Construction Commuter	1.418	1.804	19.731	0.060	0.762	0.208	293.250
TOTAL CY2012	***6.63***	***2.71***	***21.90***	***0.18***	***7.73***	***1.18***	***889.91***

Note: Total CY2012 $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***807.15 metric tons***

CY2013

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	4.723	0.280	1.867	0.094	0.286	0.277	550.011
Construction Fugitive Dust	-	-	-	-	6.651	0.665	-
Stationary Generator Combustion	0.486	0.627	0.295	0.025	0.030	0.030	46.126
Haul Truck On-Road	0.002	0.002	0.006	0.0002	0.002	0.001	0.528
Construction Commuter	1.418	1.804	19.731	0.060	0.762	0.208	293.250
TOTAL CY2013	***6.63***	***2.71***	***21.90***	***0.18***	***7.73***	***1.18***	***889.91***

Note: Total CY2013 $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***807.15 metric tons***

Worst-Case Scenario

	NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)	$PM_{2.5}$ (ton)	CO_2 (ton)
Construction Combustion	24.714	1.466	9.770	0.494	1.495	1.450	2,878.045
Construction Fugitive Dust	-	-	-	-	34.893	3.489	-
Stationary Generator Combustion	1.945	2.506	1.182	0.100	0.119	0.119	184.504
Haul Truck On-Road	0.038	0.028	0.112	0.003	0.045	0.012	9.657
Construction Commuter	5.674	7.216	78.925	0.238	3.049	0.830	1,173.000
TOTAL Worst-Case Scenario	***32.37***	***11.22***	***89.99***	***0.84***	***39.60***	***5.90***	***4,245.21***

Note: Total Worst-Case Scenario $PM_{10}/_{2.5}$ fugitive dust emissions are assuming USEPA 50% control efficiencies.

CO_2 emissions converted to metric tons = ***3,850.40 metric tons***

Since future year budgets were not readily available, actual 2002 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Albuquerque-Mid Rio Grande Intrastate Air Quality Control Region 152

	Point and Area Sources Combined					
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2002	36,778	31,651	245,346	2,619	137,376	16,676

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 19 October 2009.

Determination Significance (Significance Threshold = 10%)

CY2010

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	36,778	31,651	245,346	2,619	137,376	16,676
CY2010 Emissions	12.48	3.08	24.29	0.30	16.41	2.36
CY2010 %	**0.0339%**	**0.0097%**	**0.0099%**	**0.0114%**	**0.0119%**	**0.0142%**

CY2011

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	36,778	31,651	245,346	2,619	137,376	16,676
CY2011 Emissions	6.63	2.71	21.90	0.18	7.73	1.18
CY2011 %	**0.0180%**	**0.0086%**	**0.0089%**	**0.0068%**	**0.0056%**	**0.0071%**

CY2012

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	36,778	31,651	245,346	2,619	137,376	16,676
CY2012 Emissions	6.63	2.71	21.90	0.18	7.73	1.18
CY2012 %	**0.0180%**	**0.0086%**	**0.0089%**	**0.0068%**	**0.0056%**	**0.0071%**

CY2013

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	36,778	31,651	245,346	2,619	137,376	16,676
CY2013 Emissions	6.63	2.71	21.90	0.18	7.73	1.18
CY2013 %	**0.0180%**	**0.0086%**	**0.0089%**	**0.0068%**	**0.0056%**	**0.0071%**

Worst Case Scenario

	Point and Area Sources Combined					
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Regional Emissions	36,778	31,651	245,346	2,619	137,376	16,676
Worst Case Emissions	32.37	11.22	89.99	0.84	39.60	5.90
Worst Case Scenario%	**0.0880%**	**0.0354%**	**0.0367%**	**0.0319%**	**0.0288%**	**0.0354%**

2010 Combustion Emissions

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

Assumptions:

2010 demolition activities assumes the 6 largest buildings will be demolished.
Total project area disturbed is based on a 100 foot zone surrounding each building.

Total project area disturbed (ft^2)= ($\sqrt{}$(Building Size (ft^2)) + 200 ft)^2

This methodology conservatively assumes that each building is one-story. It also assumes that each building is square.

2010 General Demolition Activities	Building Size	Total Project Area Disturbed
Demolition and removal of Building 613	11,048 ft^2	93,092 ft^2
Demolition and removal of Building 614	4,254 ft^2	70,343 ft^2
Demolition and removal of Building 736	4,000 ft^2	69,298 ft^2
Demolition and removal of Building 1013	5,747 ft^2	76,071 ft^2
Demolition and removal of Building 30143	59,840 ft^2	197,689 ft^2
Demolition and removal of Building 48066	2,880 ft^2	64,346 ft^2

Total Building Size:	87,769	ft^2	
	2.0	acres	
2010 Total Project Area Disturbed:	570,839	ft^2	
	13.1	acres	
Construction Duration:	12	months	
Annual Construction Activity:	240	days/yr	Assume 12 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	1	41.641	2.577	15.710	0.833	2.546	2.469	4941.526
Paving Equipment	1	45.367	2.606	18.578	0.907	2.776	2.693	5623.957
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			0.000					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days
Grading:	570,839	13.10	6
Paving:	0	0.00	0
Demolition:	570,839	13.10	655
Building Construction:	0	0.00	0
Architectural Coating	0	0.00	0

(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

2010 Total Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	249.85	15.46	94.26	5.00	15.27	14.81	29,649
Paving	-	-	-	-	-	-	0
Demolition	20,841.37	1,235.45	8,245.30	416.83	1,260.14	1,222.33	2,426,375
Building Construction	-	-	-	-	-	-	0
Architectural Coatings	-	-	-	-	-	-	0
Total Emissions (lbs):	**21,091.22**	**1,250.91**	**8,339.56**	**421.82**	**1,275.41**	**1,237.15**	**2,456,024**

Results: 2010 Total Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	21,091.22	1,250.91	8,339.56	421.82	1,275.41	1,237.15	2,456,024
Total Project Emissions (tons)	10.55	0.63	4.17	0.21	0.64	0.62	1,228.01

2011-2013 Combustion Emissions

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2 due to Construction

Assumptions:

Demolition activities will be completed over a three year period, therefore the total project area disturbed will be divided by three to estimate the annual project area disturbed.

Total project area disturbed is based on a 100 foot zone surrounding each building.

Total project area disturbed (ft^2)= ($\sqrt{}$(Building Size (ft^2)) + 200 ft)^2

This methodology conservatively assumes that each building is one-story. It also assumes that each building is square.

2011-2013 General Demolition Activities	Building Size	Total Project Area Disturbed
Demolish Building 605	500 ft^2	49,444 ft^2
Demolish Building 1003	120 ft^2	44,502 ft^2
Demolish Building 37505	629 ft^2	50,661 ft^2
Demolish Building 48055	684 ft^2	51,145 ft^2
Demolish Building 48056	573 ft^2	50,148 ft^2
Demolish Building 48058	1,986 ft^2	59,812 ft^2
Demolish Building 48059	1,586 ft^2	57,516 ft^2
Demolish Building 48061	864 ft^2	52,622 ft^2
Demolish Building 48062	1,134 ft^2	54,604 ft^2
Demolish Building 48063	480 ft^2	49,244 ft^2
Demolish Building 48064	2,040 ft^2	60,107 ft^2
Demolish Building 48067	2,880 ft^2	64,346 ft^2
Demolish Building 48068	1,812 ft^2	58,839 ft^2
Demolish Building 48069	1,920 ft^2	59,447 ft^2

Total Building Size:	17,208	ft^2	
	0.4	acres	
Total Disturbed Area:	762,436	ft^2	For the entire three year period.
	17.5	acres	
Annual Disturbed Area:	254,145	ft^2	Annual disturbed area is the total disturbed area divided by three years.
	5.8	acres	
Construction Duration:	12	months	
Annual Construction Activity:	240	days/yr	Assume 12 months, 4 weeks per month, 5 days per week.

Emission Factors Used for Construction Equipment

References: Guide to Air Quality Assessment, SMAQMD, 2004; and U.S. EPA NONROAD Emissions Model, Version 2005.0.0
Emission factors are taken from the NONROAD model and were provided to e²M by Larry Landman of the Air Quality and Modeling Center (Landman.Larry@epamail.epa.gov) on 12/14/07. Factors provided are for the weighted average US fleet for CY2007.
Assumptions regarding the type and number of equipment are from SMAQMD Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Bulldozer	1	13.60	0.96	5.50	1.02	0.89	0.87	1456.90
Motor Grader	1	9.69	0.73	3.20	0.80	0.66	0.64	1141.65
Water Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	3	41.64	2.58	15.71	0.83	2.55	2.47	4941.53

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Paver	1	3.83	0.37	2.06	0.28	0.35	0.34	401.93
Roller	1	4.82	0.44	2.51	0.37	0.43	0.42	536.07
Truck	2	36.71	1.79	14.01	3.27	1.99	1.93	4685.95
Total per 10 acres of activity	4	45.37	2.61	18.58	0.91	2.78	2.69	5623.96

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Loader	1	13.45	0.99	5.58	0.95	0.93	0.90	1360.10
Haul Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Total per 10 acres of activity	2	31.81	1.89	12.58	0.64	1.92	1.87	3703.07

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c] (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Stationary								
Generator Set	1	2.38	0.32	1.18	0.15	0.23	0.22	213.06
Industrial Saw	1	2.62	0.32	1.97	0.20	0.32	0.31	291.92
Welder	1	1.12	0.38	1.50	0.08	0.23	0.22	112.39
Mobile (non-road)								
Truck	1	18.36	0.89	7.00	1.64	1.00	0.97	2342.98
Forklift	1	5.34	0.56	3.33	0.40	0.55	0.54	572.24
Crane	1	9.57	0.66	2.39	0.65	0.50	0.49	931.93
Total per 10 acres of activity	6	39.40	3.13	17.38	3.12	2.83	2.74	4464.51

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)	CO_2 (lb/day)
Air Compressor	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77
Total per 10 acres of activity	1	3.57	0.37	1.57	0.25	0.31	0.30	359.77

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC. The NONROAD model contains emissions factors for total HC and for VOC. The factors used here are the VOC factors.

c) The NONROAD emission factors assume that the average fuel burned in nonroad trucks is 1100 ppm sulfur. Trucks that would be used for the Proposed Actions will all be fueled by highway grade diesel fuel which cannot exceed 500 ppm sulfur. These estimates therefore over-estimate SO2 emissions by more than a factor of two.

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2**	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	1	41.641	2.577	15.710	0.833	2.546	2.469	4941.526
Paving Equipment	1	45.367	2.606	18.578	0.907	2.776	2.693	5623.957
Demolition Equipment	1	31.808	1.886	12.584	0.636	1.923	1.865	3703.074
Building Construction	1	39.396	3.130	17.382	3.116	2.829	2.744	4464.512
Air Compressor for Architectural Coating	1	3.574	0.373	1.565	0.251	0.309	0.300	359.773
Architectural Coating**			0.000					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 acre)*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days
Grading:	254,145	5.83	4
Paving:	0	0.00	0
Demolition:	254,145	5.83	292
Building Construction:	0	0.00	0
Architectural Coating	0	0.00	0

(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	166.56	10.31	62.84	3.33	10.18	9.88	19,766
Paving	-	-	-	-	-	-	0
Demolition	9,278.87	550.04	3,670.92	185.58	561.03	544.20	1,080,256
Building Construction	-	-	-	-	-	-	0
Architectural Coatings	-	-	-	-	-	-	0
Total Emissions (lbs):	**9,445.43**	**560.35**	**3,733.76**	**188.91**	**571.21**	**554.08**	**1,100,022**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	9,445.43	560.35	3,733.76	188.91	571.21	554.08	1,100,022
Total Project Emissions (tons)	4.72	0.28	1.87	0.09	0.29	0.28	550.01

Emission Calculation Spreadsheet
Stationary Generator Combustion

Generator

7.4 hp Assume Honda portable generator model EB6500XA (Rated at 5500 W)

Criteria Air Pollutants	AP-42 Emission Factors[1] (lb/MMBtu)	Fuel Use[2] (gal/hr)	Heating Value (HV)[3] (Btu/gal)	Hourly Emissions[4] (lb/hr)	Annual Emissions[5] (ton/yr)	Annual Emissions[6] (six generators) (ton/yr)
Carbon Dioxide	154	0.40	130000	**8.01**	**7.69**	**46.13**
Carbon Monoxide	0.99	0.40	130000	**0.051**	**0.049**	**0.30**
Nitrogen Oxides	1.63	0.40	130000	**0.084**	**0.081**	**0.49**
Particulate Matter[7]	0.10	0.40	130000	**0.0052**	**0.0050**	**0.030**
Particulate Matter <10μm	0.10	0.40	130000	**0.0052**	**0.0050**	**0.030**
Particulate Matter <2.5μm[8]	0.10	0.40	130000	**0.0052**	**0.0050**	**0.030**
Sulfur Oxides	0.084	0.40	130000	**0.0044**	**0.0042**	**0.025**
Volatile Organic Compounds[9]	2.10	0.40	130000	**0.11**	**0.10**	**0.63**

Assume each generator operates a maximum of 1920 hours per year and is powered by gasoline.

Conservatively assume a total of 6 generators per year used on project sites simultaneously.

[1] Emission factors from EPA AP-42 Section 3.3 Gasoline and Diesel Industrial Engines, Table 3.3-1 (October 1996)

[2] The following equation was used to calculate hourly fuel use:
Hourly fuel use = hp * Brake specific fuel consumption (7000 Btu/hp-hr) * 1/HV (Btu/gal)

[3] The heating value (HV) of gasoline is given in AP-42 Appendix A: Miscellaneous Data & Conversion Factors (September 1985), Typical Parameters of Various Fuels as 130,000 Btu/gal.

[4] The following equation was used to calculate hourly emissions for each pollutant:
Hourly emissions (lb/hr) = EF (lb/MM Btu) * fuel use (gal/hr) * HV (Btu/gal) / 1000000
where: EF = Emission Factor
HV = Heating Value

[5] The following equation was used to calculate annual emissions for each pollutant:
Annual emissions (ton/yr) = Hourly emissions (lb/hr) * 1920 (hrs/yr) / 2000 (lb/ton)

[6] Annual emissions for six generators was calculated based on the following equation:
Annual emissions (six generators) (ton/yr) = Annual emissions (ton/yr) * 6 (generators)

[7] No emission factor data for Particulate Matter (PM) is included in AP-42, assume PM emission factors are equal to Particulate Matter <10μm.

[8] Assume Particulate Matter <2.5μm equals Particulate Matter <10μm.

[9] Volatile Organic Compounds assumed to be the exhaust portion of Total Organic Compounds (TOC).

2010 Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006

$PM_{2.5}$ Emissions

$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	0	months	
Area	0	acres	

General Construction Activities (0.19 ton PM_{10}/acre-month) Applies to demolition of buildings.

Duration of Construction Project	12	months	
Area	13.1	acres	Annual estimated acreage disturbed in FY 2010.

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	PM_{10} controlled	$PM_{2.5}$ uncontrolled	$PM_{2.5}$ controlled
New Road Construction	0.00	0.00	0.00	0.00
Construction Activities	29.88	14.94	2.99	1.49
Total	**29.88**	**14.94**	**2.99**	**1.49**

2011-2013 Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM_{10}/acre-month	MRI 1996; EPA 2001; EPA 2006

$PM_{2.5}$ Emissions

$PM_{2.5}$ Multiplier	0.10	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	EPA 2001; EPA 2006

Project Assumptions

New Road Construction (0.42 ton PM_{10}/acre-month)

Duration of Construction Project	0	months	
Area	0	acres	

General Construction Activities (0.19 ton PM_{10}/acre-month)

Duration of Construction Project	12	months	
Area	5.8	acres	Annual average acreage disturbed in each year (FY 2011, FY 2012, and FY 2013).

Applies to demolition of buildings.

	Project Emissions (tons/year)			
	PM_{10} uncontrolled	PM_{10} controlled	$PM_{2.5}$ uncontrolled	$PM_{2.5}$ controlled
New Road Construction	0.00	0.00	0.00	0.00
Construction Activities	13.30	6.65	1.33	0.67
Total	**13.30**	**6.65**	**1.33**	**0.67**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM_{10}/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM_{10}/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM_{10}/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM_{10}/acre-month) and 75% of the average emission factor (0.11 ton PM_{10}/acre-month). The 0.19 ton PM_{10}/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM_{10}/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particulate (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District as well as the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM_{10}/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM_{10}/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

$PM_{2.5}$ Multiplier **0.10**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (EPA 2006). Wetting controls will be applied during project construction.

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

2010 Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 13.1 acres/yr (from Combustion Worksheet)

Qty Equipment: 4.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	13.10	1.64
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	13.10	6.41
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	6.55	6.61
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	6.55	2.71
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	13.10	4.60
TOTAL								21.96

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 21.96
Qty Equipment: 4.00
Grading days/yr: 5.49

2011-2013 Grading Schedule

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 5.8 acres/yr (from Combustion Worksheet)

Qty Equipment: 3.0 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	5.83	0.73
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	5.83	2.85
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	2.92	2.94
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	2.92	1.21
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	5.83	2.05
TOTAL								9.78

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 9.78
Qty Equipment: 3.00
Grading days/yr: 3.26

2010 Haul Truck Emissions

Emissions from hauling construction and demolition debris are estimated in this spreadsheet.

Emission Estimation Method References: United States Air Force (USAF) Institute for Environment, Safety and Occupational Health Risk Analysis (IERA) Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (Revised December 2003).

US EPA Estimating 2003 Building-Related Construction and Demolition Materials Amounts (March 2009).

Assumptions:

Haul trucks carry 20 cubic yards of material per trip.

The average distance from a demolition site to the base landfill is 10 miles, and from a demolition site to the offsite Cerro Colorado Landfill is 30 miles.

Assume 85% of demolition waste would go to the base landfill and 15% would be transported offsite. Therefore a haul truck will have a weighted average of 26 miles round trip.

Estimated number of trips required by haul trucks = total amount of material demolished on installation/20 cubic yards per truck

pical non-residential demolition materials generation per unit area:	158	lb/ft^2	EPA 2009
Total building size removed:	87,769	ft^2	From Project Combustion
Total demolition waste:	13,867,502	lbs	Density of demolition waste * project area
Density of demolition waste:	150	lbs/ft^3	Density of concrete (EPA 2009)
Total volume of demolition waste:	3,424	cubic yards	
Number of trucks required to haul demolition waste:	171		Heavy duty diesel haul trucks (20 CY)
Miles per round trip:	26	miles	Weighted average

Heavy Duty Diesel Vehicle (HDDV) Average Emission Factors (grams/mile)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
HDDV	**6.500**	**4.7000**	**19.10**	**0.512**	**7.7**	**2.01**	**1646**

Notes:

Emission factors for all pollutants except CO_2 are from USAF IERA 2003.

Emission factors for PM, PM_{10}, SO_x are from HDDV in Table 4-50 (USAF IERA 2003).

Emission factors for VOC, CO, and NO_x are from Tables 4-41 through 4-43 for the 2010 calendar year, 2000 model year (USAF IERA 2003).

Diesel fuel produces 22.384 pounds of CO_2 per gallon.

It is assumed that the average HDDV has a fuel economy of 6.17 miles per gallon, Table 4-51 (USAF IERA 2003)

CO_2 emission factor = 22.384 lbs CO_2/gallon diesel * gallon diesel/6.17 miles * 453.6 g/lb

HDDV Haul Truck Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**63.79**	**46.12**	**187.43**	**5.02**	**75.86**	**19.72**	**16148.76**
tons	**0.03**	**0.02**	**0.09**	**0.00**	**0.04**	**0.01**	**8.07**

Example Calculation: NO_x emissions (lbs) = 26 miles per round trip * 918 trips * NO_x emission factor (g/mile) * lb/453.6 g

2011-2013 Haul Truck Emissions

Annual emissions from hauling construction and demolition debris are estimated in this spreadsheet.

Emission Estimation Method References: United States Air Force (USAF) Institute for Environment, Safety and Occupational Health Risk Analysis (IERA) Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (Revised December 2003).

US EPA Estimating 2003 Building-Related Construction and Demolition Materials Amounts (March 2009).

Assumptions:

The annual emissions estimated in this spreadsheet apply to each year: FY 2011, FY 2012, and FY 2013

Haul trucks carry 20 cubic yards of material per trip.

The average distance from a demolition site to the base landfill is 10 miles, and from a demolition site to the offsite Cerro Colorado Landfill is 30 miles.

Assume 85% of demolition waste would go to the base landfill and 15% would be transported offsite. Therefore a haul truck will have a weighted average of 26 miles round trip.

Estimated number of trips required by haul trucks = total amount of material demolished on installation/20 cubic yards per truck

Typical non-residential demolition materials generation per unit area:	158	lb/ft^2	EPA 2009
Total building size removed (annual):	5,736	ft^2	From Project Combustion
Total demolition waste:	906,288	lbs.	Density of demolition waste * project area
Density of demolition waste:	150	lbs/ft^3	Density of concrete (EPA 2009)
Total volume of demolition waste:	224	cubic yards	
Number of trucks required to haul demolition waste:	11		Heavy duty diesel haul trucks (20 CY)
Miles per round trip:	26	miles	Weighted average

Heavy Duty Diesel Vehicle (HDDV) Average Emission Factors (grams/mile)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
HDDV	**6.500**	**4.7000**	**19.10**	**0.512**	**7.7**	**2.01**	**1646**

Notes:

Emission factors for all pollutants except CO_2 are from USAF IERA 2003.

Emission factors for PM, PM_{10}, SO_x are from HDDV in Table 4-50 (USAF IERA 2003).

Emission factors for VOC, CO, and NO_x are from Tables 4-41 through 4-43 for the 2010 calendar year, 2000 model year (USAF IERA 2003).

Diesel fuel produces 22.384 pounds of CO_2 per gallon.

It is assumed that the average HDDV has a fuel economy of 6.17 miles per gallon, Table 4-51 (USAF IERA 2003)

CO_2 emission factor = 22.384 lbs CO_2/gallon diesel * gallon diesel/6.17 miles * 453.6 g/lb

HDDV Haul Truck Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
lbs	**4.17**	**3.01**	**12.25**	**0.33**	**4.96**	**1.29**	**1055.38**
tons	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.53**

Example Calculation: NO_x emissions (lbs) = 26 miles per round trip * 918 trips * NO_x emission factor (g/mile) * lb/453.6 g

2010-2013 Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Emission Estimation Method: United States Air Force (USAF) Institute for Environment, Safety and Occupational Health Risk Analysis (IERA) Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (Revised December 2003).

Assumptions:

Passenger vehicle emission factors for scenario year 2010 are used.

Assume representative of annual emissions for each scenario year (FY 2010 - 2013).

Passenger vehicle model year 2000 is used.

The average roundtrip commute for a construction worker =	50	miles
Number of construction days =	240	days
Number of construction workers (daily) =	48	people
Riders per vehicle =	1	person
Number of vehicles (daily) =	48	vehicles

Average On-Road Vehicle Emission Factors (grams/mile)

Vehicle Type Category	NO_x	VOC	CO	SO_x	PM_{10}	$PM_{2.5}$	CO_2	
LDGV	**2.10**	**2.90**	**33.10**	**0.072**	**0.71**	**0.20**	**391.97**	Light Duty Gasoline Vehicles
LDGT1	**2.20**	**3.10**	**35.20**	**0.096**	**1.08**	**0.29**	**526.04**	Light SUVs and Pickups
LDGT2	**2.50**	**3.40**	**38.60**	**0.098**	**2.58**	**0.66**	**535.24**	Heavy SUVs and Pickups
HDGV	**3.40**	**2.90**	**20.50**	**0.154**	**5.51**	**1.42**	**843.56**	Heavy Duty Gasoline Vehicles
LDDV	**1.20**	**0.60**	**1.70**	**0.116**	**0.80**	**0.28**	**373.70**	Light Duty Diesel Vehicles
LDDT	**1.50**	**1.00**	**1.90**	**0.157**	**1.59**	**0.48**	**505.90**	Light Duty Diesel Trucks
HDDV	**6.50**	**2.00**	**11.80**	**0.512**	**7.73**	**2.01**	**1645.60**	Heavy Duty Diesel Vehicles
MC	**0.90**	**5.70**	**22.50**	**0.032**	**0.08**	**0.03**	**177.48**	Motorcycles

Notes:

Emission factors for all pollutants except CO_2 are from USAF IERA 2003.

Emission factors for PM, PM_{10}, SO_x are from Table 4-50 (USAF IERA 2003).

Emission factors for VOC, CO, and NO_x are from Tables 4-2 through 4-49 for the 2010 calendar year, 2000 model year (USAF IERA 2003).

It is assumed that the average vehicle will produce 19.564 pounds of CO_2 per gallon of gas used and 22.384 pounds of CO_2 per gallon of diesel used (http://www.eia.doe.gov/oiaf/1605/coefficients.html).

Using the default fuel economy for the vehicle type categories in USAF IERA Table 4-51, the CO_2 emission factor was estimated.

HDDV CO_2 emission factor = 22.384 lbs CO_2/gallon diesel * gallon diesel/6.17 miles * 453.6 g/lb = 1645.60 g/mile

Default Fuel Economies for On-Road Vehicles

Vehicle Type Category	Default Fuel Economy (mpg)
LDGV	22.64
LDGT1	16.87
LDGT2	16.58
HDGV	10.52
LDDV	27.17
LDDT	20.07
HDDV	6.17
MC	50

Notes:

Values from Table 4-51 (USAF IERA 2003).

On-Road Vehicle Emissions (Annual)

Vehicle Type Category	NO_x	VOC	CO	SO_x	PM_{10}	$PM_{2.5}$	CO_2
LDGV	**1837.33**	**2537.27**	**28959.87**	**62.99**	**621.19**	**174.98**	**342943.79**
LDGT1	**318.48**	**448.76**	**5095.62**	**13.90**	**156.34**	**41.98**	**76150.00**
LDGT2	**269.84**	**366.98**	**4166.35**	**10.58**	**278.48**	**71.24**	**57771.62**
HDGV	**64.76**	**55.24**	**390.48**	**2.93**	**104.95**	**27.05**	**16067.77**
LDDV	**59.43**	**29.71**	**84.19**	**5.74**	**39.62**	**13.87**	**18506.96**
LDDT	**36.19**	**24.13**	**45.84**	**3.79**	**38.36**	**11.58**	**12205.80**
HDDV	**239.37**	**73.65**	**434.54**	**18.85**	**284.66**	**74.02**	**60600.05**
MC	**11.43**	**72.38**	**285.71**	**0.41**	**1.02**	**0.38**	**2253.77**
Total (lbs)	**2836.83**	**3608.13**	**39462.60**	**119.20**	**1524.62**	**415.10**	**586499.77**
Total (tons)	**1.42**	**1.80**	**19.73**	**0.06**	**0.76**	**0.21**	**293.25**

Average On-Road Vehicle Mix

Vehicle Type Category	Average On-Road Vehicle Mix (%)
LDGV	68.9
LDGT1	11.4
LDGT2	8.5
HDGV	1.5
LDDV	3.9
LDDT	1.9
HDDV	2.9
MC	1

Notes:

Vehicle mix is from Table 6-1 (USAF IERA 2003).

Example Calculation: NO_x emissions (lbs) = 48 vehicles * percent of vehicle mix /100 * NO_x emission factor (g/mile) * 50 miles/day * number of construction days * lb/453.6 g

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			Point Source Emissions						Area Source Emissions (Non-Point and Mobile Sources)					
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
1	NM	Bernalillo Co	1,179	1,199	177	119	43.6	310	184,071	23,731	61,715	8,064	1,524	24,000
2	NM	Sandavol Co	346	186	94.5	92.6	0.40	62.4	39,031	4,519	36,517	4,274	603	4,517
3	NM	Valencia Co	153	296	1.24	1.07	0	27.1	20,566	6,847	38,871	4,125	448	2,734
Grand Total			1,678	1,681	273	213	44	400	243,668	35,097	137,103	16,463	2,575	31,251

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 19 Oct 2009.

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	CO	NOx	PM10	PM2.5	SO2	VOC
Bernalillo	185,250	24,930	61,892	8,183	1,568	24,310
Total	245,346	36,778	137,376	16,676	2,619	31,651