# United States Department of the Interior
# Bureau of Land Management
# Rio Puerco Field Office
# Roswell Field Office
# Socorro Field Office

Final Environmental Assessment for
BLM RIGHT OF WAY FOR 58 SOW TRAINING/
NEAR KIRTLAND AFB
Sandoval, Cibola, Socorro, Guadalupe, and De Baca Counties, New Mexico
DOI-BLM-NM-A010-2019-0011-EA

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In Reply Refer to:
NMNM 138244
2800 (A0100)

## FINDING OF NO SIGNIFICANT IMPACT

Right-of-Way for 58th Special Operations Wing
Training near Kirtland Air Force Base, New Mexico
DOI-BLM-NM-A010-2019-0011-EA

## INTRODUCTION:

The Bureau of Land Management (BLM) in coordination with the U.S. Air Force has conducted an environmental analysis (DOI-BLM-NM-A010-2019-0011-EA) for a proposed action to continue the 58th Special Operations Wing (58 SOW) training on BLM administered land near Kirtland Air Force Base (Kirtland AFB), Bernalillo County, New Mexico. The 58 SOW has applied for a 30-year right-of-way (ROW) under the Federal Land Policy and Management Act (FLPMA) to access 49 BLM locations on public lands administered by the BLM Rio Puerco, Socorro, and Roswell Field Offices.

## FINDING OF NO SIGNIFICANT IMPACT:

Based upon a review of the EA and the supporting documents, I have determined that the Proposed Action will not significantly affect the quality of the human environment, individually or cumulatively with other actions in the general area. No environmental effects meet the definition of significance in context or intensity as defined in Title 40 Code of Federal Regulations Section 1508.27 (40 CFR 1508.27). Environmental effects do not exceed those effects described in the amended 1992 Rio Puerco Field Office Resource Management Plan/Final Environmental Impact Statement (RMP/FEIS), the Socorro Field Office Resource Management Plan 2010, the Roswell Field Office Resource Management Plan 1997, and Special Status Species Record of Decision and Approved Resource Management Plan Amendment 2008, therefore, an environmental impact statement is not needed. This finding is based on the context and intensity of the project as described:

**Context:** The proposed action will allow ongoing activity to continue at existing and new sites that will allow the Air Force to continue to provide specialized training at locations within close proximity with variable terrain and landscapes that simulate potential real-world deployment environments and complex training scenarios.

**Intensity:** Intensity refers to the severity of the impact. The following discussion is organized around the Ten Significance Criteria described in 40 CFR 1508.27. The following have been considered in evaluating intensity:

1. Impacts that may be both beneficial and adverse:
The activities described in the proposed action do not include any significant beneficial or adverse impacts.

2. Degree of effect on public health and safety:
The activities included in the proposed action would not significantly affect public health or safety.

3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas:
The activities described in the proposed action would not significantly affect unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

4. Degree to which the possible effects on the quality of the human environment are likely to be highly controversial:
The activities described in the proposed action do not involve effects on the human environment that are likely to be highly controversial.

5. Degree to which the possible effects on the quality of the human environment are highly uncertain or involve unique or unknown risk.
The activities described in the proposed action do not involve effects that are highly uncertain or involve unique or unknown risks.

6. Degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration:
The proposed action to grant access to sites for training is a continuance of past access and does not establish a new precedent for future actions with significant effects or represent a decision in principle about a future consideration.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts:
The 58 SOW currently conducts training activities on 26 sites, encompassing 413.5 acres, on BLM-administered public property under a 3-year temporary ROW that expires 31 December 2018. Under the Proposed Action, a new authorization is being sought for continuing training activities at the 26 sites plus expanding the training activities to 23 new BLM sites, encompassing an additional 336.5 acres. Currently, the 58 SOW uses 23 of the 26 BLM sites for helicopter landing zone (HLZ) training, including helicopter takeoffs and landings in locations with variable terrain in addition to low-elevation maneuvering of aircraft. Three HLZ sites are used for CV-22B Osprey training.

The effects of the current and proposed training will not be significant, individually or cumulatively, when considered with the effects of other actions. Any adverse impacts identified in the proposed action, in conjunction with any adverse impacts of other past, present, or reasonably foreseeable future actions will not result in negligible impacts to natural and cultural resources.

8. Degree to which the action may adversely affect district, sites, highways, structures, or objects listed on the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources:
The activities described in the proposed action will not adversely affect or cause loss or destruction of scientific, cultural, or historical resources, including those listed in or eligible for listing in the National Register of Historic Places (NRHP).

9. Degree to which the action may adversely affect an endangered or threatened species or its critical habitat:

The proposed activities will have no effect on any endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act.

10. Whether the action threatens a violation of federal, state, or local environmental protection law:
This action is in conformance with federal, state, and local laws.

*/s/ Jesus Gallegos* *05/20/2019*
District Manager, Albuquerque District Office Date

FIELD OFFICE, Pan American Bldg., 100 Sun Avenue NE, Suite 330, Albuquerque, NM 87109 with copies sent to the Regional Solicitor, Southwest Region, U.S. Department of Interior, 505 Marquette Ave., NW, Suite 1800, Albuquerque, NM 87102, and to the Department of the Interior, Board of Land Appeals, 801 North Quincy St., MS300-QC, Arlington, VA, 22203. If a statement of reasons for the appeal is not included with the notice, it must be filed with the Interior Board of Land Appeals at the above address within 30 days after the Notice of Appeal is filed with the Authorized Officer.

5 /20/2019

Jesus Gallegos
Acting District Manager, Albuquerque, NM

Date

Attachment(s)

1. Right of Way for 58 SOW Training / Near Kirtland AFB Environmental Assessment (DOI-BLM-NM-A010-2019-0011-EA).

2. FONSI

3. BLM Site Location Table

10. Whether the action threatens a violation of federal, state, or local environmental protection law:
This action is in conformance with federal, state, and local laws.

District Manager, Albuquerque District Office — Date 5/20/19

**United States Department of the Interior**
**Bureau of Land Management**
**Rio Puerco Field Office**
**Roswell Field Office**
**Socorro Field Office**

Final Environmental Assessment for
BLM RIGHT OF WAY FOR 58 SOW TRAINING/
NEAR KIRTLAND AFB
Sandoval, Cibola, Socorro, Guadalupe, and De Baca Counties, New Mexico
DOI-BLM-NM-A010-2019-0011-EA

Pamela Reed, Realty Specialist — 5/9/2019
Signature and Title of Project Lead — Date

, Acting Field Office Manager — 5/9/2019
Signature and Title of Lead Reviewer — Date

March 2019

**AIR FORCE FINDING OF NO SIGNIFICANT IMPACT**
**ENVIRONMENTAL ASSESSMENT FOR THE**
**BLM RIGHT OF WAY FOR 58 SOW TRAINING NEAR**
**KIRTLAND AIR FORCE BASE, NEW MEXICO**

Pursuant to provisions of the National Environmental Policy Act (NEPA), 42 United States Code (USC) 4321 to 4347, as amended, implementing Council on Environmental Quality (CEQ) Regulations; 40 Code of Federal Regulations (CFR) 1500–1508; and 32 CFR § 989, *Environmental Impact Analysis Process (EIAP)*, the United States Air Force (USAF) in coordination with the Bureau of Land Management (BLM), prepared an Environmental Assessment (EA) to assess potential environmental consequences associated with the approval of a BLM right-of-way (ROW) permit to continue the 58th Special Operations Wing (58 SOW) training on BLM administered land near Kirtland Air Force Base (AFB), Bernalillo County, New Mexico. A Draft EA was released for a 30-day public review period on October 21, 2018. No comments were received from the public. A few comments related to the associated consultation process and desire to be notified of any future actions were received from agencies and tribes.

The BLM and the USAF are issuing separate Findings of No Significant Impact (FONSIs) per each agencies' procedures. This FONSI fulfills the USAF EIAP requirements.

The purpose of the BLM is to provide a ROW, under the application provisions of the Federal Land Policy and Management Act of 1976 (FLPMA), to the USAF for the 58 SOW training mission. The need for the action is established by the BLM's responsibility under FLPMA to respond to a request for a 30-year ROW to 49 BLM locations.

The purpose of the proposed action is to acquire a real property interest in lands that will allow the 58 SOW to conduct training and preparation for real-world combat situations and humanitarian efforts for the next 30 years. The need for the action is to meet the 58 SOW training mission requirements and to continue to provide specialized training at locations within close proximity with variable terrain and landscapes that simulate potential real-world deployment environments and complex training scenarios.

The EA addressing the BLM ROW permit for the 58 SOW training, attached hereto and incorporated herein, analyzes the potential environmental consequences of activities associated with the training activities on BLM-administered lands and provides environmental protection measures to avoid or reduce adverse environmental impacts.

The EA considers all potential impacts of the Proposed Action and alternatives including the No Action Alternative. The EA also considers cumulative environmental impacts with other projects within the Region of Influence.

**PROPOSED ACTION – Alternative 1 (EA §2.2, pages 2-3 to 2-11)**

Under the Proposed Action, the BLM would allow the 58 SOW ROW access to BLM-administered public lands for training purposes and grant a 30-year ROW to the USAF. The 58 SOW currently conducts training activities on 26 sites, encompassing 413.5 acres, on BLM-administered public property under a 3-year temporary ROW that expires 31 December 2018. Under the Proposed Action, a new authorization is being sought for continuing training activities at the 26 sites plus expanding the training activities to 23 new BLM sites, encompassing an additional 336.5 acres. Currently, the 58 SOW uses 23 of the 26 BLM sites for helicopter landing zone (HLZ) training, including helicopter takeoffs and landings in locations with variable terrain in addition to low-elevation maneuvering of aircraft. Three HLZ sites are used for CV-22B Osprey training.

**NO-ACTION ALTERNATIVE – Alternative 2 (EA §2.3, page 2-12)**

Under the No-action Alternative, the BLM would not grant a 30-year ROW to the USAF. The 58 SOW would discontinue training activities on BLM-administered public property after the current

3-year term expires on 31 December 2018. Until 31 December 2018, the 58 SOW training activities would continue only on the 26 existing BLM sites.

**CURRENT OPERATIONS AT CURRENT SITES ALTERNATIVE – Alternative 3 (EA §2.4, page 2-12)**

Under Alternative 3, the BLM would allow the 58 SOW ROW access to BLM-administered public lands for training purposes and grant a 30-year ROW to the USAF only to the 26 sites currently in use. Alternative 3 is similar to the Proposed Action, except there would be no new training sites. The 23 current BLM sites would be used for HLZ training and the three current BLM sites would be used for CV-22 Osprey training.

**SUMMARY OF FINDINGS**

Under the Proposed Action, current 58 SOW activities would continue at the current levels of operation, however, the helicopter training operations would be spread out over 23 new sites as well as the 23 currently utilized site. The CV-22 Osprey training would continue at the current levels of operation only at the three currently utilized sites. No additional student throughput is planned, and flight activities would continue to use established helicopter drop zones, low-level training routes, and installation entry and exit procedures. No new structures or grading of sites is proposed. Environmental analyses within the EA focused on the following resource areas:

**Airspace and Management (EA § 4.1, pages 4-1 to 4-6).** Under the Proposed Action, the level of 58 SOW activities would not change. The operations would be spread out amongst the existing and proposed HLZs. Therefore, no increase in flight sorties is anticipated. The existing flight approach and flight departure tracks to and from Kirtland AFB would also remain unchanged for the existing HLZs and most of the new HLZs. No short- or long-term impacts on airspace management are anticipated.

**Noise (EA § 4.2, pages 4-7 to 4-9).** There are no noise sensitive receptors or human population nearby to any of the existing or proposed BLM HLZ sites. For the 23 existing HH-60G Pave Hawk and UH-1N Iroquois HLZ sites, implementation of the Proposed Action would decrease the radius of the 65 decibels (dB) day-night sound level (DNL) noise contour by 0.05 miles. For the 16 new HH-60G Pave Hawk and UH-1N Iroquois HLZ sites, implementation of the Proposed Action would increase noise levels in the vicinity of the new HLZ sites. However, this noise increase would be expected to be minor due to the low number of aircraft operations. The Proposed Action would result in a minor positive impact for these 23 sites. For the three existing CV-22B Osprey HLZ sites, implementation of the Proposed Action would not change aircraft activities or noise contours. There would be no change and no impact at these sites due to the Proposed Action. The pyrotechnic equipment used in opposing forces (OPFOR) training (e.g., Smokey surface-to-air missiles [SAMs], alternative rockets, and smoke grenades) range in loudness levels comparable with small-to-large firecrackers and shotguns. There would be no construction activities associated with the Proposed Action.

**Air Quality (EA § 4.3, pages 4-9 to 4-11).** The sites in the Proposed Action are spread over various counties within New Mexico. Main operations are managed from Kirtland AFB, which is located within Bernalillo County, New Mexico. Training operations currently take place within Cibola, Sandoval, and Valencia Counties. New training sites are proposed for De Baca, Guadalupe, and Socorro Counties. With regard to National Ambient Air Quality Standards (NAAQS), Bernalillo County is listed as attainment for all standards. The Albuquerque Area within Bernalillo County is listed a Moderate Maintenance Area for carbon monoxide (CO). The other counties are listed as in attainment for all standards.

Under the Proposed Action, the total amount of training activities would remain the same as current operations, but they would occur in a greater number of training sites with different travel distances to the training sites. This increase in air miles flown by the aircraft would result in a slight increase in air emissions over those resulting from current operations. Emissions of criteria pollutants in the State of New Mexico have a decreasing trend. The small increases in emissions of criteria

pollutants from the Proposed Action over those of the current operations would not affect this trend and would conform with the State Implementation Plan (SIP). The greenhouse gas emissions are below the reporting requirement.

**Earth Resources (EA§ 4.4, page 4-12).** Impacts to the soils would be limited to the area of the training sites. The impacts to soils from the existing training operations have only impacted the soils at a few of the existing sites. The impacts of the proposed operations would likely result in the same localized erosion of soils at a portion of the new sites over time. There is potential for less erosion at the new sites and recovery at the four sites with bare areas, as the number of air events at each site is reduced as the training is spread out to the greater number of available training sites.

**Natural Resources (EA§ 4.5, pages 4-12 to 4-29).** The frequency/intensity of use for helicopter operations would be reduced at 23 of the existing HLZs, as compared to baseline conditions. Loss or damage to vegetation and habitat under the Proposed Action would be: (1) minor on open grassland within 23 of the existing HLZs currently used for helicopter landing operations, which would be reduced relative to current conditions due to the reduction in helicopter sorties at these sites; and (2) minor within and adjacent to 14 of the existing training sites from truck use during OPFOR training. Helicopter operations within the proposed new HLZ sites would result in direct damage to vegetation and habitat within the helicopter landing footprint. This may result in minor long-term impacts to vegetation and/or habitat in the landing areas. The total acreage that could be potentially impacted by training activities is very small compared to the total acreage managed in the project region. Therefore, the Proposed Action would result in less than significant impacts to vegetation and habitat region-wide.

The Proposed Action would result in increased acreage of potentially impacted wildlife habitat at the project-level due to helicopter landing operations and vehicle. However, because these habitats are small in area compared to the total acreage managed in the project region, it has been determined that implementation of the Proposed Action would not result in significant region-wide impacts to wildlife habitat and are highly unlikely to result in population-level impacts to wildlife species.

No special status plant species were found during surveys of the current and proposed training sites. Due to the presence of predominantly disturbed open grassland habitat, impacts to special status plants would not occur under the Proposed Action. No federally-listed threatened or endangered, proposed, or candidate species, nor designated habitats were present within the project sites, and only a few individuals of BLM sensitive animal species were found within or near the sites. Additionally, affected habitat acreage is relatively minimal compared to total acreage in the project region. Therefore, while training activities under the Proposed Action may impact individuals of the BLM sensitive species found within the proposed sites, these activities are not likely to result in a trend toward federal listing or a loss of viability for any BLM sensitive species and are not likely to adversely affect any federally-listed threatened or endangered, proposed, or candidate species.

No riparian resources were identified within areas affected under this Proposed Action. No wetlands were observed within any site. However, dry, ephemeral drainages that are considered non-wetland waters of the U.S. were observed and delineated at three current and one proposed HLZ. No impacts have been documented to waters of the U.S. within the three existing HLZs with ongoing air operations, no impacts to waters of the U.S. within the existing sites or proposed sites are anticipated.

**Cultural Resources (EA § 4.6, pages 4-29 to 4-30).** All existing sites currently used by the 58 SOW and all sites proposed for potential use in the future were surveyed for cultural resources. Operations were discontinued at existing sites with cultural resources that could be impacted by training activities. All proposed sites with cultural resources that could be impacted by training activities were removed from the list of potential sites being considered. There would be no identified impacts to cultural resources from the Proposed Action.

**Water Resources (EA § 4.7, pages 4-30 to 4-31).** The Proposed Action would not be expected to impact the groundwater located under the training sites. The training activities do not involve the

use of any groundwater at either the existing or the proposed new sites. The training activities do not include the transfer or use of uncontained petroleum or hazardous materials. The current and proposed activities would not impact groundwater or groundwater quality.

The Proposed Action would have no direct effects on surface water within the BLM-administered lands as creeks, springs, and drainages would remain unaltered. All ground transportation vehicles would remain on existing roads and routes and therefore would not contribute to soil erosion and surface water quality impacts. The training activities do not involve the use of any surface water at the training sites. The proposed actions would not impact surface water or surface water quality.

While other current and proposed sites are in or partially in 100-year floodplains, the training activities do not involve any ground disturbance or construction. The floodplains would not be altered by the training activities. There would be no impact to the 100-year floodplains.

**Hazardous Materials and Waste (EA § 4.8, pages 4-31 to 4-32).** The only hazardous waste anticipated during the Proposed Action would be from liquids leaving a vehicle during an emergency repair. All liquids would be captured and disposed of properly off-site; therefore, no impacts from hazardous wastes are anticipated.

**Ground and Aircraft Safety (EA § 4.9, pages 4-32 to 4-34).** Under current operations, the presence of land vehicle traffic is limited to pickup trucks used for OPFOR activities and maintenance vehicles in case of emergency. There would be no change to current impacts to ground and traffic safety under the Proposed Action. The number of air events would be the same under the Proposed Action as under the current operations. The sorties would be spread out to more sites, but the number of sorties and the air vehicles used would be the same as under current operations. There would be no change to current impacts to aircraft safety under the Proposed Action.

**Bird Strike Aircraft (EA § 4.10, pages 4-34 to 4-35).** While bird-aircraft collisions may occur within the HLZs, total annual sorties would remain constant under the Proposed Action, such that the potential for bird-aircraft strikes are likely to remain at baseline levels when averaged across all HLZs. It should be noted that a slight overall increase to bird-aircraft collisions could occur if birds at existing sites are habituated to air operations, whereas those at proposed sites are not. This increase is unquantifiable and would only be temporary until the bird populations at the new sites also become habituated.

**Land Use, Special Designations, Recreation and Visual Quality (EA § 4.11, pages 4-35 to 4-37).** The overall land use surrounding the existing and proposed new training sites has not been changed. The Proposed Action is not incompatible with existing land use management plans and therefore does not have significant impact to land use.

There are no current or proposed HLZs located within the boundaries of any existing or proposed special designation area. Some proposed OPFOR sites are located on the borders of special designation areas. There would be no impacts to special designation areas or special designation area protected resources under the Proposed Action.

The current or proposed training sites do not involve any recreational facilities. There are no recreational facilities within the immediate area of any of the training sites. The recreational use of the areas surrounding the sites is not expected to be reduced.

The only impact to visual character would be that of the air vehicles in flight and on the ground at a training site. The impact to the visual resources at the sites would be compatible with the current management. The impacts to visual resources from the Proposed Action would be minor.

**Socioeconomics (EA § 4.12, pages 4-37 to 4-38).** Training activities on the current and proposed new training sites would not result in changes to population, housing, or the economy as a result of the Proposed Action. The influx of trainees from outside of Kirtland AFB has been, and would continue to be, a slight economic benefit for the 6-month duration of the training. It is unlikely that

this temporary increase in the population generates a substantial demand for educational or other public facilities.

**Environmental Justice (EA § 4.13, pages 4-38 to 4-39).** Any physical effects of the Proposed Action, such as increased noise at new training sites, would not disproportionately affect environmental justice populations. There would be no disproportionate effects on environmental justice populations, since there would be no change in the physical or economic condition of minority or low income populations in the six counties affected by the project.

The USAF has concluded that no significant adverse cumulative impacts would result from activities associated with implementation of the Proposed Action when considered with past, present, or reasonably foreseeable future projects in the Region of Influence (**EA § 4.14, pages 4-39 to 4-43**).

## FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and analyses contained in the attached EA, conducted under the provisions of NEPA, CEQ Regulations, and 32 CFR § 989, and based on review of public and agency comments submitted during the 30-day public comment period, I conclude that the Proposed Action would not have a significant environmental impact, either by itself or cumulatively with other known projects. Accordingly, an Environmental Impact Statement is not required. The signing of this Finding of No Significant Impact completes the environmental impact analysis process.

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Date: 2019.04.12 07:14:55 -05'00'

CYNTHIA H. OLIVA, GS-15
USAF AETC/A4P
Approving Official, USAF

12 April 2019
Date

Attachment: *Environmental Assessment for the BLM Right of Way for 58 SOW Training Near Kirtland Air Force Base, New Mexico.*

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## APPENDICES

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| % | percent |
| ABW | Air Base Wing |
| ACEC | areas of critical environmental concern |
| AETC | Air Education and Training Command |
| AFB | Air Force Base |
| AFI | Air Force Instruction |
| AGL | above ground level |
| ANSI | American National Standards Institute |
| ATTW | Aircrew Training and Test Wing |
| ATV | all-terrain vehicle |
| BASH | Bird/Wildlife Aircraft Strike Hazard |
| BEA | U.S. Bureau of Economic Analysis |
| BGEPA | Bald and Golden Eagle Protection Act |
| BISON-M | Biota Information System of New Mexico |
| BLM | Bureau of Land Management |
| BLMS | BLM Sensitive Species |
| BLS | U.S. Bureau of Labor Statistics |
| CAAA | Clean Air Act Amendments |
| CCTW | Combat Crew Training Wing |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| $CH_4$ | methane |
| CO | carbon monoxide |
| $CO_2$ | Carbon dioxide |
| $CO_2eq$ | Carbon Dioxide equivalent |
| CSO | Combat Systems Operator |
| CTW | Crew Training Wing |
| CWA | Clean Water Act |
| dB | decibel |
| dBA | “A-weighted” decibel |
| DNL | Day-Night Average Sound Level |
| DoD | Department of Defense |
| EA | Environmental Assessment |
| EIAP | Environmental Impact Analysis Process |
| EIS | Environmental Impact Statement |
| EO | Executive Order |
| ERMA | Extensive Recreation Management Area |
| ESA | Federal Endangered Species Act |
| FAA | Federal Aviation Administration |

| | |
|---|---|
| FE | Federally-Listed Endangered |
| FICON | Federal Interagency Committee on Noise |
| FLPMA | Federal Land Policy and Management Act |
| FT | Federally-Listed Threatened |
| GHG | Greenhouse Gas |
| GIS | Geographic Information System |
| GWP | Global Warming Potential |
| HFCs | hydrofluorocarbons |
| HLZ | Helicopter Landing Zone |
| IDT | Interdisciplinary Team |
| IPAC | Information, Planning, and Conservation |
| m | meters |
| MBTA | Migratory Bird Treaty Act |
| mm | millimeter |
| MOA | Military Operations Area |
| MSA | Metropolitan Statistical Area |
| MSL | mean sea level |
| $MTCO_2eq$ | metric tons carbon dioxide equivalent |
| MTPY | metric tons per year |
| MTR | Military Training Route |
| $N_2O$ | Nitrous oxide |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act |
| NF | National Forest |
| NHD | National Hydrography Dataset |
| NHNM | Natural Heritage New Mexico |
| NM | New Mexico |
| NMAC | New Mexico Administrative Code |
| NMCRIS | New Mexico Cultural Resources Inventory System |
| NMDGF | New Mexico Department of Game and Fish |
| NO | nitrogen oxide or nitrogen monoxide |
| $NO_2$ | nitrogen dioxide |
| NOx | nitrogen oxides |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| OF | Opposing Force (OPFOR) training site designation (e.g., OF 1) |
| OHV | off-highway vehicles |
| OPFOR | Opposing Force |
| PFC | perfluorocarbons |
| PILT | payment in lieu of taxes |

| | |
|---|---|
| $PM_{10}$ | particulate matter less than ten micrometers in aerodynamic diameter |
| $PM_{2.5}$ | particulate matter less than 2.5 micrometers in aerodynamic diameter |
| PR | Personnel Recovery |
| RFO | Roswell Field Office |
| RMP | Resource Management Plan |
| ROW | Right-of-Way |
| RPFO | Rio Puerco Field Office |
| SAM | surface-to-air missile |
| $SF_6$ | Sulfur Hexafluoride |
| SFO | Socorro Field Office |
| SHPO | State Historic Preservation Office |
| SIP | State Implementation Plan |
| $SO_2$ | sulfur dioxide |
| SOAR | Special Operations Aviation Regiment |
| SOF | Special Operations Forces |
| SOW | Special Operations Wing |
| SRMA | Special Recreation Management Area |
| SUA | Special Use Airspace |
| SWReGAP | U.S. Geological Survey (USGS) Southwest Regional Gap Analysis Project |
| TCP | Traditional Cultural Property |
| TerraLOC | dust suppressant |
| tpy | tons per year |
| TRACON | Terminal Radar Approach Control |
| U.S. | United States |
| U.S.C. | United States Code |
| USACE | United States Army Corps of Engineers |
| USAF | United States Air Force |
| USCB | United States Census Bureau |
| USEPA | United States Environmental Protection Agency |
| USFS | United States Forest Service |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| VMT | vehicle miles traveled |
| VOC | volatile organic compound |
| VRM | Visual Resource Management |
| WSA | Wilderness Study Area |
| WSMR | White Sands Missile Range |

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# 1 INTRODUCTION

## Background

The 377th Air Base Wing (377 ABW), a unit of the United States Air Force (USAF) Global Strike Command, is the host unit at Kirtland Air Force Base (AFB), New Mexico (NM). Kirtland AFB supports the 58th Special Operations Wing (58 SOW).

The 58 SOW is requesting a 30-year Right-of-Way (ROW) to 49 sites on Bureau of Land Management (BLM) administered lands near Kirtland AFB. This would allow the 58 SOW to continue training activities on 26 sites where it currently conducts training exercises and expand onto an additional 23 proposed training sites (Figure 1-1 and Appendix A – Site Maps). This long-term ROW would allow the 58 SOW to improve the ability to meet the current training mission and not require changes to the approved training curriculum.

This Environmental Assessment (EA) includes the potential environmental consequences from conducting training at selected locations and will support establishment of a 30-year ROW access agreement between BLM and USAF.

The 58 SOW provides the USAF's training course for aircrews operating the CV-22B Osprey tilt rotor aircraft, and two types of helicopters (HH-60G Pave Hawk and UH-1N Iroquois). Aircrews are trained and evaluated in daytime and nighttime for both basic and advanced aviation.

**CV-22 Osprey Tiltrotor**

To be effective and realistic, training must replicate actual forward-deployed conditions as much as possible in order to ensure that Airmen are prepared for the mission they will be tasked to perform in those challenging environments. Potential training sites must be located near existing airspace and must utilize landing zones adjacent to and in proximity to Kirtland AFB to meet the current 58 SOW training mission.

**HH-60G Pave Hawk Helicopter**

This training currently occurs on land controlled by the BLM, the Cibola National Forest (NF), or private land for which the USAF has use agreements with the landowners.

**UH-1N Iroquois Helicopter**

The 58 SOW currently uses 26 sites located on BLM-administered public land for helicopter/tiltrotor landing zones (HLZs) under a three-year temporary grant issued by the BLM that expired 31 December 2018[1]. The sites have also been used, with USAF and BLM agreement, by other Department of Defense (DoD) agencies, including the Marines (pre-deployment spin-up of MV-22s), the Army (high desert training), and the Army's 160th Special Operations Aviation Regiment (SOAR) (training with MH-47s or M/AH-6s). The BLM training sites are located in close proximity to Kirtland AFB and duplicate the necessary conditions (remote location, topography, vegetation, etc.) not available anywhere else in the area.

Expanding the training activities to additional locations will allow for more diverse and challenging training conditions for 58 SOW due to reduced repetition. In furtherance of enabling diverse training, the prospective training locations must represent a variable topography. For example, training sites must include variations of slopes of 10 to 12 percent, high and low elevations, rock outcrops, ridgelines, valleys, mountains, flatlands, grass and shrub lands, and forest cover.

## 1.1 Purpose and Need

The purpose of the BLM is to provide a ROW, under the application provisions of the Federal Land Policy and Management Act of 1976 (FLPMA), to the USAF for the 58 SOW training mission. The need for the action is established by the BLM's responsibility under FLPMA to respond to a request for a 30-year ROW to 49 BLM locations.

The purpose of the proposed action is to acquire a real property interest in lands that will allow the 58 SOW to conduct training and preparation for real-world combat situations and humanitarian efforts for the next 30 years. The need for the action is the 58 SOW training mission requirements and to continue to provide specialized training at locations within close proximity with variable terrain and landscapes that simulate potential real-world deployment environments and complex training scenarios.

[1] A short-term extension was granted for temporary ROW for the 58 SOW training activities to continue only on the 26 existing BLM sites as presented in table 2-2.

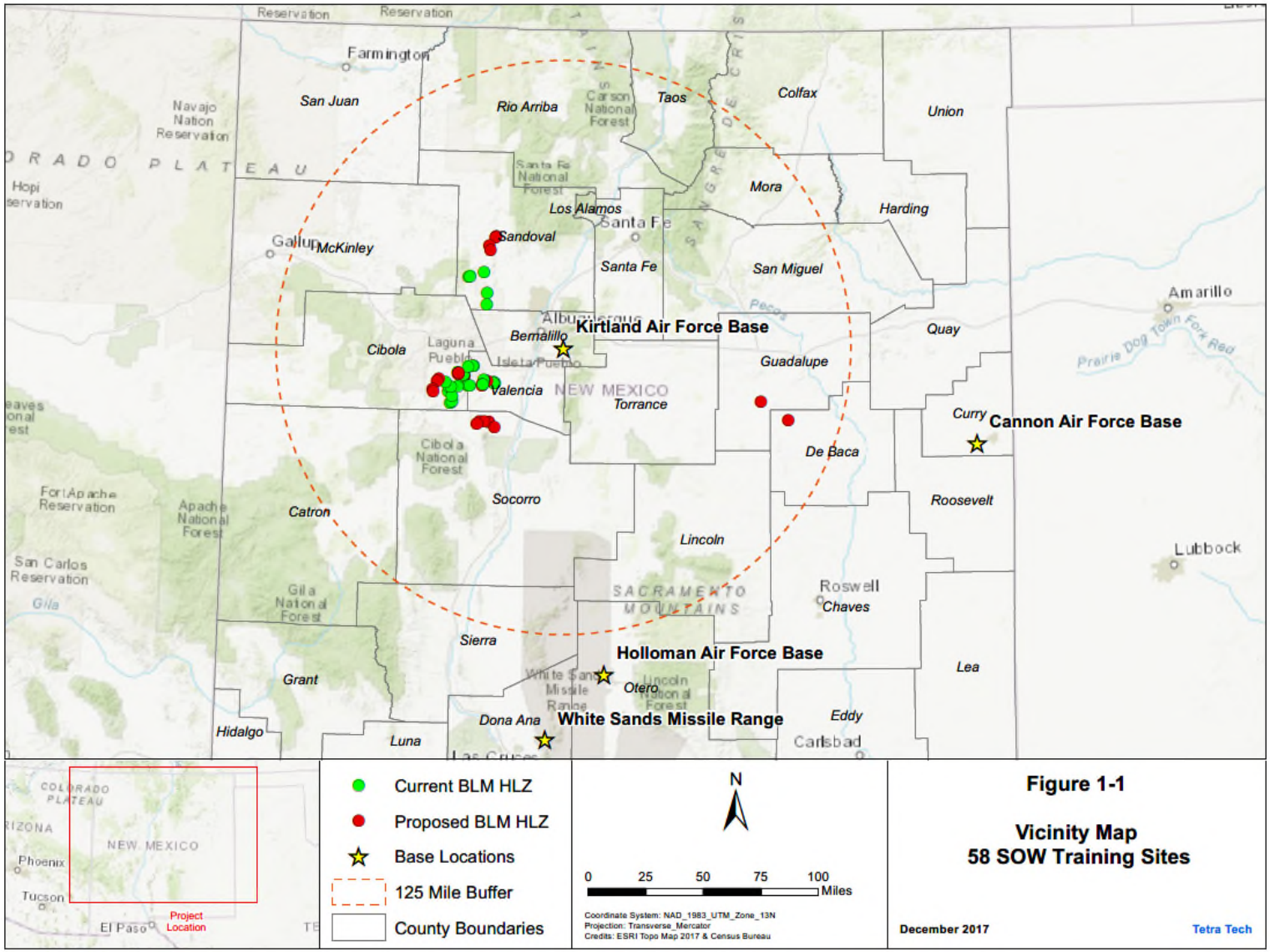


**Figure 1-1. Vicinity Map 58 SOW Training Sites**

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## 1.2 Decision to be Made

The BLM is considering whether to allow the 58 SOW ROW access to BLM-administered public lands for training purposes and to grant a 30-year ROW to the USAF. This analysis evaluates the potential environmental consequences from 58 SOW training activities performed on BLM ROW property.

## 1.3 Plan Conformance

This Proposed Action conforms to the 1986 Rio Puerco Resource Management Plan, as amended 1992, Socorro Field Office Resource Management Plan 2010, the Roswell Field Office Resource Management Plan 1997, and Special Status Species Record of Decision and Approved Resource Management Plan Amendment 2008.

## 1.4 Applicable Regulatory Requirements

This EA is part of the USAF *Environmental Impact Analysis Process* (EIAP) for the proposed project and was prepared in compliance with NEPA regulations and BLM and USAF NEPA requirements. Appendix B includes description of the laws and regulations that apply or may apply to the proposed and alternative actions.

### 1.4.1 Government-to-Government Coordination

EO 13175, *Consultation and Coordination with Indian Tribal Governments*, directs federal agencies to coordinate and consult with Native American tribal governments whose interests might be directly and substantially affected by activities on federally administered lands. Correspondence is presented in Appendix C.

### 1.4.2 Other Regulatory Requirements

The EA considers all applicable laws and regulations. For a list that is inclusive but not limited, see Appendix B.

## 1.5 Scoping and Issues

As part of the NEPA process for evaluating the Proposed Action and alternatives, issues were identified in both internal and external scoping.

### 1.5.1 Internal Scoping

An interdisciplinary team (IDT) of BLM, USAF, and contractor resource specialists was assembled for the EA. The internal scoping was conducted through meetings and conference calls between BLM and USAF, and the IDT. The kick-off meeting was held on 29 November 2016, and team calls have been held monthly.

### 1.5.2 External Scoping

No external scoping meetings were held. Coordination with consulting agencies (e.g., USFWS and SHPO) was part of the performance of the field surveys and review of the associated reports. Letters notifying the officials and tribes on the BLM and Kirtland distribution lists were mailed out on June 13, 2018. The respondents either stated that they did not foresee any significant impacts from the proposed action or asked to review the Draft EA when it was made available.

### 1.5.3 Resource Issues Identified

Resource areas that could be affected by the proposed or alternative actions have been selected to allow for a comprehensive analysis of potential impacts. The following resource areas were evaluated and discussed in the EA:

- Airspace Use and Management
- Noise
- Air Quality
- Earth Resources
- Natural Resources
- Cultural Resources
- Water Resources
- Hazardous Materials and Wastes
- Ground and Aircraft Safety
- Bird-Aircraft Strike Hazard
- Land Use, Special Designations, Recreation, and Visual Quality
- Socioeconomic Resources
- Environmental Justice

The only military unit training areas analyzed are those for which the BLM has jurisdiction to issue a ROW. Kirtland AFB and other training areas outside of BLM administered lands are referenced in the analysis of BLM sites.

## 1.6 Public Review

The Draft EA was released for a 30-day public review period on October 21, 2018. No comments were received from the public. Only a few comments were received from agencies and tribes. These comments related to the consultation process and desire to be notified of any future actions.

## 1.7 Changes since the Issuance of the Draft EA

There were no changes to the Draft EA based on the comments received. Minor changes have been made to the maps of the proposed OPFOR sites in Appendix A to increase their accuracy.

# 2 PROPOSED ACTION AND ALTERNATIVES

This section has four parts: selection standards, a detailed description of the Proposed Action (Alternative 1); a description of the No-action Alternative; a description of Alternative 3.

## 2.1 Section Standards

### 2.1.1 Selection Standards for Training Location Alternatives

As discussed in section 1, the 58 SOW is the sole SOF and PR training wing for AETC. AETC-prescribed training requires the following criteria:

- Training areas must have diverse terrain and landscape conditions that replicate the conditions in which personnel trained by the units could be employed worldwide (e.g., high and low elevations, rock outcrops, ridgelines, valleys, mountains, flatlands, grass and shrub lands, and forest cover). To increase the adaptability of the trainees, sites that are new or unfamiliar are preferred.
- Training areas should be viable for use within current funding levels.
- Training areas should not require changing of any already-approved training curriculum to accommodate or increase training time for travel to the training location, or require unit relocations to access suitable training.
- The training must be compatible with the existing missions of the DoD installations.

### 2.1.2 Application of Selection Standards to the Alternatives Considered

Given the additional transit times, unacceptable topography for accomplishing required training objectives, additional costs to use, and necessity to change already approved training syllabi, the USAF decided that the training sites in or near New Mexico are the only viable locations for 58 SOW training.

### 2.1.3 Use of Military Installations within New Mexico and Close Proximity

Kirtland AFB explored potential training sites at military installations within or in close proximity to New Mexico; Kirtland AFB, White Sands Missile Range (WSMR), Holloman AFB, Cannon AFB, and Fort Bliss in Texas. The installations were evaluated according to meeting the selection criteria and compatibility with the existing missions at the installations.

A summary of selection standards results for military installations within and in close proximity to New Mexico is included in table 2-1.

**Table 2-1. Selection Standards Results for Nearby Military Installation Sites**

| Site | Selection Standards | | | |
|---|---|---|---|---|
| | **Meets Terrain Diversity Requirements** | **Viable with Current Funding Levels** | **Requires No Changes to Approved Training Program** | **Compatible With Existing Mission(s)** |
| Kirtland AFB | | X | X | X |
| WSMR | X | X | | |
| Holloman AFB | X | | | X |
| Cannon AFB | | | | X |
| Fort Bliss, Texas | | | | X |

With the exception of Kirtland AFB and WSMR, all other training locations require additional transportation time and/or vehicles to use, necessitating a significant increase in funding to conduct training.

The use of WSMR's active missile range for extended-duration ground-based training is not compatible with missile tactics and fighter training already taking place there, because WSMR could not accommodate Kirtland AFB's ground training without moving their pre-existing WSMR operations to another location.

That said, the terrain, conditions, and familiarity of the limited useable training areas on Kirtland AFB are not suitable for conducting effective training where a certain degree of unfamiliarity with the surroundings and environmental conditions is required. Additionally, a fair amount of the land within the boundaries of Kirtland AFB proper is actually NOT controlled or managed by the DoD or USAF, but rather by other tenant federal and partner units.

Non-military areas near Kirtland AFB. The assessment of potential specific training sites in the area surrounding Kirtland AFB included:

- Locations that allow for flight training in mountainous terrain, including modified contour low level training, aerial refueling, helicopter weapons employment tactics training, helicopter and tiltrotor landings, and search and rescue training scenarios.

- Locations within approximately 125 nautical miles of Kirtland AFB. The distance is based on the air speed of the aircraft used in the training (i.e., CV-22B Ospreys, HH-60G Pave Hawks, and UH-1N Iroquois) and associated sortie duration. This distance allows for the optimization of the amount of training time at the HLZs. Longer durations would risk requiring the alteration of the training syllabus as additional transit time would reduce training time.

- Locations on lands where the landowner is willing to enter into long-term agreements. By entering into a long-term agreement, the USAF can obtain a greater degree of surety for continuity of essential training operations and avoid potential re-purposing by landowners that may accompany shorter term agreements.
- Compatibility with existing missions/actions of entities using the sites.
- Sufficient distance from obstructions that interfere with communications equipment and line of sight capabilities with communications equipment necessary for the training.
- Avoidance of nearby residences, homesteads, and farms that would present obstacles for training operations and would likely be affected by the noise generated by the training.
- Avoidance of power lines and highly populated areas (cities).
- Located on areas previously used or surveyed, and determined to have no, or at least a low likelihood of having, cultural resources present.

Private Property. The leasing process would require a survey of interested land owners, determination of fair market value, and real property negotiation prior to training operations. The 58 SOW is currently considering the possibility of private property leases in the future. However, these potential leases do not meet the purpose and need to continue the near-term training activities, and therefore, are not included in this EA.

State of New-Mexico Owned Land. The 58 SOW considered the possibility of using state-owned property for training purposes. State trust lands in New Mexico must be managed to benefit the beneficiaries of the trust grant. However, in order for the USAF to avoid leasing costs, they would be required to solicit a gift of the leasing costs from the state, which is currently prohibited.

### 2.1.4 Sites on BLM Lands Eliminated from Further Evaluation

In coordination with the BLM, the 58 SOW considered approximately 43 additional potential training locations on BLM-administered public land that met most of selection standards for proximity to Kirtland AFB and terrain variability requirements. However, upon initial visits to these locations, 20 of these additional sites were eliminated as unsuitable for the military training activities due to line of sight obstructions, obstacles to communications compatibility, and presence of cultural resources. The remaining 23 potential new are considered under the Proposed Action.

## 2.2 Proposed Action (Alternative 1)

Under the Proposed Action, the BLM would allow the 58 SOW ROW access to BLM-administered public lands for training purposes and grant a 30-year ROW to the USAF. The 58

SOW currently conducts training activities on 26 sites, encompassing 413.5 acres, on BLM-administered public property under a 3-year temporary that expired 31 December 2018. Under the Proposed Action, a new authorization is being sought for continuing training activities at the 26 sites plus expanding the training activities to 23 new BLM sites, encompassing an additional 336.5 acres.

Currently, the 58 SOW uses 23 of the 26 BLM sites for HLZ training, including helicopter takeoffs and landings in locations with variable terrain in addition to low-elevation maneuvering of aircraft. The helicopter training, HLZs are not graded or altered as the training is supposed to emulate field conditions. These sites are only accessed with ground vehicles in the case of emergency repairs to a grounded aircraft.

Three HLZ sites are used for CV-22B Osprey training. The CV-22B Osprey landing sites were graded before use started years ago. Periodically, dust suppressant is applied to the landing site using equipment carried in pick-up trucks. Surface access is from existing roads.

In addition to the aircraft training, the 58 SOW uses 14 of the current sites for Opposing Forces (OPFOR) events. The OPFOR training events are conducted by instructors in a pick-up truck at a distance of up to five miles from the HLZ being used for training. Table 2-2 presents a listing of the current training sites and activities.

The OPFOR training events include the use of electronic emitters to train aircrews in defensive aircraft maneuvers, as well as aiding in search and rescue scenarios. These training events may also include the use of pyrotechnic equipment, (e.g., smoke trailing non-explosive surface-to-air missiles [Smokey SAMs], alternative rockets, and smoke candles fired from the ground toward the aircraft. Aircraft do not eject flares or chaff during OPFOR training. A description of each type of munition is provided below:

- Smokey SAM – A 13-inch rocket designed to fly up to an altitude of 200-300 feet above ground level and leave a smoke trail. The leftover rocket body is composed of white Styrofoam.
- Alternative Rocket – A model rocket smaller in size and scale than a Smokey SAM, with an attached parachute.
- Smoke Grenade – A flare-type non-explosive smoke generator that is designed to be handheld if necessary and easily contained within a five-gallon bucket. The spent grenade is a 12-inch long cardboard tube or a small metal can the approximate size of an aluminum soda can.

At the end of each OPFOR training event, all spent munitions or identifiable trash would be collected by OPFOR personnel. All pyrotechnic equipment would be used in accordance with prescribed USAF and BLM safety procedures. The BLM is contacted before each trip to

**Table 2-2. Current BLM HLZ Locations**

| HLZ Identifier | Area (acres) | Coordinates (decimal degrees) | County | Site Activities (C – Current, P – Proposed) | | TerraLOC Use (acres) |
|---|---|---|---|---|---|---|
| | | | | HLZ | OPFOR | |
| 6 | 26.0 | 34.7330N / -107.3308W | Cibola | C | -- | None |
| 7 | 1.0 | 34.7567N / -107.3738W | Cibola | C | -- | None |
| 13 | 1.0 | 34.7608N / -106.9963W | Valencia | C | -- | None |
| 15 | 1.0 | 34.7565N / -107.0055W | Valencia | C | C | None |
| 16 | 1.0 | 34.7655N / -107.0068W | Valencia | C | C | None |
| 17 | 26.0 | 34.7100N / -107.3452W | Cibola | C | C | None |
| 18 | 26.0 | 34.8630N / -107.1610W | Valencia | C | C | None |
| 18A | 130 | 34.8662N / -107.1663W | Valencia | C | C | Current (~35 acres) |
| 19 | 1.0 | 34.7482N / -107.0888W | Valencia | C | -- | None |
| 20 | 1.0 | 34.7807N / -107.0852W | Valencia | C | C | None |
| 22 | 1.0 | 34.8052N / -107.2320W | Cibola | C | -- | None |
| 22B | 26.0 | 34.8058N / -107.2348W | Cibola | C | C | None |
| 23 | 1.0 | 34.7411N / -107.2017W | Valencia | C | C | None |
| 24 | 1.0 | 34.7425N / -107.1892W | Valencia | C | -- | None |
| 27 | 26.0 | 34.7328N / -107.3507W | Cibola | C | C | None |
| 28 | 1.0 | 34.6260N / -107.3347W | Cibola | C | -- | None |
| 29 | 1.0 | 34.6393N / -107.3185W | Cibola | C | C | None |
| 30 | 26.0 | 35.2552N / -107.0715W | Sandoval | C | C | None |
| 31 | 9.5 | 35.3252N / -107.0713W | Sandoval | C | C | Current (26 acres) |
| 32 | 1.0 | 35.4247N / -107.2143W | Sandoval | C | -- | None |
| 33 | 1.0 | 35.4307N / -107.2018W | Sandoval | C | -- | None |
| 34 | 1.0 | 35.4555N / -107.0990W | Sandoval | C | -- | None |
| 36 | 26.0 | 34.8612N / -107.2018W | Valencia | C | -- | None |
| 37 | 26.0 | 34.8223N / -107.2825W | Cibola | C | C | Current (26 acres) |
| 38 | 26.0 | 34.7360N / -107.2803W | Cibola | C | -- | None |
| 42 | 26.0 | 34.6748N / -107.3192W | Cibola | C | C | None |
| Total Sites: **26** | Total Acreage: **413.5** | | | | | Total TerraLOC: **87 acres** |

Notes: HLZ – Helicopter Landing Zone OPFOR – Opposing Forces

determine the fire danger level; however, fire protection equipment, including shovels, pick axes, and extinguishers, are carried in all vehicles regardless of the fire condition. Additionally, the BLM phone numbers are carried in the continuity book and, in the event that a fire breaks out, personnel will notify the BLM immediately, regardless of the source of the fire.

In addition to 58 SOW training activities, the current sites are used occasionally for other DoD training by the Army and Marines under USAF sponsorship. Kirtland AFB currently sponsors Marine training on an annual or biannual basis, typically for pre-deployment spin-up of MV-22s. Army training is currently conducted between four and six times per year for environmental (high desert) training. The 160 SOAR also utilizes the sites six times per year for MH-47 training and four times per year for M/AH-6 training. Most training events are conducted during evening hours with infrequent occurrences during the daytime. The agreement between the Army and the USAF stipulates that the Army will stay within the authorized area and will adhere to the existing conditions specified in the BLM ROW.

Under the Proposed Action, the addition of 23 new training locations would increase training diversity to support the current 58 SOW mission. The proposed BLM training locations are generally located within undeveloped areas in six counties: Cibola, De Baca, Guadalupe, Sandoval, Socorro, and Valencia. Existing and proposed training locations are shown on figures 2-1 through 2-4 and Appendix A – Site Maps. The current level of training events would be spread out across the current and new sites to keep the trainees from getting too familiar with any single site. Table 2-3 presents a list of the proposed new training sites and the activities proposed for each site.

The seven proposed OPFOR-only training sites (designated OF1 through OF7) will be evaluated for use as OPFOR locations only. The sites would require access by ground vehicles only. No air vehicles would use the OPFOR sites.

**Design Features**

The 58 SOW currently applies a commercial, environmentally-friendly dust suppressant (TerraLOC) on the three HLZ sites used for CV-22B Osprey training. The product is used to bind soil together when applied in a landing zone to reduce the amount of airborne soil that results from landing activities. Under the Proposed Action, the use of TerraLOC would continue as presently used on HLZs 18A, 31, and 37 for CV-22B Osprey training (87 acres) and would not be applied to any other existing or proposed sites (see tables 2-2 and 2-3).

In case emergency maintenance activities are needed, use of petroleum or hazardous materials may be required. These activities would be intermittent and include procedures to contain, remediate, and transport away any spilled material in accordance with applicable, promulgated federal and state regulatory requirements.

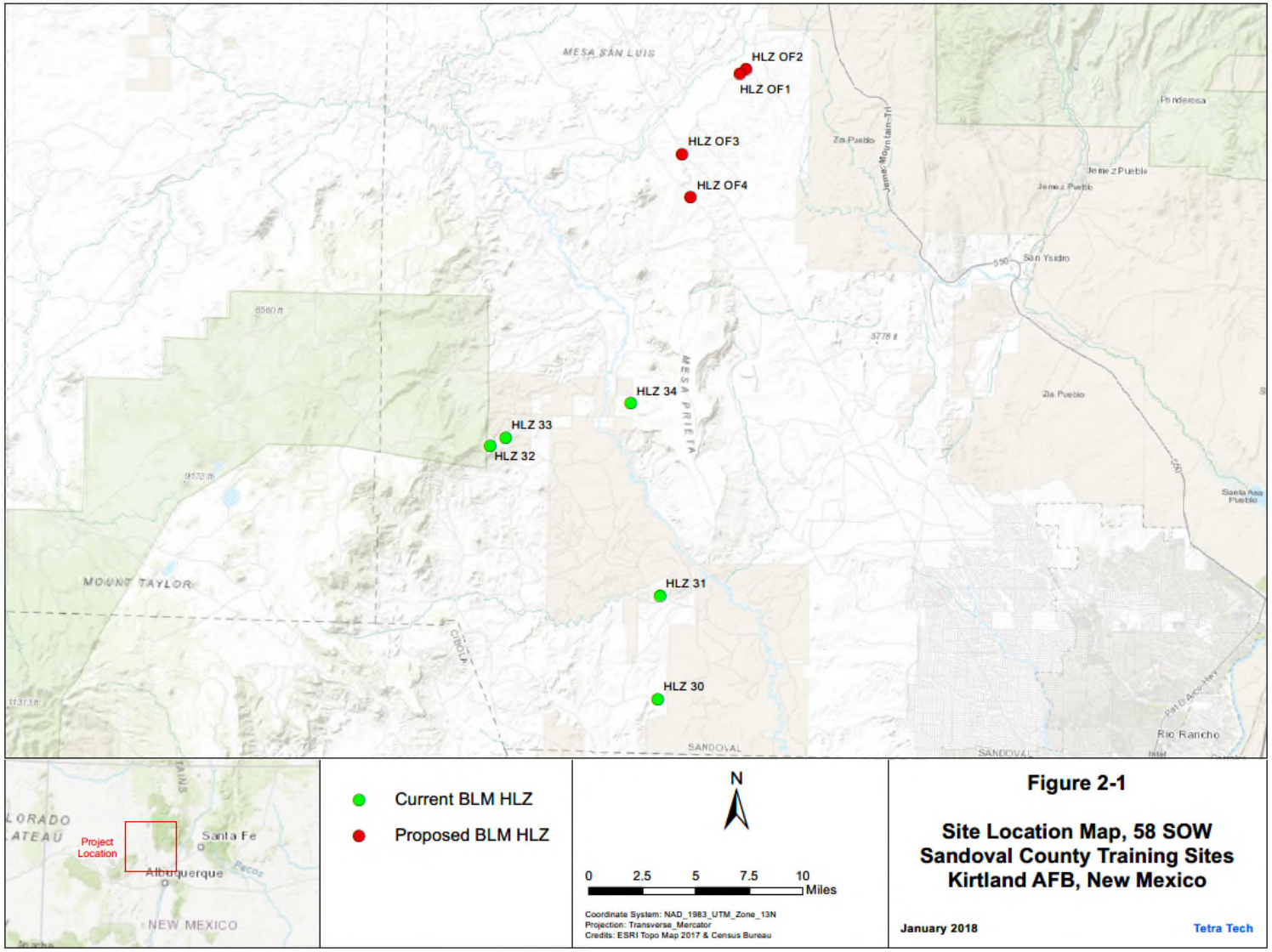


**Figure 2-1. Site Location Map, 58 SOW Sandoval County Training Sites, Kirtland AFB, New Mexico**

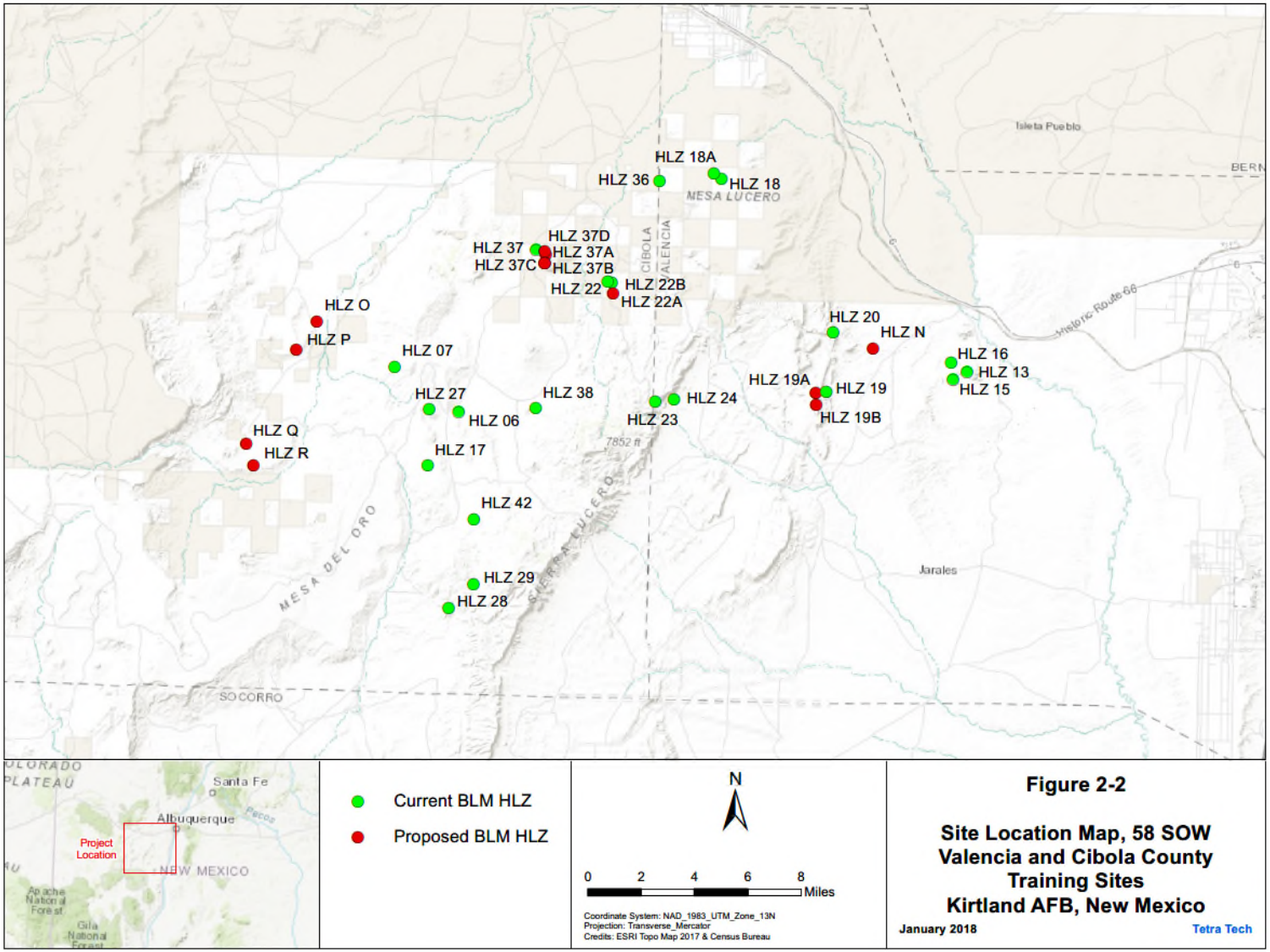


**Figure 2-2. Site Location Map, 58 SOW Valencia and Cibola County Training Sites, Kirtland AFB, New Mexico**

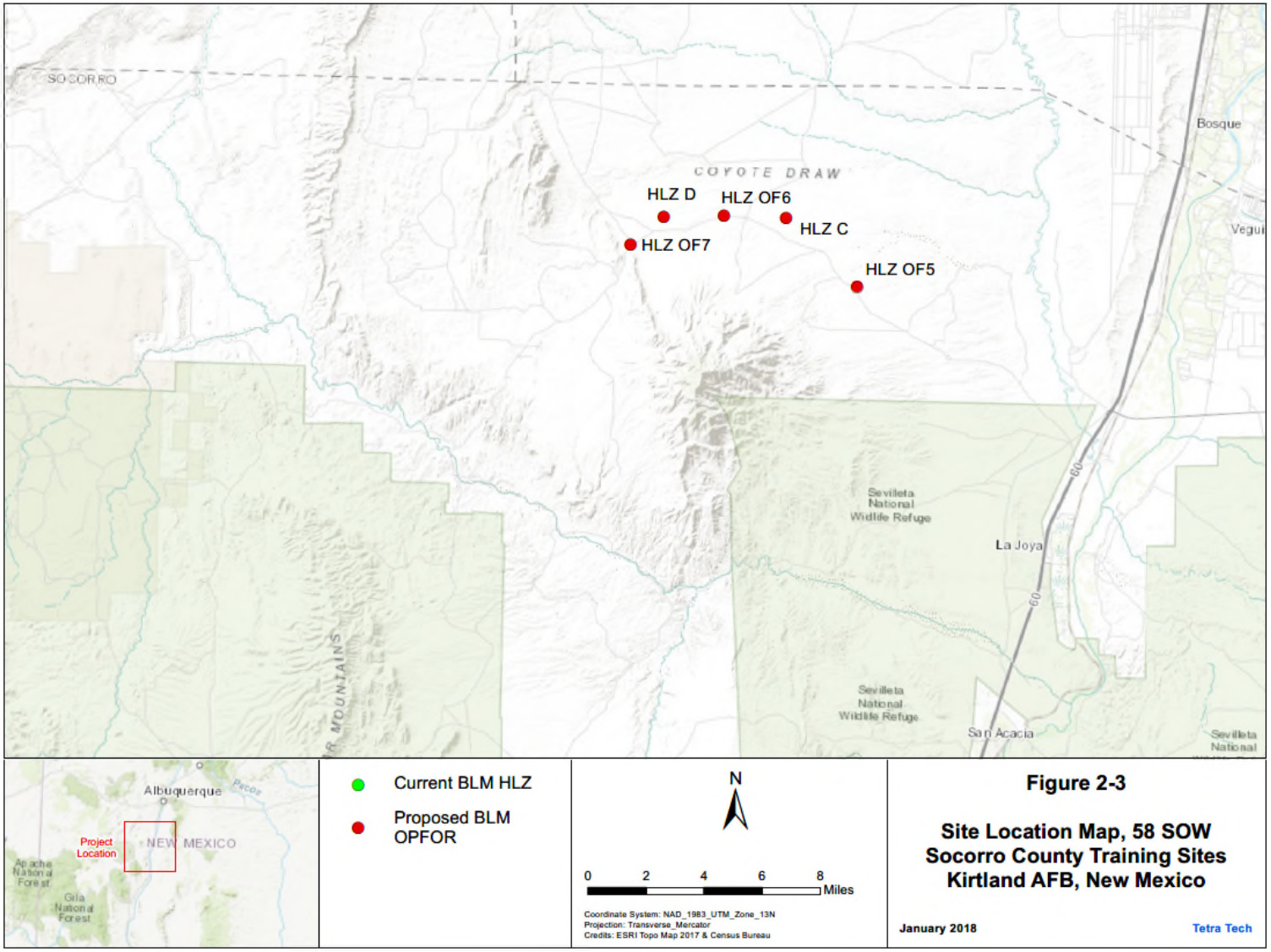


**Figure 2-3. Site Location Map, 58 SOW Socorro County Training Sites, Kirtland AFB, New Mexico**

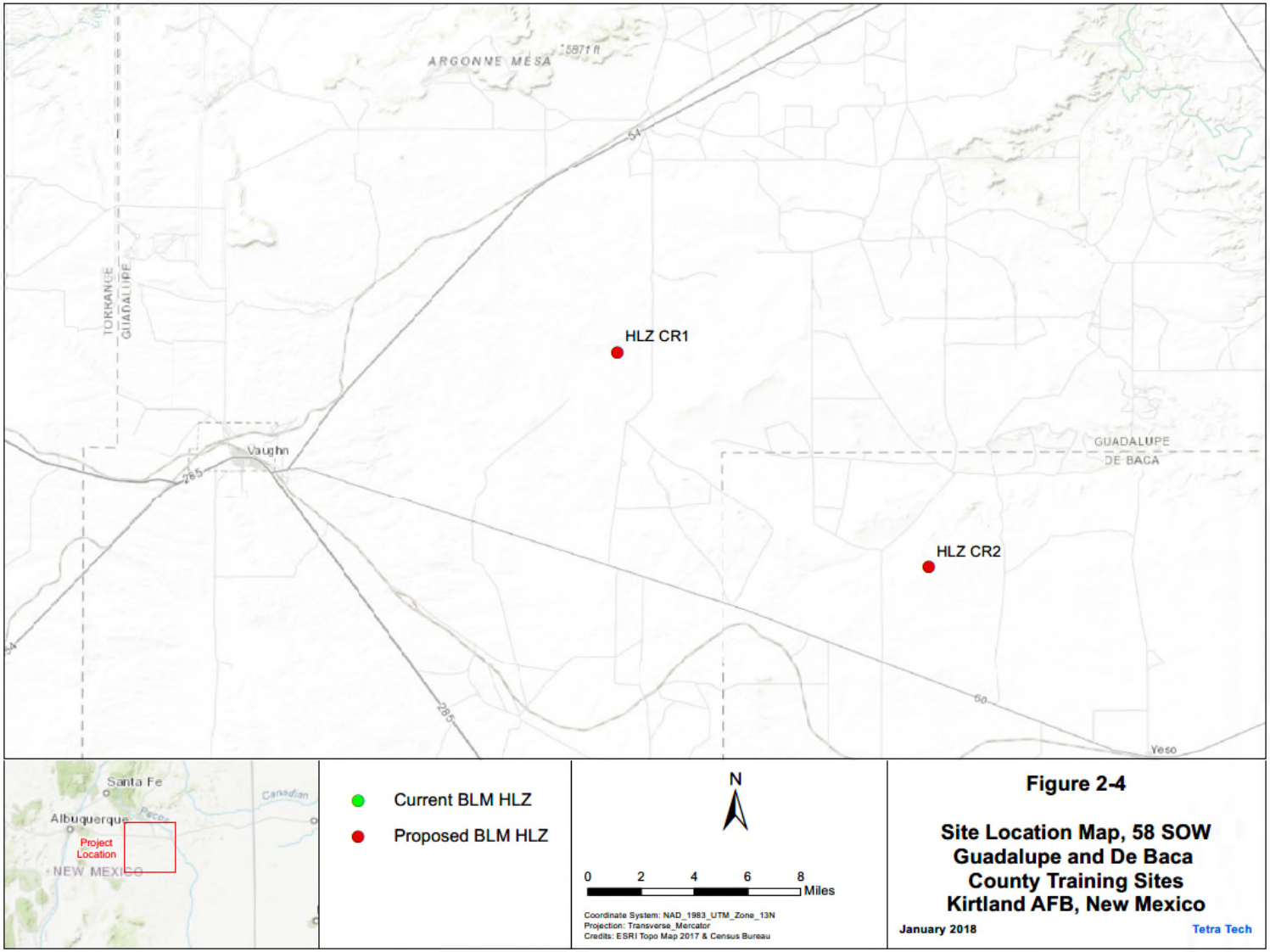


**Figure 2-4. Site Location Map, 58 SOW Guadalupe and De Baca County Training Sites, Kirtland AFB, New Mexico**

## Table 2-3. Proposed BLM HLZ Locations

| HLZ Identifier | Area (acres) | Coordinates (decimal degrees) | County | Site Activities (C – Current, P – Proposed) | | Potential TerraLOC |
|---|---|---|---|---|---|---|
| | | | | HLZ | OPFOR | |
| 19a | 26.0 | 34.7475N / -107.0957W | Valencia | P | -- | None |
| 19b | 26.0 | 34.7415N / -107.0955W | Valencia | P | -- | None |
| C | 26.0 | 34.5132N / -107.0361W | Socorro | P | -- | None |
| D | 26.0 | 34.5126N / -107.1099W | Socorro | P | -- | None |
| O | 26.0 | 34.7805N / -107.4258W | Valencia | P | -- | None |
| P | 26.0 | 34.7647N / -107.4388W | Valencia | P | -- | None |
| Q | 26.0 | 34.7130N / -107.4705W | Valencia | P | -- | None |
| R | 26.0 | 34.7013N / -107.4653W | Valencia | P | -- | None |
| N | 26.0 | 34.7727N / -107.0585W | Valencia | P | -- | None |
| CR1 | 26.0 | 34.6590N / -104.9604W | Guadalupe | P | P | None |
| CR2 | 26.0 | 34.5417N / -104.7557W | De Baca | P | P | None |
| 22A | 1.0 | 34.7995N / -107.2308W | Valencia | P | -- | None |
| 37A | 1.0 | 34.8197N / -107.2758W | Valencia | P | P | None |
| 37B | 1.0 | 34.8148N / -107.2762W | Valencia | P | P | None |
| 37C | 1.0 | 34.8152N / -107.2767W | Valencia | P | P | None |
| 37D | 1.0 | 34.8217N / -107.2750W | Valencia | P | P | None |
| OF1 | 6.5 | 35.6843N / -107.0088W | Sandoval | -- | P | None |
| OF2 | 6.5 | 35.6810N / -107.0138W | Sandoval | -- | P | None |
| OF3 | 6.5 | 35.6257N / -107.0607W | Sandoval | -- | P | None |
| OF4 | 6.5 | 35.5964N / -107.0526W | Sandoval | -- | P | None |
| OF5 | 6.5 | 34.4795N / -106.9922W | Socorro | -- | P | None |
| OF6 | 6.5 | 34.5129N / -107.0726W | Socorro | -- | P | None |
| OF7 | 6.5 | 34.5001N / -107.1233W | Socorro | -- | P | None |
| Total Sites: **23** | Total Acreage: **336.5** | | | | | Total TerraLOC: **0 acres** |

## 2.3 No-action Alternative (Alternative 2)

Under the No-action Alternative, the BLM would not grant a 30-year ROW to the USAF. The 58 SOW would discontinue training activities on BLM-administered public property after the current 3-year term expired on 31 December 2018. A short-term extension was granted for a temporary ROW for the 58 SOW training activities to continue only on the 26 existing BLM sites as presented in table 2-2.

## 2.4 Current Operations at Current Sites (Alternative 3)

Under Alternative 3, the BLM would allow the 58 SOW ROW access to BLM-administered public lands for training purposes and grant a 30-year ROW to the USAF only to the 26 sites currently in use. Alternative 3 is similar to the Proposed Action, except there would be no new training sites. The 23 current BLM sites would be used for HLZ training, the three sites would continue to be used for CV-22 Osprey training, and 14 of the current sites would also be used for OPFOR training. Table 2-2 presents a listing of the current training sites and the activities at each site.

The current Kirtland AFB-sponsored Marine training, Army training, and 160 SOAR training would continue on the 26 sites. The agreement between the Army and the USAF stipulates that the Army will stay within the ROW and will adhere to the existing conditions specified in the current 3-year temporary grant issued by BLM. These conditions will be made part of the new ROW.

### Design Features

The 58 SOW currently applies the TerraLOC dust suppressant on three BLM HLZ sites (18A, 31, and 37, encompassing 87 acres) for CV-22B Osprey training. The use of TerraLOC would continue on these three sites, but would not be applied to any other existing sites (see table 2-2).

In case emergency maintenance activities are needed, use of petroleum or hazardous materials may be required. These activities would be intermittent and include procedures to contain, remediate, and transport away any spilled material in accordance with applicable promulgated federal and state regulatory requirements.

# 3 AFFECTED ENVIRONMENT

This section describes the affected environment (i.e., current conditions) for each environmental resource that would be affected by implementation of the actions associated with the Proposed Action and alternatives.

## 3.1 Location

The BLM Rio Puerco Field Office (RPFO) includes approximately 744,387 acres of BLM-managed public surface land in Bernalillo, Cibola, Torrance, and Valencia counties, most of Sandoval County, and portions of McKinley County in central and west-central New Mexico. Some of the sites are located in lands administered by the Socorro Field Office and the Roswell Field Office.

Kirtland AFB is located within Bernalillo County, New Mexico, and is bordered to the west and north by the City of Albuquerque, to the south by Isleta Pueblo, and to the east by the Cibola NF. Kirtland AFB contains 51,585 total acres of fee owned and public withdrawn lands, 7,533 of which are owned by the Department of Energy.

### 3.1.1 Kirtland Military Unit Missions

The mission of the 58 SOW is to train warriors, professionalize airmen, and employ airpower (KAFB 2015). This mission has existed at Kirtland AFB since 20 February 1976, when the 1550 Aircrew Training and Test Wing (ATTW) moved from Hill AFB, Utah. The 1550 ATTW trained helicopter and fixed-wing aircrews. The USAF redesignated the unit as the 1550 Combat Crew Training Wing (CCTW) in May 1984, inactivating it in October 1991, and transferring the training mission to the 542 Crew Training Wing (CTW). The USAF then deactivated the 542 CTW in April 1994, transferring the training mission to the 58 SOW (KAFB 2015).

### 3.1.2 Affected Environment Baseline

The USAF military training activities have occurred, and are ongoing, on portions of BLM lands, under a ROW. Some of these activities are currently ongoing in several locations. Any lasting effects of these past and current activities are considered part of the affected environment for this EA. Existing conditions are the baseline with which the impacts of the Proposed Action and alternatives are compared.

The Affected Environment section for each resource will discuss the area encompassed by past and current operations as well as the new sites and areas that could be affected by proposed operations.

## 3.2 Airspace Use and Management

This section describes the current use and management of the airspace in the area in which the training flights take place. It also describes the current actions in greater detail than section 2. Additional background and other detail can be found in Appendix D.

### 3.2.1 Definition of Resource

Airspace is a finite resource defined vertically, horizontally, and temporally. Airspace management involves the direction, control, and handling of flight operations in the volume of air that overlies the geopolitical borders of the U.S. and its territories. Airspace is a resource managed by the Federal Aviation Administration (FAA), with established policies, designations, and flight rules to protect aircraft in the airfield and en-route; in special use airspace (SUA) identified for military and other governmental activities; and in other military training airspace.

Aircrews monitor radio frequencies assigned by air traffic control or as stated in the DoD Flight Information Publications for the type of military training route (MTR) being flown or the specific route. These actions advise aircrews of the location of other aircraft and help reduce the potential for airspace conflicts between aircraft operating on MTRs, in Military Operations Areas (MOAs), and other aircraft. A 58 SOW-specific common frequency is also monitored to facilitate deconfliction between SOW aircraft.

### 3.2.2 Current Operations

The airspace at and within the immediate vicinity of the HLZs is typically Class G airspace controlled by either Albuquerque Terminal Radar Approach Control (TRACON) or the Albuquerque Air Route Traffic Control Center. Although air traffic control has no official authority or responsibility to control air traffic in Class G airspace, pilots have to abide by visual flight rules. 58 SOW aircraft do not accomplish intentional low-level overflight of wildlife, dwellings, or populated areas.

A typical training mission, or sortie, includes approximately 2 hours within the BLM lands, with airland and/or hover operations occurring in 15-minute intervals (i.e., up to 8 air events per sortie). Both the CV-22B Osprey and the HH-60G Pave Hawk training often involves flight in pairs, or in tandem, with two vehicles taking part in the training exercise. The UH1-H is flown singly. Aircrews are trained and evaluated in daytime and nighttime for both basic and advanced aviation.

Past and current aircraft activities on BLM-administered public lands include 3 sites used for tiltrotor (CV-22B Osprey) training and 24 sites for helicopters (HH-60G Pave Hawk and UH1-N) training. These sites can be grouped into two geographic areas; one between 30 and 50 miles to the northwest of Kirtland AFB in Sandoval County, and the other between 30 and 55 miles to the west-southwest of Kirtland AFB in Valencia and Cibola Counties.

The Sandoval County group includes HLZs 30, 31, 32, 33, and 34. These HLZs are all within approximately 13 miles of each other in the southwestern corner of the County. Federal Airway V187 transits the area from the northwest to the southeast. There are no tall steel tower transmission lines within the airspace around the HLZs. The airspace around the HLZ is Class G, or uncontrolled airspace.

The Valencia-Cibola County group includes HLZs 6, 7, 13, 15, 16, 17, 18, 18A, 19, 20, 22, 22B, 23, 24, 27, 28, 29, 36, 37, 38, and 42. These HLZs are all within approximately 13 miles of each other in western Valencia County and eastern Cibola County. No Federal Airways transit the airspace associated with Valencia-Cibola County HLZs. There are no tall steel tower transmission lines within the airspace around the HLZs. The airspace around the HLZ is Class G airspace.

Operations at HLZs have occurred in the past and are ongoing. Table D-I in Appendix D lists the current training sorties accomplished at the HLZs. Nighttime includes the time between 10:00 p.m. and 7:00 a.m. Operations at HLZs can occur anytime during a day. However, activity normally begins around 9:00 a.m. and ends about 2:00 a.m. the following day for an approximate 16-hour training day.

Multiple HLZs may be used during the 2-hour sorties. The HLZ training events are almost evenly spread among HLZs to provide variation in training. The current total average busy day events is 960 sorties per aircraft type per year. The CV-22B Osprey sorties are spread amongst three sites. The helicopter sorties are spread amongst 23 sites.

The aircraft remain within approximately 5 nautical miles of the HLZ when accomplishing training events. The “ground tracks”, the actual locations on the ground above which the aircraft fly, can vary for reasons such as different pilot techniques, wind, terrain, and ground objects to be avoided. The ground tracks are typically “box patterns” around the center point of the landing zone. The CV-22B Osprey’s “box pattern” extends outward to approximately 7 miles from the center of the landing zone. The CV-22B Osprey aircraft altitude when flying a pattern is typically 500 feet AGL. The “box pattern” for the HH-60G Pave Hawks and UH-1N Iroquois extends outward to approximately 2 miles from the center of the HLZ, and the aircraft altitude when flying a pattern is typically 300 feet AGL.

**Opposing Force Training**

OPFOR training activities take place at 14 existing HLZs (HLZs 15, 16, 17, 18, 18A, 20, 22B, 23, 27, 29, 30, 31, 37, and 42). The OPFOR training is accomplished at random locations within 5 miles of HLZs to familiarize aircrew members with recognizing surface-to-air missiles and ground fire. No training sorties are scheduled solely for OPFOR training, and OPFOR training is accomplished in conjunction with regularly scheduled training. As the aircraft passes overhead, personnel on the ground operate the electronic emitter or fire pyrotechnic equipment (e.g., Smokey SAMs, alternative rockets, and smoke grenades to simulate threats to the aircraft.

Smokey SAMs can reach altitudes as high as 300 feet AGL and alternative rockets may reach 110 feet AGL. All electronic emitters, smoke grenades, alternative rockets, and Smokey SAMs are used in accordance with prescribed safety procedures. OPFOR personnel also act as survivor(s) for personnel recovery training as part of routine OPFOR operations. OPFOR personnel may ride the hoists of helicopters and tiltrotors as required for personnel recovery training.

## 3.3 Noise

This section describes the measurement, perception, and modeling of the levels of noise resulting from current training operations. Background information and additional details can be found in Appendix E.

### 3.3.1 Definition of Resource

Noise is defined as any sound that is unwanted because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. The characteristics of sound include parameters such as amplitude (loudness), frequency (pitch), and duration. The decibel (dB) is the accepted standard unit for describing levels of sound.

Impulsive noises are generally short, loud events. Their single-event duration is usually less than 1 second. Examples of impulsive noises are small-arms gunfire, hammering, pile driving, metal impacts during rail-yard shunting operations, and riveting. Examples of high-energy impulsive sounds are quarry/mining explosions, sonic booms, etc. The munitions used in OPFOR training (e.g., Smokey SAMs, alternative rockets, and smoke grenades) range in loudness levels comparable with small-to-large firecrackers and shotguns. The reports are momentary and were therefore not modeled for noise.

Because aircraft noise events last more than a few seconds, the noise levels represent the total sound energy in the event. Individual military overflight events differ from typical community noise events in that noise from a low-altitude high-airspeed flyover can have a rather sudden onset or "surprise" effect.

### 3.3.2 Current Operations

Noise associated with the existing USAF activities in BLM-administered public property are generated by training events consisting of vehicle and aircraft operations. Aircraft noise was modeled. Noise from vehicle operations is not considered to be significant when compared to aircraft noise.

The American National Standards Institute (ANSI 2013) provides typical background noise levels for various land use categories. The BLM-administered land is wilderness-like and most

similar to rural or remote areas with estimated ambient DNL less than 49 dB. There are no noise sensitive receptors or human population nearby to any of the existing 26 BLM HLZ sites.

### 3.3.3 Noise Exposure

Single-Event Noise levels from individual rotorcraft and tiltrotor aircraft overflights were modeled at altitudes of 100 feet, 200 feet and 300 feet AGL. The results are discussed in detail in Appendix E. The CV-22B Osprey generates the greatest noise. Due to the large number of HLZ sites currently in use for training, it would be unnecessary duplication to display DNL noise contours for all sites individually. Sites within one half mile of each other (e.g., those sites with letters following their number designation as HLZ 18 and HLZ 18A) could experience an minor additive noise effect if operations were undertaken at both sites at the same time.

Figure 3.3-1 displays a representative noise contour for a single HLZ that receives only CV-22B Osprey operations. All three HLZs for the CV-22B Osprey receive the same number of aircraft operations which results in identical DNL noise levels at each HLZ. The DNL noise contours displayed in figure 3.3-1 for HLZ 37 are identical to contours for the other two CV-22B Osprey-specific HLZ sites. The computed 65 dB DNL contour extends 0.56 miles from the center of the HLZ due to the current existing aircraft activity.

Figure 3.3-2 displays a representative noise contour for a single HLZ that receives only HH-60G Pave Hawk and UH-1N Iroquois operations. All 23 HLZs for the HH-60G Pave Hawk and UH-1N Iroquois receive the same number of aircraft operations which results in identical DNL noise levels at each HLZ. The DNL noise contours displayed in figure 3.3-2 for HLZ 6 are identical to contours for the other HH-60G Pave Hawk and UH-1N Iroquois-specific HLZ sites. The computed 65 dB DNL contour extends 0.27 miles from the center of the HLZ due to the current existing aircraft activity.

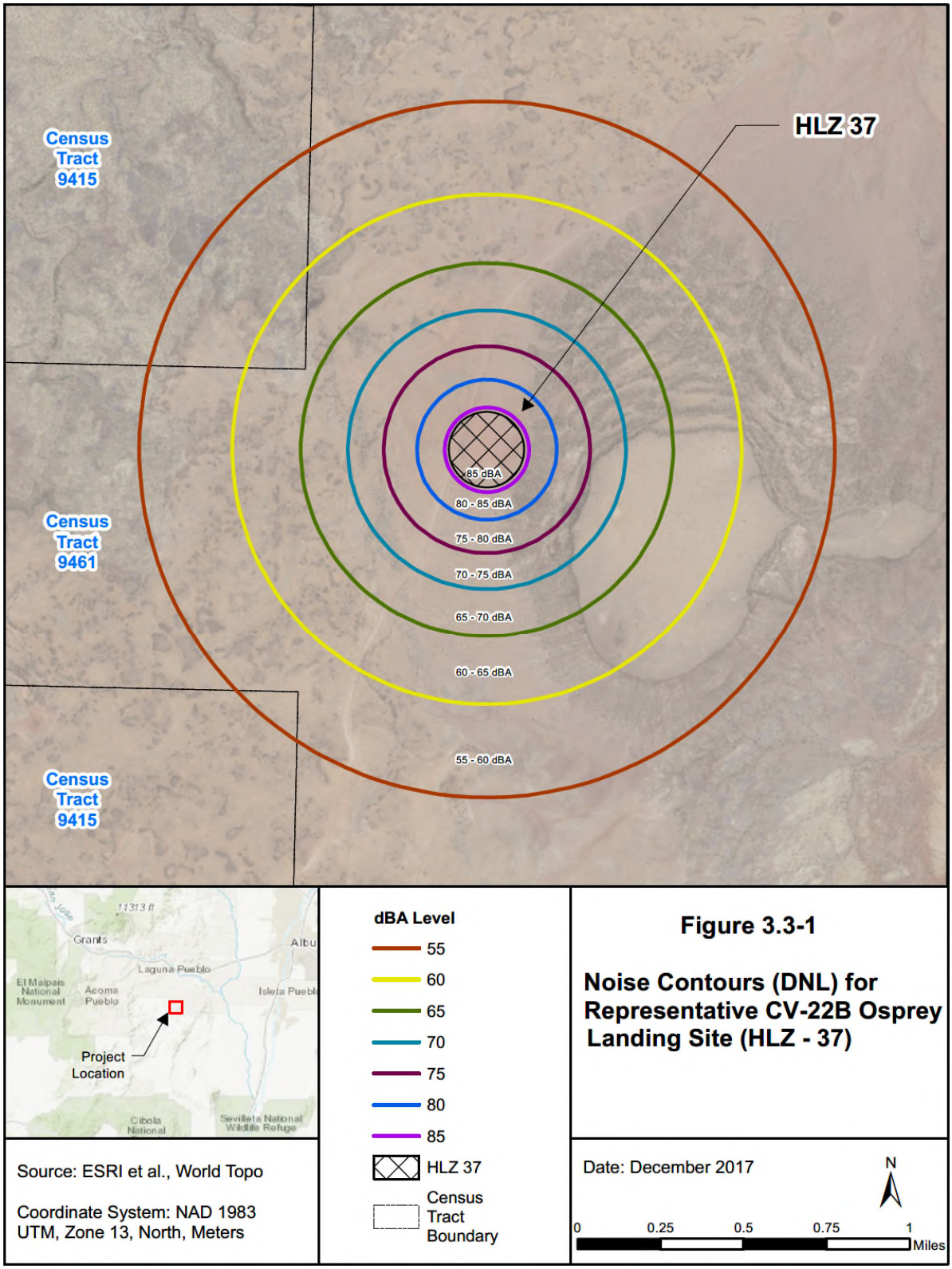


**Figure 3.3-1. Noise Contours (DNL) for Representative CV-22B Osprey Landing Site (HLZ 37).**

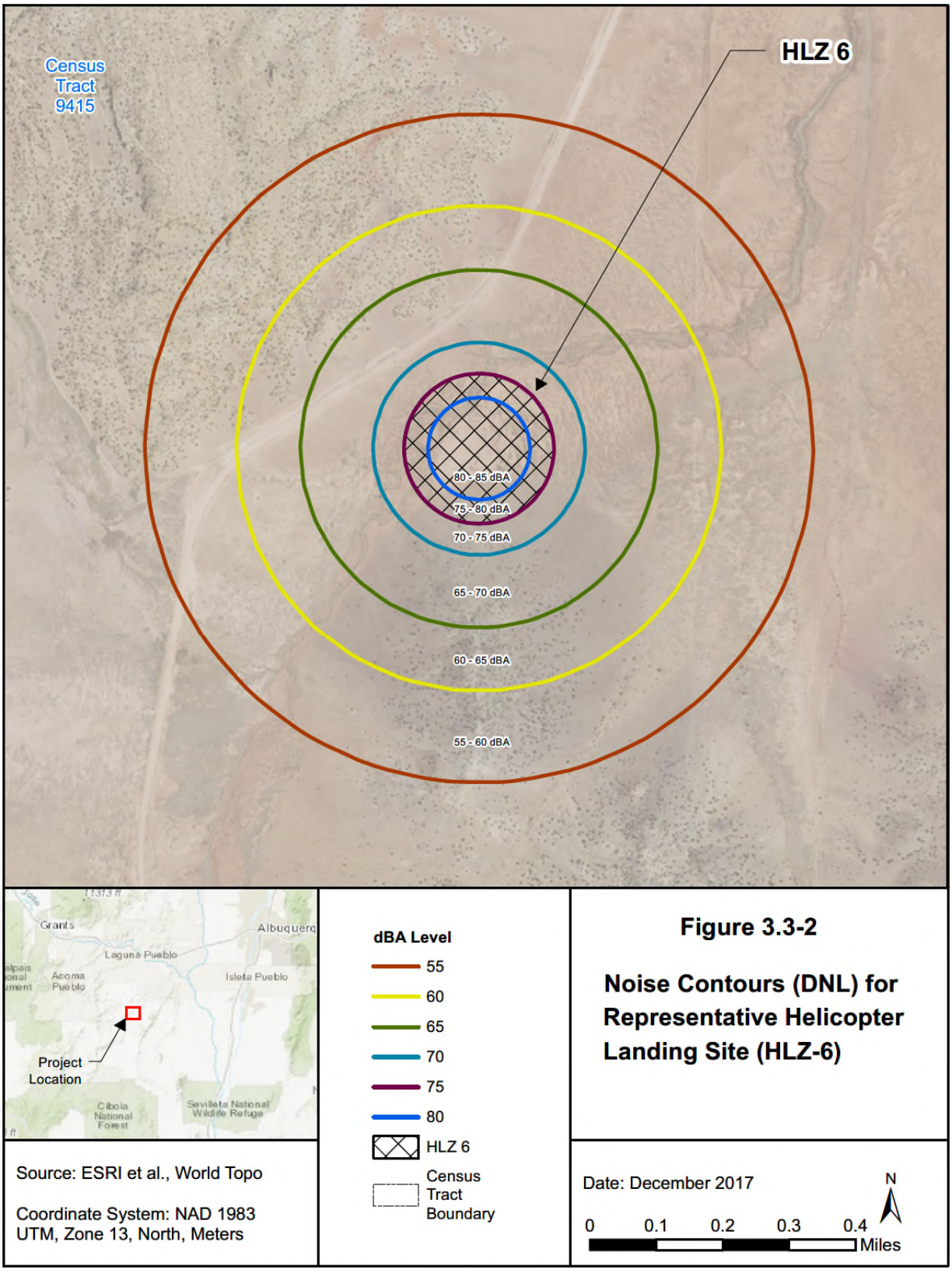


**Figure 3.3-2. Noise Contours (DNL) for Representative Helicopter Landing Site (HLZ 6)**

## 3.4 Air Quality

This section describes the affected environment for air quality including air emissions resulting from current training operations. Additional detail and calculations can be found in Appendix F.

### 3.4.1 Definition of Resource

Air quality in a given location is defined by the concentration of various pollutants in the atmosphere. By comparing a pollutant concentration in the atmosphere to federal and/or state ambient air quality standards, the impact of its presence can be determined.

Pursuant to the Clean Air Act Amendments of 1990 (CAAA), the United States Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment.

The USEPA classifies the air quality within an Air Quality Control Region with regard to its attainment of federal primary and secondary NAAQS. States with nonattainment or maintenance areas are required to prepare plans, known as State Implementation Plans (SIPs), stating how they will attain or maintain NAAQS. The New Mexico SIP includes Air Quality Control Regulations in the New Mexico Administrative Code (NMAC), *State Implementation Plan Revisions for Nonattainment Areas, Air Quality Control Programs, and State Ambient Air Quality Standards*.

#### General Conformity

Section 176(c) of the federal CAAA requires federal agencies to ensure that their actions are consistent with the CAAA and with applicable state air quality management plans.

### 3.4.2 Greenhouse Gases

Climate change refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns over a period of time. Significant changes in global climate patterns have recently been associated with global warming, an average increase in the temperature of the atmosphere near the Earth's surface, attributed to accumulation of greenhouse gas (GHG) emissions in the atmosphere. Regulated GHGs include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$). GHGs are commonly quantified in the equivalent mass of $CO_2$, denoted $CO_2$eq, which takes into account the global warming potential (GWP) of each individual GHG compound. The most common GHG that results from human activity is $CO_2$, followed by $CH_4$ and $N_2O$. The U.S. EPA has instituted various regulation measures to reduce GHSs. One of these efforts is under 40 CFR, Part 98 that require mandatory reporting of GHG emissions for combustion sources which emit more than 25,000 metric tons of $CO_2$-equivalents (MTCO2e) per year.

### 3.4.3 Current Operations

The sites in Proposed Action are spread over various counties within New Mexico. Main operations are managed from Kirtland AFB, which is located within Bernalillo County, New Mexico. Training operations currently take place within Cibola, Sandoval, and Valencia Counties. New training sites are proposed for De Baca, Guadalupe, and Socorro Counties. With regard to NAAQS, Bernalillo County is listed as attainment for all standards. The Albuquerque Area within Bernalillo County is listed a Moderate Maintenance Area for carbon monoxide (CO). The other counties are listed as in attainment for all standards.

Under current operations, there are emissions from training exercises resulting from aircraft and support vehicles consisting of light duty diesel vehicles (i.e., 0 to 8,500 pounds of gross vehicle weight rating), used for OPFOR personnel and aircraft maintenance/emergency repair. Annual emissions resulting from current operation of these vehicles are summarized in table 3.4-1. Detailed calculations of these emissions are included in Appendix F. As the 58 SOW training operations are ongoing operations that have been performed for many years, the resulting emissions are part of the current emissions levels contained within the SIP. Therefore, the current 58 SOW operations conform to the SIP. The GHGs are below the reporting requirement. The emissions from the small pyrotechnic equipment used for OPFOR training arms firing and munitions would be inconsequential compared to the vehicle emissions and are not discussed further.

**Table 3.4-1. Current Operations Annual Emissions**

| Emission Source | VOC (tpy) | CO (tpy) | $NO_x$ (tpy) | $PM_{10}$ (tpy) | $PM_{2.5}$ (tpy) | $SO_2$ (tpy) | $CO_2eq$ (MTPY) |
|---|---|---|---|---|---|---|---|
| VMT | 0.08 | 1.22 | 0.13 | 0.00 | 0.00 | 0.00 | 108.74 |
| Aircraft | 0.13 | 3.04 | 9.97 | 1.34 | 1.04 | 0.85 | 2,345.94 |
| Total | 0.21 | 4.26 | 10.09 | 1.34 | 1.04 | 0.85 | 2,454.67 |
| Conformity Threshold | None | 100 | None | None | None | None | None |
| Significant? | No | No | No | No | No | No | No |

Notes:

| | |
|---|---|
| CO | carbon monoxide |
| $CO_2eq$ | carbon dioxide equivalent |
| MTPY | metric tons per year |
| NO | nitrogen oxide |
| $NO_2$ | nitrogen dioxide |
| $NO_x$ | nitrogen oxides (NO and $NO_2$) |
| $PM_{2.5}$ | respirable particulate matter 2.5 microns in diameter and smaller |
| $PM_{10}$ | respirable particulate matter 10 microns in diameter and smaller |
| $SO_2$ | sulfur dioxide |
| tpy | tons per year |
| VMT | vehicle miles traveled |
| VOC | volatile organic compound |

## 3.5 Earth Resources

This section describes the affected environment for earth resources (i.e., geology and soils) and includes the impacts resulting from current training operations. The helicopter and tiltrotor training operations do not affect the lithology, stratigraphy, or geological structures in the area of the HLZs. As there are no structures associated with the current or proposed activities, the ability of the geology and soils to support structures is not relevant. Also the seismic character of the area is not relevant to the assessment of the potential impacts of the current and proposed operations. These characteristics are briefly discussed. This section concentrates on the sensitivity of the soils to wind erosion (i.e., rotor wash).

### 3.5.1 Existing Conditions

Geology. The current operations take place in two physiographic provinces, the Colorado Plateau and the Rio Grande Rift. The Colorado Plateau is a crustal block that has been uplifted and has maintained its elevation despite crustal thinning in the surrounding basin and range province. The Rio Grande Rift, a subset of the Basin and Range province, is an area characterized by crustal extension, or the divergence of tectonic plates. These provinces contain many mesas and other high flat areas that are suitable for the helicopter and tiltrotor training.

Major rock units in the planning area consist of Quaternary alluvium, Cretaceous mudstone and sandstone, Tertiary volcanic rocks, Jurassic sandstone, gypsum, limestone, and sedimentary units from the Triassic and Jurassic. Most of the current HLZs are located on Quaternary sediments.

Soils. Soil types and properties vary within the region of current and proposed HLZs. Soils are formed on volcanic and sedimentary bedrock, and on water-deposited and wind-deposited sediments on the landscape (BLM 2012). In the semi-arid landscapes in the area of the HLZs, erosion is due to wind and naturally-occurring surface water runoff. A normal degree of soil erosion caused by wind or water is expected under natural conditions, but erosion that exceeds natural rates because of land use activities is referred to as accelerated erosion. The BLM defines sensitive soils as 1) erosion-sensitive soils that have higher susceptibility to wind or water erosion; and 2) reclamation-sensitive soils that would be difficult to restore or reclaim with vegetation after drastic disturbance of the soil profile has occurred. Most of the current HLZs are in areas mapped as containing sensitive soils by the BLM.

There are three broad categories of soils within the areas of the HLZs: (1) very shallow to deep, well-drained sandy loams with small rock fragments (gravel, cobbles) found on mesas, hills, mountains, ridges, slopes, and upland plains; (2) deep, well-drained very stony to very fine sandy and silty clay loams found on fan terraces, bajadas, and swales; and (3) deep, poor- to well-drained clay loams to loamy very fine sands found in the Rio Grande floodplain. Table 3.5-1 presents a summary of the conditions at the existing and proposed sites.

## Table 3.5-1. Site Soil Condition Summary

| HLZ | Proposed or Existing | Size of Site (acres) | Area with slopes greater than 60 degrees (acres) | Vegetation Communities | Site Observations |
|---|---|---|---|---|---|
| 6 | Existing | 26.0 | 0 | Open grassland with exposed soil. | Dry ephemeral drainage. Non-wetland waters of the U.S. Dry drainage in sandy area in NW portion of site. Drift and/or debris; presence of bed and bank; benches.<br>Area of open soil potentially due to rotor wash. |
| 7 | Existing | 1.0 | 0 | Open grassland bordered by open juniper woodland. | No rotor wash scour observed. |
| 13 | Existing | 1.0 | 0 | Open grassland on a ridgeline. | No rotor wash scour observed. |
| 15 | Existing | 1.0 | 0 | Open grassland on a ridgeline. | No rotor wash scour observed. |
| 16 | Existing | 1.0 | 0 | Open grassland on a ridgeline. | No rotor wash scour observed. |
| 17 | Existing | 26.0 | 0 | Open grassland and cholla. | No rotor wash scour observed. |
| 18 | Existing | 26.0 | 0 | Open grassland. | No rotor wash scour observed. |
| 18A | Existing | 130 | 0 | Open grassland with cleared areas. | Part of the site has been cleared and graded in the past. TerraLOC applied. Sediment erosion is limited by TerraLOC. |
| 19 | Existing | 1.0 | 0 | Open grassland with open juniper woodland. | No rotor wash scour observed. |
| 20 | Existing | 1.0 | 0 | Open grassland and open juniper woodland on top of a mesa/ridgeline. | No rotor wash scour observed. |
| 22 | Existing | 1.0 | 0 | Open grassland bordered by open juniper woodland with some exposed soil areas. | Area of open soil potentially due to rotor wash. |
| 22B | Existing | 26.0 | 0 | Open grassland and open juniper woodland with some exposed soil areas. | Area of open soil potentially due to rotor wash. |
| 23 | Existing | 1.0 | 0 | Open grassland bordered by open juniper woodland. | No rotor wash scour observed. |
| 24 | Existing | 1.0 | 0 | Open grassland and open juniper woodland next to cliffs. | No rotor wash scour observed. |
| 27 | Existing | 26.0 | 0.2 | Open grassland bordered by open juniper woodland. | No rotor wash scour observed. |
| 28 | Existing | 1.0 | 0 | Open grassland bordered by open juniper woodland. | No rotor wash scour observed. |

## Table 3.5-1. Site Soil Condition Summary, continued

| HLZ | Proposed or Existing | Size of Site (acres) | Area with slopes greater than 60 degrees (acres) | Vegetation Communities | Site Observations |
|---|---|---|---|---|---|
| 29 | Existing | 1.0 | 0 | Open grassland bordered by open juniper woodland. | No rotor wash scour observed. |
| 30 | Existing | 26.0 | 0 | Open grassland with exposed soil areas. | Dry ephemeral drainage. Non-wetland waters of the U.S. Dry drainage in loamy soil in far eastern portion of site. Drift and/or debris; presence of bed and bank. Area of open soil potentially due to rotor wash. |
| 31 | Existing | 9.5 | 1.1 | Exposed soil adjacent to large cliff areas. Sparse vegetation. | Part of the site has been cleared and graded in the past. TerraLOC applied. Sediment erosion is limited by TerraLOC. Dry ephemeral drainage. Non-wetland waters of the U.S. Large, dry drainage in a sandy area in SE portion of site. Ripples; drift and/or debris; presence of bed and bank; benches. |
| 32 | Existing | 1.0 | 0 | Open grassland and open juniper woodland on top of a mesa. | No rotor wash scour observed. |
| 33 | Existing | 1.0 | 0 | Open grassland and open juniper woodland on top of a mesa. | No rotor wash scour observed. |
| 34 | Existing | 1.0 | 0 | Open grassland bordered by open juniper woodland. | No rotor wash scour observed. |
| 36 | Existing | 26.0 | 0 | Open grassland bordered by open juniper woodland. | No rotor wash scour observed. |
| 37 | Existing | 26.0 | 0 | Exposed soil surrounded by open grassland and juniper woodland. | Part of the site has been cleared and graded in the past. TerraLOC applied. Sediment erosion is limited by TerraLOC. |
| 38 | Existing | 26.0 | 0 | Open grassland. | No rotor wash scour observed. |
| 42 | Existing | 26.0 | 0 | Open grassland bordered by open juniper woodland. | No rotor wash scour observed. |
| 19A | Proposed | 26.0 | 1.1 | Open grassland and cholla. | |
| 19B | Proposed | 26.0 | 0 | Open grassland and cholla. | |
| 22A | Proposed | 1.0 | 0 | Open grassland bordered by open juniper woodland. | |
| 37A | Proposed | 1.0 | 0 | Open grassland on top of a mesa. | |
| 37B | Proposed | 1.0 | 0 | Open grassland on top of a mesa. | |
| 37C | Proposed | 1.0 | 0 | Open grassland on top of a mesa. | |
| 37D | Proposed | 1.0 | 0.2 | Open grassland on top of a mesa. | |
| C | Proposed | 26.0 | 0 | Open grassland and cholla. | |

## Table 3.5-1. Site Soil Condition Summary, continued

| HLZ | Proposed or Existing | Size of Site (acres) | Area with slopes greater than 60 degrees (acres) | Vegetation Communities | Site Observations |
|---|---|---|---|---|---|
| D | Proposed | 26.0 | 0 | Open grassland and cholla. | |
| N | Proposed | 26.0 | 0 | Open grassland. | Dry ephemeral drainage. Non-wetland waters of the U.S. Dry drainage in sandy area surrounded by dense grassland in NW and western portion of site. Hydrophytic vegetation (tamarisk) present. Ripples; drift and/or debris; presence of bed and bank; benches |
| O | Proposed | 26.0 | 0 | Open grassland and cholla. | |
| P | Proposed | 26.0 | 0 | Open grassland and cholla on top of a mesa. | |
| Q | Proposed | 26.0 | 0.1 | Open grassland and cholla on top of a mesa. | |
| R | Proposed | 26.0 | 0 | Open grassland and cholla on top of a mesa. | |
| CR1 | Proposed | 26.0 | 0 | Open grassland and cholla. | |
| CR2 | Proposed | 26.0 | 0 | Open grassland and cholla. | |
| OF1 | Proposed | 6.5 | 0 | Open grassland on gentle slopes with adjacent juniper woodland. | |
| OF2 | Proposed | 6.5 | 0 | Open grassland on gentle slopes with adjacent juniper woodland. | |
| OF3 | Proposed | 6.5 | 0 | Open grassland with some open juniper woodland. | |
| OF4 | Proposed | 6.5 | 0 | Open grassland with some open juniper woodland. | |
| OF5 | Proposed | 6.5 | 0 | Open grassland and cholla. | |
| OF6 | Proposed | 6.5 | 0 | Open grassland and cholla. | |
| OF7 | Proposed | 6.5 | 0 | Open grassland and cholla. | |

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The current HLZs have experienced the down force winds generated by the CV-22B Ospreys and the helicopter rotors (rotor wash) for many years. The HLZs used by the CV-22B Ospreys (e.g., HLZs 18A, 31, and 37) were observed to have open exposed soil with denuded vegetation due to past and ongoing military activities. This was the result of clearing and grading the sites. The USAF applies TerraLOC, a non-petroleum biodegradable polyvinyl alcohol based product used as a dust abatement agent, to the CV-22B HLZs. It is sprayed on and penetrates the soil, creating a thin layer with the soil locked in place. The solution is non-toxic and readily biodegradable. The depth of the layer depends on viscosity and the soil type. TerraLOC is designed to handle both wind and water erosion. The application is advertised to last four months. These methods were used to ensure no foreign objects impacted the CV-22B Osprey engines or rotors during training activities. These methods are limited to the HLZs used by the CV-22B Ospreys (i.e., HLZs 18A, 31, and 37). No other HLZs have received this treatment. The other HLZs are not used by the CV-22B Ospreys and have experienced the rotor wash only from the helicopters.

Pilots during training tend to aim for the centers of the HLZs. This limits the area that experiences the greatest rotor wash. Existing training sites, HLZs 6, 22, 22B, and 30, were observed to have areas of open soil potentially due to rotor wash (Tetra Tech 2017a). HLZ 6 is not in an area designated as having sensitive soils.

## 3.6 Natural Resources

This section describes the affected environment for natural resources (i.e., vegetation and habitat, wildlife, special status species, and wetlands and waters of the U.S.) and includes the impacts resulting from current training operations.

### 3.6.1 Definition of Resource

BLM-administered public lands have a vast assemblage of natural resources that include numerous ecosystems, habitats, and animal and plant species, as well as varied topography. To assess the impact of military training activities on natural resources within the project areas, several categories were selected for consideration in this EA. These natural resources categories are tied to management considerations for the BLM and can be used to assess overall health of the ecosystem. The following categories were selected for analysis:

- Vegetation and habitat;
    - Plant species and wildlife habitats not addressed under special status species.
- Wildlife;
    - Wildlife species not addressed under special status species.

- Special status species; and
    - Plant and animal species federally-listed as threatened or endangered, species proposed for federal listing, and candidates for federal listing.
    - Plant and animal species designated as sensitive by the BLM.
    - Other species awarded legal protection (i.e., under the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act).
- Wetlands and waters of the U.S.
    - Wetlands and other protected waters pursuant to Sections 404 and 401 of the CWA and EOs 11990 and 12608.
    - Wetlands are defined as areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (USEPA 40 CFR 230.3; U.S. Army Corps of Engineers [USACE] 33 CFR 328.3).
    - Waters of the U.S. most commonly encompass navigable waters bound by the ordinary high water mark, adjacent wetlands, and tributaries.

### 3.6.2 Existing Conditions

This section discusses current conditions, including any impacts from ongoing training activities.

The 49 BLM training locations are located within undeveloped areas in six counties: Cibola, De Baca, Guadalupe, Sandoval, Socorro, and Valencia, as shown on figures 2-1 through 2-4 and Appendix A – Site Maps. The project areas considered within this natural resources analysis include all 26 current and 23 proposed 58 SOW BLM training areas. The Rio Puerco Field Office (RPFO) is the lead BLM office for this EA.

The RPFO administers 43 of the 49 training areas on BLM-administered lands. The remainder of the areas are within the jurisdictions of the BLM Socorro Field Office (SFO) (five sites: C, D, OF5, OF6, and OF7) and BLM Roswell Field Office (RFO) (two sites: CR1 and CR2).

The majority of the training area-specific natural resources information is from the Biological Survey Report that provides the results of natural resources surveys performed in support of the Proposed Action (Tetra Tech 2017a) and is supplemented by existing natural resources information from the BLM RPFO RMP/EIS, SFO RMP, RFO RMP, and Special Status Species Plan.

Historical data prior to initiation of ongoing training at the existing project sites is not available. However, training at these sites has been conducted for many years. Potential long-term effects at the existing sites include ground disturbance or denuded vegetation in the landing areas as well as wildlife avoidance behaviors and habituation due to noise and visual stimuli.

The Biological Survey Report included a preliminary habitat suitability analysis based on thorough review of existing natural resources data (Tetra Tech 2017a). The data sources utilized were:

- Aerial photographs and topographic maps;
- Soil surveys;
- U.S. Geological Survey (USGS) Southwest Regional Gap Analysis Project (SWReGAP; vegetation communities);
- Geospatial Data Gateway (Natural Resources Conservation Science [NRCS] for National Hydrography Dataset [NHD]-Wetland spatial data);
- U.S. Fish and Wildlife Service (USFWS) data sources (from Information, Planning, and Conservation [IPAC] website);
- New Mexico State Endangered Plant Species listed by County;
- Biota Information System of New Mexico (BISON-M) query by County; and
- Natural Heritage New Mexico (NHNM) database query of occurrences by watershed.

Additionally, an initial reconnaissance field survey was conducted in March 2017 to determine the habitats at each site and provide field verification for the preliminary habitat suitability analysis. All sites were visited and visually surveyed. Potential habitat for special status species was identified at each site during the reconnaissance survey.

Four focused field surveys were performed from May to July 2017 to determine the presence/absence of target species (Tetra Tech 2017a). A 100-foot buffer was surveyed around some sites to characterize habitat and survey for burrowing owls and small mammals. A 0.5-mile buffer was surveyed around all sites for raptors and nesting birds. Visual meandering surveys were conducted for vegetation communities, special status plants, small mammals, bat roosts, and reptiles. Mapping of prairie dog colonies and small mammal burrows was performed when found. All wildlife species observed during any surveys were noted (Tetra Tech 2017a).

Protocol surveys were conducted for the following two species, and each survey had three distinct events: mountain plover (*Charadrius montanus*) per USFWS 2002 Survey Guidelines as described in BLM 2011; and burrowing owl (*Athene cunicularia hypogea*) per BLM 2011 Survey Protocol. If potential wetlands, waters of the U.S., or other waters were found in the field, a wetlands delineation was performed pursuant to USACE Methodology (Tetra Tech 2017a). Areas were surveyed for each species and potential wetlands or waters of the U.S. during the spring/summer of 2017. Additional details on survey methods are available within the Biological Survey Report (Tetra Tech 2017a).

### 3.6.2.1 Vegetation and Habitat

EPA Ecoregions within the project areas are identified through the analysis of environmental patterns and the composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity. The project areas generally consist of four Level III Ecoregions: Arizona/New Mexico Plateau, Arizona/New Mexico Mountains, Southwestern Tablelands, and Southern Rockies. Most of the project areas are occupied by Arizona/New Mexico Plateau Level III Ecoregion.

Arizona/New Mexico Plateau is described by Wiken et al. (2011) as having dry, mid-latitude steppe and desert climates with hot, low-humidity summers and cool to cold dry winters. Mean annual precipitation ranges from 125 millimeters at low elevations to 380 millimeters at high elevations. Lower elevations support arid shrubland-grassland and higher elevations transition to pinyon-juniper woodland. Within this ecoregion, water is scarce and streams are predominantly ephemeral and intermittent. Major landforms are plateaus and mesas, cliffs, deep canyons, valleys, and irregular plains. The Arizona/New Mexico Plateau Ecoregion generally provides habitat for large and small mammals, birds, and reptiles (refer to sections 3.6.2.2 and 3.6.2.3).

USGS SWReGAP data was assessed for all project sites to characterize major vegetation types (Tetra Tech 2017a). USGS SWReGAP data utilizes multi-season aerial satellite imagery in conjunction with digital elevation model derived Geographic Information System (GIS) datasets (e.g., elevation, landform, aspect) to model natural and semi-natural vegetation. Based on an assessment of SWReGAP data within the specific project sites for this EA, semi-desert represents approximately 588 acres; forest and woodland represents approximately 77 acres; shrubland and grassland represents approximately 59 acres; and nonvascular and sparse vascular rock vegetation represents approximately 6 acres (Tetra Tech 2017a). Forest and woodland is anticipated to support the highest species diversity and abundance, followed by shrubland and grassland, semi-desert, and nonvascular and sparse vascular rock vegetation

SWReGAP data was groundtruthed and updated in the field during the natural resources surveys conducted for this EA (Tetra Tech 2017a). The habitats present at the project sites were documented as grassland with various degrees of exposed soil and rocks, cholla, and sparse juniper woodland; associated landforms were ridgelines, cliffs, and mesas. The existing HLZs that use the dust suppressant TerraLOC (18A, 31, and 37) were observed to have open exposed soil with denuded vegetation due to ongoing military activities (Tetra Tech 2017a).

The dominant plant species within each project site were also documented during the natural resources surveys (Tetra Tech 2017a). No special status plant species were observed. The dominant plant species found within the sites are presented in table 3.6-1 (Tetra Tech 2017a).

## Table 3.6-1. Plant Species Observed

| Common Name | Scientific Name | Project Areas Observed |
|---|---|---|
| Purple three-awn | *Aristida purpurea* | CR1 |
| Sand sagebrush | *Artemisia filifolia* | 13, 16, 19A, 19B |
| Side-oats grama | *Bouteloua curtipendula* | CR2 |
| Black grama | *Bouteloua eriopoda* | CR1 |
| Blue grama | *Bouteloua gracilis* | 18, 18A, 22, 22A, 22B, 37A, 37B, 37C, 37D, C, O, P, Q, R, CR2 |
| Hairy grama | *Bouteloua hirsuta* | C |
| Buffalograss | *Buchloe [Bouteloua] dactyloides* | 19A, 19B |
| Narrow-leaved cryptantha | *Cryptantha angustifolia* | C, D, OF5, OF6, OF7 |
| Tree cholla | *Cylindropuntia imbricata* | 18, 18A, 22, 22A, 22B, 37A, 37B, 37C, 37D, C, D, O, P, Q, R, CR1, CR2, OF5, OF6, OF7 |
| Cholla | *Cylindropuntia* sp. | 19B |
| Featherplume | *Dalea formosa* | CR2 |
| Low woollygrass | *Dasyochloa pulchella* | C, D, OF5, OF6, OF7 |
| Mountain tansy mustard | *Descurainia incana* | D, OF5, OF6, OF7 |
| Touristplant | *Dimorphocarpa wislizeni* | 16 |
| Longleaf ephedra | *Ephedra trifurca* | 13, 15 |
| New Mexico fleabane | *Erigeron neomexicanus* | 13, 15, 16 |
| Firewheel indian blanket | *Gaillardia pulchella* | 16 |
| Dakota mock vervain | *Glandularia bipinnatifida* | C |
| Club cholla | *Grusonia clavata* | D, OF5, OF6, OF7 |
| Matchweed | *Gutierrezia sarothrae* | 7, 13, 15, 16, 19, C, CR2 |
| Pig-nut, hog potato | *Hoffmannseggia glauca* | D, OF5, OF6, OF7 |
| Ashe's juniper | *Juniperus ashei* | 7, 13, 15, 16, 19, 19A, 19B, 20, 22, 22B, 23, 24, 27, 28, 29, 32, 33, 34, 36, 37, 37A, 37D, 42, CR2, OF1, OF2, OF3, OF4 |
| Plains blackfoot | *Melampodium leucanthum* | 16 |
| Ring muhly | *Muhlenbergia torreyi* | C |
| Twistspine pricklypear | *Opuntia macrorhiza* | C, D, OF5, OF6, OF7 |
| Patagonia plantain | *Plantago patagonica* | 19A, 19B, C, D, OF5, OF6, OF7 |
| Tobosagrass | *Pleuraphis mutica* | 7, 13, 15, 18, 18A, 19, 19A, 19B, 20, 22, 22A, 22B, 23, 36, 37A, 37B, 37C, 37D, 42, C, O, P, Q, R, OF1, OF2, OF3, OF4 |
| Honey mesquite | *Prosopis glandulosa* | 13, 15 |
| Skunk bush | *Rhus trilobata [aromatica]* | 13, CR2 |
| Russian thistle | *Salsola kali* | N |
| White horse-nettle | *Solanum elaeagnifolium* | N |
| Sand dropseed | *Sporobolus cryptandrus* | 18, 18A, 22, 22A, 22B, 37A, 37B, 37C, 37D, N, O, P, Q, R |
| Tamarisk | *Tamarix sp.* | N |
| Common dandelion | *Taraxacum officinale* | 18, 18A, 22, 22A, 22B, 37A, 37B, 37C, 37D, D, O, P, Q, R, OF5, OF6, OF7 |
| Resinbush | *Viguiera stenoloba* | 16 |
| Soapweed yucca | *Yucca glauca* | CR1, CR2 |

An analysis of potential raptor cliff nesting habitat at the project sites was performed in GIS and then field verified during natural resources surveys (Tetra Tech 2017a). All sites and an additional 1-mile buffer around each site were analyzed to determine if slopes over 60 degrees occurred, which is considered potential raptor habitat. Table 3.6-2 provides the acreage of potential raptor habitat at or within the 1-mile buffer of each site (Tetra Tech 2017a). It was determined through this assessment that potential raptor habitat within the HLZs and OPFOR sites is minimal (2.7 acres). However, the majority of the 1-mile buffer areas were found to have potential raptor habitat. A total of 2.7 acres within the HLZ and OPFOR sites and 2,155.8 acres within the 1-mile buffers of the sites are considered potential raptor habitat (cliffs greater than 60 degree slope). HLZs 19A, 27, 31, 37D, and Q have potential raptor habitat within the site boundaries.

Cliffs and caves are also considered potential bat roost locations. In the RPFO, travertine, gypsum, and lava tube caves are the most common types of cave formations (BLM 2012). Although karst exposures (which indicate cave potential) are widespread through the RPFO, data to make an accurate estimate of the total number of caves are not available (BLM 2012). However, based on geologic maps, the probability of cave features in some areas is certain. Cliffs were not found within the vast majority of HLZ and OPFOR sites but were found within 100-feet of some sites and within 1-mile of most sites (Table 3.6-2; Tetra Tech 2017a).

#### 3.6.2.2 Wildlife

The BLM wildlife program maintains wildlife habitat and species occurrence data with an emphasis on biodiversity and ecosystem management. Wildlife population sizes and species diversity vary depending upon the extent and type of habitat. For example, dry upland habitat may support low species diversity and scattered populations over extensive areas, while wetland-riparian habitat and lands adjacent to them contain more plant and animal species during certain seasons than much larger areas year-round. The ongoing RPFO RMP/EIS revision proposes designating particular wildlife species for special management emphasis. These species include Gunnison's prairie dog (*Cynomys gunnisoni*), big game species, mule deer (*Odocoileus hemionus*), rocky mountain elk (*Cervus canadensis nelson*), and bats.

As part of the project-specific natural resources surveys, a preliminary data analysis and initial reconnaissance field survey were conducted to determine the habitats present at each site (Tetra Tech 2017a). As a result of these analyses, it was determined that a variety of mammals, raptors and nesting birds, and reptiles had the potential to be present within the sites. Special status species are discussed in section 3.6.2.3. Other wildlife species are discussed as follows. Nearly

## Table 3.6-2. Potential Raptor Nesting Habitat

| Project Site* | Cliffs Greater than 60 Degree Slope Within Site (acres) | Cliffs Greater than 60 Degree Slope Within 1-Mile Buffer (acres) |
|---|---|---|
| 6 | 0 | 3.5 |
| 7 | 0 | 3.2 |
| 13 | 0 | 50.0 |
| 15 | 0 | 48.6 |
| 16 | 0 | 17.3 |
| 17 | 0 | 2.9 |
| 18A | 0 | 0.2 |
| 19 | 0 | 133.9 |
| 19A | 1.1 | 141.4 |
| 19B | 0 | 126.2 |
| 20 | 0 | 276.7 |
| 22 | 0 | 1.9 |
| 22A | 0 | 1.6 |
| 22B | 0 | 2.1 |
| 23 | 0 | 212.4 |
| 24 | 0 | 153.6 |
| 27 | 0.2 | 10.9 |
| 28 | 0 | 16.2 |
| 29 | 0 | 25.0 |
| 30 | 0 | 33.1 |
| 31 | 1.1 | 39.6 |
| 32 | 0 | 212.2 |
| 33 | 0 | 182.4 |
| 34 | 0 | 121.8 |
| 36 | 0 | 9.1 |
| 37 | 0 | 33.4 |
| 37A | 0 | 44.0 |
| 37B | 0 | 39.4 |
| 37C | 0 | 38.9 |
| 37D | 0.2 | 42.1 |
| 38 | 0 | 1.7 |
| 42 | 0 | 1.7 |
| N | 0 | 25.3 |
| O | 0 | 0.3 |
| P | 0 | 0.2 |
| Q | 0.1 | 41.2 |
| R | 0 | 6.5 |
| OF1 | 0 | 5.6 |
| OF2 | 0 | 5.5 |
| OF3 | 0 | 2.7 |
| OF4 | 0 | 2.0 |
| OF7 | 0 | 39.5 |
| **Total** | **2.7** | **2,155.8** |

**Note: Sites** without potential raptor habitat (cliffs greater than 60-degree slope) within the site nor the 1-mile buffer of the site are not included in this table.

all avian species discussed throughout this document are protected by the Migratory Bird Treaty Act.

As part of the project-specific natural resources surveys, a preliminary data analysis and initial reconnaissance field survey were conducted to determine the habitats present at each site (Tetra Tech 2017a). As a result of these analyses, it was determined that a variety of mammals, raptors and nesting birds, and reptiles had the potential to be present within the sites. Special status species are discussed in section 3.6.2.3. Other wildlife species are discussed as follows. Nearly all avian species discussed throughout this document are protected by the Migratory Bird Treaty Act.

**Small mammals.** Small mammals with the potential to occur within the project sites include, but are not limited to, moles, mice, rats, kangaroo rats, gophers, prairie dogs, and foxes (Tetra Tech 2017a). Species from each of these groups use a wide variety of habitats that vary greatly by species. Most known habitats occurring in New Mexico are used by small mammals.

**Gunnison's prairie dog.** In New Mexico, Gunnison's prairie dogs may occur from about 4,500 to 10,000 feet elevation. Gunnison's prairie dogs occur in grasslands, shrub-grasslands, montane meadows, mountain grasslands, valley floors to higher meadows, and alpine meadows with slopes of less than 15 percent. Vegetation structure in occupied habitats is characterized by predominantly graminoid and herbaceous plant cover with few or no trees and variable shrub density and can occur in areas where shrub density is relatively high (USFS 2013). This prairie dog occurs in northern and western New Mexico, where black-tailed prairie dogs are not likely to occur. They form small, loosely organized towns that are often colonies consisting of only two to three animals (BISON-M 2017). Gunnison's prairie dog also has ecological value as a keystone species. A keystone species' ecological influence in a biotic community is disproportionately large with respect to its numerical abundance. Prairie dogs differ from most conventional keystone species because they both act as prey and modify habitat structure and dynamics (Kotliar et al. 1999). Species in the project areas that benefit from prairie dogs include burrowing owl, mountain plover, and raptors.

**Black-tailed prairie dog.** In New Mexico, black-tailed prairie dogs (*Cynomys ludovicianus ludovicianus*) occur in shortgrass and mixed-grass prairies and grass-shrub habitats. They are found in areas without dense vegetation and tend to avoid areas with tall grass, heavy sagebrush, and other thick vegetation cover (BISON-M 2017). Black-tailed prairie dogs are known to inhabit south-central New Mexico.

**Swift fox.** The swift fox (*Vulpes velox*) is a small canid, approximately the size of a house cat, which lives in prairie regions (Dark-Smiley and Keinath 2003). It is native to New Mexico and found primarily in the central and eastern plains of the state. The swift fox prefers native grasslands dominated by blue gramma, spear grass, and fescue. They are found in the same

habitat throughout the year and live in underground burrows called dens (Dark-Smiley and Keinath 2003).

**Bats and roosts.** The BLM signed a memorandum of understanding with Bat Conservation International in 1993, which increased BLM efforts to consider bat habitat protection in its management activities. Important habitat areas for bats include cliffs, trees, caves, and abandoned mines. Bats are known to roost in caves that are often found along cliffs. A BLM survey conducted in 1998 documented thirteen bat species across a total of five riparian and/or pinyon-juniper sites in the project area.

**Big game species.** The primary big game species in the project areas are Rocky Mountain elk, mule deer, and pronghorn antelope (*Antilocapra americana*). The New Mexico Department of Game and Fish (NMDGF) is the lead authority with responsibility for management of big game populations.

**Mule deer.** While mule deer occur throughout most woodland and timbered areas as well as adjacent shrublands, observations are typically infrequent. Much of the land managed by the BLM is considered important winter and/or summer habitat for mule deer. Mule deer are known to utilize 167 vegetative types as a food source throughout the year. The mule deer's diet is generally made up of sagebrush, mountain mahogany, cliff rose, oaks, etc., and this species primarily occurs within the Madrean Pine-Oak Conifer-Oak Forest and Woodland/Intermountain Basins Big Sagebrush Shrubland habitat types. Mule deer are a Species of Greatest Conservation Need under the NMDGF and include a browse/shrub component within their habitat. NMDGF defines Species of Greatest Conservation Need as those species indicative of the diversity and health of the state's wildlife that are associated with key habitats, including low and declining populations and species of high recreational, economic, and/or charismatic value.

**Rocky mountain elk.** The project areas also provides winter and/or summer habitat for Rocky Mountain elk. Important elk management areas include winter and summer ranges, migration corridors, and calving areas. The BLM does not yet have calving areas identified.

**Raptors and nesting birds.** Raptors and other smaller avian species also have the potential to occur within the project areas. Raptors include all known species of eagles, hawks, falcons, vultures, kites, merlins, osprey, and crested caracara that exist in North America. These fast-flying, skilled hunters prey on a wide variety of food items including small mammals, fish, lizards, birds, insects, and carrion. Optimal nesting habitat is forested areas or open areas with rocky, steep cliffs in areas where prey concentrations are high. Most raptors require open areas for hunting. Many raptor species nest on ledges of cliffs, trees, and sometimes on tall, man-made structures, such as office buildings or bridges. They are found at all elevations occurring within New Mexico (Kimey and Conley 1988).

**American peregrine falcon.** The American peregrine falcon (*Falco peregrinus anatum*) occurs in various open habitats, including grasslands and forested areas in association with suitable

nesting cliffs. This species nests in ledges or holes on the face of rocky cliffs or crags (USFS 2013). Peregrine falcons breed in the mountains and river canyons of western New Mexico east to Sangre de Cristo/Manzano, and the Sacramento mountains (USFS 2013).

All wildlife species observed within or adjacent to each HLZ and OPFOR site during the natural resources surveys were recorded (Tetra Tech 2017a). Special Status species observed are presented in tables 3.6-3 and 3.6-4 and in section 3.6.2.3.

**Table 3.6-3. Special Status Animal Species with Potential to Occur within Project Areas**

| Common Name | Scientific Name | Status | Habitat |
|---|---|---|---|
| **Birds** | | | |
| Aplomado falcon | *Falco femoralis* | FE | Open terrain with scattered trees or shrubs. |
| Mexican spotted owl | *Strix occidentalis lucida* | FT | Habitat consists of dense multistory stands of large mixed conifer trees. Prefer shaded, cool, moist canyon sites and mountain slopes with rock outcrops, cliffs, talus, and standing dead and down woody material. |
| Piping plover | *Charadrius melodus* | FT | Less fragmented prairie habitat. |
| Yellow-billed cuckoo | *Coccyzus americanus occidentalis* | FT | Lowland deciduous woodlands, willow and alder thickets, and open to dense stands of shrubs and low trees, including sagebrush and saltbush. |
| Baird's sparrow | *Ammodramus bairdii* | BLMS | Steppe/juniper-pinyon woodland and shortgrass prairie. Possible migrant in area or wintering. |
| **Burrowing owl** | ***Athene cunicularia hypugea*** | **BLMS** | **Associated with prairie dog burrows. Prefer shrub steppe and open to dense stands of shrubs and low trees, including big sagebrush and saltbush.** |
| Ferruginous hawk | *Buteo regalis* | BLMS | Rare to uncommon transient and winter migrant. Nest sites include trees, ledges, large rock outcrops, and low cliffs in sagebrush valleys and grasslands. |
| Gray vireo | *Vireo vicinior* | BLMS | Strongly associate with pinyon-juniper woodland and montane shrub. Inhabit mid-elevation rocky slopes. Nests often found in small forks in low trees or shrubs less than 10 feet. In northwest New Mexico, found in broad-bottomed flat or gently sloped canyons with rock outcroppings near ridgetops from April to August. |
| Loggerhead shrike | *Lanius ludovicianus* | BLMS | Prefer widely spaced shrubs and low trees interspersed with short grasses, forbs, and bare ground. |
| **Mountain plover** | ***Charadrius montanus*** | **BLMS** | **Prairie grasslands and open mesas. Prefer large flat grasslands with short vegetation and bare ground. Blue grama and buffalo grass or wheatgrass are common associations.** |
| Northern goshawk | *Accipiter gentilis* | BLMS | Prefer closed canopy coniferous forests. Found in ponderosa pine, mixed conifer and spruce-fir forests. Nests are located in large trees. |
| **Mammals** | | | |
| Black-footed ferret | *Mustela nigripes* | FE | Extirpated in the state of New Mexico. Prefer shortgrass and mixed grass prairie with prairie dog colonies. |
| Big free-tailed bat | *Nyctinomops macrotis* | BLMS | Summer resident; prefers coniferous and mixed woodlands. Roosts on rocky cliffs, caves, rock fissures, bridges, and buildings. |

## Table 3.6-3. Special Status Animal Species with Potential to Occur within Project Areas, continued

| Common Name | Scientific Name | Status | Habitat |
|---|---|---|---|
| **Mammals, cont.** | | | |
| **Cebolleta southern pocket gopher** | ***Thomomys umbrinus paguatae*** | **BLMS** | **Typically below 6,700 feet in shrub and grasslands.** |
| Fringed myotis | *Myotis thysanodes* | BLMS | Occurs in mid-elevation habitats including desert scrub, grasslands, and oak/pine juniper. Roosts in caves, mines and buildings. |
| Long-eared myotis | *Myotis evotis* | BLMS | Pinyon-juniper woodlands, and coniferous forests. Roosts in caves and buildings generally above 6,700 feet. |
| Long-legged myotis | *Myotis volans* | BLMS | Habitat is usually ponderosa pine at higher elevations. |
| Pale Townsend's big-eared bat | *Corynorhinus townsendii pallescens* | BLMS | Occurs widely throughout all habitats. |
| Small-footed myotis | *Myotis ciliolabrum* | BLMS | Found in woodlands, forests, and desert communities. Known to roost in caves, abandoned buildings, under rocks, in crevices, and under pine bark. |
| Spotted bat | *Euderma maculatum* | BLMS | Rough, rocky, semi-arid and arid terrain, varying from ponderosa pine forest to scrub and open desert. Roosts often are situated on high cliffs, crevices or under loose rocks. |
| Yuma myotis | *Myotis yumanensis* | BLMS | Uncommon seasonal visitor to desert, grassland, woodland, and riparian areas from 4,000 to 7,000 feet. Roost in buildings, caves, and crevices. |
| **Reptiles** | | | |
| **Texas horned lizard** | ***Phrynosoma cornutum*** | **BLMS** | **Found in arid and semiarid habitats in open areas with sparse plant cover. Prefer loose sand of loamy soils.** |

Notes: FE = Federally-listed endangered; FT = Federally-listed threatened; BLMS = BLM sensitive species.
**Bold species are those for which potential habitat was identified within the project areas during reconnaissance survey.**

## Table 3.6-4. Special Status Animal Species Observed within or near Project Areas

| Common Name | Scientific Name | Status | Project Areas Observed* |
|---|---|---|---|
| **Birds** | | | |
| Baird's sparrow | *Ammodramus bairdii* | BLMS | CR1 |
| Burrowing owl | *Athene cunicularia hypugea* | BLMS | *O** |
| Gray vireo | *Vireo vicinior* | BLMS | 34, *36**, 42 |
| Golden eagle | *Aquila chrysaetos* | MBTA, BGEPA | *23**, *24** |
| Golden eagle nest | N/A | MBTA, BGEPA | *24** |
| Loggerhead shrike | *Lanius ludovicianus* | BLMS | CR2 |
| **Reptiles** | | | |
| Texas horned lizard | *Phrynosoma cornutum* | BLMS | *OF5** |

Notes: ****Observation occurred outside the site boundary.***
BGEPA = Bald and Golden Eagle Protection Act; BLMS = BLM sensitive; MBTA = Migratory Bird Treaty Act; N/A = not applicable.

Small mammal burrows and prairie dog mounds/colonies were observed within the following project sites:

- HLZ 7;
- HLZ 17;
- HLZ 22B;
- HLZ 27;
- HLZ C;
- HLZ O;
- HLZ P;
- HLZ Q; and
- HLZ R.

Based on the known ranges for prairie dogs, it is expected that all prairie dog colonies observed were Gunnison's prairie dogs. However, no individuals were observed (Tetra Tech 2017a). Small mammal burrows also have the potential to be habitat for burrowing owls.

Although cliffs were present within 100 feet of some project sites and within 1 mile of most sites, no bats or roosts were observed during the project natural resources surveys (Tetra Tech 2017a).

One large mammal burrow was observed at OF5 (Tetra Tech 2017a). It is expected that this burrow would be used by an American badger (*Taxidea taxus*), although no individual was observed to confirm species identification. Other mammals observed throughout the sites were elk (primarily observed on hikes into the sites), coyote (*Canis latrans*), mule deer, and pronghorn antelope (Tetra Tech 2017a).

The most commonly observed avian species throughout all sites were black-throated sparrow (*Amphispiza bilineata*), common raven (*Corvus corax*), horned lark (*Eremophila alpestris*), and northern mockingbird (*Mimus polyglottos*) (Tetra Tech 2017a). Two potential raptor nests were also observed approximately 200 meters outside HLZ 15 and adjacent to HLZ 20. No individuals were observed using the nests and it was not possible to determine if the nests were active (Tetra Tech 2017a).

Multiple horned lizards (*Phrynosoma* sp.) were also observed, including the desert horned lizard and round-tailed horned lizard (Tetra Tech 2017a). One Texas horned lizard (BLM sensitive) was observed just outside OF5, as discussed in section 3.6.2.3.

### 3.6.2.3 Special Status Species

Special status species with the potential to occur in the project areas were identified through a preliminary habitat suitability analysis, initial reconnaissance field survey, and focused natural

resources surveys conducted for this project (Tetra Tech 2017a). No federally designated or proposed critical habitat occurs within the project sites.

***Federally-Listed, Proposed, and Candidate Species, and BLM Sensitive Species***

A broad list of all federally-listed, proposed, candidate, and BLM sensitive plant species that could be present within the project areas was developed based on preliminary habitat suitability analysis (Tetra Tech 2017a). The list of potential species was groundtruthed during an initial reconnaissance field survey that was performed at all HLZ and OPFOR sites. It was determined that four BLM sensitive plants have the potential to occur within the project sites based on habitats present (Tetra Tech 2017a):

(1) New Mexico spiny milkvetch (*Astragalus kentrophyta* var. *neomexicana*)
- A historical population was previously found at Site 31 (Weston Solutions, Inc. 2016). However, during the reconnaissance survey, it was determined that this area was denuded of vegetation due to the existing use of TerraLOC at the site. Therefore, Site 31 does not have potential habitat for this species.

(2) Acoma fleabane (*Erigeron acomanus*)
- Site 24 has potential habitat.

(3) Tufted evening primrose (*Oenothera caespitosa*)
- The following sites have potential habitat: 7, 13, 15, 16, 17, 19, 19A, 19B, 20, 22, 22A, 22B, 23, 24, 27, 28, 32, 33, 34, 36, 37, 37A, 37B, 37C, 37D, 42, CR2, OF1, OF3, and OF4.

(4) Grama grass cactus (*Sclerocactus papyracanthus*)
- The following sites have potential habitat: 18, 18A, 19A, 19B, 22B, 33, C, D, O, P, Q, R, CR1, and CR2.

During the project-specific natural resources surveys, meandering visual surveys were conducted for all special status plants that could occur in the area (Tetra Tech 2017a).

No special status plants were observed during the natural resources surveys (Tetra Tech 2017a). Additionally, while some potential special status plant habitat occurs at the sites as described above, the sites were determined to have low likelihood of supporting these plants. The historical population of New Mexico spiny milkvetch known to occur at HLZ 31 was not observed. HLZ 31 primarily consisted of open exposed soils due to the existing use of TerraLOC at the site (Tetra Tech 2017a). The current condition of the site does not provide potential habitat for the New Mexico spiny milkvetch.

Table 3.6-3 presents all special status animal species with the potential to be present within the project areas. The list of potential species in table 3.6-3 was groundtruthed during an initial reconnaissance field survey that was performed at all HLZ sites. Based on the reconnaissance survey, species that were determined to have potential habitat occurring within the sites are bolded in table 3.6-3. Strictly obligate aquatic and riparian species are not included below

because no permanent water or riparian habitat occurs at the project sites (i.e., aquatic snails, fish, frogs, and riparian birds). In addition, species for which no potential habitat occurs within the project areas are not included in table 3.6-3.

Based on a preliminary habitat suitability analysis and groundtruthing performed during the initial reconnaissance field survey conducted in support of this EA, the list of potential special status species in table 3.6-3 was assessed and refined. The species that were determined to potentially occur within the sites are described as follows (Tetra Tech 2017a). All special status species observed during the project natural resources surveys were recorded (Tetra Tech 2017a).

**Burrowing owl (BLM sensitive).** In New Mexico, the burrowing owl occurs in grassland, open shrubland, and woodland, at elevations between 2,800 and 7,500 feet (USFS 2013). Approximately 75 percent of New Mexico ecological zones, as described by Dick-Peddie (1993), support or have the potential to support burrowing owls (Arrowood et al. 2001). Burrowing owls also inhabit human-modified landscapes, such as golf courses and parking lots. Burrowing owls rarely dig their own burrows and therefore depend in part upon the presence of burrowing animals. In New Mexico, burrowing owls are associated with Gunnison's prairie dogs, black-tailed prairie dogs, American badgers, ground squirrels, rock squirrels, foxes, and coyotes. Burrowing owls can also utilize human-made structures, such as storm drains, berms, roadsides, irrigation canals, and artificial burrows specifically constructed for the owls.

**Mountain plover (BLM sensitive).** The mountain plover is a small bird known to occupy grassland, open mesas, and low shrub habitats in northern and eastern New Mexico (BLM 2007). Their habitats include a combination of short vegetation (usually 4 inches or less in average height), bare ground (minimum of 25 percent), and flat topography (less than 5 percent slope). Although wintering mountain plovers are most commonly found in the Central Valley of California, Texas, and Mexico, they are also known to occur in low densities in New Mexico. Mountain plovers typically forage in areas with high levels of disturbance, including prairie dog towns, plowed fields, roadways, and heavily grazed areas (BLM 2007).

**Cebolleta southern pocket gopher (BLM sensitive).** The Cebolleta southern pocket gopher (*Thomomys umbrinus paguatae*) is known to occur in New Mexico in shrub and grassland habitats below 6,700 feet. These gophers live almost entirely underground and prefer deep, moist soils that can be easily manipulated. They are herbivorous and primarily eat grasses and forbs.

**Texas horned lizard (BLM sensitive).** The Texas horned lizard (*Phrynosoma cornutum*) is known to occur in arid and semiarid habitats in open areas with minimal vegetation. They are known to occur in loose sand of loamy soils.

According to current BLM data, the only federally-listed species known to occur within the project areas is the southwestern willow flycatcher (*Empidonax traillii extimus*) (BLM 2012). However, because this is a riparian obligate species, it is highly unlikely to occur within the project areas and is not included in table 3.6-3.

The project areas also contain potential habitat that may support the Mexican spotted owl (*Strix occidentalis lucida*), but this species is much more likely found in high elevation mixed conifer forests.

The majority of BLM sensitive species include birds, bats, and plants. A 1998 survey at 5 locations documented 13 bat species (two riparian sites, two pinon-juniper sites, and one riparian/pinon-juniper site), some of which were special status and BLM sensitive species. However, neither of these habitat types occur within the project areas. As described in section 3.6.2.2, while some cliff habitat does occur outside the project sites, no bats or roosts were observed during the natural resources surveys (Tetra Tech 2017a).

Table 3.6-4 lists all special status species observed at each site during the project natural resources surveys (Tetra Tech 2017a). No federally-listed threatened or endangered, proposed, or candidate species were observed.

One burrowing owl, a BLM sensitive species, was observed approximately 2 miles northeast of HLZ O along the road (Tetra Tech 2017a). No burrowing owls were observed within any sites (Tetra Tech 2017a). The single burrowing owl observation was very early in the breeding season, so it is possible that the individual was migrating through the area.

Small mammal burrows that were found within some of the project areas are also potential habitat for burrowing owls (refer to section 3.6.2.2).

No mountain plovers (BLM sensitive) or Cebolleta southern pocket gophers (BLM sensitive) were observed at any of the project areas (Tetra Tech 2017a).

The following BLM sensitive species were observed within or near the project areas during the surveys (Tetra Tech 2017a):

- One Texas horned lizard was observed just south of OF5 near the road, outside of the site boundaries.
- One Baird's sparrow (*Ammodramus bairdii*) was observed at HLZ CR1.
- One loggerhead shrike (*Lanius ludovicianus*) was observed at HLZ CR2.
- Incidental observations of the gray vireo (*Vireo vicinior*) were made at HLZ 34 (one adult) and HLZ 42 (two adults). Gray vireos were also observed while hiking to HLZ 36 on multiple occasions, but not within the project site.

A golden eagle (*Aquila chrysaetos*) and golden eagle nest were observed and are discussed within the other protected species section.

***Other Protected Species***

Other protected species that could occur in the project area include those awarded legal protection under the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act.

**Migratory Bird Treaty Act.** The Migratory Bird Treaty Act of 1981 implements various treaties and conventions for the protection of migratory birds. Under the Act, it is illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird, except under the terms of a valid permit issued pursuant to federal regulations. The migratory bird species protected by the Act are listed in 50 CFR 10.13. The 10.13 List was last updated in December 2013 (USFWS 2013). Over 1,000 species are currently covered under the Migratory Bird Treaty Act. The USFWS has statutory authority and responsibility for enforcing the Migratory Bird Treaty Act. "Take" of a species, as defined in 50 CFR 10.12, means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.

Nearly all avian species that could occur within the project areas are protected under the Migratory Bird Treaty Act. This includes all birds and nests discussed throughout this document, within section 3.6.2.2, and those discussed as follows.

**Bald and Golden Eagle Protection Act.** The Bald and Golden Eagle Protection Act enacted in 1940, prohibits persons, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their parts, nests, or eggs. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. "Disturb" means: to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior: or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

Based on the preliminary habitat suitability analysis and initial reconnaissance field survey conducted in support of this EA, the bald eagle (*Haliaeetus leucocephalus*) and golden eagle were determined to have potential to occur within the project areas (Tetra Tech 2017a). Potential raptor cliff habitat was found to occur within the 1-mile buffer of most project sites (refer to section 3.6.2.1). While bald eagles are unlikely to nest within the project sites due to the lack of permanent water, transient individuals could occur.

**Bald eagle.** Bald eagles are known to regularly occur in dry areas between Pecos Valley and the Sandia, Manzano, Capitan, and Sacramento Mountains (BISON-M 2017). Bald eagles typically nest near a large body of water that supports an adequate food supply (NatureServe Explorer 2006). Nesting activity typically begins in November/December. Nests occur in trees, cliffs, or pinnacles (USFS 2013).

**Golden eagle.** Golden eagles are predatory birds known to occur in hilly and mountainous areas of New Mexico. They usually nest on cliffs but also utilize large coniferous trees, especially near open rangeland where jackrabbits, their preferred prey, are found. They have a low tolerance for

human disturbance and are found year-round in New Mexico (New Mexico Avian Protection Working Group 2005).

Raptor surveys were conducted at all sites during the natural resources surveys completed in support of this EA (Tetra Tech 2017a). One adult golden eagle was observed flying overhead between HLZs 23 and 24 during multiple field events; it was likely the same individual that was observed during each visit (Tetra Tech 2017). One large golden eagle nest was also observed on a cliff overlooking HLZ 24, approximately 1,000 feet outside the site boundary to the northwest (Tetra Tech 2017a). Figure 3.6-1 shows the location of the golden eagle nest, which is approximately 1,000 feet outside of HLZ 24.

#### 3.6.2.4 Wetlands and Waters of the U.S.

Riparian-wetland areas, though they comprise a small percent of the total land base, are the most productive resources on BLM land. These areas make up less than two percent of the land base in New Mexico but are critical areas in relation to the total amount of land in the project areas. Riparian zones are the most critical wildlife habitats in managed rangelands. More wildlife species depend entirely on or spend disproportionately more time in this habitat than any other.

A review of existing natural resources data on jurisdictional wetlands, waters of the U.S., and other waters was conducted in support of this EA for all project areas (Tetra Tech 2017a). While riparian resources are known to occur elsewhere, none were identified within project areas potentially affected under the alternatives in this EA. Based on a preliminary data analysis, it was determined that the following HLZs could contain potential wetlands or Waters of the U.S.: HLZ 6, HLZ 22B, HLZ 29, HLZ 30, HLZ 31, and/or, HLZ N (Tetra Tech 2017a). Field surveys were conducted at all project areas to determine if wetlands, waters of the U.S., or other waters occurred in the project areas. If potential wetlands or waters were found in the field, a wetlands delineation was performed (Tetra Tech 2017a). The delineations were conducted pursuant to USACE Methodology, which relies on the characterization of hydrology, vegetation, and soils of any potential wetland areas (Tetra Tech 2017a).

No wetlands were observed within any site (Tetra Tech 2017a). However, non-wetland waters of the U.S. were observed at the following HLZs:

- HLZ 6;
- HLZ 30;
- HLZ 31; and
- HLZ N.

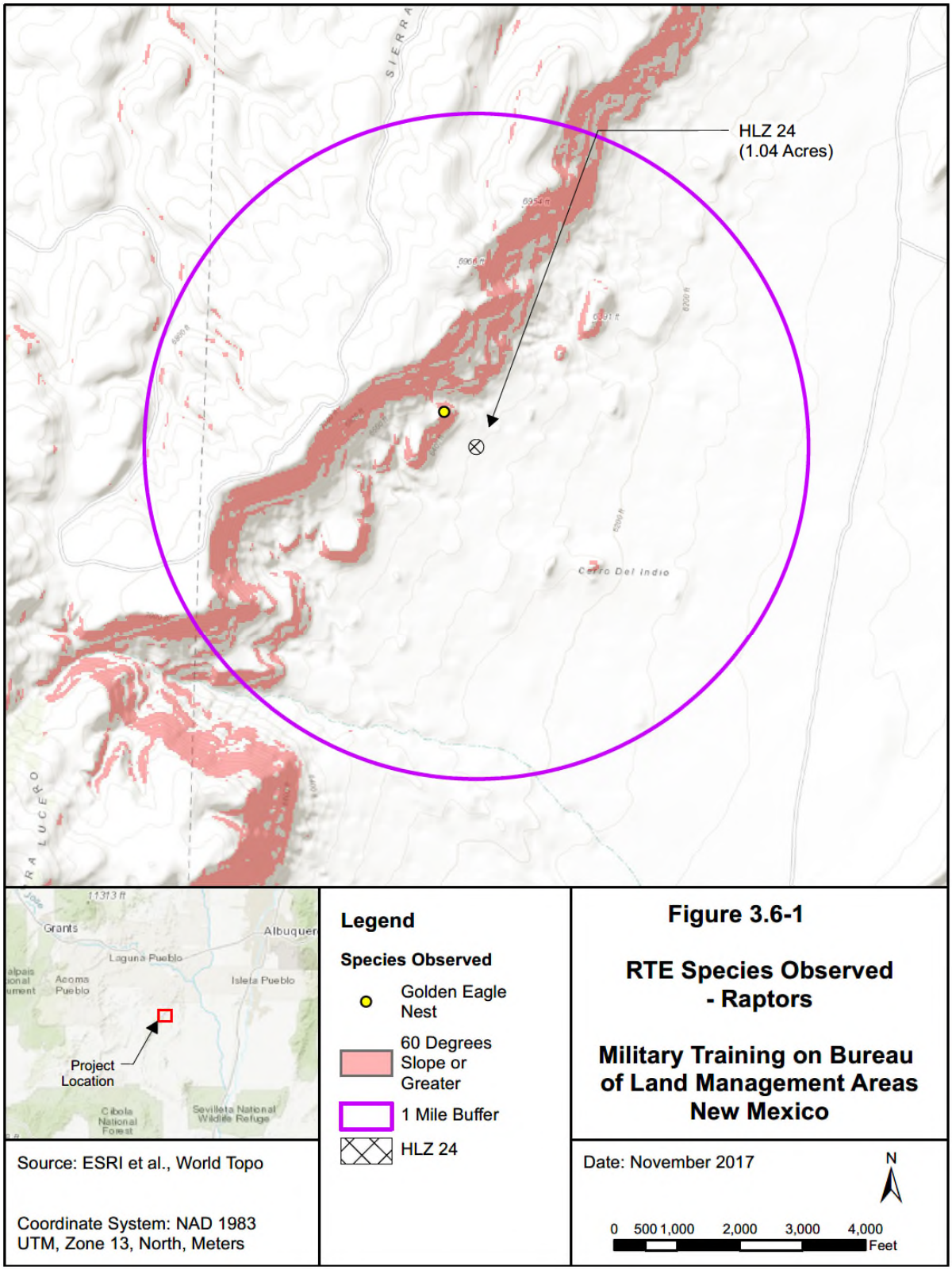


**Figure 3.6-1. RTE Species Observed – Raptors (Golden Eagle Nest - HLZ 24), Military Training on BLM-Administered Lands, NM**

Dry, ephemeral drainages were observed in these four HLZs. These drainages had hydrologic indicators, such as the presence of ripples; drift and/or debris; bed and bank; and benches. Only HLZ N had hydrophytic vegetation (tamarisk) present. HLZs 22B and 29 were surveyed for potential wetlands and non-wetland waters of the U.S., but none were found.

## 3.7 Cultural Resources

Cultural resources, as defined by the BLM, consist of discrete areas of human activity, occupation, or use, evidenced by physical remnants, historical documents, or oral interviews. They include archaeological and architectural resources, as well as traditional cultural properties (TCPs). Archaeological resources are spatially finite areas containing physical remains of past human activity on and within the ground. Architectural resources are aboveground resources, typically consisting of historic buildings and structures. TCPs are locations that derive their significance from traditional values of a cultural group such as an Indian tribe or local community.

All existing sites currently used by the 58 SOW and all sites proposed for potential use in the future were surveyed for cultural resources. Operations were discontinued at existing sites with cultural resources that could be impacted by training activities. All proposed sites with cultural resources that could be impacted by training activities were removed from the list of potential sites being considered. There would be no identified impacts to cultural resources from either ongoing operations or operations at the propose sites. Therefore, there is no further detailed discussion of cultural resources in this EA.

If previously undiscovered cultural resources are encountered during the implementation of this project, work in that area will cease immediately until the resources can be assessed and evaluated by a professional archaeologist from BLM, and the SHPO has been afforded the opportunity to review the findings. The site resource area will be excluded from all project activities until the review can be completed.

## 3.8 Water Resources

This section describes the affected environment for surface water, groundwater, and floodplains and includes the impacts resulting from current training operations. Wetlands and waters of the U.S. are discussed in section 3.6.2.4.

### 3.8.1 Definition of Resource

Water resources are natural and man-made sources of water that are available for use by, and for the benefit of, humans and the environment. Water resources include groundwater, surface water, floodplains, and wetlands. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes and ensures compliance with the CWA.

### 3.8.2 Existing Conditions/Current Operations

Impacts to surface water and groundwater resulting from the Proposed Action or alternatives would be considered significant if project activities resulted in substantial, long-term degradation of surface or groundwater water quality. Impacts could also be significant if construction in floodplains or increases in impervious cover caused major disturbances in the natural flow, discharge, and recharge of water resources.

Groundwater. The training activities do not involve the use of any groundwater at the HLZs. The activities do not include the transfer or use of uncontained petroleum or hazardous materials. Emergency maintenance activities could include use of petroleum or hazardous materials. These activities would be intermittent and include procedures to contain or cleanup any spills. The current and proposed activities would not impact groundwater and groundwater is not discussed further in this EA.

Surface water. The current operations have no direct effects on surface water within the BLM-administered lands as creeks, springs, and drainages would remain unaltered. All ground transportation vehicles would remain on existing roads and routes and therefore would not contribute to soil erosion and surface water quality impacts.

The training activities do not involve the use of any surface water at the HLZs. The activities do not include the transfer or use of uncontained petroleum or hazardous materials. Emergency maintenance activities could include use of petroleum or hazardous materials. These activities would be intermittent and include procedures to contain or cleanup any spills.

Dry, ephemeral drainages were observed in three existing HLZs (HLZs 6, 30, 31). The Proposed HLZ N also had a dry ephemeral drainage.

Stormwater. The existing training sites for CV-22B Ospreys (HLZs 18A, 31, and 37) have been graded and TerraLOC applied to minimize dust and flying debris. Sediment erosion from these sites due to stormwater is also minimized by the TerraLOC. The rest of the HLZs have not been altered. Erosion and runoff has been increased in the center of existing training sites, HLZs 6, 22, 22B, and 30, in those limited areas where rotor wash has eroded the soil. The limited area of this increased erosion results in minor increase in sediment deposition in the surround areas due to surface run-off.

Floodplains. The only alteration of the HLZs was associated with the existing training sites for CV-22B Ospreys (HLZs 18A, 31, and 37). HLZs 18A and 37 are not within the 100-year floodplain. The southeast corner of HLZ 31 is within the 100-year floodplain. The grading did not affect the floodplain elevation or impede floodplain flow. The training operations do not put life or property at risk from flooding, nor does it create any impact that would affect functions of natural floodplains.

## 3.9 Hazardous Materials and Wastes

Hazardous material use and management by Kirtland AFB personnel and the BLM are regulated under the Toxic Substance Control Act, Occupational Safety and Health Administration, Emergency Planning and Community Right-to-Know Act, and USAF Occupational Safety and Health Standards. The regulations require personnel using hazardous materials to be trained in the application, management, handling, and storage of material; know the location of material safety data sheets for all hazardous materials that they are using; and wear the correct personal protective equipment required for materials that are being used.

There are no structures present within the proposed training areas; therefore, neither asbestos nor lead-based paint would be present. There are no records of pesticide use in the areas currently used, or proposed for use, for military training within the BLM-administered lands.

Current military training activities located within the BLM-administered lands do not utilize hazardous materials, with the exception of pyrotechnic equipment used by OPFOR trainers and materials that would be utilized during vehicle maintenance emergencies.

At the end of each OPFOR training event, all spent munitions or identifiable trash are be collected by OPFOR personnel.

Materials included in emergency maintenance would be small quantities of petroleum, oil, and lubricants, and would be managed in accordance with the BLM hazardous materials procedures and the Operating Plan.

For spills occurring during military training activities within the BLM-administered lands, the AF will comply with applicable environmental requirements pertaining to unplanned releases to the environment. Additionally, any spills occurring within the BLM-administered lands would be reported to the Field Office Manager and 58 SOW would be responsible for cleaning up any spills in a manner that meets applicable, promulgated federal and state regulatory requirements.

## 3.10 Ground and Aircraft Safety

A safe environment is one in which there is no, or is an optimally reduced, potential for death, serious bodily injury or illness, or property damage. The elements of an accident-prone environment include the presence of a hazard and an exposed population at risk of encountering the hazard. Numerous approaches are available to manage the operational environment to improve safety, including reducing the magnitude of a hazard or reducing the probability of encountering the hazard. The primary safety categories discussed in this analysis include Ground and Traffic Safety and Aircraft Safety.

### 3.10.1 Ground and Traffic Safety

Naturally occurring potential health and safety hazards include wildfires, venomous reptiles and insects, geologic hazards, and weather conditions. Potential manmade health and safety hazards include traffic accidents.

According to data in the 1992 Rio Puerco Field Office RMP/EIS and the ongoing RMP/EIS revision, natural and human-caused fires will continue throughout the BLM-administered lands. The majority of natural fires will be ignited by lightning every year from May to September. Natural fires are expected to continue to account for approximately 80 percent of the annual number of ignitions. The size of these fires will depend on weather, topography, fuel characteristics, and suppression response times.

Human-caused fires will continue to occur year round and likely will increase in ignitions per year over the next 20 years. The primary drivers for increased human-caused ignitions are activities associated with recreation, land tenure, and wilderness/urban interface areas.

All pyrotechnic equipment used by OPFOR personnel would be used in accordance with prescribed USAF and BLM safety procedures. The BLM is contacted before each trip to determine the fire danger level; however, fire protection equipment, including shovels, pick axes, and extinguishers, are carried in all vehicles regardless of the fire condition. Additionally, the BLM phone numbers are carried in the continuity book and, in the event that a fire breaks out, personnel will notify the BLM immediately, regardless of the source of the fire.

Venomous reptiles and insects which could be found within the training areas include rattlesnakes and scorpions. Cacti may also be present.

Climate within the planning area exhibits considerable variation largely influenced by elevation and topography. Arid to semiarid lower elevations transition into more moist and cool areas at higher elevations. In general, the area experiences warm summer temperatures (daytime highs around 80-90°F) and moderately cold winters (nighttime lows between 10-25°F). Most annual precipitation occurs during the summer months associated with the Southwest Monsoon though rain and snow associated with Pacific weather systems can also occur during winter.

The greatest risk associated these public lands is related to the use of motorized vehicles in remote locations. Off-highway vehicles (OHV) use, defined here as any motor vehicle traveling over land off of paved highway, occurs throughout the BLM-administered lands for purposes of transportation as well as for recreation.

Under current operations, the presence of land vehicle traffic is limited to pickup trucks used for OPFOR activities and maintenance vehicles in case of emergencies. All other vehicle traffic is comprised of air vehicles. Except for the OPFOR personnel, there would be no regular presence of personnel on the ground outside of the HLZs.

### 3.10.2 Aircraft Safety

The USAF defines five categories of aircraft flight mishaps: Classes A, B, C, E, and High Accident Potential. Class A mishaps result in loss of life, permanent total disability, a total cost in excess of $2 million, destruction of an aircraft, or damage to an aircraft beyond economical repair. Class B mishaps result in total costs ranging between $500,000 and $2 million or result in permanent partial disability but do not involve fatalities. Class C mishaps result in more than $50,000 (but less than $500,000) in total costs or a loss of worker productivity exceeding eight hours. Class E mishaps represent minor incidents not meeting the criteria for Classes A through C. High Accident Potential events are significant occurrences with a high potential for causing injury, occupational illness, or damage if they occur and do not have a reportable mishap cost. Class C and E mishaps, the most common types of accidents, represent relatively unimportant incidents because they generally involve minor damages and injuries and rarely affect property or the public.

Class A mishaps are the most serious of aircraft-related accidents and represent the category of mishap most likely to result in a crash. Table 3.10-1 lists the 5-year Class A mishap rates for the

**Table 3.10-1. 5-Year Class A H-60, H-1, and V-22 Aircraft Mishap Information**

| Aircraft | 5-Year Class A Mishap Rate |
|---|---|
| H-60 | 0.60 |
| H-1 | 0.20 |
| V-22 | 0.00 |

Note: The mishap rate is an annual average based on the total number of Class A mishaps and 100,000 flying hours. The USAF does not track mishap data by a specific aircraft series (i.e., HH-60, UH-1N, or CV-22B). Instead, aircraft mishaps are tracked by the basic aircraft model (i.e., H-60, H-1, or V-22) and include all aircraft series within the model.

Source: USAF 2017

H-60, H-1, and V-22 aircraft. This table reflects the USAF-wide data for all phases of flight of all missions and sorties for each aircraft type.

The training schedule developed by the 58 SOW distributes aircraft "flow" to the HLZs to avoid too many aircraft at a HLZ simultaneously. Additionally, 58 SOW flight followers maintain a log sheet to track the progress of each sortie. Aircrews radio the flight followers with updates on training sortie progress and provide aircraft position. These procedures minimize the potential for overcrowding a HLZ and aircraft collisions.

## 3.11 Bird Strike Aircraft

Bird and wildlife strikes by aircraft constitute a safety concern because of the potential for damage to aircraft, injury to aircrews, or local populations if an aircraft strike and subsequent aircraft accident should occur in a populated area. Also, if the frequency of bird strikes were high, certain bird species populations might be reduced.

Aircraft may encounter birds at altitudes of 30,000 feet MSL or higher; however, most birds fly close to the ground. For reported bird strikes with altitude data, over 94 percent occur below 3,000 feet AGL. Approximately 41 percent of bird strikes occur in the airport environment and 12 percent during low-level cruise (USAF 2018). Table 3.11-1 contains the distribution of USAF bird/wildlife-aircraft strikes by altitude. Historically, one-half of one percent of all reported bird/wildlife-aircraft strikes involving USAF aircraft resulted in a serious mishap. None of the 58 SOW bird/wildlife-aircraft strikes occurred at a dropzone or HLZ (USAF 2010).

AFI 91-202, *The U.S. Air Force Mishap Prevention Program*, requires that USAF installations supporting a flying mission have a Bird/Wildlife Aircraft Strike Hazard (BASH) Plan for the base. The Kirtland AFB Plan (*Kirtland AFB Bird/Wildlife Aircraft Strike Hazard Plan 92-212, 30 March 2007*) provides guidance for reducing the incidents of bird strikes in and around areas where flying operations are being conducted. The plan is reviewed annually and updated as needed.

**Table 3.11-1. USAF Bird/Wildlife-Aircraft Strikes by Altitude**

| Altitude (feet AGL) | Percent of Total |
|---|---|
| 0-49 | 28.90% |
| 50-99 | 10.88% |
| 100-199 | 6.71% |
| 200-299 | 6.81% |
| 300-399 | 5.40% |
| 400-499 | 2.48% |
| 500-599 | 5.85% |
| 600-699 | 1.46% |
| 700-799 | 1.34% |
| 800-899 | 1.76% |
| 900-999 | 0.64% |
| 1,000-1,499 | 7.21% |
| 1,500-1,999 | 6.78% |
| 2,000-2,999 | 7.01% |
| 3,000-3,999 | 4.58% |
| 4,000-4,999 | 0.98% |
| 5,000 and greater | 1.22% |

Source: AFSC 2006
Note: % – Percent AGL – above ground level

Collisions between aircraft and birds are an inherent risk. However, aircrews use guidance and procedures contained in the Kirtland AFB BASH Plan, which uses data from the Bird Avoidance Model, to minimize the potential for bird-aircraft strikes.

As noted in section 3.6, birds at the existing sites may be habituated to air operations.

## 3.12 Land Use, Special Designations, Recreation, and Visual Quality

### Land Use

Land use in the areas of the existing and proposed training sites is varied as appropriate for public lands. Current land use includes grazing, recreation, and ROWs. The military training currently performed at the existing sites within the BLM-administered lands are authorized by BLM through a ROW. These military operations use airspace for low-level training exercises with a designated set of landing sites.

### Special Designations

ACECs. There are no current HLZs located within the boundaries of any existing, or proposed, ACEC. HLZs 6 and 27 are close (within 1 mile) of the Pronoun Cave Complex ACEC which is managed for cave resources, paleontological, and wildlife (bats) values. The current HLZs do not impact the cave or paleontological values. Proposed OPFOR sites OF5 and OF 6 are located on Socorro County Road 12, on the northern border of the Ladron Mountain-Devil's Backbone Complex ACEC. OF7 is located on Socorro County Road 12, on the northern border of the Sierra Ladrones Wilderness Study Area.

### Recreation

There are no current or proposed training sites within the boundaries of SRMAs.

The ERMAs are managed with recreation as planned actively on an interdisciplinary basis in concert with other resources/resource programs.

### Visual Quality

The VRM classification of the lands with the existing and proposed training sites is being revised through BLM's RMP process. The VRM classification of most of the training sites is Class IV, under which the change to the character of the landscape can be high. Only the three CV-22B Osprey training sites (HLZs 18A, 31, and 37) involved any disturbance or alteration of the training site. This alteration was limited to grading and removal of any trees. None of the other existing training sites have been altered. The only impact to visual character would be that of the air vehicles in flight and on the ground at a training site. The impact to the visual resources at the sites would be compatible with the VRM Class IV management.

## 3.13 Socioeconomic Resources

Socioeconomic resources are the basic attributes and resources associated with the human environment, particularly population, housing, availability of educational facilities, and economic activity. Economic activity encompasses employment, personal income, industry, and economic growth. The social and economic area of analysis focuses on the degree to which 58 SOW training activities on BLM lands would affect these resources in the six counties in which

the training would occur: Sandoval, Valencia, Cibola, Socorro, Guadalupe, and De Baca. The broad scale, Albuquerque economic area defined by the Bureau of Economic Analysis (BEA) includes these counties and is used to describe the relevant regional markets for labor, products, and information.

**Population.** According to the data from the 2012 Draft Rio Puerco RMP/EIS population change in the Planning Area increased by 132 percent between 1970 and 2010, which was greater than the percentage state and national increase (102 percent and 52 percent). Most of the growth over this period occurred in Sandoval County (648 percent) (BLM 2012), which currently includes 51.7 percent of the population of the six-county project area (USCB 2017). Valencia and Sandoval counties are the most densely populated of the six counties that would be affected by the project. Table 3.13-1 indicates a continuation of this increase in population in the overall area affected by the project. However, this reflects growth in the population of Sandoval County and a minor increase in the population of Cibola County. The population in the other four counties has slightly decreased. Population projections suggest all counties in the impact area will increase in the next 20 to 25 years (BLM 2012).

**Table 3.13-1. Total Population**

| Geography | 2010 | 2015 | Percent of Six-County Total 2015 | Percent Change | Population/ Square Mile |
|---|---|---|---|---|---|
| New Mexico | 2,059,179 | 2,084,117 | NA | 1.2 | 17.18 |
| Sandoval County | 131,561 | 136,638 | 51.7 | 3.9 | 36.82 |
| Valencia County | 76,569 | 76,297 | 28.9 | -0.4 | 71.56 |
| Cibola County | 27,213 | 27,382 | 10.4 | 0.6 | 6.03 |
| Socorro County | 17,866 | 17,494 | 6.6 | -2.1 | 2.63 |
| Guadalupe County | 4,687 | 4,526 | 1.7 | -3.4 | 1.49 |
| De Baca County | 2,022 | 2,020 | 0.8 | -0.1 | 0.87 |
| Six-County Total | 259,918 | 264,357 | | 1.7 | 12.40 |

Source: (USCB 2010, 2017)

Housing. Table 3.13-2 shows the housing characteristics for the six counties that could be affected by 58 SOW training. Total housing units in several counties declined between 2010 and 2015; however, the percentage of vacant units ranges from 10.7 percent in Sandoval County, which also has the highest percentage of owner occupancy, to 47.3 percent in Guadalupe County.

The total number of housing in Sandoval County increased by 2.7 percent (an increase of 1,388 units) and 0.3 percent Valencia County (an increase of only 77 units). Throughout the counties that could be engaged in training activities, the housing supply increased by 894 units. A total of 16,177 units are vacant throughout the six affected counties.

**Table 3.13-2. Housing Characteristics 2015**

| Geography | Total Units 2010 | Total Units 2015 | Percent Change | 2015 Percent Vacant | 2015 Percent Owner Occupied |
|---|---|---|---|---|---|
| Cibola County | 11,101 | 11,088 | -0.1 | 23 | 74.2 |
| De Baca County | 1,344 | 967 | -28.1 | 46.2 | 79.8 |
| Guadalupe County | 2,393 | 2,261 | -5.5 | 47.3 | 72.4 |
| Sandoval County | 52,287 | 53,675 | 2.7 | 10.7 | 81.1 |
| Socorro County | 8,059 | 8,010 | -0.6 | 46.2 | 79.8 |
| Valencia County | 30,085 | 30,162 | 0.3 | 38.2 | 72.7 |
| Six-County Total | 105,269 | 106,163 | 0.8 | 15.2 | 79.4 |

Source: (USCB 2010, 2017)

Educational Facilities. There is one school district in Cibola County. The Grants-Cibola County School District has 11 schools serving 3,746 students. The Fort Sumner Municipal Schools provide public education to 320 students in De Baca County, and there are 8 school districts with 44 schools serving 21,900 students. Socorro County has 2 school districts with a total of 10 schools serving 2,234 students. These school districts are classified as “Rural/Remote” and “Town/Remote”. There are 3 school districts in Valencia County with a total of 28 schools serving 12,992 students (NCES 2017). Student to teacher ratios are below 20 to 1 (NCES 2017), which implies that there is room for some increase in the number of students.

Economy. The most current annual data for workforce, employment, and unemployment for 2016 indicates that Cibola County has the highest unemployment rate at 8.3 percent, and De Baca County has the lowest unemployment rate at 4.9 percent with the smallest labor force of 816 workers. Cibola County’s labor force is 9,124. The two counties within the project area closest to Albuquerque have the largest labor forces. Sandoval County has the largest labor force (62,601 workers), followed by Valencia County with 29,823 workers (BLS 2017). As shown in table 3.13-3, state and local government employ a relatively large portion of the population of all six of the counties in the project area, particularly in Cibola and Socorro counties. Retail trade and accommodation and food services also employ a comparatively large number of workers in the project area counties. Accommodation and food services in particular employs a substantial number of the workforce in Guadalupe County, and farm employment is a dominant source of jobs in De Baca, Guadalupe, and Socorro counties.

The degree of economic specialization is indicated by the ratio of the percent employment in each industry in each county within the impact area to an average percent of employment in that industry for the Albuquerque Metropolitan Statistical Area (MSA). When the percent employment in the counties that could be affected by the project is greater than in the Albuquerque MSA, local employment specialization exists in that industry. All of the six counties showed specialization in agriculture, with the highest level in De Baca, Guadalupe, and Socorro counties. Valencia and Guadalupe counties show specialization in retail trade. Cibola

**Table 3.13-3. Employment by Industry 2015**

| Industry | Cibola County | De Baca County | Guadalupe County | Sandoval County | Socorro County | Valencia County |
|---|---|---|---|---|---|---|
| Total employment | 10,444 | 999 | 2,229 | 46,102 | 7,936 | 21,814 |
| Farm employment | 440 | 251 | 390 | 954 | 824 | 1,659 |
| Nonfarm employment | 10,004 | 748 | 1,839 | 45,148 | 7,112 | 20,155 |
| Private nonfarm employment | 6,718 | 550 | 1,406 | 37,056 | 4,426 | 15,869 |
| Forestry, fishing, and related activities | (D) | (D) | (D) | 102 | (D) | (D) |
| Mining | (D) | 17 | (L) | 354 | (D) | 117 |
| Utilities | 218 | (D) | (D) | 69 | (D) | 54 |
| Construction | 229 | 46 | 50 | 2,609 | 167 | 1,517 |
| Manufacturing | 167 | (D) | (D) | 3,723 | 194 | 740 |
| Wholesale trade | 247 | 35 | (D) | 830 | (D) | 364 |
| Retail trade | 1,054 | 108 | 253 | 4,915 | 633 | 2,877 |
| Transportation | 141 | (D) | 49 | 636 | 100 | 1,563 |
| Information | (D) | (D) | (D) | 881 | 30 | 130 |
| Finance and insurance | 165 | (D) | (D) | 1,429 | 105 | 636 |
| Real estate and rental and leasing | 128 | (L) | (D) | 2,123 | 135 | 779 |
| Professional, scientific, and technical services | (D) | (D) | (D) | 2,741 | 455 | 699 |
| Management | (D) | 0 | 0 | 84 | (D) | 98 |
| Administrative, support, and waste management services | 587 | 12 | (D) | 4,112 | (D) | 586 |
| Educational services | (D) | 11 | 11 | 899 | (D) | 237 |
| Health care and social assistance | (D) | 58 | 185 | 3,898 | (D) | 2,172 |
| Arts, entertainment, and recreation | 98 | 18 | 18 | 1,507 | 86 | (D) |
| Accommodation and food services | 648 | 37 | 427 | 3,533 | 669 | 1,541 |
| Other services | (D) | (D) | 68 | 2,611 | 310 | 1,282 |
| Government | 3,286 | 198 | 433 | 8,092 | 2,686 | 4,286 |
| Federal, civilian | 320 | 10 | 21 | 367 | 178 | 97 |
| Military | 65 | (L) | 10 | 362 | 45 | 194 |
| State and local | 2,901 | 183 | 402 | 7,363 | 2,463 | 3,995 |
| State government | 567 | 29 | 93 | 275 | 1,454 | 1,379 |
| Local government | 2,334 | 154 | 309 | 7,088 | 1,009 | 2,616 |

Source: (BEA 2017)

(D) Not shown to avoid disclosure of confidential information, but the estimates are included in the total.

(L) Less than 10 jobs, but the estimates for this item are included in the total.

and Socorro counties have specialization in the government sector. Within the government sector, Sandoval and Valencia counties are specialized in military employment.

Since per capita personal income includes measures of wealth in addition to income from employment, average earnings per job are identified to show how employment is affecting the incomes in the project area counties. Table 3.13-4 shows that earnings per job exceed per capita income in all counties in the project area except Guadalupe County. Employment earnings increased between 2010 and 2015 in five out of the six counties. De Baca and Socorro counties experienced the greatest increase (16.7 percent and 10.6 percent, respectively), and Guadalupe County's workforce earnings decreased by 6.8 percent.

**Table 3.13-4. Income 2015**

| Geography | Per Capita Personal Income 2015 | Earnings per Job 2015 | Earnings per Job 2010 | Percent Change Earnings per Job |
|---|---|---|---|---|
| Cibola County | $26,459 | $40,728 | $37,714 | 8.0 |
| De Baca County | $42,078 | $40,070 | $34,331 | 16.7 |
| Guadalupe County | $30,873 | $29,948 | $32,145 | -6.8 |
| Sandoval County | $37,885 | $41,875 | $39,332 | 6.5 |
| Socorro County | $32,680 | $41,124 | $37,183 | 10.6 |
| Valencia County | $30,733 | $33,888 | $32,140 | 5.4 |
| Six-County Average | $33,451 | $37,939 | $35,474 | 6.9 |

Source: (BEA 2017)

Data from the 2012 Draft RPFO RMP/EIS shows that BLM lands contribute to the local economy through visitor expenditures for recreation, livestock productivity from grazing on BLM lands, timber production, mining, ecosystem restoration projects, payments in lieu of taxes (PILT), renewable energy development and direct expenditures and employment. BLM expenditures, PILT, grazing, recreation, and minerals resulted in the highest contributions to labor income. BLM expenditures, grazing, and recreation on BLM lands resulted in the greatest number of jobs. The government, agriculture, retail trade, and accommodation and food services sectors receive the most contributions from BLM and make up 74 percent of the total employment and 60 percent of the total labor income contribution (BLM 2012). All six project area counties are specialized in the agricultural sector. Project area counties are considered to be specialized with respect to the government sector (Cibola and Socorro counties), retail trade (Valencia and Guadalupe counties) and the accommodation and food services sector (Sandoval County). These counties may be more susceptible to changes, given their specialization in these sectors connected to the BLM. Sandoval and Valencia counties' specialization in the military sector could make them more susceptible to changes in policy toward military training on BLM lands.

## 3.14 Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, specifies that "each Federal Agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

Visitors to BLM land in the RPFO area are not limited by race, ethnicity, or economic class; therefore, impacts to visiting populations (minor increases in air quality emissions, short-term noise increases) would be distributed amongst all visitors and would not disproportionately and adversely affect environmental justice populations.

For the purposes of this analysis, the following criteria were used to identify the potential environmental justice populations:

- Minority Population: Black or African Americans, American Indians and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Hispanic or Latino, and some other race.
- Low-Income Population: The percentage of persons living below the poverty level, according to the U.S. Census Bureau.

Table 3.14-1 presents the race characteristics of the six project area counties, as compared to the state. The percentage of minorities in Cibola County is greater than 50 percent, and percentage of minorities in Sandoval County is greater than that of the state. The percentage Hispanic or Latino population in Guadalupe and Valencia counties is greater than 50 percent, and the Hispanic or Latino population in Socorro County is greater than that of New Mexico. De Baca County is the only county in the project area that does not have an identified high percentage (i.e., greater than 50 percent or greater than the overall State percentage) of minority or Hispanic populations.

As shown in table 3.14-2, Sandoval County is the only county of the six counties that could be affected by the project where the median household income is greater than the state average. The median income in Valencia County is the next highest. Both of these counties are closest to the Albuquerque economic hub. None of the project area counties have low income populations greater than 50 percent; however, several have substantially higher populations in poverty than the state: Cibola, De Baca, Socorro, and Valencia counties. The U.S. Census data suggest low income populations within these counties meet the CEQ's Environmental Justice characteristics. Cibola County has the highest percentage in poverty (29.3 percent), and Guadalupe County had the lowest (14.1 percent).

**Table 3.14-1. Race as a Percentage of Total Population 2015**

| Industry | Cibola County | De Baca County | Guadalupe County | Sandoval County | Socorro County | Valencia County | New Mexico |
|---|---|---|---|---|---|---|---|
| White | 20.9 | 50.2 | 17.8 | 45.5 | 39.1 | 34.7 | 39.2 |
| Black or African American alone | 0.9 | 0.0 | 1.6 | 1.9 | 0.7 | 1.0 | 1.8 |
| American Indian and Alaska Native alone | 38.5 | 0.0 | 2.3 | 11.9 | 9.8 | 3.6 | 8.5 |
| Asian alone | 0.6 | 0.0 | 0.0 | 1.3 | 0.7 | 0.5 | 1.3 |
| Native Hawaiian and Other Pacific Islander alone | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Some other race alone | 0.2 | 0.0 | 0.0 | 0.4 | 0.1 | 0.1 | 0.2 |
| Two or more races | 1.4 | 4.7 | 1.0 | 2.1 | 0.4 | 0.9 | 1.6 |
| Total percentage racial minority | 64.6 | 0.0 | 17.1 | 24.6 | 22.3 | 12.6 | 22.5 |
| Hispanic or Latino | 37.5 | 45.1 | 77.3 | 36.9 | 49.1 | 59.2 | 47.4 |

Source: (USCB 2017)

**Table 3.14-2. Low Income Populations 2015**

| Geography | Median Household Income | Percent in Poverty |
|---|---|---|
| Cibola County | $34,565 | 29.3 |
| De Baca County | $32,500 | 22.8 |
| Guadalupe County | $30,772 | 14.1 |
| Sandoval County | $58,982 | 14.2 |
| Socorro County | $34,037 | 25.1 |
| Valencia County | $41,703 | 23.7 |
| New Mexico | $44,963 | 21.0 |

Source: (USCB 2017)

# 4 ENVIRONMENTAL EFFECTS

This chapter discusses the impacts of the Proposed Action and the alternatives. The Proposed Action would include using both the current training sites and the proposed new training sites. The impacts of the current ongoing operations at the current sites were discussed in Chapter 3. The impacts of the Proposed Action and alternatives are discussed in terms of changes to the impacts of the ongoing operations.

## 4.1 Airspace Use and Management

This section discusses the impacts to airspace management of the Proposed Action and alternatives.

### 4.1.1 Impacts of Proposed Action on Airspace Use and Management (Alternative 1)

Aircraft operations impacts would be considered significant if: (1) the airspace does not have the capacity to accommodate the activities associated with the action; or (2) the airspace use and management procedures needed to support the action would conflict with the baseline airspace use and management procedures.

The 58 SOW would continue to schedule and flight-follow its aircraft to minimize the potential for multiple aircraft to be at a training site simultaneously, other than those flying in tandem. This scheduling procedure would ensure the airspace has the capacity to support operations at each HLZ and promote and ensure safe and effective training. Operations at the HLZs would continue to be accomplished in accordance with AFI 13-217, *Drop Zone and Landing Zone Operations*. Continued adherence with the established low-altitude flying restrictions would ensure that 58 SOW aircraft would not:

- Overfly cities, towns, and groups of people at an altitude of less than 1,000 feet above the highest obstacle within 2,000 feet of the aircraft;
- Overfly non-congested areas at less than 1,328 feet AGL (except when operating at and around an HLZ in accordance with prescribed directives);
- Overfly wilderness and primitive areas below 2,000 feet AGL; and
- Conduct intentional low-level overflight of livestock, wildlife, dwellings, or populated areas.

The training schedule developed by the 58 SOW distributes aircraft “flow” to the HLZs to avoid too many aircraft at a HLZ simultaneously, thereby minimizing the potential for overcrowding a HLZ.

Under the Proposed Action Alternative, the BLM would approve a 30-year ROW to the USAF for the 58 SOW to continue training events at the 26 current HLZs and begin using the 16 new proposed HLZs for training activities.

The three sites currently used for CV-22B Osprey tiltrotor training (i.e., HLZs 18A, 31, and 37) would continue to be used for tiltrotor training. No other HLZs would be used for tiltrotor training. The new proposed HLZs would be used for HH-60G Pave Hawk and UH-1 Iroquois helicopter training activities.

Under the Proposed Action, the total number of average busy day air events for all HLZs in BLM lands (63 daily/23,040 annual air events) would remain the same as under the current operations (63 daily/23,040 annual events). The operations would be spread out amongst the existing and proposed HLZs.

Eight new HLZs in Valencia County and three new HLZs in Cibola County are proposed to add to the HLZs in the existing Cibola-Valencia County group along with two new HLZs located just to the south in Soccoro County.

Two new HLZs are proposed to be located east-southeast of Kirtland AFB. One in southwestern Guadalupe County and the other in northwestern De Baca County.

Expanding the training activities to additional locations will allow for more diverse and challenging training conditions for 58 SOW due to reduced repetition. The total number of training sorties on BLM lands would remain the same, they would just be spread out over more HLZs (see table 4.1-1).

Under the Proposed Action, the level of 58 SOW activities would not change, as no new flight operations or additional student throughput are planned or anticipated at this time. Therefore, no increase in flight sorties is anticipated. The existing flight approach and flight departure tracks to and from Kirtland AFB would also remain unchanged for the existing HLZs and most of the new HLZs. The flight approach and flight departure paths from Kirtland AFB to HLZs CR1 and CR2 would be to the east though the military training route VR1107/1195 in figure D-3.

Because the Proposed Action would mostly use the existing flight approach and flight departure tracks and the new flight approach and flight departure tracks follow established helicopter aerial refueling tracks, weapons ranges, drop zones, low-level training routes, and installation entry and exit procedures, the USAF anticipates no short- or long-term impacts on airspace management.

**Opposing Force Training**

The OPFOR training includes personnel on the ground operating the electronic emitter or fire Smokey SAMs, alternative rockets, and smoke grenades to simulate threats to the aircraft. The aircraft engage in countermeasures including altering their flight path. Aircraft do not eject flares or chaff during OPFOR training.

**Table 4.1-1. Current and Proposed BLM HLZ Operations**

| HLZ Identifier | Coordinates (decimal degrees) | County | Average Number of Sorties | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | CV-22B Osprey Weekly | CV-22B Osprey Yearly | HH-60G Pave Hawk Weekly | HH-60G Pave Hawk Yearly | UH-1N Iroquois Weekly | UH-1N Iroquois Yearly |
| 6 | 34.7330N / -107.3308W | Cibola | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 7 | 34.7567N / -107.3738W | Cibola | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 13 | 34.7608N / -106.9963W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 15 | 34.7565N / -107.0055W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 16 | 34.7655N / -107.0068W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 17 | 34.7100N / -107.3452W | Cibola | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 18 | 34.8630N / -107.1610W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 18A | 34.8662N / -107.1663W | Valencia | 6.7 | 320 | | | | |
| 19 | 34.7482N / -107.0888W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 20 | 34.7807N / -107.0852W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 22 | 34.8052N / -107.2320W | Cibola | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 22B | 34.8058N / -107.2348W | Cibola | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 23 | 34.7411N / -107.2017W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 24 | 34.7425N / -107.1892W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 27 | 34.7328N / -107.3507W | Cibola | | | 0.49 | 23.4 | 0.49 | 23.4 |

**Table 4.1-1. Current and Proposed BLM HLZ Operations, continued**

| HLZ Identifier | Coordinates (decimal degrees) | County | Average Number of Sorties | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | CV-22B Osprey Weekly | CV-22B Osprey Yearly | HH-60G Pave Hawk Weekly | HH-60G Pave Hawk Yearly | UH-1N Iroquois Weekly | UH-1N Iroquois Yearly |
| 28 | 34.6260N / -107.3347W | Cibola | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 29 | 34.6393N / -107.3185W | Cibola | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 30 | 35.2552N / -107.0715W | Sandoval | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 31 | 35.3252N / -107.0713W | Sandoval | 6.7 | 320 | | | | |
| 32 | 35.4247N / -107.2143W | Sandoval | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 33 | 35.4307N / -107.2018W | Sandoval | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 34 | 35.4555N / -107.0990W | Sandoval | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 36 | 34.8612N / -107.2018W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 37 | 34.8223N / -107.2825W | Cibola | 6.7 | 320 | | | | |
| 38 | 34.7360N / -107.2803W | Cibola | | | 0.49 | 23.4 | 0.49 | 23.4 |
| 42 | 34.6748N / -107.3192W | Cibola | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **19a** | 34.7475N -107.0957W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **19b** | 34.7415N -107.0955W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **C** | 34.5132N / -107.0361W | Socorro | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **D** | 34.5126N / -107.1099W | Socorro | | | 0.49 | 23.4 | 0.49 | 23.4 |

**Table 4.1-1. Current and Proposed BLM HLZ Operations, continued**

| HLZ Identifier | Coordinates (decimal degrees) | County | Average Number of Sorties | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | CV-22B Osprey Weekly | CV-22B Osprey Yearly | HH-60G Pave Hawk Weekly | HH-60G Pave Hawk Yearly | UH-1N Iroquois Weekly | UH-1N Iroquois Yearly |
| **O** | 34.7805N / -107.4258W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **P** | 34.7647N / -107.4388W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **Q** | 34.7130N / -107.4705W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **R** | 34.7013N / -107.4653W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **N** | 34.7727N / -107.0585W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **CR1** | 34.6590N / -104.9604W | Guadalupe | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **CR2** | 34.5417N / -104.7557W | De Baca | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **22A** | 34.7995N / -107.2308W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **37A** | 34.8197N / -107.2758W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **37B** | 34.8148N / -107.2762W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **37C** | 34.8152N / -107.2767W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |
| **37D** | 34.8217N / -107.2750W | Valencia | | | 0.49 | 23.4 | 0.49 | 23.4 |

Note: Bolded sites are proposed new sites

OPFOR training activities would continue to be conducted at 14 existing HLZs (HLZs 15, 16, 17, 18, 18A, 20, 22B, 23, 27, 29, 30, 31, 37, and 42). The OPFOR activities are proposed to be conducted at the six new proposed training sites (HLZs CR1, CR2, 37A, 37B, 37C, and 37D) as well. OPFOR training activities would also be conducted at proposed sites OF1 through OF7. Table 4.1-2 lists the sites that would only be used by ground personnel for OPFOR training.

**Table 4.1-2. Proposed BLM OPFOR Training Sites**

| HLZ Identifier | Coordinates (decimal degrees) | County |
|---|---|---|
| OF1 | 35.6843N / -107.0088W | Sandoval |
| OF2 | 35.6810N / -107.0138W | Sandoval |
| OF3 | 35.6257N / -107.0607W | Sandoval |
| OF4 | 35.5964N / -107.0526W | Sandoval |
| OF5 | 34.4796N / -106.9922W | Socorro |
| OF6 | 34.5129N / -107.0726W | Socorro |
| OF7 | 34.5008N / -107.1233W | Socorro |

There would be no aerial operations at proposed sites OF1 through OF7, so the OPFOR activities would have no impact to airspace use and management.

### 4.1.2 Impacts of No-action Alternative on Airspace Use and Management (Alternative 2)

Under the No-action Alternative, the BLM would not approve a ROW to the USAF for use of the existing or proposed HLZs for 58 SOW training activities. The 58 SOW would discontinue training activities on BLM-administered public property after the current 3-year temporary ROW expired on 31 December 2018. Under the short-term ROW extension, the 58 SOW training activities would continue only on the 26 existing BLM sites as presented in table D-1. After the short-term extension expired, there would be no airborne operations associated with the 58 SOW occurring within BLM lands. The airspace at and within the immediate vicinity of the HLZs would continue to be typically Class G airspace and would be controlled by either Albuquerque TRACON or the Albuquerque Air Route Traffic Control Center.

### 4.1.3 Impacts of Alternative 3 (Current Operations at Current Sites) on Airspace Use and Management

Under Alternative 3, the BLM would allow the 58 SOW ROW access to BLM-administered public lands for training purposes and grant a 30-year ROW easement to the USAF only to the 26 sites currently in use. The impacts of Alternative 3 are essentially the same as the baseline conditions discussed for current operations in section 3.2. The 26 current BLM sites would be used for HLZ training; 14 of the current sites would also be used for OPFOR training, and the 3 sites would still be used for CV-22B Osprey operations. Table D-1 presents a listing of the current training sites and the activities at each site.

The airspace at and within the immediate vicinity of the HLZs would continue to be typically Class G airspace and be controlled by either Albuquerque TRACON or the Albuquerque Air Route Traffic Control Center.

## 4.2 Noise

This section discusses the noise impacts from the Proposed Action and alternatives.

### 4.2.1 Noise Impacts of Proposed Action (Alternative 1)

Under the Proposed Action, the BLM would allow the 58 SOW ROW access to BLM-administered public lands for training purposes and grant a 30-year ROW to the USAF. Under the Proposed Action, training activities would be conducted at 23 new BLM sites in addition to the 26 existing HLZs. Of these 23 new BLM sites, 16 would be used as HLZs for aircraft training activities and the remaining 7 would be used for OPFOR training.

#### 4.2.1.1 Training Activity

A typical HLZ sortie would include approximately 2 hours over the BLM-administered land, with landing, departures, and/or hover operations occurring in 15-minute intervals resulting in a maximum of 8 air events per sortie. Aircraft using the BLM HLZs also perform circling patterns in airspace above the HLZ between sorties.

Implementation of the Proposed Action would not cause any changes to existing CV-22B Osprey aircraft activities at the three existing CV-22B Osprey specific HLZ sites (HLZ 18A, 31, and 37).

HH-60 Pave Hawk and UH-1N Iroquois operations would decrease at each of the 23 existing HLZ sites. A total of 16 new HLZ sites would receive HH-60G Pave Hawk and UH-1N Iroquois aircraft activities. All sites receiving HH-60G Pave Hawk and UH-1N Iroquois training activities would receive 46 sorties per year (23 sorties per year for the HH-60G Pave Hawk and 23 sorties per year for the UH-1N Iroquois).

The 7 OPFOR-only site locations would not receive any aircraft operations and would only be accessed by ground vehicle.

Operational counts at HLZ training sites are summarized in table 4.2-1. All sorties flown by the 58 SOW would be evenly distributed between environmental daytime (7:00 a.m. to 10:00 p.m.) and environmental nighttime (10:00 p.m. to 7:00 a.m.) periods.

#### 4.2.1.2 Noise Exposure

Aircraft flight parameters in the BLM-administered public land and single-event noise levels presented in table E-1 for the CV-22B Osprey, HH-60G Pave Hawk, and UH-1N Iroquois would be the same as existing conditions. The greatest SEL of 106 dBA and $L_{max}$ of 104 dBA would continue to be generated by the CV-22B Osprey operating at 100 feet AGL.

**Table 4.2-1. BLM Training Operations**

| | Proposed Action (CV-22B Osprey sites) | | Proposed Action (HH-60G Pave Hawk and UH-1N Iroquois sites) | |
|---|---|---|---|---|
| Sorties per year | 320 | | 47 | |
| Sorties per week | 6.2 | | 0.9 | |
| Landings per sortie(1) | 8 | | 8 | |
| Estimated landings per year(2) | Daytime | Nighttime | Daytime | Nighttime |
| | 1,280 | 1,280 | 184 | 184 |

Notes:
(1) Landings per sorties assumes up to one landing every 15 mins

(2) Operations evenly split between acoustic daytime (0700-2200) and acoustic nighttime (2200-0700)

#### 4.2.1.3 Noise Exposure

Aircraft flight parameters in the BLM-administered public land and single-event noise levels presented in table E-1 for the CV-22B Osprey, HH-60G Pave Hawk, and UH-1N Iroquois would be the same as existing conditions. The greatest SEL of 106 dBA and $L_{max}$ of 104 dBA would continue to be generated by the CV-22B Osprey operating at 100 feet AGL.

Due to the large number of HLZ sites currently in use for training, it is unwieldy to display DNL noise contours for all sites individually. Figure 3.3-1 displays a representative noise contour for a single HLZ that receives only HH-60G Pave Hawk and UH-1N Iroquois operations. All 23 existing HLZs and all 16 new HLZs for the HH-60G Pave Hawk and UH-1N Iroquois receive the same number of aircraft operations, which results in identical DNL noise levels at each HLZ. The DNL noise contours displayed in figure 3.3-1 in section 3.3 for HLZ 6 are identical to contours for the other HH-60G Pave Hawk and UH-1N Iroquois specific HLZ sites. The computed 65 dB DNL contour extends 0.22 miles from the center of the HLZ due to the current existing aircraft activity.

There are no noise sensitive receptors or human population nearby to any of the existing or proposed BLM HLZ sites. Noise impacts to wildlife is discussed in section 4.5.

For the three existing CV-22B Osprey HLZ sites, implementation of the Proposed Action would not change aircraft activities or noise contours. There would be no change and no impact at these sites due to the Proposed Action.

For the 23 existing HH-60G Pave Hawk and UH-1N Iroquois HLZ sites, implementation of the Proposed Action would decrease the radius of the 65 dB DNL noise contour by 0.05 miles. The Proposed Action would result in a minor positive impact for these 23 sites.

For the 16 new HH-60G Pave Hawk and UH-1N Iroquois HLZ sites, implementation of the Proposed Action would increase noise levels in the vicinity of the new HLZ sites. However, this noise increase would be expected to be minor due to the low number of aircraft operations.

The seven new OPFOR-only sites would only be exposed to noise levels from vehicles and pyrotechnic equipment. Vehicular noise would not be expected to cause any significant impacts. The pyrotechnic equipment used in OPFOR training (e.g., Smokey SAMs, alternative rockets, and smoke grenades) range in loudness levels comparable with small-to-large firecrackers and shotguns.

No significant impacts due to noise are expected for the implementation of the Proposed Action.

### 4.2.2 Noise Impacts of No-action Alternative (Alternative 2)

Under the No-action Alternative, the BLM would not grant a 30-year ROW to the USAF and the 58 SOW would discontinue to conduct training activities on BLM-administered public property. Implementation of the No-action Alternative would result in a positive impact to the noise environment due to fewer noise generating activities occurring in the area.

### 4.2.3 Noise Impacts of Alternative 3 (Current Operations at Current Sites)

Under Alternative 3, existing training activities would continue at all 26 BLM sites currently in use. The noise environment for Alternative 3 is identical to the noise environment of the existing conditions at these sites. Under Alternative 3, no new impacts would be expected.

## 4.3 Air Quality

This section discusses the impacts to air quality from the Proposed Action and alternatives.

### 4.3.1 Impacts of Proposed Action on Air Quality (Alternative 1)

Under the Proposed Action, the total amount of training activities would be the same as discussed for ongoing operations in section 3, but they would occur in a greater number of training sites. The flight times over the training sites would be the same. However, there would be different travel distances to the training sites.

#### 4.3.1.1 Short-term Impacts

Short-term emissions occur during the construction process of a project and are typically generated by on-road (e.g., employee vehicles and vendor/delivery and water trucks) and off-road vehicles or equipment (e.g., backhoes, dozers, portable generators, and cranes). Short-term emissions end once the construction phase is complete. The Proposed Action is not expected to have short-term emissions because there would be no construction. Therefore, short-term emissions for the Proposed Action are not further discussed.

#### 4.3.1.2 Long-term Impacts

Long-term or operational emissions are emissions that result from operation of a project and include emissions from sources such as vehicle emissions associated with employee commute and delivery vehicles, manufacturing processes, and facility upkeep. The Proposed Action would allow the 58 SOW ROW access to BLM-administered public lands for training purposes and grant a 30-year ROW to the USAF. The new authorization is being sought for continuing training activities at the current sites and expanding to an additional 23 new BLM sites. Emissions from the Proposed Action training exercises would result from vehicles consisting of light duty diesel vehicles (i.e., 0 to 8,500 pounds of gross vehicle weight rating) for the OPFOR personnel and aircraft. Annual emissions resulting from operation of these vehicles are summarized in table 4.3-1. Under the Proposed Action, the miles flown would increase slightly due to the further distance to some of the new HLZs. This increase in air miles flown by the aircraft would result in a slight increase in air emissions over those resulting from current operations described in section 3.4.3. Detailed calculations of these emissions are included as Appendix F.

**Table 4.3-1. Proposed Action Annual Emissions**

| Emission Source | VOC (tpy) | CO (tpy) | $NO_x$ (tpy) | $PM_{10}$ (tpy) | $PM_{2.5}$ (tpy) | $SO_2$ (tpy) | $CO_2eq$ (MTPY) |
|---|---|---|---|---|---|---|---|
| VMT | 0.09 | 1.36 | 0.14 | 0.00 | 0.00 | 0.00 | 121.19 |
| Aircraft | 0.13 | 3.04 | 9.97 | 1.34 | 1.04 | 0.85 | 2,345.94 |
| Total | 0.22 | 4.40 | 10.11 | 1.34 | 1.04 | 0.85 | 2,467.13 |
| Conformity Threshold | None | 100 | None | None | None | None | None |
| Significant? | No | No | No | No | No | No | No |
| Increase over current operations | 5.0% | 3.29% | 0.14% | 0.01% | 0.02% | 0.01% | 0.51% |

Notes:
- CO carbon monoxide
- $CO_2eq$ carbon dioxide equivalent
- MTPY metric tons per year
- NO nitrogen oxide
- $NO_2$ nitrogen dioxide
- $NO_x$ nitrogen oxides (NO and $NO_2$)
- $PM_{2.5}$ respirable particulate matter 2.5 microns in diameter and smaller
- $PM_{10}$ respirable particulate matter 10 microns in diameter and smaller
- $SO_2$ sulfur dioxide
- tpy tons per year
- VMT vehicle miles traveled
- VOC volatile organic compound

Table 4.3-2 provides a summary of criteria pollutants emitted in the state of New Mexico from 2012 to 2016 (USEPA 2017b).

**Table 4.3-2. Emissions of Criteria Pollutants and GHGs in New Mexico in Tons**

| Criteria Pollutant | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|
| CO | 336,589 | 297,041 | 257,492 | 250,955 | 244,417 |
| NOX | 106,273 | 102,621 | 98,970 | 88,883 | 78,795 |
| PM10 | 5,306 | 5,129 | 4,951 | 4,636 | 4,320 |
| PM25 | 3,740 | 3,646 | 3,553 | 3,190 | 2,828 |
| SO2 | 615 | 622 | 629 | 468 | 307 |
| VOC | 38,725 | 34,567 | 30,409 | 28,556 | 26,703 |

Source: EPA 2017b

Notes:

| | |
|---|---|
| CO | carbon monoxide |
| $CO_2eq$ | carbon dioxide equivalent |
| MTPY | metric tons per year |
| NO | nitrogen oxide |
| $NO_2$ | nitrogen dioxide |
| $NO_x$ | nitrogen oxides (NO and $NO_2$) |
| $PM_{2.5}$ | respirable particulate matter 2.5 microns in diameter and smaller |
| $PM_{10}$ | respirable particulate matter 10 microns in diameter and smaller |
| $SO_2$ | sulfur dioxide |
| tpy | tons per year |
| VOC | volatile organic compound |

Based on the data presented in table 4.3-2, there is no increasing trend for any of the criteria pollutants. On the contrary, emissions of criteria pollutants in the State of New Mexico have a decreasing trend. The small increases in emissions of criteria pollutants from the Proposed Action over those of the current operations would not affect this trend and would conform with the SIP. The GHGs are below the reporting requirement.

### 4.3.2 Impacts of No-action Alternative on Air Quality (Alternative 2)

Under the No-action Alternative, the military training activities described in this EA would cease. All associated air emissions would cease. There would be a slight beneficial impact to current air quality.

### 4.3.3 Impacts of Alternative 3 (Current Operations at Current Sites) on Air Quality

Under Alternative 3, the activities described under current operations would continue at their present level and in the same locations. The impacts to air quality would be the same as described for current operations in section 3.4.3.

## 4.4 Earth Resources

The helicopter and tiltrotor training operations do not affect the lithology, stratigraphy, or geological structures in the area of the HLZs. This section concentrates on the impacts to soils from the training activities due to the rotor wash.

### 4.4.1 Impacts of Proposed Action on Earth Resources (Alternative 1)

Impacts to the soils would be limited to the area of the training sites.

As discussed in section 3.5.2, the current training sites have experienced the down force winds generated by the aircraft rotors (rotor wash) for many years. Pilots during training tend to aim for the centers of the HLZs. This limits the area that experiences the greatest rotor wash. The soils at four of the existing training sites (HLZs 6, 22, 22B, and 30) have had minor impacts, exhibit localized bare areas at the center of the HLZs potentially due to rotor wash resulting in a lack of vegetation. The vegetation at the other 22 sites continues to hold the soils.

The impacts to soils from the existing training operations have only impacted the soils at a few of the existing sites. The impacts of the proposed operations would likely result in the same localized erosion of soils at a portion of the new sites over time. There is potential for less erosion at the new sites and recovery at the four sites with bare areas, as the number of air events at each site is reduced as the training is spread out to the greater number of available training sites.

### 4.4.2 Impacts of No-action Alternative on Earth Resources (Alternative 2)

Under the No-action Alternative, the military training activities described in this EA would cease. All associated erosion due to the training would cease. There would be a slight beneficial impact to soils as the few localized bare areas could be reclaimed and would recover over time.

### 4.4.3 Impacts of Alternative 3 (Current Operations at Current Sites) on Earth Resources

Under Alternative 3, the activities described under current operations would continue at their present level and in the same sites. The impacts to soils would be the same as described for current operations in section 3.5.3.

## 4.5 Natural Resources

Potential natural resources impacts considered include whether training activities would: (1) disrupt or remove vegetation, habitat, special status plant, and/or waters of interest to the U.S. government; (2) cause behavior modifications in animals, such as avoidance behaviors, interference with mating and reproduction, or impaired ability to obtain food, cover, or water; (3)

cause high noise levels (i.e., aircraft noise) resulting in direct physiological changes to animal auditory systems; and/or (4) cause direct mortality to animal species.

Natural resources considered in this evaluation are: vegetation and habitat; wildlife; special status species (federally-listed as threatened or endangered, proposed for federal listing, candidate for federal listing, BLM sensitive, and other protected species); and wetlands and waters of the U.S. Potential direct or indirect impacts that would be considered significant for each of the natural resources are as follows:

- Vegetation and habitat: loss, damage, or measurable change to large areas (relative to region-wide acreage managed) of natural vegetation and habitat.
- Wildlife:
    - Implementation of the Proposed Action or alternatives would cause habitat to a) increase region-wide, or b) decrease region-wide.
    - Implementation of the Proposed Action or alternatives would a) decrease the population of a particular species, or b) increase the population of a particular species.
- Species status species:
    - Likely to adversely affect species or its habitat.
    - Likely to beneficially affect species or its habitat.
    - Likely to result in a trend toward federal listing or a loss of viability for BLM sensitive or other protected species.
- Wetlands and waters of the U.S.: loss, damage, or measurable change to wetlands and/or waters of the U.S., including discharge of fill.

As a requirement under the federal Endangered Special Act (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). The BLM completed informal Section 7 consultation with the USFWS IPAC tool to determine the potential species that may have direct effect from the Proposed Action. The official species list was requested on December 19, 2017.

### 4.5.1 Impacts of Proposed Action (Alternative 1) on Natural Resources

#### 4.5.1.1 Vegetation and Habitat

All current and proposed training sites support open grassland vegetation communities with various degrees of exposed soil and rocks, cholla, and sparse juniper woodland (table 3.6-1). Overall vegetation cover at the 26 existing training sites is lower than vegetation cover at proposed sites due to the history of use at existing HLZs. While conducting aircraft and

helicopter landing operations within the HLZs, it is anticipated that all woodlands would be avoided. Therefore, adverse impacts to woodlands are not anticipated to occur.

Current Training Sites

Under the Proposed Action (Alternative 1), the 26 existing training sites would continue to be used. No change in acreage would occur to these sites (413.5 acres). Annual helicopter sorties at 23 of the existing sites, which comprise approximately 248 acres (this acreage does not include HLZs 18A, 31, and 37 that are used specifically for CV-22B Osprey and do not support helicopter sorties), would be reduced by approximately half. Therefore, potential loss or damage to vegetation due to helicopter touchdown at these sites would be reduced, as compared to baseline conditions. Continued operations at these sites entail minor direct impacts to open grassland vegetation within 23 of the existing HLZs.

TerraLOC would continue to be applied at HLZs 18A, 31, and 37 for dust suppression from CV-22B Osprey sorties. These HLZs are described as cleared areas surrounded by open grassland and/or sparse juniper woodland (Tetra Tech 2017a). A total of approximately 87 acres within these three HLZs is currently treated with TerraLOC. The same locations of unvegetated or sparsely vegetated areas would continue to be impacted under the Proposed Action; however, no additional impacts over baseline conditions would occur. CV-22B Osprey landing regularly occurs within these three HLZs. Under the Proposed Action, CV-22B Osprey operations would continue at current levels. All CV-22B Osprey aircraft are anticipated to land in previously disturbed, unvegetated locations within these HLZs where TerraLOC is applied. Therefore, no impacts over baseline conditions would occur and additional impacts from continued operations would be minor.

Under the Proposed Action, OPFOR training would be conducted at 14 existing training sites (Table 2-2). Potential impacts to vegetation and habitat from OPFOR training could result from the use of trucks within and adjacent to the sites. However, all trucks used during OPFOR training would utilize existing roads both within and adjacent to the sites and avoid vegetated areas. While OPFOR training would primarily occur outside the sites on existing roads, the use of existing roads within all sites may not be possible (i.e., sites with no existing roads). Therefore, the use of vehicles may result in minor direct impacts to vegetation and/or habitat on a small subset of the acreage within the sites used for OPFOR training. The acreage of vegetation and/or habitat that may be impacted cannot be quantified, but is anticipated to be a very low percentage of total site area. Impacts over baseline conditions are unlikely to occur because OPFOR training is already conducted at these existing sites.

Existing HLZs 27 and 31 were determined to have a total of 1.3 acres of potential raptor cliff habitat within the sites. No direct loss or damage as a result of helicopter landing activities and/or OPFOR training would occur to potential raptor habitat within or adjacent to the sites. Furthermore, the acreage of potential raptor habitat within the sites is minimal compared to the

total acreage within the 1-mile buffers of the sites (2,155.8 acres). Therefore, impacts to raptor habitat would be negligible.

Based on the analysis and discussion above, loss or damage to vegetation and habitat under the Proposed Action (Alternative 1) would be: (1) minor on open grassland within 23 of the existing HLZs currently used for helicopter landing operations, which would be reduced relative to current conditions due to the reduction in helicopter sorties at these sites; and (2) minor within and adjacent to 14 of the existing training sites from truck use during OPFOR training. The frequency/intensity of use for helicopter operations would be reduced at 23 of the existing HLZs, as compared to baseline conditions. Additionally, the total acreage that could be potentially impacted by training activities is very small compared to the total acreage managed in the project region. Therefore, the Proposed Action would result in less than significant impacts to vegetation and habitat region-wide.

Proposed Training Sites

Under the Proposed Action, 16 of the 23 total proposed sites will be added as HLZs for helicopter operations, which does not include the 7 proposed OPFOR-only locations (OF1 through OF7) (Table 2-3). These 16 HLZs comprise approximately 291 acres of open grassland vegetation. Helicopter operations within these sites would result in direct damage to vegetation and habitat within the helicopter landing footprint. 58 SOW helicopter pilots typically aim for the center of the HLZ while conducting landing operations. Therefore, damage to vegetation and habitat is anticipated to occur on a subset of the approximately 291 acres comprising the HLZs where helicopters directly touch down. This may result in minor long-term impacts to vegetation and/or habitat in the landing areas.

Under the Proposed Action, OPFOR training would be conducted at 23 proposed sites (table 2-3). Seven of the new 23 training sites are OPFOR-only locations (OF1 through OF7), where only OPFOR training will occur (i.e., no air operations). Potential impacts to vegetation and habitat from OPFOR training at proposed training sites would be as discussed for current sites, above. The use of vehicles may result in minor direct impacts to vegetation and/or habitat on a small subset of the acreage within the sites proposed for OPFOR training. The acreage of vegetation and/or habitat that may be impacted cannot be quantified but is anticipated to be a very low percentage of total site area.

Proposed HLZs 19A, 37D, and Q were determined to have a total of 1.4 acres of potential raptor cliff habitat within the sites. No direct loss or damage as a result of helicopter landing activities and/or OPFOR training would occur to potential raptor habitat within or adjacent to the sites. Furthermore, the acreage of potential raptor habitat within the sites is minimal compared to the total acreage within the 1-mile buffers of the sites (2,155.8 acres). Therefore, impact to raptor habitat would be negligible in the proposed sites.

Based on the analysis and discussion above, loss or damage to vegetation and habitat under the Proposed Action (Alternative 1) would be: (1) minor from helicopter landing operations on approximately 291 acres of open grassland that comprises the 16 proposed HLZs (does not include proposed OPFOR-only sites); and, (2) minor within and adjacent to 7 of the new proposed sites from truck use during proposed OPFOR training. Overall acreage of potentially impacted vegetation and habitat would be increased at the project-level because proposed sites would be added to the existing sites. Frequency/intensity of use for helicopter operations would be reduced at the 23 existing HLZs and increased at the 16 new HLZs that are proposed for air operations, as compared to baseline conditions. However, the total acreage that could be potentially impacted by training activities is very small compared to the total acreage managed in the project region. Therefore, the Proposed Action would result in less than significant impacts to vegetation and habitat region-wide.

#### 4.5.1.2 Wildlife

All wildlife species observed within or adjacent to each site during the project-specific natural resources surveys are presented in table 3.6-4 (Tetra Tech 2017a). Other than migratory birds, special status species are discussed as follows. Wildlife species that have been designated by the BLM for special management emphasis include Gunnison's prairie dog, big game species (e.g., pronghorn antelope), mule deer, rocky mountain elk, and bats. The results of the project-specific natural resources surveys are (Tetra Tech 2017a):

- Common birds, mammals, reptiles, and one invertebrate species were observed within the sites.
- Small mammal burrows/prairie dog colonies (anticipated to be Gunnison's prairie dog), which also have the potential to be habitat for burrowing owls, were observed within the following nine sites:
    - HLZ 7 (existing site);
    - HLZ 17 (existing site);
    - HLZ 22B (existing site);
    - HLZ 27 (existing site);
    - HLZ C (proposed site);
    - HLZ O (proposed site);
    - HLZ P (proposed site);
    - HLZ Q (proposed site); and
    - HLZ R (proposed site).
- Although cliffs were present within 100 feet of some project sites and within 1 mile of most sites, no bats or roosts were observed.
- One large mammal burrow (anticipated to be American badger) was observed at OF5.
- Potential raptor nests were observed outside HLZ 15 and HLZ 20. No individuals were observed using the nests.

While bird-aircraft collisions may occur within the HLZs, total annual sorties would remain constant under the Proposed Action, such that the potential for bird-aircraft strikes is likely to remain at current levels when averaged across all HLZs. It should be noted that a slight increase to bird-aircraft collisions could occur if birds at existing sites are habituated to air operations, whereas those at proposed sites are not. This increase is minimal and would not result in population-level impacts to bird species.

Helicopter landing operations and the use of trucks during OPFOR training may result in wildlife behavior modifications or direct physical injury or mortality to individuals. Wildlife species that are present directly within helicopter touchdown zones or vehicle transit routes (i.e., roads) would likely exhibit avoidance behaviors, described as follows. However, if wildlife species are unable to avoid helicopter touchdown or vehicles, direct injury or mortality of these individual(s) could occur.

Current Training Sites

Under the Proposed Action (Alternative 1), the 26 existing training sites would continue to be used and helicopter landings would be reduced by approximately half at 23 of the existing sites. Existing CV-22B Osprey operations at HLZs 18A, 31, and 37 would not change (including the use of TerraLOC). Therefore, impacts to wildlife within these sites from helicopter and aircraft operations would be minor and would be reduced at the 23 existing helicopter sites and unchanged at the 3 existing CV-22B Osprey sites, as compared to baseline conditions.

OPFOR training within the 14 existing training sites may result in minor impacts to wildlife habitat due to tire tracks from the use of trucks. However, these effects are greatly reduced because vehicles would utilize existing roads to the maximum extent possible within and adjacent to the sites, OPFOR training primary occurs outside of the sites on existing roads, and the effects are likely outweighed by the reduction in frequency of helicopter landing operations at the existing HLZs. Because affected habitats are small in area compared to the total acreage managed in the project region, it has been determined that implementation of the Proposed Action would not result in significant region-wide impacts to wildlife habitat and are highly unlikely to result in population-level impacts to wildlife species. Additionally, impacts over baseline conditions are unlikely to occur because OPFOR training is already conducted at these existing sites.

Noise levels from proposed training activities may result in animal behavior modifications, injury, or mortality; and helicopter landing operations and the use of trucks may result in animal behavior modifications or direct injury or mortality of these species, if present. For the three existing CV-22B Osprey sites (HLZs 18A, 31, and 37), implementation of the Proposed Action would not change aircraft activities or noise contours as compared to the baseline condition. For 23 of the existing HLZ sites (does not include sites 18A, 31, and 37 that are used specifically for CV-22B Osprey and do not support helicopter sorties), implementation of the Proposed Action

would decrease the radius of the 65 dB DNL noise contour by 0.05 miles, decreasing the noise impacts to wildlife at these existing sites as compared to the baseline condition.

The following evidence is used in part to assess the impact of aircraft and helicopter operations on wildlife and birds.

Wildlife. While there is little direct evidence for the effects of helicopter noise on wildlife, some studies suggest that certain species may habituate or adjust to aircraft overflight noise. Bunch and Workman (1993) instrumented experimental animals (elk, antelope, and sheep) with heart rate and body temperature transmitters to determine physiological changes after exposure to various types of disturbances (e.g., people on foot, motorcycles, helicopters, and F-16 aircraft). This project indicated that animals habituated to most disturbance factors in a short period of time. The exceptions included people on foot who entered the research enclosures where the animals were kept, fixed wing aircraft at low levels of flight, and helicopter flights at low elevations near the animal enclosures. The animals habituated to subsonic and supersonic jet overflight after about four passes over the animals. This habituation seemed to be long-term, as these same animals did not respond when tested at a later date. Krausman et al. (2002) observed the response of Sonoran pronghorn to military jet activity at the Barry M. Goldwater Range in Arizona from February 1998 to June 2000. Pronghorn were exposed to 109 direct military overflights, but only six were <305 feet AGL. Overall, behavior of males and females was not significantly different, and the presence of military aircraft did not cause changes in behavior.

Birds. There is no direct evidence in response to noise for many bird species. Awbrey and Hunsacker (1997) found that birds may tend to build fewer nests and lay fewer eggs in high-noise areas. However, once a nest is established with eggs in it, military aircraft noise has no detectable influence on reproductive performance. Andersen et al. (1986) exposed 35 red-tailed hawk nests to helicopter overflights to measure behavioral response. Results were consistent with the hypothesis that red-tailed hawks habituate to low-level air-traffic during the nesting season.

With the exception of burrowing mammals, nesting birds, and roosting bats that are more likely to remain in-situ during disturbance, the primary response of wildlife species to noise would be temporary avoidance behaviors and potential displacement to more suitable habitat. These avoidance behaviors may result in interference with animal mating and reproduction, or an impaired ability to obtain food, cover, or water, which could lead to reduced long-term survivability for affected individuals. Habituation and increased behavioral resistance of wildlife to noise impacts would likely occur over time. If wildlife species are unable to avoid the noise, physiological injury to animal auditory systems or mortality could occur to affected individuals. These potential noise impacts would potentially affect all wildlife species present within the HLZs. While two potential raptor nests were observed outside existing HLZs 15 and 20, the frequency of noise disturbance at these two sites would be reduced over baseline conditions because existing sorties would be spread across more HLZs. However, nest abandonment within

the affected noise contours for all HLZs, and potentially within the 1-mile raptor habitat around each site, could occur and result in nestling mortality. If small mammals are occupying the burrows found within the HLZs, these species would also be subject to potential avoidance behaviors, injury, or mortality as a result of increased noise. Impacts to wildlife generated by noise from the Proposed Action would be minor are not likely to affect species population trends or result in population-level impacts to any species.

Small mammal burrows/colonies were documented within four existing sites (HLZs 7, 17, 22B, and 27). No age can be assigned to colonies within the existing sites as an indicator of longevity, despite ongoing training activities. However, it is anticipated that the colonies at the existing sites have been in place for multiple years and thus have not been significantly damaged by training activities. Therefore, it is unlikely that colonies at existing sites would receive impacts over baseline conditions. The number of colonies and acreage of wildlife habitat impacted under the Proposed Action is minimal compared to the total managed in the project region. Because all vehicles are confined to existing roads and OPFOR training would primarily occur outside the sites, impacts are unlikely.

Impacts to wildlife species would be: (1) minor at 23 of the existing sites, and would decrease as a result of fewer annual helicopter sorties conducted at these sites when compared to baseline conditions; and (2) minor at the 14 existing sites where OPFOR training is conducted, due to the use of trucks. Additionally, small mammal colonies documented within the sites are unlikely to be significantly impacted. Despite the potential impacts to individual wildlife species within the sites if present, the Proposed Action is not likely to affect species population trends or result in population-level impacts to any species, particularly when the affected wildlife habitat acreage is compared to total acreage in the project region.

Proposed Training Sites

Implementation of the Proposed Action would result in increased acreage of potentially impacted wildlife habitat at the project-level due to helicopter landing operations and vehicle use with the inclusion of 23 proposed HLZ and OPFOR-only sites. However, because these habitats are small in area compared to the total acreage managed in the project region, it has been determined that implementation of the Proposed Action would not result in significant region-wide impacts to wildlife habitat and are highly unlikely to result in population-level impacts to wildlife species.

Noise levels from proposed training activities may result in animal behavior modifications, injury, or mortality; and helicopter landing operations and the use of trucks may result in animal behavior modifications or direct injury or mortality of these species, if present. For the 16 proposed HLZs, implementation of the Proposed Action would increase noise levels in the vicinity of the new HLZ sites. However, this noise increase is expected to be minor due to the low number of aircraft operations. The seven new OPFOR-only sites would only be exposed to noise levels from vehicles.

The primary response of wildlife species to noise would be as described for current training sites, above. Impacts to wildlife generated by noise from the Proposed Action are not likely to affect species population trends or result in population-level impacts to any species.

Small mammal burrows/colonies were documented within five proposed sites (HLZs C, O, P, Q, and R Colonies at proposed sites could be potentially damaged or destroyed if they are directly within helicopter touchdown areas or vehicle transit routes. However, because colonies at existing sites have not been damaged by ongoing training, helicopter pilots typically aim for the center of the HLZ while conducting landing operations, and vehicles would be confined to existing roads (where possible), it is unlikely that colonies at proposed sites would receive significant impacts. The large mammal burrow at OF5, which is an OPFOR-only site, is unlikely to have impacts since all vehicles are confined to existing roads.

Impacts to wildlife species could occur at the 23 proposed sites as a result of new air operations and OPFOR training. Small mammal colonies documented within the sites are unlikely to be significantly impacted. Despite the potential impacts to individual wildlife species within the sites if present, the Proposed Action is not likely to affect species population trends or result in population-level impacts to any species, particularly when the affected wildlife habitat acreage is compared to total acreage in the project region.

#### 4.5.1.3 Special Status Species

***Federally-Listed, Proposed, and Candidate Species, and BLM Sensitive Species***

Meandering visual surveys were conducted for special status plant species during the project-specific natural resources surveys (Tetra Tech 2017a). The surveys were designed to occur at the time of year that would maximize the detection of annual plants (i.e., during the blooming period). Perennial plants can be detected year-round. No special status plants were observed within the project sites (Tetra Tech 2017a).

Special status species observed during the project natural resources surveys were (Tetra Tech 2017a):

- One burrowing owl (BLM sensitive) 2 miles northeast of HLZ O;
- One Texas horned lizard (BLM sensitive) just south of OF5;
- One Baird's sparrow (BLM sensitive) within HLZ CR1;
- One loggerhead shrike (BLM sensitive) within HLZ CR2;
- One adult gray vireo (BLM sensitive) within HLZ 34, two adults within HLZ 42, and individuals observed outside HLZ 36; and
- One golden eagle and one golden eagle nest.

No federally-listed threatened or endangered, proposed, or candidate species were observed (Tetra Tech 2017a).

Current Training Sites

Since no special status plant species were found and due to the presence of predominantly disturbed open grassland habitat, impacts to special status plants would not occur under the Proposed Action (Alternative 1).

Effects from training activities and impacts to special status animal species under the Proposed Action (Alternative 1) would generally be consistent with those identified for wildlife, if these species are present within the project sites during training. Potential impacts entail noise levels from proposed training activities, which may result in animal behavior modifications, injury, or mortality; and helicopter landing operations and the use of trucks during OPFOR training, which may result in animal behavior modifications or direct injury or mortality of these species, if present. However, because all trucks would be constrained to existing roads within and adjacent to the sites wherever possible and since OPFOR training primary occurs outside the sites, impacts from this activity are likely to be minor.

All gray vireo observations occurred within or adjacent to existing project sites (within HLZs 34 and 42; outside HLZ 36). Because training activities are ongoing in these areas, this and other species have likely habituated to regular noise disturbance. Additionally, helicopter sorties would be reduced at these existing sites because approximately half would be transitioned to proposed sites. OPFOR training would be conducted at HLZ 42, which involves the use of trucks, and may increase the risk of avoidance behaviors if species are present on roads within or adjacent to the sites.

No federally-listed threatened or endangered, proposed, or candidate species, nor officially designated critical habitats were present within the project sites, and only a few individuals of BLM sensitive animal species were found within or near the sites during survey efforts. Additionally, affected habitat acreage is relatively minimal compared to total acreage in the project region. Therefore, after review of the Biological Resource inventory report, the BLM, in concurrence among the Socorro, Roswell, and Rio Puerco field office, made a “no effect” determination on federally-listed threatened or endangered, proposed, or candidate species that may be affected with the Proposed Action. While training activities under the Proposed Action may impact individuals of the BLM sensitive species found within the existing sites, these activities are not likely to result in a trend toward federal listing or a loss of viability for any BLM sensitive species. Special status species occurring in existing training areas would likely receive reduced impacts under the Proposed Action as compared to baseline conditions, because approximately half of the helicopter sorties would be transitioned to proposed sites.

Proposed Training Sites

Since no special status plant species were found and due to the presence of open grassland habitat, impacts to special status plants would not occur under the Proposed Action (Alternative 1).

Effects from training activities and impacts to special status animal species under the Proposed Action (Alternative 1) would generally be consistent with those identified for wildlife and as described above, if these species are present within the project sites during training. However, because all trucks would be constrained to existing roads within and adjacent to the sites wherever possible and OPFOR training primary occurs outside the sites, impacts from this activity are likely to be minor.

It is unlikely that the burrowing owl (HLZ O) or Texas horned lizard (OF5), which were detected outside proposed project sites, would be affected by noise generated by the Proposed Action. Noise impacts at HLZ O due to helicopter landing operations have potential to affect areas outside the HLZ boundary, which may cause avoidance responses by burrowing owl, if present. However, this species was detected 2 miles northeast of the project site, which is likely outside the air operations noise contour. No OPFOR training will be conducted at HLZ O. OPFOR training at OF5 (an OPFOR-only site) is unlikely to result in impacts to the Texas horned lizard, as previously described, unless this species is present in the direct path of a vehicle.

One Baird's sparrow and one loggerhead shrike were observed within proposed HLZs CR1 and CR2, respectively. Both air operations and OPFOR training are proposed within these sites. Potential impacts to these species from both training exercises are consistent with those previously described. However, these bird species are highly mobile and, unless nesting, would be expected to more readily avoid training operations as compared to burrowing species or reptiles.

No federally-listed threatened or endangered, proposed, or candidate species, nor officially designated critical habitats were present within the project sites, and only a few individuals of BLM sensitive animal species were found within or near the sites during survey efforts. Additionally, affected habitat acreage is relatively minimal compared to total acreage in the project region. Therefore, after review of the Biological Resource inventory report, the BLM, in concurrence among the Socorro, Roswell, and Rio Puerco field office, made a "no effect" determination on federally-listed threatened or endangered, proposed, or candidate species that may be affected with the Proposed Action. While training activities under the Proposed Action may impact individuals of the BLM sensitive species found within the proposed sites, these activities are not likely to result in a trend toward federal listing or a loss of viability for any BLM sensitive species.

### *Other Protected Species*

Other protected species that could occur in the project areas include those awarded legal protection under the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act. Nearly all avian species discussed throughout this document are protected by the Migratory Bird Treaty Act. Based on the preliminary habitat suitability analysis and initial reconnaissance field survey conducted in support of this EA, bald and golden eagles were determined to have

potential to occur within the project areas (Tetra Tech 2017a). Potential raptor cliff habitat was found to occur in the 1-mile buffer of most project sites (2,155.8 acres), but not within the sites (2.7 acres). While bald eagles are unlikely to nest within the project sites due to the lack of permanent water, transient individuals could potentially occur.

Current Training Sites

Raptor surveys were conducted at all sites during the natural resources surveys completed in support of this EA (Tetra Tech 2017a), with results as follows:

- One adult golden eagle was observed on multiple occasions between existing HLZs 23 and 24; and
- One golden eagle nest was also observed on a cliff overlooking existing HLZ 24, approximately 1,000 feet outside the site boundary to the northwest.

Effects from training activities and impacts to other protected species under the Proposed Action (Alternative 1) would generally be consistent with those identified for other avian species. Potential impacts entail noise levels from training activities, which may result in animal behavior modifications, injury, or mortality; and helicopter landing operations and the use of trucks, which may result in animal behavior modifications or direct injury or mortality of these species, if present.

The primary response to disturbance from training exercises by eagles would be avoidance behaviors. However, nesting eagles would be less likely to exhibit these behaviors, and high levels of disturbance could be required to prompt nest abandonment, which may increase the risk of auditory injury. A golden eagle and the golden eagle nest were located outside existing training sites (HLZs 23 and 24). While individuals present may be habituated to regular noise disturbance, potential impacts could include temporary avoidance behaviors, nest abandonment, and/or injury from air operations noise.

Impacts could occur to individual eagles if present within or adjacent to the existing project sites, however, activities are not likely to result in a trend toward federal listing or a loss of viability for these species. Minimal potential raptor cliff nesting habitat is present within the sites when compared to the total within the 1-mile buffers of the sites (Tetra Tech 2017a). Additionally, intensity of impact at the existing helicopter training sites would be reduced because approximately half of the helicopter sorties are being transitioned to proposed sites under the Proposed Action. Therefore, impacts would be minor.

Proposed Training Sites

Raptor surveys were conducted at all sites during the natural resources surveys completed in support of this EA, and none were found at the proposed training sites (Tetra Tech 2017a).

Effects from training activities and impacts to other protected species under the Proposed Action (Alternative 1) would generally be consistent with those identified for other avian species and as previously described. Impacts may result in animal behavior modifications or direct injury or mortality of these species, if present.

Impacts could occur to individual eagles if present within or adjacent to the proposed project sites, however, activities are not likely to result in a trend toward federal listing or a loss of viability for these species. Additionally, no raptors were found within the proposed training sites. Minimal potential raptor cliff nesting habitat is present within the proposed sites when compared to the total acres within the 1-mile buffers of the sites (Tetra Tech 2017a). Therefore, impacts would be minor.

#### 4.5.1.4 Wetlands and Waters of the U.S.

A thorough review of existing natural resources data on jurisdictional wetlands, waters of the U.S., and other waters was conducted in support of this EA for all project areas. No riparian resources were identified within areas affected under this Proposed Action. No wetlands were observed within any site. However, dry, ephemeral drainages that are considered non-wetland waters of the U.S. were observed and delineated at the following four HLZs—linear feet of waters of the U.S. within each HLZ are also provided (Tetra Tech 2017a):

- HLZ 6 (1,075 linear feet);
- HLZ 30 (370 linear feet);
- HLZ 31 (533 linear feet); and
- HLZ N (101 linear feet).

Three of the delineated waters of the U.S. are within existing HLZs (6, 30, and 31) and one is within proposed HLZ N.

Current Training Sites

Potential loss or damage to waters of the U.S. could occur within existing HLZs 6, 30, and 31 as a result of helicopter landing operations and/or trucks utilized during OPFOR training. Ongoing operations have been conducted within HLZs 6, 30, and 31 for many years. Additionally, under the Proposed Action (Alternative 1), sorties would be reduced at these three existing HLZs (6, 30, and 31) due to the transition of about half of the sorties to the proposed HLZs. Therefore, impacts would be reduced as compared to baseline conditions. OPFOR training would also conducted at HLZs 30 and 31. However, all trucks utilized during OPFOR training would be confined to existing roads and would not impact waters of the U.S. Since helicopter pilots typically aim for the center of the HLZ while conducting landing operations, and no impacts

have been documented to waters of the U.S. within the 3 existing HLZs with ongoing air operations, no impacts to waters of the U.S. within the existing sites are anticipated.

Proposed Training Sites

Potential loss or damage to waters of the U.S. could occur within proposed HLZ N as a result of helicopter landing operations. HLZ N is a proposed site that would be utilized for air operations only (i.e., OPFOR training would not be conducted at this site). Potential impacts to waters of the U.S. could occur if helicopter touchdown occurs directly on top of or discharges fill into the historic channel in the western portion of the site. However, because helicopter pilots typically aim for the center of the HLZ while conducting landing operations, and no impacts have been documented to waters of the U.S. within the 3 existing HLZs where ongoing air operations occur, no impacts to waters of the U.S. within proposed HLZ N are anticipated.

### 4.5.2 Impacts of No-action Alternative (Alternative 2) on Natural Resources

#### 4.5.2.1 Vegetation and Habitat

Under the No-action Alternative, all training activities within the existing project sites would cease. No new sites would be added. While vegetation and habitat conditions at these sites may potentially improve over time, these sites have been consistently used for ongoing training. If training is halted under the No-action Alternative, it is unknown if or when these sites would transition to pre-training conditions, or if these conditions would differ substantially from the current baseline.

Beneficial but less than significant impacts would occur to vegetation and habitat under the No-action Alternative. These impacts are unlikely to result in region-wide effects.

#### 4.5.2.2 Wildlife

Under the No-action Alternative, all training activities within the existing project sites would cease. No new sites would be added. While habitat conditions and suitability of the sites to support wildlife species may potentially improve over time, these sites have been consistently used for ongoing training. If training is halted under the No-action Alternative, it is unknown if or when these sites would transition to pre-training conditions, or if these conditions would differ substantially from the current baseline.

Potential noise and landing activity impacts on individual wildlife species would be eliminated as a result of halting air operations under the No-action Alternative. The No-action Alternative would likely result in beneficial impacts to individual wildlife species, if present, but is unlikely to result in population-level effects.

#### 4.5.2.3 Special Status Species

***Federally-Listed, Proposed, and Candidate Species, and BLM Sensitive Species***

Under the No-action Alternative, all training activities within the existing project sites would cease. No new sites would be added. While habitat conditions and suitability of the sites to support special status species may potentially improve over time, these sites have been consistently used for ongoing training. If training is halted under the No-action Alternative, it is unknown if or when these sites would transition to pre-training conditions, or if these conditions would differ substantially from the current baseline.

Potential noise and landing activity impacts on individual special status species would be eliminated as a result of halting air operations under the No-action Alternative. The No-action Alternative would likely result in beneficial impacts to individual special status species, if present.

***Other Protected Species***

Under the No-Action Alternative, all training activities within the existing project sites would cease. No new sites would be added. While habitat conditions and suitability of the sites to support other protected species may potentially improve over time, these sites have been consistently used for ongoing training. If training is halted under the No-Action Alternative, it is unknown if or when these sites would transition to pre-training conditions, or if these conditions would differ substantially from the current baseline.

Potential noise and landing activity impacts on individual protected species would be eliminated as a result of halting air operations under the No-Action Alternative. The No-Action Alternative would likely result in beneficial impacts to individual protected species, if present.

#### 4.5.2.4 Wetlands and Waters of the U.S.

Under the No-action Alternative, all training activities within the existing project sites would cease. No new sites would be added. Therefore, no impacts would occur to waters of the U.S. that are present within the project sites.

### 4.5.3 Impacts of Current Operations at Current Sites (Alternative 3) on Natural Resources

#### 4.5.3.1 Vegetation and Habitat

Potential impacts to vegetation and habitat under Alternative 3 would be similar to those described under the Proposed Action (Alternative 1). The primary differences are as follows: (1) training activities would only be conducted within the 26 existing sites; (2) no new sites would

be added; and (3) intensity of air operations (i.e., annual sorties) at each site would remain consistent with baseline conditions. Under Alternative 2, effects of helicopter sorties would not be reduced on open grassland vegetation within 23 of the existing HLZs that are used for helicopter operations—these activities would remain consistent with baseline conditions. Therefore, impacts to vegetation and habitat at the existing sites under Alternative 3 would be greater as compared to the Proposed Action. However, no impacts from the establishment of 16 proposed HLZs on approximately 291 acres of open grassland vegetation would occur under Alternative 2, and no OPFOR training would be conducted at new project sites. Under Alternative 2, OPFOR training would be still conducted at 14 existing HLZs.

Under Alternative 3, acreage of impacted vegetation and habitat would remain constant at the project-level, as compared to baseline conditions. The existing frequency of use for helicopter operations would be maintained at 23 of the existing HLZs, which is a relative increase over the Proposed Action. The total impacted acreage is relatively small in area compared to the total acreage managed in the project regions. Therefore, Alternative 3 would result in less than significant impacts to vegetation and habitat region-wide and is not likely to result in a measurable increase in impacts over baseline conditions.

#### 4.5.3.2 Wildlife

Potential impacts to wildlife under Alternative 3 would be similar to those described under the Proposed Action (Alternative 1).

No new sites would be added under Alternative 3. Therefore, helicopter sorties at 23 of the existing sites under Alternative 3 would remain consistent with baseline conditions, which is an increase at these sites compared to the Proposed Action. OPFOR training would be conducted at 14 existing sites, which entails the use of trucks. The use of trucks has potential to cause avoidance behaviors or direct injury or mortality to wildlife species, if present. However, because all trucks would be confined to existing roads within and adjacent to the sites as described under the Proposed Action, impacts are unlikely to occur.

Alternative 3 is not likely to affect species population trends or result in population-level effects for any species, particularly when the affected habitat acreage is compared to total acreage in the project region.

#### 4.5.3.3 Special Status Species

Potential impacts to special status species under Alternative 3 would be similar to those described under the Proposed Action (Alternative 1). No new sites would be added under Alternative 3.

***Federally-Listed, Proposed, and Candidate Species, and BLM Sensitive Species***

Under Alternative 3, OPFOR training would be conducted at some of the existing sites (HLZs 15-18, 18A, 20, 22B, 23, 27, 29-31, 37, and 42). This training could potentially result in avoidance behaviors and/or injury to special status species, if present directly in the transit route of vehicles. However, all vehicle use would be constrained to existing roads within and adjacent to the sites. Additionally, no special status plant species or federally-listed threatened or endangered, proposed, or candidate animal species were documented at the sites (Tetra Tech 2017a). Because training activities are ongoing at all training sites under Alternative 3, measurable impacts over baseline conditions are unlikely.

No impacts to federally-listed threatened or endangered, proposed, or candidate species would occur, and while training activities under Alternative 3 have a low likelihood of impacting individuals of BLM sensitive species, if present, activities are not likely to result in a trend toward federal listing or a loss of viability for any BLM sensitive species.

***Other Protected Species***

Impacts to other protected species would be consistent with those described above for federally-listed threatened or endangered, proposed, candidate, and BLM sensitive species. Potential impacts (e.g., avoidance behaviors) could occur to other protected species, particularly eagles, if present at the existing sites. However, no eagles were found within the sites (Tetra Tech 2017a), and all truck use outside the sites would be confined to existing public roads. Additionally, air operations at these sites would remain at baseline conditions.

Therefore, while training activities under Alternative 2 have a low likelihood of impacting individuals of other protected species, if present, activities are not likely to result in a trend toward federal listing or a loss of viability of these species.

#### 4.5.3.4 Wetlands and Waters of the U.S.

Under Alternative 3, impacts to wetlands and waters of the U.S. would be similar to those described under the Proposed Action (Alternative 1). However, because no training would be conducted at HLZ N, potential impacts to waters of the U.S. at this site would not occur.

Potential loss or damage to waters of the U.S. under Alternative 2 could still occur within HLZs 6, 30, and 31, as a result of helicopter landing operations and/or trucks utilized during OPFOR training. Ongoing operations have been conducted within these HLZs for many years prior to the initiation of this EA. Therefore, additional impacts over baseline conditions are not likely to occur. OPFOR training would be conducted at HLZs 30 and 31. However, all trucks utilized during OPFOR training would be confined to existing roads and would not impact waters of the U.S.

## 4.6 Cultural Resources

Numerous laws and regulations require that possible effects on cultural resources be considered during the planning and execution of federal undertakings. These laws and regulations stipulate a process of compliance, define the responsibilities of the federal agency proposing the actions, and prescribe the relationships among involved agencies. In addition to NEPA, the primary laws that pertain to the treatment of cultural resources during environmental analysis are the National Historic Preservation Act (especially Sections 106 and 110), the Archaeological Resources Protection Act, the American Indian Religious Freedom Act, and the Native American Graves Protection and Repatriation Act.

Adverse effects to historic properties under Section 106 of the National Historic Preservation Act are typically considered significant impacts under NEPA but may be mitigated to lessen the degree of significance. Following this, impacts on historic properties (NRHP-listed resources) or potential historic properties (NRHP-eligible or unevaluated resources) would generally be considered significant impacts. Section 800.5(2) of 36 CFR 800, *Protection of Historic Resources*, includes a discussion of potential adverse effects on historic properties.

All existing sites currently used by the 58 SOW and all sites proposed for potential use in the future were surveyed for cultural resources. Operations were discontinued at existing sites with cultural resources that could be impacted by training activities. All proposed sites with cultural resources that could be impacted by training activities were removed from the list of potential sites being considered. There would be no identified impacts to cultural resources from any of the alternatives. Therefore there is no detailed discussion of cultural resources in this EA.

If previously undiscovered cultural resources are encountered during the implementation of this project, work in that area will cease immediately until the resources can be assessed and evaluated by a professional archaeologist from BLM, and the SHPO has been afforded the opportunity to review the findings. The site resource area will be excluded from all project activities until the review can be completed.

## 4.7 Water Resources

Impacts to groundwater and surface water would be considered significant if project activities resulted in substantial long-term degradation of surface or groundwater water quality. Impacts could also be significant if construction in floodplains or increases in impervious cover caused major disturbances in the natural flow, discharge, and recharge of water resources. Impacts to wetlands and waters of the U.S. are discussed in section 4.5.

### 4.7.1 Impacts of Proposed Action (Alternative 1) on Water Resources

Groundwater. The Proposed Action would not be expected to impact the groundwater located under the training sites. The training activities do not involve the use of any groundwater at

either the existing or the proposed new sites. The training activities do not include the transfer or use of uncontained petroleum or hazardous materials. Emergency maintenance activities could include use of petroleum or hazardous materials. These activities would be intermittent and include procedures to contain or remediate any spills. The current and proposed activities would not impact groundwater or groundwater quality.

Surface water. The Proposed Action would have no direct effects on surface water within the BLM-administered lands as creeks, springs, and drainages would remain unaltered. All ground transportation vehicles would remain on existing roads and routes and therefore would not contribute to soil erosion and surface water quality impacts. The training activities do not involve the use of any surface water at the training sites. The activities do not include the transfer or use of uncontained petroleum or hazardous materials. Emergency maintenance activities could include use of petroleum or hazardous materials. These activities would be intermittent and include procedures to contain or remediate any spills. The proposed actions would not impact surface water or surface water quality.

Stormwater. The existing training sites for CV-22B Ospreys (HLZs 18A, 31, and 37) have been graded and TerraLOC applied to minimize dust and flying debris. Sediment erosion from these sites due to stormwater is also minimized by the TerraLOC. The rest of the existing training sites and proposed new sites would not be altered. There would be no impacts associated with stormwater.

Floodplains. The three existing training sites for the CV-22B Osprey training (HLZs 18A, 31, and 37) were originally graded and TerraLOC has been periodically applied to reduce flying debris when the CV-22B Ospreys are operating at the sites. No further grading is proposed. The southeast corner of HLZ 31 is within the 100-year floodplain. The grading did not affect the floodplain elevation or impede floodplain flow.

While other current and proposed sites are in or partially in 100-year floodplains, the training activities do not involve any ground disturbance or construction. The floodplains would not be altered by the training activities. The training operations do not put life or property at risk from flooding, nor does it create any impact that would affect functions of natural floodplains. There would be no impact to the 100-year floodplains.

### 4.7.2 Impacts of No-action Alternative (Alternative 2) on Water Resources

Under the No-action Alternative, the military training activities described in this EA would cease. There would be no impact to groundwater, surface water, stormwater, or floodplains.

### 4.7.3 Impacts of Alternative 3 (Current Operations at Current Sites) on Water Resources

Under Alternative 3, the activities described under current operations would continue at their present level and in the existing sites. The impacts to water resources would be the same as

described for current operations in section 3.8. There would be no impacts to groundwater, surface water, stormwater, or floodplains.

## 4.8 Hazardous Materials and Wastes

This section discusses the hazardous materials and waste impacts from the Proposed Action and alternatives.

### 4.8.1 Impacts of Proposed Action (Alternative 1) on Hazardous Materials and Wastes

At the end of each OPFOR training event, all spent munitions or identifiable trash are be collected by OPFOR personnel. The only hazardous waste anticipated during the Proposed Action would be from liquids leaving a vehicle during an emergency repair. All liquids would be captured and disposed of properly off-site; therefore, no impacts from hazardous wastes are anticipated. In the event of a spill, trainees from Kirtland AFB would utilize BLM hazardous materials procedures and would notify the Field Office Manager.

During training activities occurring under the Proposed Action, any liquids that may be used during emergency vehicle maintenance would be stored and utilized appropriately, and any live and spent ordnance would be removed, along with casings and spent bodies of Smokey SAMs, alternative rockets, and smoke grenades. Once per quarter, the training routes are re-walked and any remaining spent munitions are collected and disposed.

The 58 SOW maintains a standard operating procedure to respond to downed aircraft and any hazardous waste generated as a result of the accident. They would also follow BLM hazardous materials procedures. For spills occurring during military training activities within the BLM-administered lands, BLM hazardous materials procedures would be determined and followed. Additionally, any spills occurring within the BLM-administered lands would be reported to the Field Office Manager and 58 SOW would be responsible for cleaning up any spills in a manner that meets applicable, promulgated federal and state regulatory requirements. Impacts from hazardous waste are not expected under the Proposed Action.

### 4.8.2 Impacts of No-action Alternative (Alternative 2) on Hazardous Materials and Wastes

Under the No-action Alternative, the military training activities would cease. As training activities would stop, USAF vehicular traffic would also cease within the forest. Therefore, any potential for the use of Hazardous Materials or generation of Hazardous Waste as a result of vehicle repair would also cease.

### 4.8.3 Impacts of Alternative 3 (Current Operations at Current Sites) on Hazardous Materials and Wastes

The impacts from Alternative 3 would be similar as those described above for the Proposed Action for the sites currently being used for military training activities.

## 4.9 Ground and Aircraft Safety

Impacts to the safety of personnel, residents, and visitors could be considered significant if the proposed or alternative actions resulted in a substantial increase in the potential for death, serious bodily injury or illness, or property damage.

An aircraft safety impact would be significant if the change in the number or type of aircraft operations could potentially change the aircraft mishap rate.

### 4.9.1 Impacts of Proposed Action (Alternative 1) on Ground and Aircraft Safety

Ground and Traffic Safety. Under current operations, the presence of land vehicle traffic is limited to pickup trucks used for OPFOR activities and maintenance vehicles in case of emergency. All other vehicle traffic is comprised of air vehicles. Except for the OPFOR personnel, there would be no regular presence of personnel on the ground outside of the HLZs.

Under current operations, the presence of land vehicle traffic is limited to pickup trucks used for OPFOR activities and maintenance vehicles in case of emergencies. All other vehicle traffic is comprised of air vehicles. Except for the OPFOR personnel, there would be no regular presence of personnel on the ground outside of the HLZs. OPFOR personnel would observe safe off-pavement vehicle use procedures, (e.g., safety belts, driving at appropriate speeds).

There would not be an increase in the number of training exercises under the Proposed Action. However, there would be new sites for the OPFOR trainers. At first, the trainers would have to familiarize themselves with the characteristics of the new sites. After familiarization, any site hazards would be noted and included in pre-operation briefings.

As the sites are on the side of existing roads, there would be risk associated with vehicles operated by non-military personnel that may be in the area. OPFOR vehicles will be pulled off the road to allow room for passing vehicles. The risk of accidents would be minimal.

Human-caused fires will continue to occur year round and likely will increase in ignitions per year over the next 20 years. The primary drivers for increased human-caused ignitions are activities associated with recreation, land tenure, and wilderness/urban interface areas.

All pyrotechnic equipment used by OPFOR personnel would be used in accordance with prescribed USAF and BLM safety procedures. The BLM is contacted before each trip to determine the fire danger level; however, fire protection equipment, including shovels, pick axes,

and extinguishers, are carried in all vehicles regardless of the fire condition. Additionally, the BLM phone numbers are carried in the continuity book and, in the event that a fire breaks out, personnel will notify the BLM immediately, regardless of the source of the fire.

There would be no change to current impacts to ground and traffic safety under the Proposed Action.

Aircraft Safety. The number of air events would be the same under the Proposed Action as under the current operations discussed in section 3.10. The sorties would be spread out to more sites, but the number of sorties and the air vehicles used would be the same as under current operations.

### 4.9.2 Impacts of No-action Alternative (Alternative 2) on Ground and Aircraft Safety

Under the No-action Alternative, the military training activities described in this EA would cease. There would be a minor decrease in the number of safety incidents occurring within BLM-administered lands.

### 4.9.3 Impacts of Alternative 3 (Current Operations at Current Sites) on Ground and Aircraft Safety

Under Alternative 3, the activities described under current operations would continue at their present level and in the same sites. There would be no change in ground or aircraft safety associated with the military training activities.

## 4.10 Bird Strike Aircraft

A bird/wildlife-aircraft strike would be significant if it would likely result in an aircraft accident, involve injury either to aircrews or to the public, or cause damage to property (other than the aircraft).

### 4.10.1 Impacts of Proposed Action (Alternative 1) on Bird Strike Aircraft

The total numbers and types of 58 SOW aircraft sorties and operations at the HLZs (to include OPFOR) within the BLM-administered lands would remain at the levels and types experienced under the existing conditions. Except for HLZs CR1 and CR2, the aircraft would continue to operate in the same areas in which they operate under the existing conditions. Approach flights and departure flights to HLZs CR1 and CR2 would be through established military training route VR1107/1195 (see figure D-3).

58 SOW aircrews would continue to follow the guidance in the Kirtland AFB BASH Plan to minimize the potential for bird-aircraft strikes. For these reasons, the number and distribution of bird-aircraft strikes would remain at approximately the baseline levels because the types of

operations by aircraft operating at and around the HLZs would be consistent with the current operations.

While bird-aircraft collisions may occur within the HLZs, total annual sorties would remain constant under the Proposed Action, such that the potential for bird-aircraft strikes are likely to remain at baseline levels when averaged across all HLZs. The potential for bird/wildlife-aircraft strikes could fluctuate as a result of the cyclical patterns of bird populations. Historically, one-half of 1 percent of all reported bird/wildlife-aircraft strikes involving USAF aircraft resulted in a serious mishap. Therefore, it is unlikely that any of these bird/wildlife-aircraft strike incidents would involve injury either to aircrews or to the public or damage to property (other than the aircraft).

It should be noted that a slight overall increase to bird-aircraft collisions could occur if birds at existing sites are habituated to air operations, whereas those at proposed sites are not. This increase is unquantifiable and would only be temporary until the bird populations at the new sites also become habituated (see discussion in section 4.5).

### 4.10.2 Impacts of No-action Alternative (Alternative 2) on Bird Strike Aircraft

Under the No-action Alternative, the 58 SOW military training activities described in this EA would cease, removing the potential for bird strike risk.

### 4.10.3 Impacts of Alternative 3 (Current Operations at Current Sites) on Bird Strike Aircraft

Under Alternative 3, the activities described under current operations would continue at their present level and in the same sites. There would be no change in bird strike risk.

## 4.11 Land Use, Special Designations, Recreation, and Visual Quality

Land Use. Impacts would be considered significant if facilities were demolished, land use was lost, or incompatibilities with existing land use management plans results from the Proposed Action or alternatives.

Special Designations. Impacts would be considered significant if the action substantially negatively affected the protected resources or conflicted with the special management prescriptions in place to protect those resources.

Recreation. Impacts would be considered significant if: (1) recreational facilities/resources were eliminated; (2) visitor usage was expected to decrease; or (3) recreational activity would be disrupted more than 50 percent of the time annually as a result of the Proposed Action or alternatives.

Visual Quality. Impacts would be considered significant if the existing visual character and quality of a site and surrounding area were degraded as a result of the Proposed Action or alternatives such that visitation to that site and the surrounding area was expected to decrease.

### 4.11.1 Impacts of Proposed Action (Alternative 1) on Land Use, Special Designations, Recreation, and Visual Quality

#### Land Use

The overall land use surrounding the existing and proposed new training sites has not been changed. The training sites do not include any physical facilities. The military training currently performed at the existing sites within the BLM-administered lands are authorized by BLM through a ROW. The proposed new sites are being included in the ongoing revision to the 1992 RMP currently being prepared. The Proposed Action is not incompatible with existing land use management plans and therefore does not have significant impact to land use.

#### Special Designations

ACECs. There are no current or proposed HLZs located within the boundaries of any existing or proposed ACEC. There would be no impacts to ACECs or ACEC protected resources under the Proposed Action. Proposed OPFOR sites OF5 and OF 6 are located on Socorro County Road 12, on the northern border of the Ladron Mountain-Devil's Backbone Complex ACEC.

OF7 is located on Socorro County Road 12, on the northern border of the Sierra Ladrones Wilderness Study Area.

As OPFOR site activities consist of parking a truck beside the existing road to simulate an attack on the helicopter conducting training at the nearby site. Only electronic simulation would be used at this location. There would be no impact to the ACEC or the WSA.

#### Recreation

The current or proposed training sites do not involve any recreational facilities. There are no recreational facilities within the immediate area of any of the training sites. There would be no elimination or deterioration of recreational resources. The existing and proposed new training sites are remote and localized by the nature of the training syllabus.

Flying would not likely occur on weekends, the time when visitors are more apt to be present. Exposure to an aircraft overflight away from the training site would be short duration because of the speed at which the aircraft moves. Anyone hiking near the sites could intermittently observe or hear an overflying aircraft during the 2-hour period. The recreational use of the areas surrounding the sites is not expected to be reduced.

**Visual Quality**

The VRM classification of the lands with the existing and proposed training sites is being revised through BLM's RMP process. Table 4.11-1 lists the existing sites with their associated VRM Class as designated in current BLM planning documents.

**Table 4.11-1. VRM Classification of Proposed Training Sites**

| HLZ | VRM Class |
|---|---|
| C | II |
| D | II |
| Q | II |
| OF1 | III |
| OF2 | III |
| OF3 | III |
| OF4 | III |
| OF7 | II |

The only impact to visual character would be that of the air vehicles in flight and on the ground at a training site. The impact to the visual resources at the sites would be compatible with the current management.

As the OPFOR site activities only involve the use of a pickup truck parked beside the existing road, the activities at the sites would be compatible with the management of those sites

The proposed training sites HLZ C and D and OPFOR site OF7 are within VRM Class II areas. The level of change within a VRM Class II area to the characteristic landscape should be low. There is no physical change to the landscape character at HLZs C and D, the only impact would be that of the air vehicles in flight and on the ground. The OPFOR site activities only involve the use of a pickup truck parked beside the existing road. The activities at the sites would be compatible with VRM Class II management.

The impacts to visual resources from the Proposed Action would be minor.

### 4.11.2 Impacts of No-action Alternative (Alternative 2) on Land Use, Special Designations, Recreation, and Visual Quality

Under the No-action Alternative, the military training activities described in this EA would cease. All associated impacts to land use, special designations, recreation, and visual resources related to the training flights would cease.

### 4.11.3 Impacts of Alternative 3 (Current Operations at Current Sites) on Land Use, Special Designations, Recreation, and Visual Quality

Under Alternative 3, the activities described under current operations would continue at their present level and in the same sites. The impacts to land use, special designations, recreation, and

visual resources would be the same as described for current operations in section 3.13. The impacts would be compatible with the management for their areas.

## 4.12 Socioeconomic Resources

This section discusses the socioeconomic impacts resulting from the Proposed Action and alternatives.

### 4.12.1 Impacts of Proposed Action (Alternative 1) on Socioeconomic Resources

Allowing the 58 SOW continued access to BLM-administered public property for training activities on the current and proposed new training sites would not result in changes to population, housing, or the economy as a result of the Proposed Action. The addition of 23 new training locations would continue to serve the existing 58 SOW. Trainees and aircraft would continue to originate from Kirtland AFB. The influx of trainees from outside of Kirtland AFB has been, and would continue to be, a slight economic benefit for the 6-month duration of the training. It is unlikely that this temporary increase in the population generates a substantial demand for educational or other public facilities.

No negative changes in employment or local business would occur. It is not anticipated that these changes would decrease the level of economic activity generated by recreation and tourism. Visitors are accustomed to military training activities in the BLM RPFO, which occurs in remote locations surrounding Kirtland AFB. The Proposed Action would therefore not result in negative economic impacts.

### 4.12.2 Impacts of No-action Alternative (Alternative 2) on Socioeconomic Resources

Discontinued training under the No-action Alternative could result in having to move the training to a sub-optimal location and the potential re-location of existing trainees. This could result in a decrease in the population of the area, including trainees and the support staff required to train them, and a consequent decrease in the demand for housing and educational facilities. Expenditures made by the students and training staff on goods and services in the local economy, such as food, supplies, and gasoline, would be reduced in the local economy, and the induced earnings and employment generated by the multiplier effect would not occur. This could particularly affect Cibola and Socorro counties, which are specialized in government employment, and Sandoval and Valencia counties, which depend on military employment.

### 4.12.3 Impacts of Alternative 3 (Current Operations at Current Sites) on Socioeconomic Resources

There would be no change to population, housing, or the economy as a result of Alternative 3. There would be no population increase; therefore, no additional demand for community services,

education, infrastructure, or housing would be generated. No negative changes in employment, earnings, or local business would occur; and Alternative 3 would not be growth-inducing.

## 4.13 Environmental Justice

This section discusses the impacts to environmental justice from the Proposed Action and alternatives.

### 4.13.1 Impacts of Proposed Action (Alternative 1) on Environmental Justice

Any physical effects of the Proposed Action, such as increased noise at new training sites, would not disproportionately affect environmental justice populations. There would be no disproportionate effects on environmental justice populations, since there would be no change in the physical or economic condition of minority or low income populations in the six counties affected by the project.

### 4.13.2 Impacts of No-action Alternative (Alternative 2) on Environmental Justice

Discontinued training under the No-action Alternative could result in having to move the training to a sub-optimal location and the potential re-location of existing trainees. This could result in a decrease in the population of the area, including trainees and the support staff required to train them, and a consequent decrease in the demand for housing and educational facilities. If training on BLM lands in the RPFO were discontinued, expenditures made by the students and the training staff on goods and services in the local economy, such as food, supplies, and gasoline, would be reduced. The induced earnings and employment generated by the multiplier effect would not occur. Since these earnings and employment are located at Kirtland AFB, the impact is negligible in relations to overall Kirtland AFB earnings and employment. There would be no disproportionate affect environmental justice populations.

### 4.13.3 Impacts of Alternative 3 (Current Operations at Current Sites) on Environmental Justice

There would be no disproportionate effects on environmental justice populations, since there would be no change in the physical or economic condition of minority or low income populations in the six counties affected by the project.

## 4.14 Cumulative Impacts

In accordance with NEPA, this EA considers the overall cumulative impact of the Proposed Action and other projects that are related in terms of time or proximity. This section presents an analysis of the cumulative impacts of implementing the Proposed Action in combination with other past, present, and reasonably foreseeable future projects that may result in environmental impacts similar to those discussed above for the individual resources.

### 4.14.1 Airspace Use and Management

There are other actions in the surrounding area that contain elements associated with use of airspace. The airspaces associated with the Albuquerque International Sunport and other military uses at Kirtland AFB overlap for the flights for 58 SOW training to and from Kirtland AFB. The Double Eagle II Airport is within the general areas of approach to the training areas to the northwest of Kirtland AFB. Under the Proposed Action, the 58 SOW training sorties generally access the training areas from Kirtland AFB using established helicopter aerial refueling tracks, weapons ranges, drop zones, low-level training routes, and installation entry and exit procedures. The training sorties would continue to be coordinated with Albuquerque TRACON when departing the Albuquerque International Sunport and proceeding to the HLZs until they are outside TRACON's airspace. Therefore, there would be no increase in cumulative airspace use and management impacts in the area of the training sites BLM-administered lands.

### 4.14.2 Noise

The noise impacts associated with the Proposed Action are limited to the local areas around each training site. There are no other contributing noise sources at these sites. There are no noise sensitive receptors or human population nearby to any of the existing or proposed training sites. Therefore, there would be no cumulative noise impacts. Noise impacts to wildlife are discussed under Natural Resources.

### 4.14.3 Air Quality

Table 4.3-2 provides a summary of criteria pollutants emitted in the state of New Mexico from 2012 to 2016 (USEPA 2017b). Based on the data presented in table 4.3-2, there is no increasing trend for any of the criteria pollutants. On the contrary, emissions of criteria pollutants in the State of New Mexico have a decreasing trend.

Emissions of criteria pollutants from the Proposed Action (Table 4.3-1) are significantly smaller than those presented in Table 4.3-2 for New Mexico and are not expected have a significant contribution to any of the State's emissions of criteria pollutants.

Table 4.14-1 provides a summary of GHG emitted in the state of New Mexico from 2010 to 2014, as provided by the U.S. Energy Information Administration (EIA 2014). Based on the data presented in Table 4.14-1 there is no increasing trend for New Mexico's GHG emissions.

**Table 4.14-1. GHG Emissions in New Mexico (Million MTPY)**

| Pollutant | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| $CO_2e$ | 336,589 | 297,041 | 257,492 | 250,955 | 244,417 |

Source EIA 2014
$CO_2eq$ carbon dioxide equivalent
GHG greenhouse gas
MTPY metric tons per year

GHG emissions from the Proposed Action (Table 4.3-1) are significantly smaller than those presented in Table 3.14-1 for New Mexico and are not expected have a significant contribution to the State's GHG emissions. Therefore, adverse cumulative impacts resulting from the Proposed Action are not expected.

### 4.14.4 Earth Resources

The impacts to soils from the training activities are limited to the training sites and are minor. Recreation activities within the BLM-administered lands, especially OHV use, would likely have a much larger impact to soil erosion in the region than the training activities occurring under the Proposed Action. There is little overlap from these activities due to the location of the training sites. The 58 SOW training activities would not contribute to overall cumulative impacts to soils in the region.

### 4.14.5 Natural Resources

The Proposed Action would result in less than significant impacts to vegetation and habitat region-wide. Project cumulative effects across the region are low due to the diversity of habitats as well as the large number of habitats compared to the area directly and indirectly affected by training activities.

Despite the potential impacts to individual wildlife species within the HLZs, the Proposed Action is not likely to affect species population trends or result in population-level impacts to any species, particularly when the affected habitat acreage is compared to total habitat acreage in the Project Region.

No federally-listed threatened or endangered, proposed, or candidate species were found within the project sites (Tetra Tech 2017a). While training activities under the Proposed Action may impact individuals of BLM sensitive species, these activities are not likely to result in a trend toward federal listing or a loss of viability for any species. No adverse cumulative effect is expected for any species.

Impacts could occur to eagles present within or adjacent to the project sites; however, activities are not likely to result in a trend toward federal listing or a loss of viability for these species. Additionally, overall intensity of impact at the existing helicopter training sites would be reduced because approximately half of the helicopter sorties are being transitioned to proposed sites under the Proposed Action.

No impacts have been documented to waters of the U.S. within the three existing HLZs, where ongoing air operations occur. No cumulative impacts to waters of the U.S. are anticipated.

### 4.14.6 Cultural Resources

All existing sites currently used by the 58 SOW and all sites proposed for potential use in the future were surveyed for cultural resources. Operations were discontinued at existing sites with cultural resources that could be impacted by training activities. All proposed sites with cultural resources that could be impacted by training activities were removed from the list of potential sites being considered. There would be no identified impacts to cultural resources from the Proposed Action. Other activities in the region would not impact the cultural resources at the training sites. There would be no increase in cumulative impact.

### 4.14.7 Water Resources

There would be no impacts to surface water, surface water quality, groundwater, groundwater quality, stormwater, or floodplains from the Proposed Action. The Proposed Action would not contribute to cumulative impacts to water resources.

### 4.14.8 Hazardous Materials and Waste

Impacts from hazardous materials and waste are not expected under the Proposed Action. The Proposed Action would not contribute to cumulative impacts from hazardous materials and waste.

### 4.14.9 Ground and Aircraft Safety

There would not be an increase in the number of training exercises under the Proposed Action. There would be no change to current impacts to ground and traffic safety under the Proposed Action. There would be no contribution to cumulative impacts to ground and traffic safety.

There would be no change in aircraft safety from the Proposed Action. There would be no contribution to cumulative impacts to aircraft safety.

### 4.14.10 Bird Strike

The Proposed Action could involve a slight overall increase to bird-aircraft collisions if birds at existing sites are habituated to air operations, whereas those at proposed sites are not. This increase is unquantifiable and would only be temporary until the bird populations at the new sites also become habituated. The increased risk in bird strike would be temporary as would its contribution to the cumulative risk.

### 4.14.11 Land Use, Special Designations, Recreation, and Visual Resources

The Proposed Action would be compatible with land use planning, special designated areas management, and visual resource landscape management. The impacts to recreation from the helicopter training is minor, localized, and intermittent. The impacts to recreation from the

CV-22B Osprey training would not change. The cumulative impact contribution of the Proposed Action to recreation would be minor.

### 4.14.12 Socioeconomic Resources

There would be no change to population, housing, or the economy as a result of the Proposed Action. As the level of activities and training would not change, there would be no population increase; therefore, no additional demand for community services, education, infrastructure, or housing would be generated. No negative changes in employment, earnings, or local business would occur; and the Proposed Action would not be growth-inducing. There would be no contribution to cumulative impacts.

### 4.14.13 Environmental Justice

Any physical effects of the Proposed Action, such as increased noise at new training sites, would not disproportionately affect environmental justice populations. There would be no disproportionate effects on environmental justice populations, since there would be no change in the physical or economic condition of minority or low income populations in the six counties affected by the project. There would be no contribution to cumulative impacts.

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# 5 INDIVIDUALS, ORGANIZATIONS, TRIBES OR AGENCIES CONSULTED

To be filled out with list of contacts with agencies and tribes after transmittal of contact letters.

## Native American Government Contacts

Acoma Pueblo
Cochiti Pueblo
Comanche Nation of Oklahoma
Fort Sill Apache Tribe of Oklahoma
Hopi Tribe
Isleta Pueblo
Jemez Pueblo
Jicarilla Apache Tribe
Kiowa Tribe of Oklahoma
Laguna Pueblo
Mescalero Apache Tribe
Nambe Pueblo
Navajo Nation
Navajo Nation - Alamo Navajo Chapter
Navajo Nation - Torreon Navajo Chapter
Ohkay Owingeh Pueblo
Picuris Pueblo
Pojoaque Pueblo
San Ildefonso Pueblo
Sandia Pueblo
San Felipe Pueblo
Santa Ana Pueblo
Santa Clara Pueblo
Santo Domingo Pueblo
Taos Pueblo
Tesuque Pueblo
Ute Mountain Ute Tribe
White Mountain Apache Tribe
Ysleta del Sur Pueblo
Zia Pueblo
Zuni Pueblo

## Federal, State, and Local Agency Contacts

Federal Aviation Administration
Natural Resource Conservation Service
New Mexico Department of Agriculture
New Mexico Department of Game and Fish
New Mexico Environment Department
New Mexico State Land Office
U.S Army Corps. of Engineers
U.S. Bureau of Indian Affairs
U.S. Environmental Protection Agency
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# APPENDIX A
# SITE MAPS


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**6**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

**BLM Helicopter Land Zones**

Environmental Assessment and
Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH
700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **6** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

7

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

**BLM Helicopter Land Zones**

Environmental Assessment and
Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH
700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | 7 |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**13**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

**BLM Helicopter Land Zones**

Environmental Assessment and
Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH
700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **13** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**15**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

# BLM Helicopter Land Zones

Environmental Assessment and
Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH
700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **15** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**16**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

**BLM Helicopter Land Zones**

Environmental Assessment and
Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH
700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **16** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**17**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

**BLM Helicopter Land Zones**

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TETRA TECH
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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **17** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**18**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

**BLM Helicopter Land Zones**

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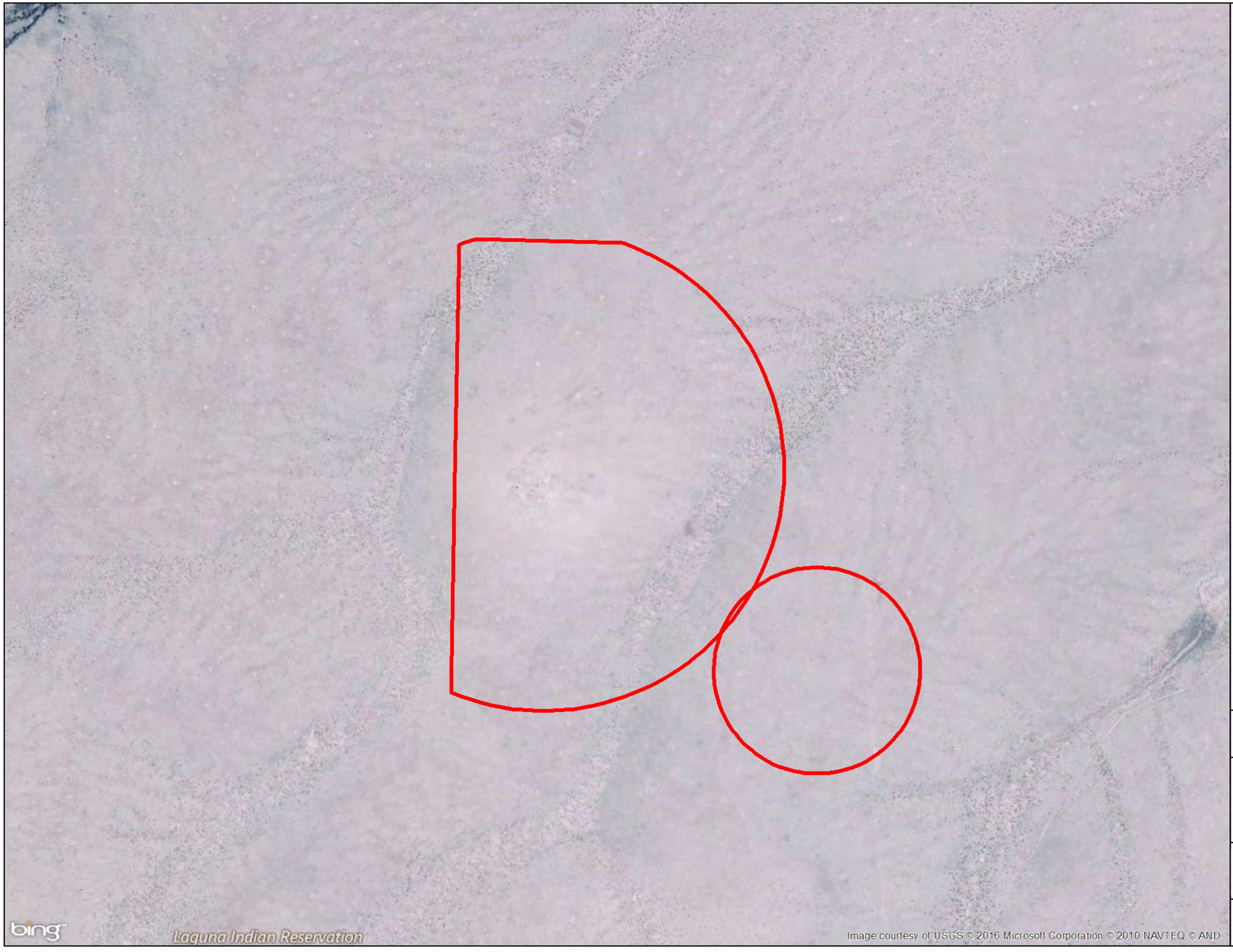
TETRA TECH
700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **18** |




## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**18A**

N

0 415 830 1,660

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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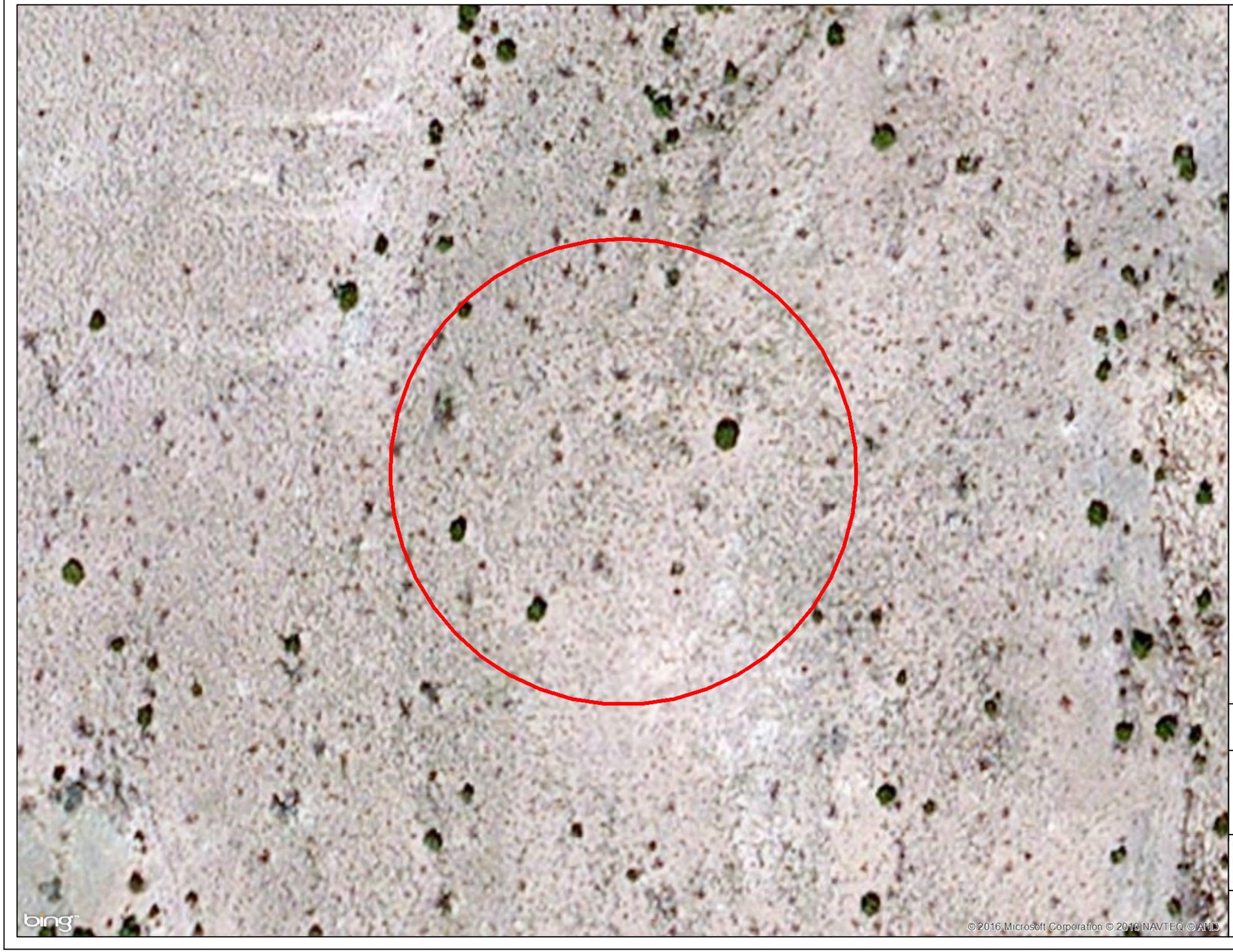
| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **18A** |




## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**19**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **19** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**20**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **20** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

22

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | 22 |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**22B**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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TETRA TECH
700 N St. Mary's St. #300
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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **22B** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**23**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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TETRA TECH
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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **23** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**24**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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BLM and Kirtland AFB, NM

TETRA TECH
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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **24** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**27**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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San Antonio, TX 78205

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|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **27** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**28**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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TETRA TECH
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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **28** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**29**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **29** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**30**

N

0 187.5 375 750

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **30** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**31**

N

0 187.5 375 750

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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TETRA TECH
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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **31** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**32**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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TETRA TECH

700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **32** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**33**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
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TETRA TECH
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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **33** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**34**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
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TETRA TECH

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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **34** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**36**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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TETRA TECH
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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **36** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**37**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

**BLM Helicopter Land Zones**

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BLM and Kirtland AFB, NM

TETRA TECH
700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **37** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**38**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
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BLM and Kirtland AFB, NM

TETRA TECH
700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **38** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**42**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

**BLM Helicopter Land Zones**

Environmental Assessment and
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TETRA TECH
700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **42** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**19A**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

**BLM Helicopter Land Zones**

Environmental Assessment and
Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH
700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **19A** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**19B**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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Environmental Assessment and
Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH

700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
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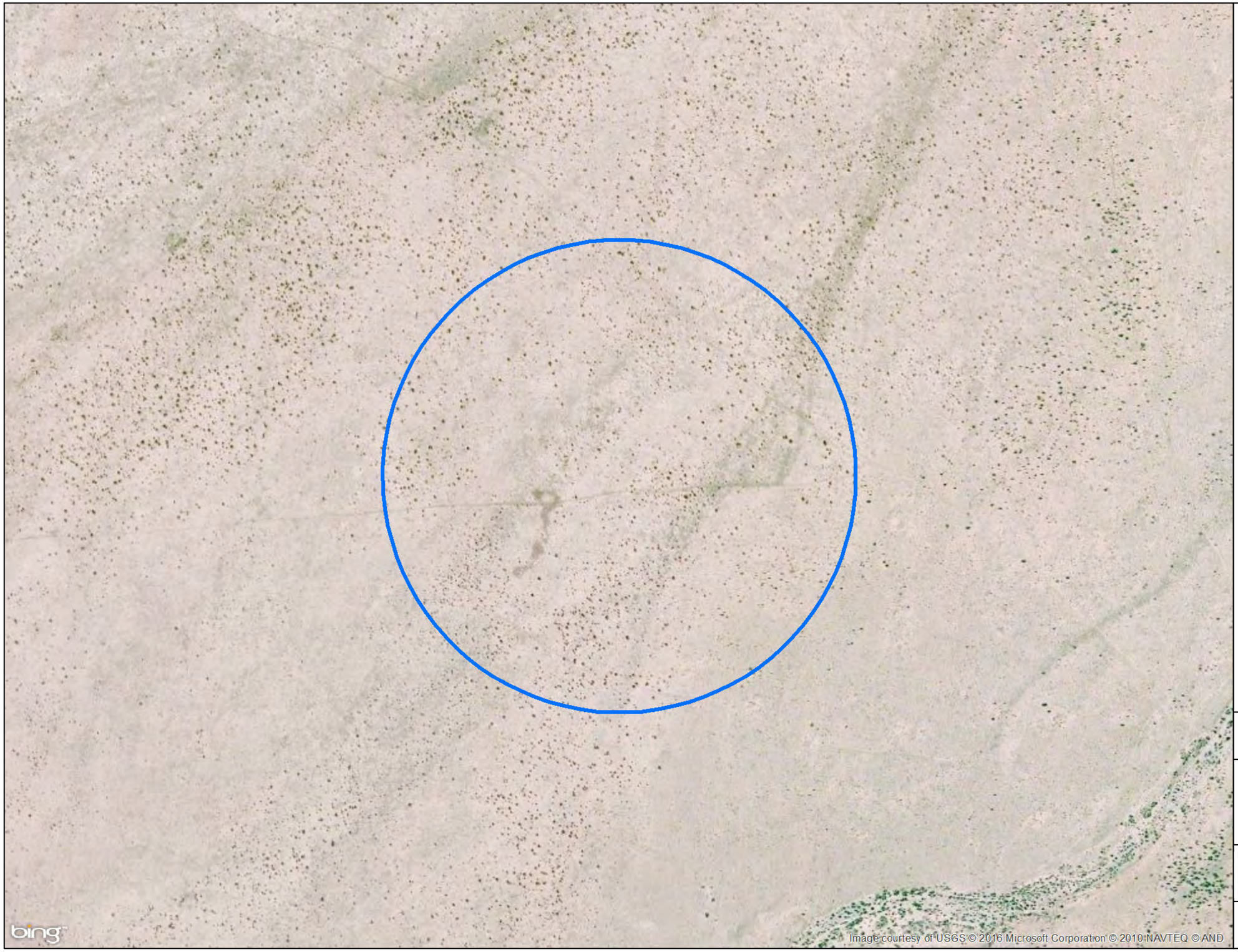
| 11AS | 10/06/2016 | ANDING | 001 | **19B** |




## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**C**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH
700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | C |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**D**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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Environmental Baseline Survey
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San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
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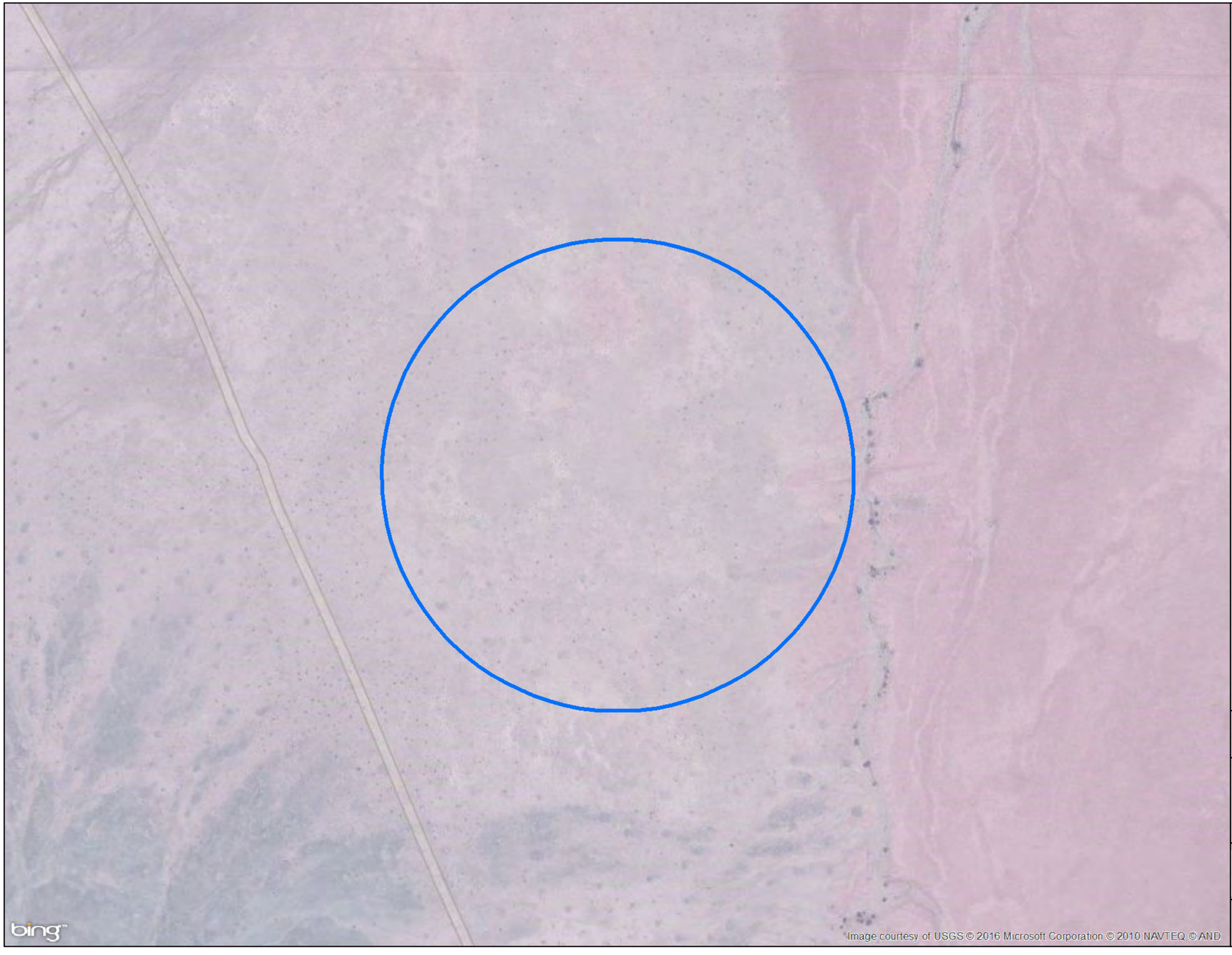
| 11AS | 10/06/2016 | ANDING | 001 | D |




## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**O**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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Environmental Baseline Survey
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TETRA TECH
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San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **O** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**P**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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Environmental Baseline Survey
BLM and Kirtland AFB, NM

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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | P |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**Q**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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Environmental Baseline Survey
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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | Q |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**R**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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700 N St. Mary's St. #300
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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | R |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**N**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
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|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **N** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**CR1**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
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|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | CR1 |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**CR2**

N

0 185 370 740

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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TETRA TECH
700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
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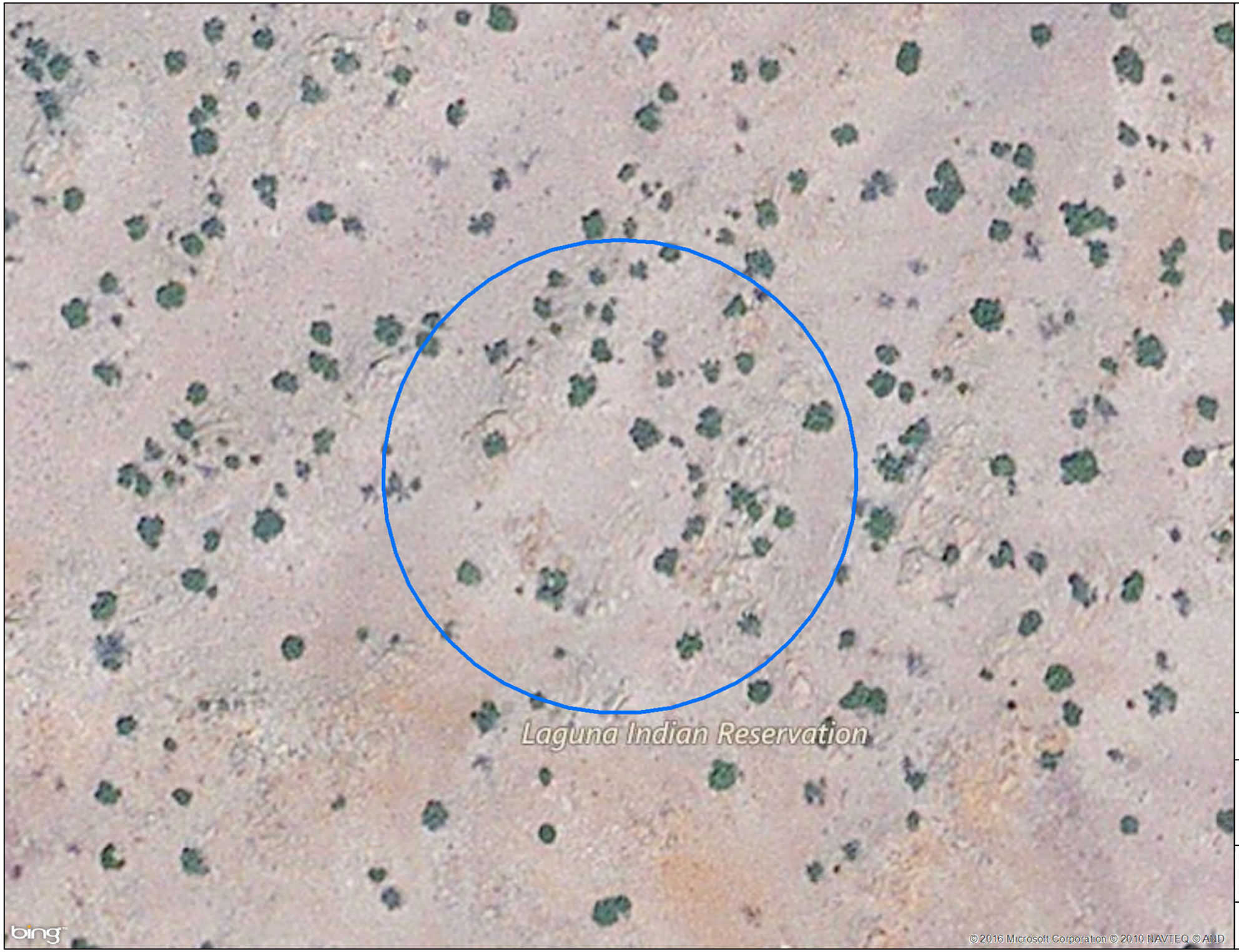
| 11AS | 10/06/2016 | ANDING | 001 | CR2 |




## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**22A**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **22A** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**37A**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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Environmental Assessment and
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TETRA TECH
700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **37A** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**37B**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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TETRA TECH
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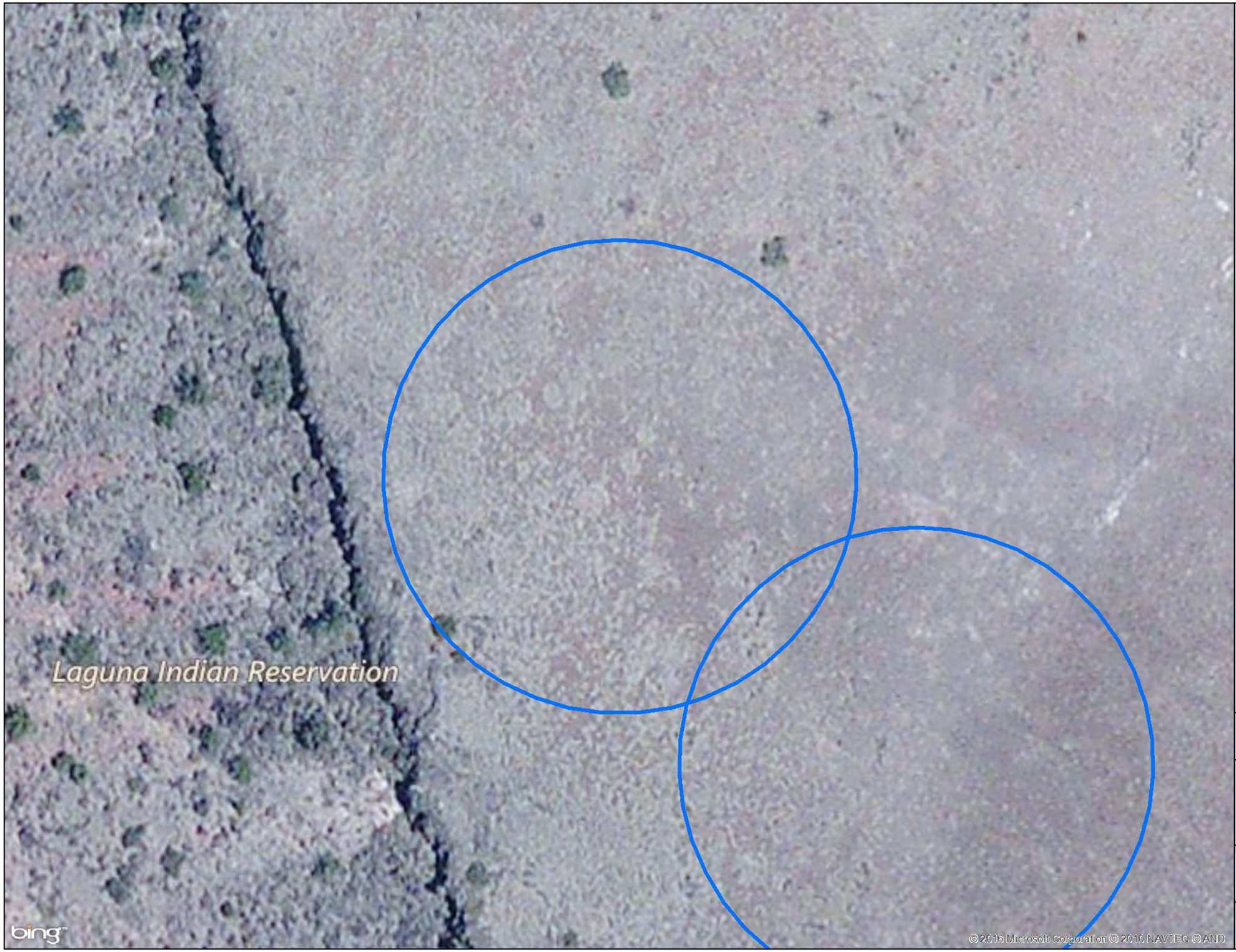
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **37B** |




## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**37C**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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700 N St. Mary's St. #300
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| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **37C** |


## Legend

**Status**

Currently Used

New/Proposed

**HLZ ID**

**37D**

N

0 35 70 140

Feet

**FOR OFFICIAL USE ONLY**

Bureau of Land Management (BLM)
Kirtland Air Force Base, New Mexico

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BLM and Kirtland AFB, NM

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700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 10/06/2016 | ANDING | 001 | **37D** |

## Legend

OPFOR Site

**Status**

Currently Used

New/Proposed

**HLZ ID**
**OF1**

N

0 50 100 200 300 400 Feet

Coordinate System: NAD_1983_UTM_Zone_13N
Projection: Transverse_Mercator
Credits: ESRI Topo Map 2017

**FOR OFFICAL USE ONLY**

Bureau or Land Management (BLM)
Kirtland Air Force Base, New Mexico

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Environmental Assessment and
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BLM and Kirtland AFB, NM

TETRA TECH

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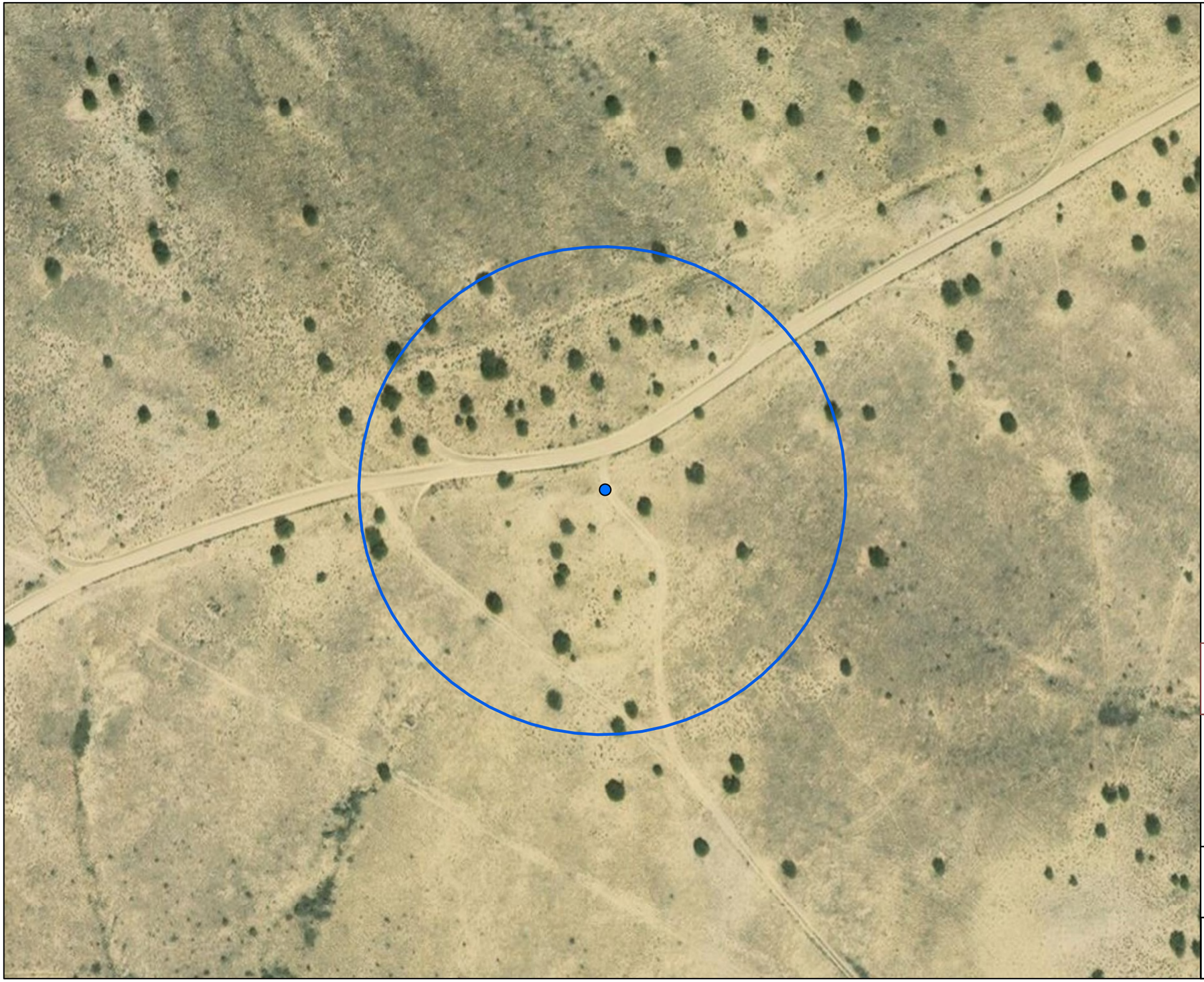
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 1/12/2018 | YTZEN | 001 | OF1 |



## Legend

OPFOR Site

**Status**

Currently Used

New/Proposed

**HLZ ID**
**OF2**

N

0 50 100 200 300 400 Feet

Coordinate System: NAD_1983_UTM_Zone_13N
Projection: Transverse_Mercator
Credits: ESRI Topo Map 2017

**FOR OFFICAL USE ONLY**

Bureau or Land Management (BLM)
Kirtland Air Force Base, New Mexico

# BLM Helicopter Land Zones

Environmental Assessment and
Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH

700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 1/12/2018 | YTZEN | 001 | OF2 |

## Legend

OPFOR Site

**Status**

Currently Used

New/Proposed

**HLZ ID**
**OF3**

N

0 50 100 200 300 400 Feet

Coordinate System: NAD_1983_UTM_Zone_13N
Projection: Transverse_Mercator
Credits: ESRI Topo Map 2017

**FOR OFFICAL USE ONLY**

Bureau or Land Management (BLM)
Kirtland Air Force Base, New Mexico

# BLM Helicopter Land Zones

Environmental Assessment and
Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH

700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 1/12/2018 | YTZEN | 001 | OF3 |

## Legend

OPFOR Site

**Status**

Currently Used

New/Proposed

**HLZ ID**
**OF4**

N

0 50 100 200 300 400 Feet

Coordinate System: NAD_1983_UTM_Zone_13N
Projection: Transverse_Mercator
Credits: ESRI Topo Map 2017

**FOR OFFICAL USE ONLY**

Bureau or Land Management (BLM)
Kirtland Air Force Base, New Mexico

# BLM Helicopter Land Zones

Environmental Assessment and
Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH

700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 1/12/2018 | YTZEN | 001 | OF4 |

## Legend

OPFOR Site

**Status**

Currently Used

New/Proposed

**HLZ ID**
**OF5**

N

0 50 100 200 300 400 Feet

Coordinate System: NAD_1983_UTM_Zone_13N
Projection: Transverse_Mercator
Credits: ESRI Topo Map 2017

**FOR OFFICAL USE ONLY**

Bureau or Land Management (BLM)
Kirtland Air Force Base, New Mexico

# BLM Helicopter Land Zones

Environmental Assessment and
Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH

700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 1/12/2018 | YTZEN | 001 | OF5 |

## Legend

OPFOR Site

**Status**

Currently Used

New/Proposed

**HLZ ID**
**OF6**

N

0 50 100 200 300 400
Feet

Coordinate System: NAD_1983_UTM_Zone_13N
Projection: Transverse_Mercator
Credits: ESRI Topo Map 2017

**FOR OFFICAL USE ONLY**

Bureau or Land Management (BLM)
Kirtland Air Force Base, New Mexico

# BLM Helicopter Land Zones

Environmental Assessment and
Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH

700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 1/12/2018 | YTZEN | 001 | OF6 |

## Legend

OPFOR Site

**Status**

Currently Used

New/Proposed

**HLZ ID**
**OF7**

N

0 50 100 200 300 400 Feet

Coordinate System: NAD_1983_UTM_Zone_13N
Projection: Transverse_Mercator
Credits: ESRI Topo Map 2017

**FOR OFFICAL USE ONLY**

Bureau or Land Management (BLM)
Kirtland Air Force Base, New Mexico

# BLM Helicopter Land Zones

Environmental Assessment and
Environmental Baseline Survey
BLM and Kirtland AFB, NM

TETRA TECH

700 N St. Mary's St. #300
San Antonio, TX 78205

| TC NO. | DATE | DRAWN BY | MAP NO. | FIGURE |
|---|---|---|---|---|
| 11AS | 1/12/2018 | YTZEN | 001 | OF7 |

# APPENDIX B
# REGULATORY REQUIRMENTS

## Applicable Regulatory Requirements

This EA is part of the USAF *Environmental Impact Analysis Process* (EIAP) for the proposed project and was prepared in compliance with NEPA regulations and BLM and USAF NEPA requirements. The following paragraphs describe the laws and regulations that apply or may apply to the proposed and alternative actions.

## Other Regulatory Requirements

The EA considers all applicable laws and regulations, including but not limited to the following:

- *American Indian Religious Freedom Act* (42 U.S.C. 1996);
- *Archaeological Resources Protection Act* (54 U.S.C. 100101 et seq.);
- *Clean Air Act, as amended* (42 U.S.C. 7401 et seq.);
- *Clean Water Act* (CWA) (33 U.S.C. § 1251 *et seq.*), including Section 404 (33 U.S.C. § 1344);
- *Comprehensive Environmental Response, Compensation, and Liability Act* (42 U.S.C. 9610);
- *Emergency Planning and Community Right-to-Know Act (EPCRA)* (42 U.S.C. 11000 et seq.);
- *Endangered Species Act* (16 U.S.C. 1531-1544);
- *Energy Independence and Security Act* (Public Law 110-140);
- EO 11990, *Protection of Wetlands* (24 May 1977);
- EO 11988, *Floodplain Management* (24 May 1977);
- EO 12580, *Superfund Implementation* (23 January 1987);
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (11 February 1994);
- *Federal Land Policy and Management Act of 1976* (43 U.S.C. 35);
- *National Historic Preservation Act* (54 U.S.C. 300101 et seq.);
- *Native American Graves Protection and Repatriation Act of 1991* (25 U.S.C. 3001 et seq.);
- *Occupation Safety and Health Act* (29 U.S.C. 651 et seq.);
- *Pollution Prevention Act* (42 U.S.C. 13101 and 13102 et seq.);
- *Protection of Historic Properties* (36 Code of Federal Regulations [CFR] 800);
- *Resource Conservation and Recovery Act* (42 U.S.C. 6901 et seq.);
- Section 10 of the *Rivers and Harbors Act of 1899* (33 U.S.C. 403);
- *Superfund Amendments and Reauthorization Act* (42 U.S.C. 9601 et seq.); and
- *Toxic Substance Control Act* (15 U.S.C. 2601 et seq.).

# APPENDIX C
# GOVERNMENT TO GOVERNMENT CORRESPONDENCE AND AGENCY CONSULTATIONS

**Government-to-Government Coordination**

EO 13175, *Consultation and Coordination with Indian Tribal Governments*, directs federal agencies to coordinate and consult with Native American tribal governments whose interests might be directly and substantially affected by activities on federally administered lands. Consistent with EO 13175, Department of Defense Instruction (DoDI) 4710.02, *Interactions with Federally-Recognized Tribes*, and Air Force Instruction (AFI) 90-2002, *Air Force Interaction with Federally-Recognized Tribes*, federally recognized tribes that are historically affiliated with lands in the vicinity of the Proposed Action have been invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation or the interagency coordination process, and it requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations. The consultations with Native American tribes is being coordinated between the BLM and USAF.

The BLM sent letters outlining the proposal and requesting consultation to the following tribes and their THPO if they had one:

Comanche Nation of Oklahoma
Fort Sill Apache Tribe of Oklahoma
Hopi Tribe
Jicarilla Apache Tribe
Kiowa Tribe of Oklahoma
Mescalero Apache Tribe
Navajo Nation
    Alamo Navajo Chapter
    Torreon Navajo Chapter
Pueblo of Cochiti
Pueblo of Isleta
Pueblo of Jemez
Pueblo of Laguna
Pueblo of Ohkay Owingeh
Pueblo of San Felipe
Pueblo of Sandia
Pueblo of Santa Ana
Pueblo of Santa Clara
Pueblo of Santo Domingo
Pueblo of Tesuque
Pueblo of Zia
Pueblo of Zuni
White Mountain Apache Tribe

A text sample of the letters is attached.

The BLM received responses from the Kiowa Tribe of Oklahoma and the White Mountain Apache Nation; neither tribe expressed concern regarding the proposal or requested further consultation.

The Pueblo of Laguna responded with calls from their THPO and requested information about the actual chemistry of the soil additive “TerraLOC.” The requested information was provided via email, the Pueblo has not responded in some time.

**Intergovernmental and Interagency Coordination**

The purpose of interagency and intergovernmental coordination is to fulfill the Interagency Coordination Act and Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs* (14 July 1982), which requires federal agencies to cooperate with and consider state and local views in implementing a federal proposal.. Federal, state, and local agencies with jurisdiction that could be affected by the Alternatives have been notified and consulted. BLM conducted consultations with the United States Fish and Wildlife Service (USFWS), and the New Mexico State Historic Preservation Office (SHPO). The results of government-to-government tribal consultations and consultations with other agencies presented in the following pages.

No federally-listed threatened or endangered, proposed, or candidate species, nor designated habitats were present within the project sites, and only a few individuals of BLM sensitive animal species were found within or near the sites. Additionally, affected habitat acreage is relatively minimal compared to total acreage in the project region. The BLM made a “no effect” determination on the federally-listed threatened or endangered, proposed, or candidate species during the informal consultation process.

All existing sites currently used by the 58 SOW and all sites proposed for potential use in the future were surveyed for cultural resources. The results of the surveys were submitted to the SHPO for review (see attached). Based on the SHPO review, operations were discontinued at existing sites with cultural resources that could be impacted by training activities. All proposed sites with cultural resources that could be impacted by training activities were removed from the list of potential sites being considered.

Susana Martinez
Governor

STATE OF NEW MEXICO
**DEPARTMENT OF CULTURAL AFFAIRS**
**HISTORIC PRESERVATION DIVISION**

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

February 26, 2018

Sean Daugherty
BLM Rio Puerco Office Pan American Building
100 Sun Ave.
Albuquerque, NM 87109

RE: *(Class III Archaeological Inventory for 58$^{Th}$ Special Operations Wing, Bureau of Land Management Sites: Cibola, De Baca, Guadalupe, Sandoval, Socorro and Valencia Counties, New Mexico (HPD log 107248)*

Dear Mr. Daugherty,

On behalf of the New Mexico Historic Preservation Officer (SHPO), I want to thank you for your providing the aforementioned report for review and comment.

The SHPO concurs with the determinations of not eligible for listing in the National Register of Historic Places for LA 109233, 134624, 187130, 187134, 187135, 187137, and 186847. SHPO would like to note, however, that cairns may be considered traditional cultural properties (TCPs), which are can only be accurately identified by tribes who have specialized knowledge of their respective locations, form, and function.

SHPO concurs with the determinations that LA 109234 and 130309 are eligible for listing in the NRHP under criterion D, for their information potential.

SHPO concurs that more information is needed to determine if LA 187846 and LA 187848 are eligible for listing in the NRHP.

SHPO does not concur that the LA 176089 and LA 187136 are not eligible for listing in the NRHP and that more information is needed to determine the eligibility for both sites. For LA 176136, the SHPO stated that more information was needed to make a determination of eligibility (HPD log 99794) and the current report provides no new information that is necessary to change the determination of eligibility. The FW 345-kV Transmission Line may possess all seven aspects or qualities of integrity. It may have been associated with a pattern of events or a historic trend that made a significant contribution to the progress and development of the greater Albuquerque community. The FW 345-kV Transmission Line may also represent the typical architecture of a type of transmission line in New Mexico. SHPO believes that transmission lines are generally NRHP eligible under Criterion A and Criterion C may also apply.

For LA 178136, more information is needed on the function of the features on the site. SHPO is interested in tribal opinions on the function and eligibility of the features. Recent consultations

indicate that such features may be traditional cultural properties (TCPs), which are can only be accurately identified by tribes who have specialized knowledge of their respective locations, form, and function. It is also SHPOs opinion that TCPs maybe eligible for the NRHP under criterion other than D alone.

Until we have more information on the features, it is SHPOs' opinion that the eligibilities of LA 176089 and LA 187136 should remain undetermined.

It is SHPO's opinion that the proposed undertaking has little potential to effect historic properties.

If you have any questions or comments please feel free to call me directly at (505) 827-4225 or e-mail me at bob.estes@state.nm.us

Sincerely,

Bob Estes

Bob Estes
HPD staff Archaeologist

The BLM sent letters outlining the proposal and requesting consultation to the following tribes and their THPO if they had one:

Comanche Nation of Oklahoma
Fort Sill Apache Tribe of Oklahoma
Hopi Tribe
Jicarilla Apache Tribe
Kiowa Tribe of Oklahoma
Mescalero Apache Tribe
Navajo Nation
    Alamo Navajo Chapter
    Torreon Navajo Chapter
Pueblo of Cochiti
Pueblo of Isleta
Pueblo of Jemez
Pueblo of Laguna
Pueblo of Ohkay Owingeh
Pueblo of San Felipe
Pueblo of Sandia
Pueblo of Santa Ana
Pueblo of Santa Clara
Pueblo of Santo Domingo
Pueblo of Tesuque
Pueblo of Zia
Pueblo of Zuni
White Mountain Apache Tribe

A text sample of the letters is attached is provided below.

The BLM received responses from the Kiowa Tribe of Oklahoma and the White Mountain Apache Nation; neither tribe expressed concern regarding the proposal or requested further consultation.

The Pueblo of Laguna responded with calls from their THPO and requested information about the actual chemistry of the soil additive “TerraLOC.” The requested information was provided via email, the Pueblo has not responded in some time.

8120, (010)

August 26, 2016

President Stanley Herrera
Alamo Navajo Chapter
P.O. Box 827
Magdalena, NM 87825

Dear President Herrera,

This letter is to notify The Alamo Navajo Chapter of the opportunity and invitation to consult with the Bureau of Land Management (BLM) under Section 102 of the National Environmental Policy Act and Sections 101(d)(6) and 106 of the National Historic Preservation Act regarding the issuance of a right-of-way to the U.S. Air Force 58th Special Operations Wing (SOW) for 17 landing zones and seven Opposition Forces areas (OPFOR). The SOW currently has 27 permitted landing zones and is requesting the new landing zones and OPFOR to better fulfill their training missions. The SOW is also requesting to use a soil stabilizer known as TarraLOC on several landing zones as a dust abatement measure. Enclosed are several maps showing the locations of the proposed landing zones and OPFPR, these maps are large scale to provide general information, we will provide more detailed maps of specific areas upon request.

The BLM requests input from The Alamo Navajo Chapter regarding identification of any potential cultural concerns or historic properties under the National Historic Preservation Act within the area of proposed action. Please communicate to us areas of specific concern, or provide or refer us to any available information that would help us to understand the significance and nature of traditional cultural concerns in the proposed project area regarding the issuance of a right-of-way to the U.S. Air Force 58th Special Operations Wing.

Please direct your comments to John Brenna Rio Puerco Field Office Manager at 1-505-761-8797 or Sean I. Daugherty, Cultural Resources Specialist at 505-761-8702 or in writing to the above address. If you plan to come to the office to meet with us in person, please call for an appointment to ensure someone is available to speak with you.

Sincerely,

John Brenna
Field Office Manager.

Enclosure(s)

# APPENDIX D
# ADDITIONAL INFORMATION

# APPENDIX D – ADDITIONAL INFORMATION

## INTRODUCTION

### Background

The mission of the 58 SOW is to train USAF Special Operations Forces (SOF) and Personnel Recovery (PR) aircrews specialized flight skills to perform special operations, personnel recovery, missile site support, Distinguished Visitor Airlift, and other worldwide aircrew duties. This training develops Pilots, Combat Systems Operators (CSO), and Special Mission Aviators (SMA) into mission qualified aircrew members. The 58 SOW aircrew training is accomplished by classroom, simulator, and flight training over an average of a 6-month timeframe.

The 58 SOW is the sole SOF and PR training wing for the Air Education and Training Command (AETC). AETC prescribed training requires operations in austere and varied locations to prepare aircrews for worldwide contingency operations. The AETC-approved Syllabi of Instruction for the various airframes requires the use of flight training in mountainous terrain, including modified contour low level training, aerial refueling, helicopter weapons employment tactics training, helicopter and tiltrotor landings, and search and rescue training scenarios.

### Decision to be Made

As required by the National Environmental Policy Act (NEPA), Title 42, United States Code (U.S.C.), Sections 4321-4370f, and its implementing regulations, preparation of an environmental analysis must precede a final decision regarding a proposed project, and the findings of that analysis must be available to the decision-maker to allow an informed decision regarding the Proposed Action.

### Scoping and Issues

NEPA requires federal agencies to consider environmental consequences in their decision-making process. The President's Council on Environmental Quality (CEQ) has issued regulations to implement NEPA that include provisions for both the content and procedural aspects of the required environmental impact analysis. The Air Force EIAP is accomplished through adherence to the procedures set forth in CEQ regulations (40 Code of Federal Regulations [CFR] Sections 1500-1508) and 32 CFR 989, *Environmental Impact Analysis Process*, 15 July 1999, and amended 1 July 2005. In addition, the environmental review will be conducted in accordance with the *BLM National Environmental Policy Act Handbook (Handbook H-1790-1[BLM 2008]).* These federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action. The CEQ regulations indicate that an EA may be prepared to:

- Assess any action at any time in order to assist agency planning and decision making.
- Briefly provide evidence and analysis to determine whether the Proposed Action might have significant impacts that would require preparation of an EIS. If the analysis determines that the environmental impacts will not be significant, a finding of no significant impact will be prepared.
- Aid the agency in complying with NEPA when no EIS is necessary.

This EA identifies, describes, and evaluates the potential environmental impacts that are associated with 58 SOW training on lands administered by the BLM, taking into consideration possible cumulative impacts from other actions. The potential environmental effects of taking no action are also described. As appropriate, the affected environment and environmental consequences of the action may be described in terms of a regional overview or a site-specific description. Fiscal year (FY) 2016 or the most current information is used as the baseline condition.

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by the President on 11 February 1994. In the EO, the President instructed each federal agency to make "achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Adverse is defined by the Federal Interagency Working Group on Environmental Justice as "having a deleterious effect on human health or the environment that is significant, unacceptable, or above generally accepted norms." This EA will determine if the proposed or alternative actions would result in disproportionately high adverse effects to low-income or minority populations.

Through Intergovernmental and Interagency Coordination for Environmental Planning, requests have been made for information on planned actions in the surrounding community. If any concurrent actions are identified during the EA process, they will be examined only in the context of potential cumulative impacts. A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

As mentioned in earlier, the 58 SOW is a tenant unit at Kirtland AFB, with the host unit being the 377 ABW. Under a typical host-tenant agreement, the host unit provides support to tenant units for activities such as financial/funds management, medical, personnel, logistics, civil

engineering, etc. NEPA support is one of the elements within the broader civil engineering category. Thus, as the host unit, the 377 ABW is assisting AETC and 58 SOW in the review of this EA and acting as the Air Force point of contact for the ROW easement.

As part of the NEPA process for evaluating the Proposed Action and alternatives, issues were identified in both internal and external scoping.

**Alternatives Formulation and Consideration**

NEPA implementing regulations require analysis of the Proposed Action and "all reasonable alternatives" to the Proposed Action, including a No-action Alternative. CEQ regulations allow for eliminating alternatives from detailed study and require that a NEPA document discuss the reasons that an alternative was eliminated. The USAF EIAP (32 CFR 989) and the BLM (36 CFR 220.7) both provide a process for determining "reasonable" alternatives (thus requiring analysis) and a process based on reasonable selection standards for eliminating from detailed analysis alternatives determined not to be "reasonable."

"Reasonable" alternatives are those that meet the underlying purpose and need for the Proposed Action (see section 1.1) that would cause a reasonable person to inquire further before choosing a particular course of action. The USAF also must consider reasonable alternatives raised during the scoping process or suggested by others, as well as combinations of alternatives. The USAF need not analyze highly speculative alternatives, such as those requiring a major, unlikely change in law or governmental policy. If the USAF identifies a large number of reasonable alternatives, it may limit alternatives selected for detailed environmental analysis to a reasonable number of examples covering the full spectrum of alternatives (32 CFR 989.8(b)).

The range of alternatives may also be limited by the level of decision making. Alternatives that would include relocation of bases, transfer of units to other bases, changes in missions, etc. would involve a higher level (i.e., programmatic or policy) of decision making. These level of decisions would require programmatic or policy level NEPA documentation.

The USAF may expressly eliminate alternatives from detailed analysis based on reasonable selection standards (e.g., operational, technical, or environmental standards suitable to a particular project). The USAF may develop written selection standards to firmly establish what is a "reasonable" alternative for a particular project, but it must not so narrowly define these standards that it unnecessarily limits considerations to the proposal initially favored by proponents (32 CFR 989.8(c)).

The BLM develops alternatives that address unresolved conflicts related to the Proposed Action (NEPA, section 102(2)(E) and 36 CFR 220.7(b)(2)(i)). When there are no unresolved conflicts, the EA may analyze the Proposed Action only. The description of the proposal and alternative(s) may include a brief description of modifications and incremental design features developed

through the analysis process to develop the alternatives considered. The documentation of these incremental changes to a proposed action or alternatives may be incorporated by reference in accordance with 40 CFR 1502.21 (36 CFR 220.7(b)(2)(iii)).

**Kirtland Airforce Base History**

Albuquerque's first airport, Oxnard Field, was constructed in 1929. Over the next 20 years, the airport was expanded multiple times and was renamed Kirtland Field in 1942. Kirtland Field was used as a bombardier training school, a flight training school, an aviation mechanics school, a navigator school, and a ground school for glider pilots during World War II. In 1966, the Albuquerque International Airport was established by utilizing airfield, taxiways, and attendant properties that had been sold to the City of Albuquerque. Kirtland AFB then initiated lease agreements with the city for military flying operations. The consolidation of Manzano Base and Sandia Base with Kirtland AFB took place on 1 July 1971, resulting in the installation's evolution into a research and development installation hosting other military organizations (USAF 2011).

**Airspace Use and Management Information**

Airspace is a finite resource defined vertically, horizontally, and temporally. Airspace management involves the direction, control, and handling of flight operations in the volume of air that overlies the geopolitical borders of the U.S. and its territories. Airspace is a resource managed by the Federal Aviation Administration (FAA), with established policies, designations, and flight rules to protect aircraft in the airfield and en-route; in special use airspace (SUA) identified for military and other governmental activities; and in other military training airspace.

The Federal Aviation Administration (FAA) is responsible for overall management of airspace and has established different airspace designations to protect aircraft while operating to or from an airport, transiting en-route between airports, or operating within “special use” areas identified for defense-related purposes. Rules of flight and air traffic control procedures were established to govern how aircraft must operate within each type of designated airspace. The Federal Aviation Regulations apply to both civil and military aircraft operations unless the FAA grants the military service an exemption or a regulation specifically excludes military operations. All aircraft operate under either instrument flight rules or visual flight rules. The FAA established special use airspace (SUA) to meet the needs of military aviation. Military training routes (MTRs), along with military operations areas (MOA) and restricted airspace, are examples of SUA.

The DoD and the FAA mutually developed and published MTRs throughout the United States (U.S.) on which military aircrews conduct low-level navigation training. There are two types of

MTRs: Instrument Routes and Visual Routes. Instrument Routes allow the aircraft flying those routes to operate below 10,000 feet above mean sea level (MSL) at speeds in excess of 250 knots indicated airspeed, or approximately 288 miles per hour (mph), in both instrument flight rules and visual flight rules weather conditions. Visual Routes are guided by the same restrictions as Instrument Routes but are limited to flight in visual flight rules weather conditions.

Several factors reduce risks between MTRs and nearby airspace used by military and civil aviation activities. The ceiling of many MTRs is below the minimum en-route altitude established for most of the Federal Airways with which they intersect. Additionally, MTRs (except for slow routes) are clearly designated on aeronautical charts. Both military and civil pilots follow the general "see and avoid" rules of flight. MTRs may also interact with other elements of military training airspace, either transiting through MOAs, restricted areas, or intersecting and merging with other MTRs. MTRs are coordinated through the scheduling unit's operations plan to eliminate simultaneous aircraft operations on conflicting routes scheduled by the installation. Aircrews monitor radio frequencies assigned by air traffic control or as stated in the DoD Flight Information Publications for the type of MTR being flown or the specific route. These actions advise aircrews of the location of other aircraft and help reduce the potential for airspace conflicts between aircraft operating on MTRs, in MOAs, and other aircraft.

A 58 SOW-specific common frequency is also monitored to facilitate deconfliction between SOW aircraft.

**Current Operations**

The airspace at and within the immediate vicinity of the HLZs is typically Class G airspace controlled by either Albuquerque Terminal Radar Approach Control (TRACON) or the Albuquerque Air Route Traffic Control Center. However, in some instances, radar coverage is not possible due to terrain. Class G Airspace, or "Uncontrolled Airspace" is the portion of the airspace that has not been designated as Controlled Airspace. Controlled airspace is a generic term that covers the different classifications of airspace and defined dimensions within which air traffic control service is provided in accordance with the airspace classification. Controlled airspace consists of Classes A through E. Class G airspace extends from the surface to the base of the overlying Class E airspace. Although air traffic control has no official authority or responsibility to control air traffic in Class G airspace, pilots have to abide by visual flight rules minimums.

58 SOW aircrews maintain radio and radar contact with Albuquerque TRACON when departing the Albuquerque International Sunport and proceeding to the HLZs until they are outside TRACON's airspace. Likewise, aircrews contact TRACON when entering its airspace on return to the Airport. The aircrews operate under visual flight rules procedures when outside TRACON airspace.

A typical training mission, or sortie, includes approximately 2 hours within the BLM lands, with airland and/or hover operations occurring in 15-minute intervals (i.e., up to 8 air events per sortie). 58 SOW flight followers maintain a log sheet that contains items such as aircraft call sign, takeoff time, training itinerary (i.e., the HLZs that will be used during the sortie), the amount of time at each training site, etc. Aircrews radio the flight followers with updates on training sortie progress and provide aircraft position. However, terrain may limit the aircrew's ability to contact the flight followers.

The HLZs used by the 58 SOW were established and are operated in accordance with AFI 13-217, *Drop Zone and Landing Zone Operations*. The existing conditions are described for the airspace within a 5 nautical mile-radius area around the existing and/or proposed HLZs. This volume of airspace allows sufficient space and defines the typical volume of airspace that is used for the air events (i.e., number of airland and/or hover events) that would occur at each specific HLZ.

58 SOW aircraft do not accomplish intentional low-level overflight of livestock, wildlife, dwellings, or populated areas. Specifically, 58 SOW aircraft are not flown:

- Congested Areas: Over congested areas (e.g., cities, towns, and groups of people) at an altitude of less than 1,000 feet above the highest obstacle within 2,000 feet of the aircraft (pilots flying helicopters may operate at lower altitudes and in closer proximity if they do not create a hazard to persons or property on the surface).
- Non-congested Areas: Over non-congested areas at an altitude of less than 500 feet above the surface except over open water or in sparsely populated areas (pilots flying helicopters may operate at lower altitudes and in closer proximity if they do not create a hazard to persons or property on the surface). Under such exceptions, aircraft must not operate closer than 500 feet to any person, vehicle, vessel, or structure.
- National Recreation Areas and Wildlife Refuges: Less than 2,000 feet above ground level (AGL) (mission permitting) over National Park Service monuments, seashores, lakeshores, recreation and scenic river ways; USFWS refuges and ranges; and BLM wilderness and primitive areas (this paragraph does not apply to special use airspace, low altitude tactical navigation areas, and military training routes).
- Over areas identified as known tribal and sensitive receptor areas.

Both the CV-22B Osprey and the HH-60G Pave Hawk training often involves flight in pairs, or in tandem, with two vehicles taking part in the training exercise. The UH1-H is flown singly. Aircrews are trained and evaluated in daytime and night-time for both basic and advanced aviation.

Past and current aircraft activities on BLM-administered public lands include 3 sites used for tiltrotor (CV-22B Osprey) training and 24 sites for helicopters (HH-60G Pave Hawk and UH1-

N) training. These sites can be grouped into two geographic areas; one between 30 and 50 miles to the northwest of Kirtland AFB in Sandoval County, and the other between 30 and 55 miles to the west-southwest of Kirtland AFB in Valencia and Cibola counties.

The Sandoval County group includes HLZs 30, 31, 32, 33, and 34. These HLZs are all within approximately 13 miles of each other in the southwestern corner of the County. Federal Airway V187 transits the area from the northwest to the southeast. There are no tall steel tower transmission lines within the airspace around the HLZs. The airspace around the HLZ is Class G, or uncontrolled airspace.

The Valencia-Cibola County group includes HLZs 6, 7, 13, 15, 16, 17, 18, 18A, 19, 20, 22, 22B, 23, 24, 27, 28, 29, 36, 37, 38, and 42. These HLZs are all within approximately 13 miles of each other in western Valencia County and eastern Cibola County. No Federal Airways transit the airspace associated with Valencia-Cibola County HLZs. There are no tall steel tower transmission lines within the airspace around the HLZs. The airspace around the HLZ is Class G airspace.

Operations at HLZs have occurred in the past and are ongoing. Table D-1 lists the current training sorties accomplished at the HLZs. Nighttime includes the time between 10:00 p.m. and 7:00 a.m. Operations at HLZs can occur anytime during a day. However, activity normally begins around 9:00 a.m. and ends about 2:00 a.m. the following day, for an approximate 16-hour training day.

Multiple HLZs may be used during the 2-hour sorties. The HLZ training events are almost evenly spread between HLZs to provide variation in training. The current total average busy day events is 960 sorties per aircraft type per year. The CV-22B Osprey sorties are spread amongst three sites. The helicopter sorties are spread amongst 23 sites.

The aircraft remain within approximately 5 nautical miles of the HLZ when accomplishing training events. The “ground tracks,” the actual locations on the ground above which the aircraft fly, can vary for reasons such as different pilot techniques, wind, terrain, and ground objects to be avoided. The ground tracks are typically “box patterns” around the center point of the landing zone. The CV-22B Osprey’s “box pattern” extends outward to approximately 7 miles from the center of the landing zone (Figure D-1). The CV-22B Osprey aircraft altitude when flying a pattern is typically 500 feet AGL.

The “box pattern” for the HH-60G Pave Hawks and UH-1N Iroquois extends outward to approximately 2 miles from the center of the HLZ and the aircraft altitude when flying a pattern is typically 300 feet AGL (Figure D-2).

## Table D-1. Current BLM HLZ Operations

| HLZ Identifier | Coordinates (decimal degrees) | County | Average Number of Sorties | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | CV-22B Osprey Weekly | CV-22B Osprey Yearly | HH-60G Pave Hawk Weekly | HH-60G Pave Hawk Yearly | UH-1N Iroquois Weekly | UH-1N Iroquois Yearly |
| 6 | 34.7330N / -107.3308W | Cibola | | | 0.83 | 40 | 0.83 | 40 |
| 7 | 34.7567N / -107.3738W | Cibola | | | 0.83 | 40 | 0.83 | 40 |
| 13 | 34.7608N / -106.9963W | Valencia | | | 0.83 | 40 | 0.83 | 40 |
| 15 | 34.7565N / -107.0055W | Valencia | | | 0.83 | 40 | 0.83 | 40 |
| 16 | 34.7655N / -107.0068W | Valencia | | | 0.83 | 40 | 0.83 | 40 |
| 17 | 34.7100N / -107.3452W | Cibola | | | 0.83 | 40 | 0.83 | 40 |
| 18 | 34.8630N / -107.1610W | Valencia | | | 0.83 | 40 | 0.83 | 40 |
| 18A | 34.8662N / -107.1663W | Valencia | 6.7 | 320 | | | | |
| 19 | 34.7482N / -107.0888W | Valencia | | | 0.83 | 40 | 0.83 | 40 |
| 20 | 34.7807N / -107.0852W | Valencia | | | 0.83 | 40 | 0.83 | 40 |
| 22 | 34.8052N / -107.2320W | Cibola | | | 0.83 | 40 | 0.83 | 40 |
| 22B | 34.8058N / -107.2348W | Cibola | | | 0.83 | 40 | 0.83 | 40 |
| 23 | 34.7411N / -107.2017W | Valencia | | | 0.83 | 40 | 0.83 | 40 |
| 24 | 34.7425N / -107.1892W | Valencia | | | 0.83 | 40 | 0.83 | 40 |

**Table D-1. Current BLM HLZ Operations, continued**

| HLZ Identifier | Coordinates (decimal degrees) | County | Average Number of Sorties | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | CV-22B Osprey Weekly | CV-22B Osprey Yearly | HH-60G Pave Hawk Weekly | HH-60G Pave Hawk Yearly | UH-1N Iroquois Weekly | UH-1N Iroquois Yearly |
| 27 | 34.7328N / -107.3507W | Cibola | | | 0.83 | 40 | 0.83 | 40 |
| 28 | 34.6260N / -107.3347W | Cibola | | | 0.83 | 40 | 0.83 | 40 |
| 29 | 34.6393N / -107.3185W | Cibola | | | 0.83 | 40 | 0.83 | 40 |
| 30 | 35.2552N / -107.0715W | Sandoval | | | 0.83 | 40 | 0.83 | 40 |
| 31 | 35.3252N / -107.0713W | Sandoval | 6.7 | 320 | | | | |
| 32 | 35.4247N / -107.2143W | Sandoval | | | 0.83 | 40 | 0.83 | 40 |
| 33 | 35.4307N / -107.2018W | Sandoval | | | 0.83 | 40 | 0.83 | 40 |
| 34 | 35.4555N / -107.0990W | Sandoval | | | 0.83 | 40 | 0.83 | 40 |
| 36 | 34.8612N / -107.2018W | Valencia | | | 0.83 | 40 | 0.83 | 40 |
| 37 | 34.8223N / -107.2825W | Cibola | 6.7 | 320 | | | | |
| 38 | 34.7360N / -107.2803W | Cibola | | | 0.83 | 40 | 0.83 | 40 |
| 42 | 34.6748N / -107.3192W | Cibola | | | 0.83 | 40 | 0.83 | 40 |

Under current operations, the sorties generally access the training areas from Kirtland AFB using established helicopter aerial refueling tracks, weapons ranges, drop zones, low-level training routes, and installation entry and exit procedures. Figure D-3 shows the footprints of these established activities. The BLM HLZs are in the area labelled as Rio Puerco Low Altitude Tactical Navigation (LATN).

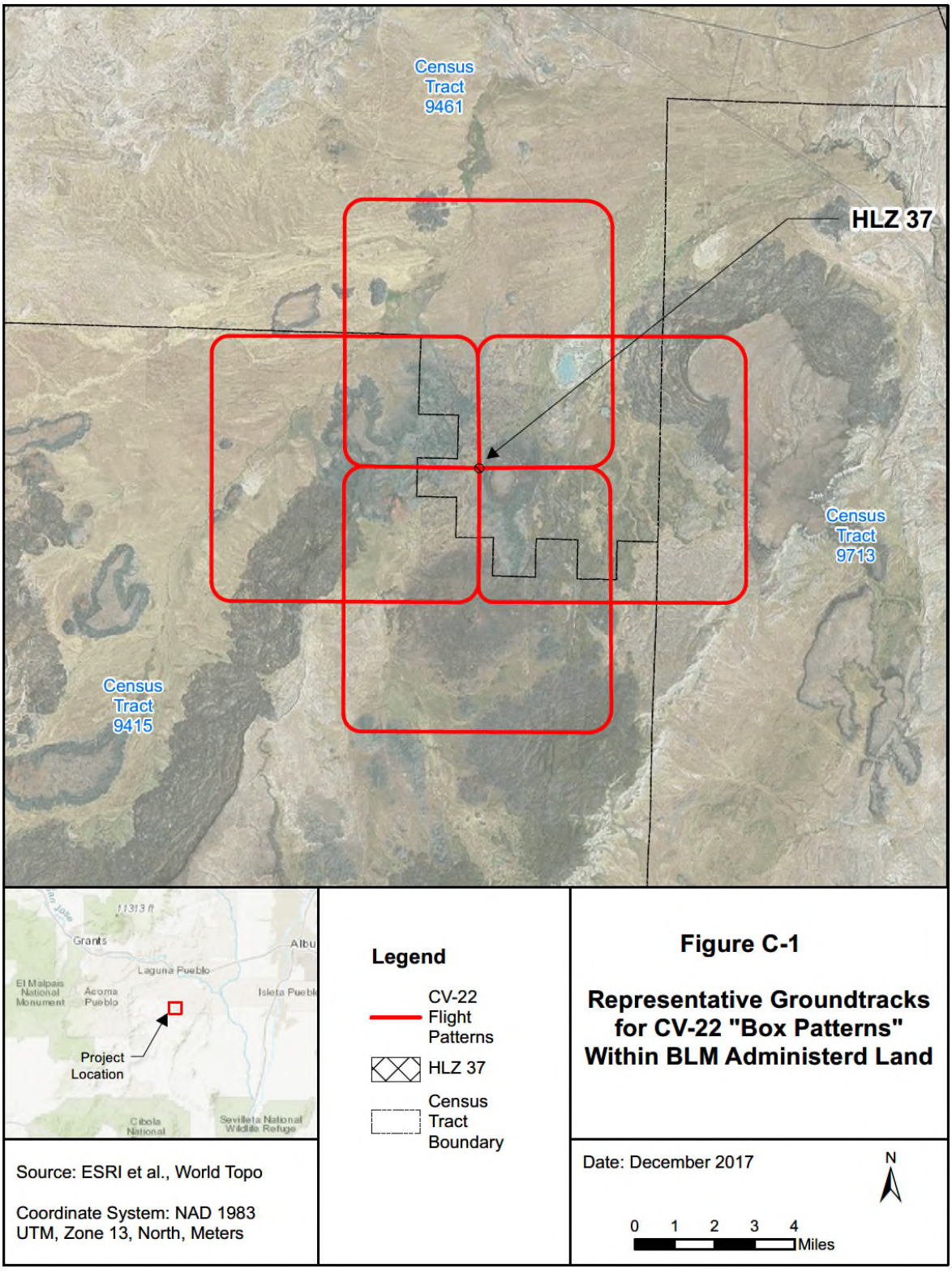



**Figure D-1. Representative Groundtracks for CV-22B Osprey "Box Patterns" Within BLM Administered Land**

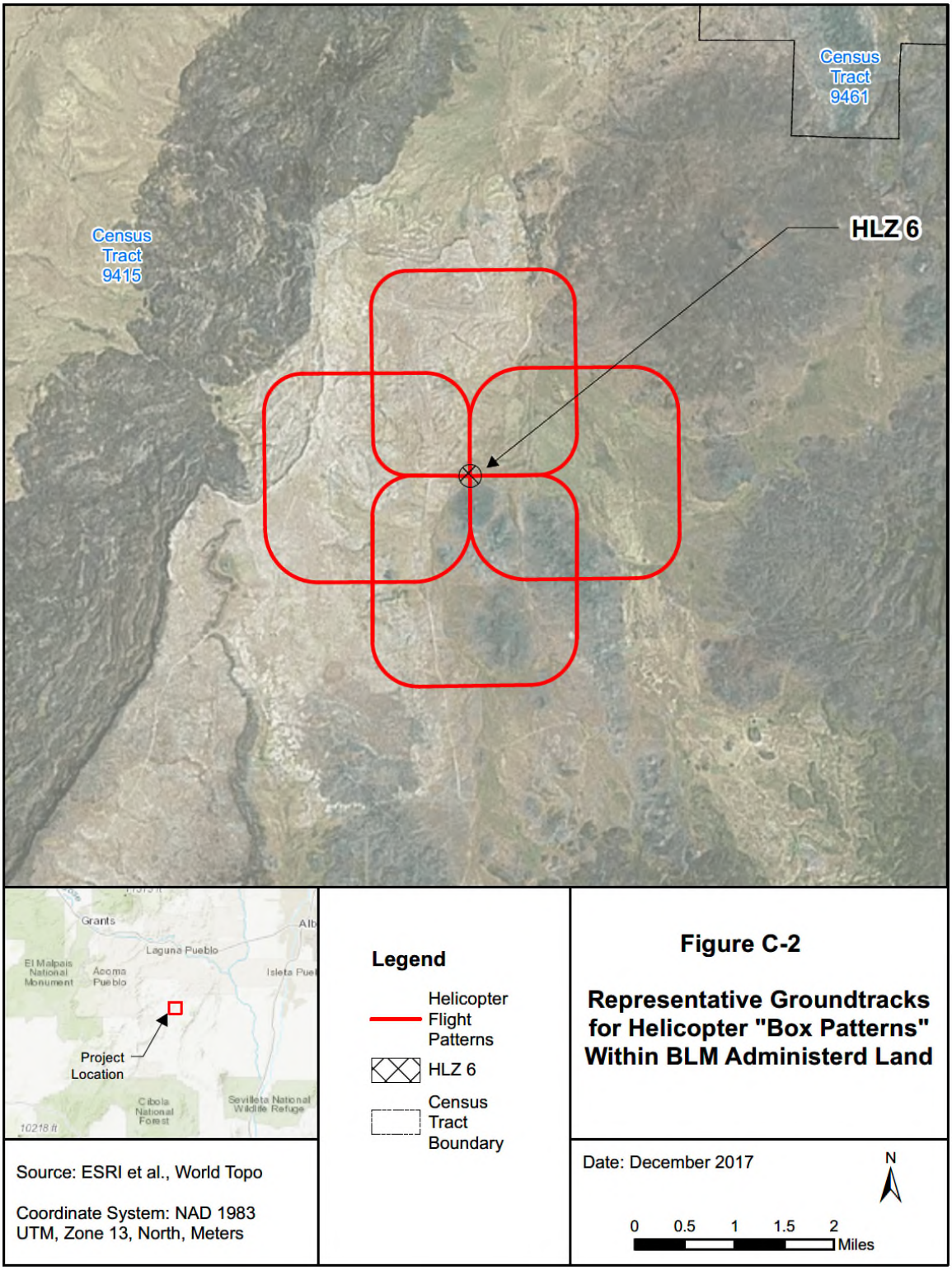



**Figure D-2. Representative Groundtracks for Helicopter "Box Patterns" within BLM Administered Land**

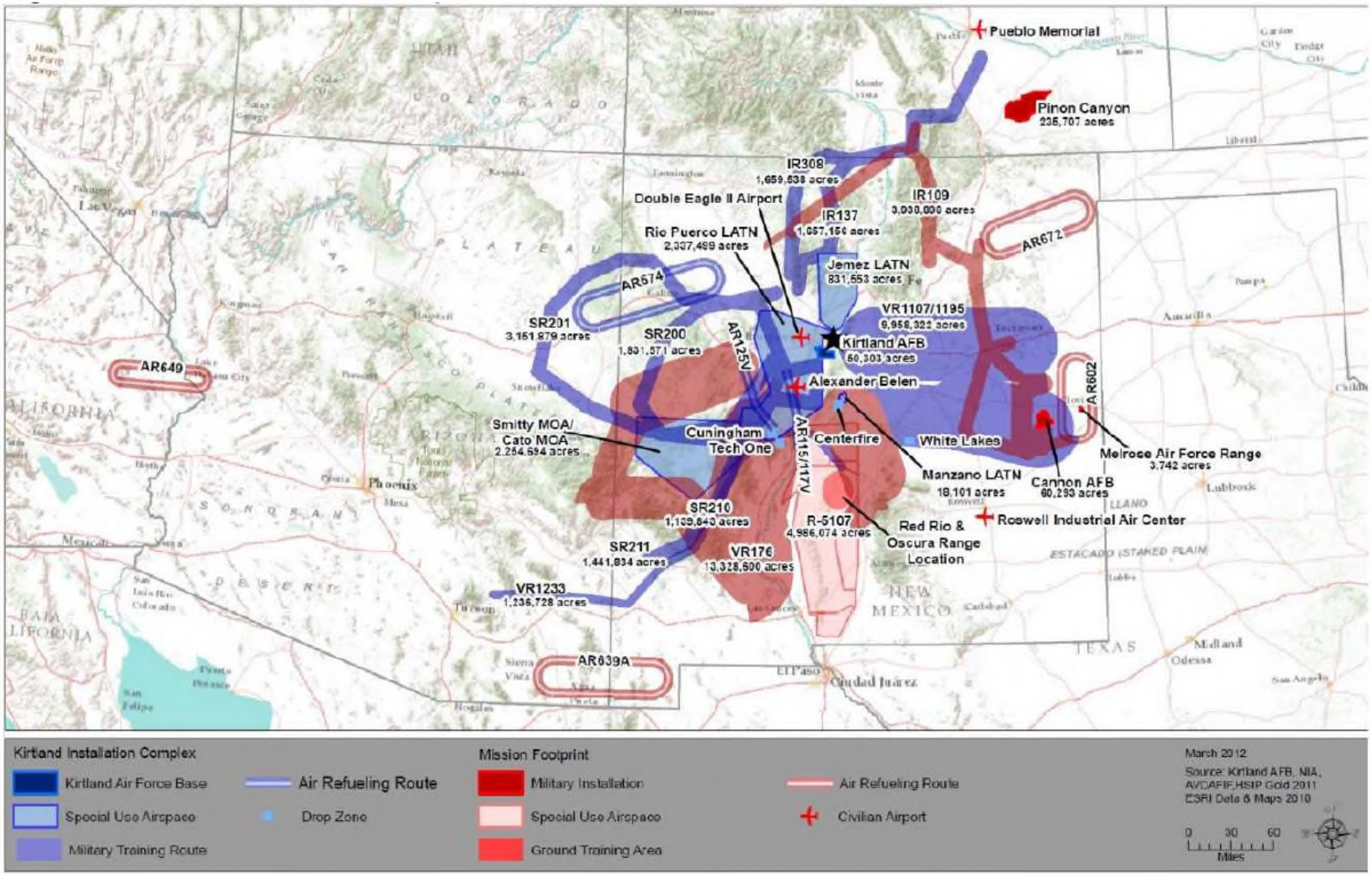



**Figure D-3. Current Military Airspace Use in New Mexico**

# APPENDIX E
# NOISE

## Noise

This section describes the measurement, perception, and modelling of the levels of noise resulting from current training operations.

## Definition of Resource

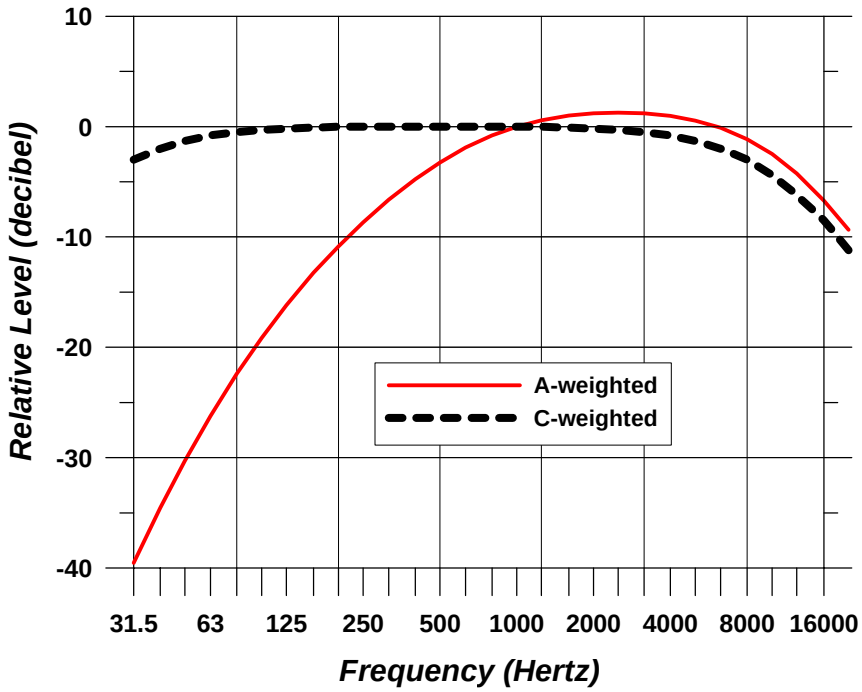
Noise is defined as any sound that is unwanted because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. The characteristics of sound include parameters such as amplitude (loudness), frequency (pitch), and duration. Sound varies over an extremely large range of amplitudes. The decibel (dB) is the accepted standard unit for describing levels of sound. Decibels are expressed in logarithmic units to account for the variations in amplitude.

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.

Sounds with different spectra are perceived differently even if the sound levels are the same. Weighting curves have been developed to correspond to the sensitivity and perception of different types of sound. A-weighting and C-weighting are the two most common weightings. These two curves, shown in figure E-1, are adequate to quantify most environmental noises. The two weightings are essentially the same between 800 and 16,000 Hertz (Hz). A-weighting places slightly more emphasis on the 1,000 to 4,000 Hz range.

Most environmental sounds are measured using A-weighting. They are called A-weighted sound levels, and sometimes use the unit dBA or dB(A) rather than dB. When the use of A-weighting is understood, the term “A-weighted” is often omitted and the unit dB is used. Unless otherwise stated, dB units refer to A-weighted sound levels.

Impulsive noises are generally short, loud events. Their single-event duration is usually less than 1 second. Examples of impulsive noises are small-arms gunfire, hammering, pile driving, metal impacts during rail-yard shunting operations, and riveting. Examples of high-energy impulsive sounds are quarry/mining explosions, sonic booms, demolition, and industrial processes that use high explosives, military ordnance (e.g., armor, artillery and mortar fire, and bombs), explosive ignition of rockets and missiles, and any other explosive source where the equivalent mass of dynamite exceeds 25 grams (American National Standards Institute [ANSI] 1996).




*Source: ANSI S1.4A -1985 "Specification of Sound Level Meters"*

**Figure E-1. Frequency Characteristics of A- and C-Weighting**

**Metrics**

Because both the duration and frequency of noise events also play a role in determining overall noise impact, several metrics are used that account for these factors. Each metric discussed below is used in the assessment of noise impacts in this EA.

Noise metrics quantify sounds so they can be compared with each other, and with their effects, in a standard way. The simplest metric is the A-weighted level, which is appropriate by itself for constant noise such as an air conditioner. Aircraft noise varies with time. During an aircraft overflight, noise starts at the background level, rises to a maximum level as the aircraft flies close to the observer, then returns to the background as the aircraft recedes into the distance. This is sketched in figure E-2, which also indicates two metrics: Maximum Sound Level ($L_{max}$) and Sound Exposure Level (SEL).

There are a number of metrics that can be used to describe a range of situations, from a particular individual event to the cumulative effect of all noise events over a long time. This section describes the metrics relevant to environmental noise analysis.

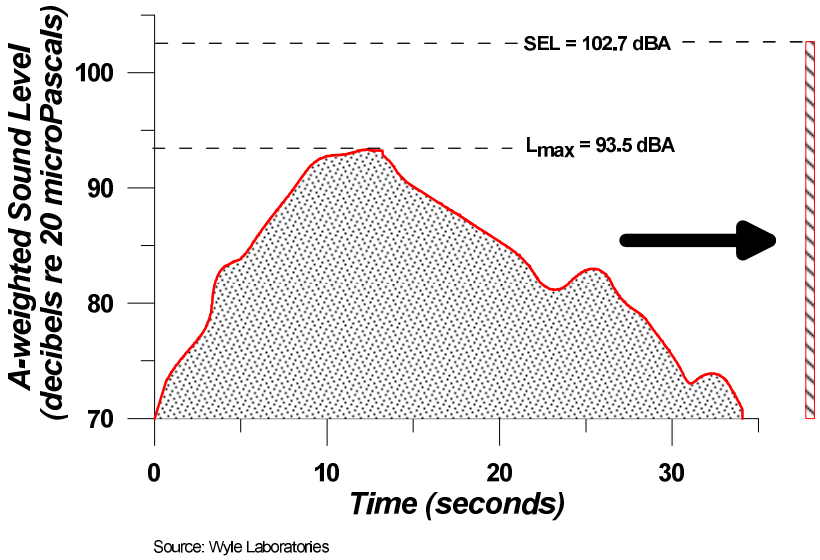



**Figure E-2. Example Time History of Aircraft Noise Flyover**

**Single-events**

*Maximum Sound Level ($L_{max}$)*

The highest A-weighted sound level measured during a single event in which the sound changes with time is called the maximum A-weighted sound level or Maximum Sound Level and is abbreviated $L_{max}$. The $L_{max}$ is depicted for a sample event in figure E-2.

$L_{max}$ is the maximum level that occurs over a fraction of a second. For aircraft noise, the "fraction of a second" is one-eighth of a second, denoted as "fast" response on a sound level measuring meter (ANSI 1988). Slowly varying or steady sounds are generally measured over 1 second, denoted "slow" response. $L_{max}$ is important in judging if a noise event will interfere with conversation, TV or radio listening, or other common activities. Although it provides some measure of the event, it does not fully describe the noise, because it does not account for how long the sound is heard.

*Sound Exposure Level (SEL)*

Sound Exposure Level combines both the intensity of a sound and its duration. For an aircraft flyover, SEL includes the maximum and all lower noise levels produced as part of the overflight, together with how long each part lasts. It represents the total sound energy in the event. Figure E-2 indicates the SEL for an example event, representing it as if all the sound energy were contained within 1 second.

Because aircraft noise events last more than a few seconds, the SEL value is larger than $L_{max}$. It does not directly represent the sound level heard at any given time but rather the entire event. SEL provides a much better measure of aircraft flyover noise exposure than $L_{max}$ alone.

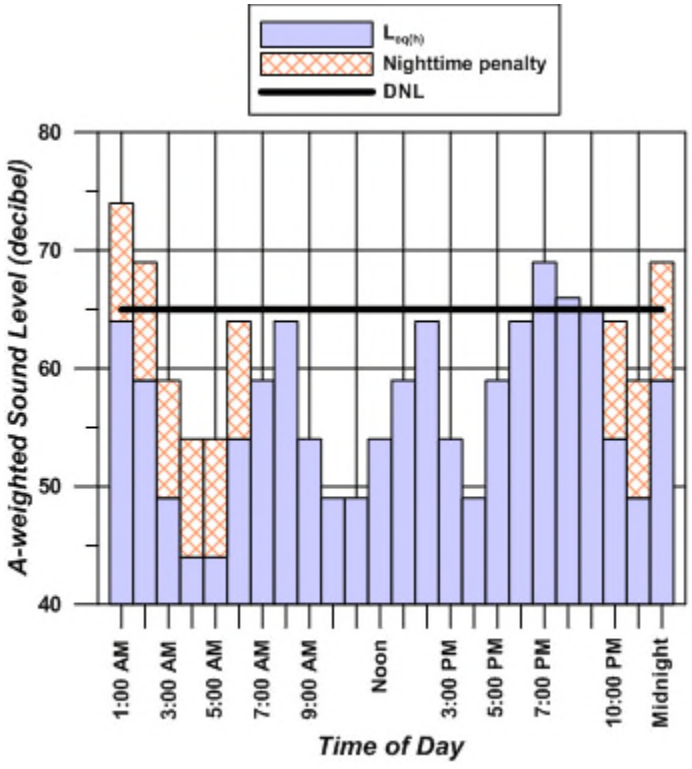
## Cumulative Events

*Equivalent Sound Level ($L_{eq}$)*

Equivalent Sound Level is a "cumulative" metric that combines a series of noise events over a period of time. $L_{eq}$ is the sound level that represents the decibel average SEL of all sounds in the time period. Just as SEL has proven to be a good measure of a single event, $L_{eq}$ has proven to be a good measure of series of events during a given time period.

The time period of an $L_{eq}$ measurement is usually related to some activity and is given along with the value. The time period is often shown in parenthesis (e.g., $L_{eq(24)}$ for 24 hours). The $L_{eq}$ from 7 a.m. to 3 p.m. may give exposure of noise for a school day.

Figure E-3 gives an example of $L_{eq(24)}$ using notional hourly average noise levels ($L_{eq(h)}$) for each hour of the day as an example. The $L_{eq(24)}$ for this example is 61 dB.




*Source: Wyle Laboratories*

**Figure E-3. Example of $L_{eq(24)}$, Day-Night Average Sound Level (DNL) Computed from Hourly Equivalent Sound Levels**

*Day-Night Average Sound Level (DNL or $L_{dn}$)*

Day-Night Average Sound Level is a cumulative metric that accounts for all noise events in a 24-hour period. However, unlike $L_{eq(24)}$, DNL contains a nighttime noise penalty. To account for our increased sensitivity to noise at night, DNL applies a 10 dB penalty to events during the nighttime period, defined as 10:00 p.m. to 7:00 a.m. The notations DNL and $L_{dn}$ are both used for Day-Night Average Sound Level and are equivalent.

For airports and military airfields, DNL represent the average sound level for annual average daily aircraft events.

Figure E-3 gives an example of DNL using notional hourly average noise levels ($L_{eq(h)}$) for each hour of the day as an example. Note the $L_{eq(h)}$ for the hours between 10 p.m. and 7 a.m. have a 10 dB penalty assigned. The DNL for this example is 65 dB.

Figure E-4 shows the ranges of DNL that occur in various types of communities. Under a flight path at a major airport the DNL may exceed 80 dB, while rural areas may experience DNL less than 45 dB.

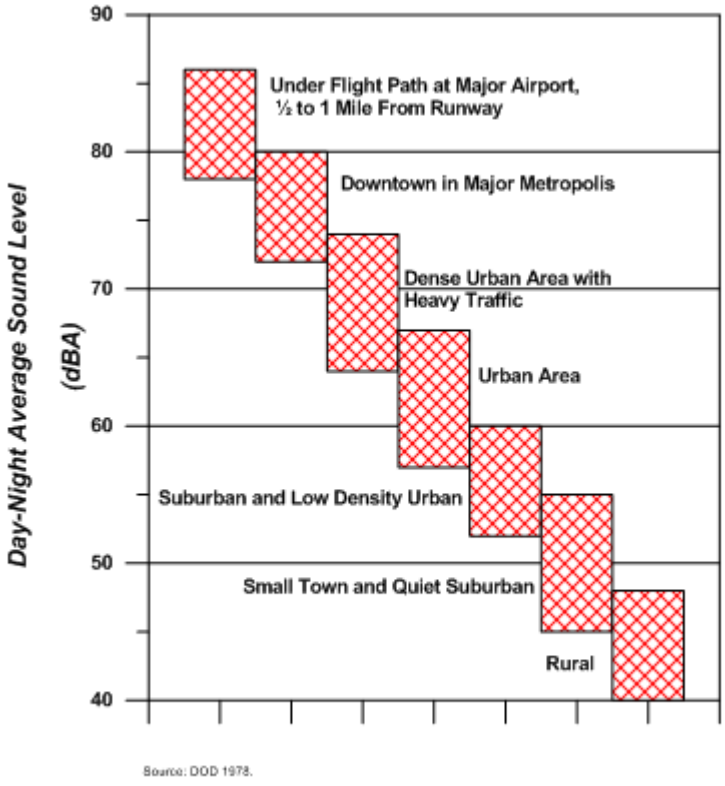



**Figure E-4. Typical DNL Ranges in Various Types of Communities**

The decibel summation nature of these metrics causes the noise levels of the loudest events to control the 24-hour average. As a simple example, consider a case in which only one aircraft overflight occurs during the daytime over a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.9 dB. Assume, as a second example that 10 such 30-second overflights occur during daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.5 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of those events.

A feature of the DNL metric is that a given DNL value could result from a very few noisy events or a large number of quieter events. For example, 1 overflight at 90 dB creates the same DNL as 10 overflights at 80 dB.

DNL does not represent a level heard at any given time, but represents long term exposure. Scientific studies have found good correlation between the percentages of groups of people highly annoyed and the level of average noise exposure measured in DNL (Schultz 1978; USEPA 1974).

*Onset-Rate Adjusted Monthly Day-Night Average Sound Level ($L_{dnmr}$)*

Military aircraft utilizing SUA such as MTRs, MOAs, and Restricted Areas/Ranges generate a noise environment that is somewhat different from that around airfields. Rather than regularly occurring operations like at airfields, activity in SUAs is highly sporadic. It is often seasonal, ranging from 10 per hour to less than 1 per week. Individual military overflight events also differ from typical community noise events in that noise from a low-altitude, high-airspeed flyover can have a rather sudden onset, with rates of up to 150 dB per second.

The cumulative daily noise metric devised to account for the "surprise" effect of the sudden onset of aircraft noise events on humans and the sporadic nature of SUA activity is the Onset-Rate Adjusted Monthly Day-Night Average Sound Level ($L_{dnmr}$). Onset rates between 15 and 150 dB per second require an adjustment of 0 to 11 dB to the event's SEL, while onset rates below 15 dB per second require no adjustment to the event's SEL (Stusnick et al. 1992). The term 'monthly' in $L_{dnmr}$ refers to the noise assessment being conducted for the month with the most operations or sorties – the so-called busiest month.

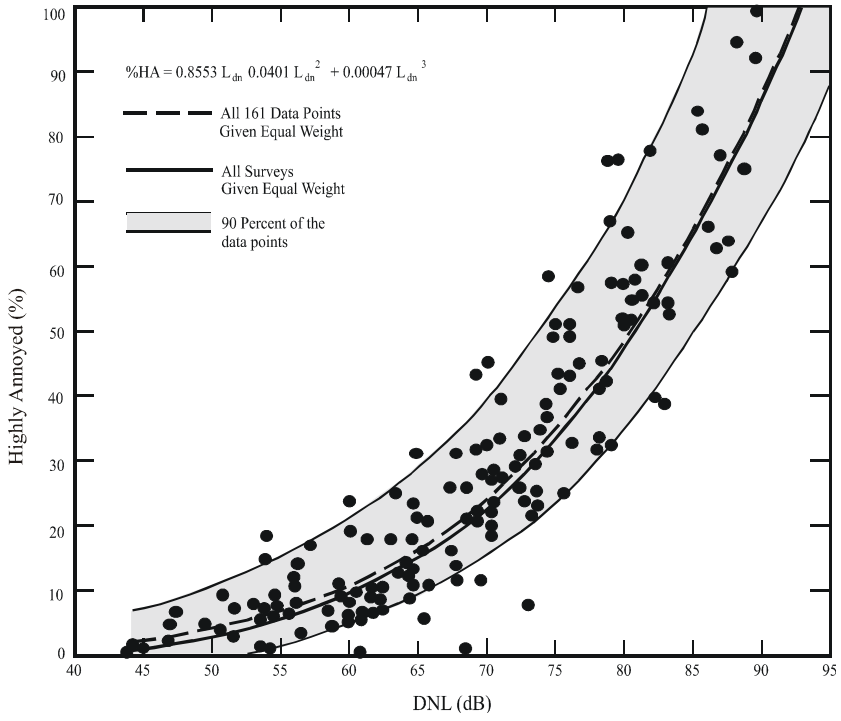
The activity assessed in this EA generates relatively low onset rates because aircraft do not travel at high speeds, so the computed $L_{dnmr}$ is similar or only slightly greater than the DNL computation for the same operation.

**Annoyance**

In the early 1970s, the USEPA published its "Levels Document" (EPA 1974) that reviewed the factors that affected communities. DNL (often referred to as $L_{dn}$ at the time) was identified as an appropriate noise metric, and threshold criteria were recommended.

Threshold criteria for annoyance were identified from social surveys, where people exposed to noise were asked how noise affects them. Surveys provide direct real-world data on how noise affects actual residents.

Surveys in the early years had a range of designs and formats, and needed some interpretation to find common ground. In 1978, Schultz showed that the common ground was the number of people "highly annoyed," defined as the upper 28 percent range of whatever response scale a survey used (Schultz 1978). With that definition, he was able to show a remarkable consistency among the majority of the surveys for which data were available. Figure E-5 shows the result of his study relating DNL to individual annoyance measured by percent highly annoyed (%HA).




Source: Schultz 1978

**Figure E-5. Schultz Curve Relating Noise Annoyance to DNL**

The Federal Interagency Committee on Noise (FICON 1992) considered the Schultz curve to be the best source of dose information to predict community response to noise.

**Noise Models**

This section describes the analysis tools used to calculate the noise levels in this report: the NOISEMAP and Military Operations Area and Range Noisemap (MR_NMAP) suites of computer programs.

Analyses of aircraft noise exposure and compatible land uses around DoD airfield-like facilities are normally accomplished using a group of computer-based programs, collectively called NOISEMAP (Czech and Plotkin 1998; Wasmer and Maunsell 2006a; Wasmer and Maunsell 2006b; Page, et al, 2008). The core computational programs of the NOISEMAP suite are NMAP and the Rotorcraft Noise Model (RNM). In this report, NMAP Version 7.3 and RNM Version 7.2 were used to analyze fixed and rotary-wing aircraft/operations, respectively. The NOISEMAP suite of computer programs includes BaseOps, OMEGA10, OMEGA11, NOISEMAP, RNM and NMPlot.

The suite also includes the NOISEFILE and NCFiles databases. The BaseOps program allows entry of runway coordinates, airfield information, flight tracks, flight profiles along each flight track for each aircraft, numbers of daily flight operations, run-up coordinates, run-up profiles, and run-up operations.

RNM is a computer program developed by Wyle Laboratories, Inc. for the National Aeronautics and Space Administration (NASA)-Langley Research Center (LaRC). RNM, as part of LaRC's Tilt Rotor Aeroacoustic Code (TRAC) suite of computer programs, is aimed at the prediction of far-field sound levels from tilt rotor aircraft and helicopters. DoD has adopted RNM for the environmental impact assessment of rotorcraft noise.

The MR_NMAP suite of computer programs includes OMEGA10R, NOISEFILE, and the core code MRNMAP, of which version 2.20 was used for this report. MR_NMAP allows for entry of airspace information, the horizontal distribution of operations, flight profiles (average power settings, altitude distributions, and speeds), and numbers of sorties. "Horizontal distribution of operations" refers to the modeling of lateral airspace utilization via three general representations: broadly distributed operations for modeling of MOA or flight area events, operations distributed among parallel tracks for modeling of noise and vibration (NAV) events, and operations on specific tracks for modeling of unique transit along routes for training purposes. OMEGA10R extrapolates/interpolates the reference SELs for each model of aircraft from the NOISEFILE database, taking into consideration the specified speeds, engine thrust settings, and environmental conditions appropriate to each flight operation. The core program MRNMAP incorporates the number of monthly operations by time period, specified horizontal distributions, volume of the airspaces, and profiles of the aircraft to primarily calculate: (a) Onset-Rate Adjusted Monthly Day-Night Average Sound Level ($L_{dnmr}$) at many points on the ground, (b) average $L_{dnmr}$ for entire airspaces, or (c) maximum $L_{dnmr}$ under NAV routes or specific tracks.

## Noise Modeling

The noise environment was modeled using Air Force approved software: Noisemap, MR_NMAP, and RNM.

MR_NMAP (version 2.2) was used for subsonic aircraft noise. Aircraft operations noise levels beneath military airspace units were calculated using the $L_{dnmr}$ metric.

RNM (version 7.4.02) was used to compute overflight SEL and $L_{max}$ levels for helicopter and tiltrotor aircraft overflight operations.

The munitions used in OPFOR training (e.g., Smokey SAMs, alternative rockets, and smoke grenades) range in loudness levels comparable with small-to-large firecrackers and shotguns. The reports are momentary and, therefore, were not modeled for noise.

## Current Operations

Noise associated with the existing USAF activities in BLM-administered public property are generated by training events consisting of vehicle and aircraft operations. Aircraft noise are generally characterized in terms of A-weighted noise. Noise from vehicle operations is not considered to be significant when compared to aircraft noise.

58 SOW aircraft do not overfly BLM-administered wilderness and primitive areas below 2,000 feet AGL or over non-congested areas at an altitude of less than 500 feet AGL. Likewise, no intentional low-level overflight of livestock, wildlife, dwellings, or populated areas occurs.

The American National Standards Institute (ANSI 2013) provides typical background noise levels for various land use categories, as presented in table E-1. The BLM-administered land is wilderness-like and most similar to rural or remote areas with estimated ambient DNL less than 49 dB. There are no noise sensitive receptors, or human population, nearby to any of the existing 26 BLM HLZ sites.

## Training Activity

Existing training occurs at 26 different sites within the BLM-administered land. Students practice low-level tactical navigation, approach, landing, and departures using CV-22B Osprey, UH-1N Iroquois, and HH-60G Pave Hawk helicopters at the existing HLZ sites. A typical HLZ sortie includes approximately 2 hours of landings, departures, and/or hover operations occurring in roughly 15 minute intervals resulting in a maximum of 8 landings per sortie. Aircraft using HLZs also perform circling patterns in airspace above the HLZ between sorties. These aircraft operations are an ongoing activity that is included under the current permit.

**Table E-1. Estimated Background Noise Levels**

| Example Land Use Category | Average Residential Intensity (people per acre) | DNL (dBA) | Leq (dBA) | |
|---|---|---|---|---|
| | | | Daytime | Nighttime |
| Rural or remote areas | <2 | <49 | <48 | <42 |
| Quiet suburban residential | 2 | 49 | 48 | 42 |
| | 4 | 52 | 53 | 47 |
| | 4.5 | 52 | 53 | 47 |
| Quiet urban residential | 9 | 55 | 56 | 50 |
| Quiet commercial, industrial, and normal urban residential | 16 | 58 | 58 | 52 |
| | 20 | 59 | 60 | 54 |

Twenty three (23) of the 26 existing HLZ sites receive operations from the HH-60G Pave Hawk and UH-1N Iroquois. Each of these 23 HLZs experiences 80 sorties per year (40 sorties per year for the HH-60G Pave Hawk and 40 sorties per year for the UH-1N Iroquois). Approximately half of the HH-60G Pave Hawk sorties involve two HH-60G Pave Hawks flying in tandem. During these tandem sorties, one helicopter lands while the other hovers or flies in a box pattern overhead. The noise calculations assume two HH-60G Pave Hawks flying for 50 percent of the sorties, and one flying for the other 50 percent.

Three (3) of the 26 existing HLZ sites (HLZ 18A, 31, and 37) receive operations from the CV-22B Osprey. Each of these three HLZs experiences 320 CV-22B Osprey sorties per year. When possible, two CV-22B Ospreys aircraft fly in tandem. The noise calculations assume two CV-22B Ospreys flying for each sortie.

Table E-2 displays the operational counts for both types of HLZ sites. All sorties flown by the 58 SOW are evenly distributed between environmental daytime (7:00 a.m. to 10:00 p.m.) and environmental nighttime (10:00 p.m. to 7:00 a.m.) periods.

**Table E-2. BLM Training Operations**

| | Existing Conditions (CV-22B Osprey sites) | | Existing Conditions (HH-60G Pave Hawk and UH-1N Iroquois sites) | |
|---|---|---|---|---|
| Sorties per year | 320 | | 80 | |
| Sorties per week | 6.2 | | 1.5 | |
| Landings per sortie[(1)] | 8 | | 8 | |
| Estimated landings per year[(2)] | Daytime | Nighttime | Daytime | Nighttime |
| | 1,280 | 1,280 | 320 | 320 |

Notes:
(1) Landings per sorties assumes up to one landing every 15 minutes
(2) Operations evenly split between acoustic daytime (0700-2200) and acoustic nighttime (2200-0700)

**Noise Exposure**

Single-Event Noise levels from individual rotorcraft and tiltrotor aircraft overflights are displayed in table E-3 comparing the CV-22B Osprey, HH-60G Pave Hawk, and UH-1N Iroquois. The CV-22B Osprey generates the greatest SEL of 106 dBA and $L_{max}$ of 104 dBA at 100 feet AGL.

**Table E-3. Lmax and SEL from Aircraft Overflights**

| Aircraft Type | Modeled As(1) | Speed (knots) | 100 ft AGL | | 200 ft AGL | | 500 ft AGL | |
|---|---|---|---|---|---|---|---|---|
| | | | Lmax (dBA) | SEL (dBA) | Lmax (dBA) | SEL (dBA) | Lmax (dBA) | SEL (dBA) |
| CV-22B Osprey | MV-22B(2) | 80 | 104 | 106 | 98 | 102 | 89 | 106 |
| HH-60G Pave Hawk | SH60B | | 92 | 95 | 87 | 92 | 78 | 87 |
| UH-1N Iroquois | AH-1W | | 100 | 102 | 94 | 98 | 86 | 94 |

Notes:
(1) Utilized RNM with standard weather conditions (59°F, 70% relative humidity)
(2) MV-22 modeled with nacelle angle at 80 degrees

Due to the large number of HLZ sites currently in use for training, it is unwieldy to display DNL noise contours for all sites individually. The figures in section 3.3 displays a representative noise contours for a single HLZ that receives only CV-22B Osprey operations and for a single HLZ that receives only HH-60G Pave Hawk and UH-1N Iroquois operations.

# APPENDIX F
# AIR QUALITY CALCULATIONS

## Air Quality

Pursuant to the Clean Air Act Amendments of 1990 (CAAA), the United States Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The NAAQS are classified as primary and secondary standards. Primary standards prescribe the maximum permissible concentration in the ambient air and are required to protect public health. Secondary standards specify levels of air quality required to protect public welfare, including materials, soils, vegetation, and wildlife, from any known or anticipated adverse effects (USEPA 2014). NAAQS are established for six pollutants (known as criteria pollutants): ozone (O3), particle pollution (i.e., respirable particulate matter less than 10 microns in diameter [PM10] and respirable particulate matter less than 2.5 microns in diameter [PM2.5]), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), and lead (Pb). A summary of NAAQS is provided in table F-1. Under the CAAA directive, attainment and maintenance of NAAQS is required.

**Table F-1. National Ambient Air Quality Standards**

| Pollutant | | Primary/Secondary | Averaging Time | Level |
|---|---|---|---|---|
| Carbon Monoxide | | Primary | 8 hours | 9 ppm |
| | | | 1 hour | 35 ppm |
| Lead | | Primary and secondary | Rolling 3 month average | 0.15 µg/m$^3$ |
| Nitrogen Dioxide | | Primary | 1 hour | 100 ppb |
| | | Primary and secondary | 1 year | 53 ppb |
| Ozone | | Primary and secondary | 8 hours | 0.070 ppm |
| Particulate Matter | $PM_{2.5}$ | Primary | 1 year | 12.0 µg/m$^3$ |
| | | Secondary | 1 year | 15.0 µg/m$^3$ |
| | | Primary and secondary | 24 hours | 35 µg/m$^3$ |
| | $PM_{10}$ | Primary and secondary | 24 hours | 150 µg/m$^3$ |
| Sulfur Dioxide | | Primary | 1 hour | 75 ppb |
| | | Secondary | 3 hour | 0.5 ppm |

Source: EPA 2016

Notes:
- µg/m$^3$ micrograms per cubic meter
- $PM_{2.5}$ respirable particulate matter 2.5 microns in diameter and smaller
- $PM_{10}$ respirable particulate matter 10 microns in diameter and smaller
- ppb parts per billion
- ppm parts per million

## General Conformity

Section 176(c) of the federal CAAA contains requirements that apply specifically to federal agency actions, including actions receiving federal funding. This section of the CAAA requires federal agencies to ensure that their actions are consistent with the CAAA and with applicable state air quality management plans. The general conformity regulation is codified in 40 CFR 51, Subpart W, and 40 CFR 93, Subpart B.

Federal agencies are required to evaluate their proposed actions to ensure that they will not cause or contribute to new violations of any federal ambient air quality standards, that they will not

increase the frequency or severity of any existing violations of federal ambient air quality standards, and that they will not delay the timely attainment of federal ambient air quality standards. To this end, the USEPA general conformity rule requires a formal conformity determination document for federally sponsored or funded actions in nonattainment or maintenance areas when the net increase in direct and indirect emissions of nonattainment or maintenance pollutants exceeds specified *de minimis* thresholds.

A federal action is exempt from general conformity requirements if the total emissions resulting from the action are equal to or less than the *de minimis* thresholds. Thus, the action's calculated emissions are compared to established *de minimis* emission levels based on the nonattainment status for each applicable criteria pollutant in the area of concern to determine the relevant compliance requirements. Table F-2 defines the *de minimis* thresholds for all nonattainment areas.

**Table F-2. De Minimis Thresholds in Nonattainment Areas**

| Pollutant | Degree of Non-attainment | *de minimis* Level (tons/year) |
|---|---|---|
| Ozone | Serious | 50 |
| | Severe | 25 |
| | Extreme | 10 |
| | Marginal and Moderate (outside an ozone transport region) | 100 |
| | Marginal and Moderate (inside an ozone transport region) | 50 (VOC) |
| | | 100 ($NO_x$) |
| Carbon monoxide | All | 100 |
| Particulate matter | Moderate | 100 |
| | Serious | 70 |
| $SO_2$ or $NO_2$ | All | 100 |
| Lead | All | 25 |

Notes:
NO nitrogen monoxide
$NO_2$ nitrogen dioxide
$NO_x$ nitrogen oxides (NO and $NO_2$)
$SO_2$ sulfur dioxide
VOC volatile organic compound

## Greenhouse Gases

Climate change refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns over a period of time. Climate change is associated with natural factors, natural processes, and human activities that change the composition of the atmosphere and alter the surface and features of the land. Significant changes in global climate patterns have recently been associated with global warming, an average increase in the temperature of the atmosphere near the Earth's surface, attributed to accumulation of greenhouse gas (GHG) emissions in the atmosphere. GHG trap heat in the atmosphere, which, in turn, heats the surface of the Earth. Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. The

emission of GHGs through the combustion of fossil fuels (i.e., fuels containing carbon) in conjunction with other human activities is associated with global warming.

Regulated GHGs include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$). GHGs are commonly quantified in the equivalent mass of $CO_2$, denoted $CO_2eq$, which takes into account the global warming potential (GWP) of each individual GHG compound. The most common GHG that results from human activity is $CO_2$, followed by $CH_4$ and $N_2O$.

Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and wood products, and also as a result of certain chemical reactions (e.g., manufacture of cement). Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.

Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.

Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent GHGs, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").

The USEPA is the agency responsible for writing and implementing federal regulation for the protection of the environment, including regulation for GHG emissions. To this end, the USEPA pursues a number of efforts including collection of data, pursuing emissions reductions by promoting clean energy economy and partnering with states, localities, and tribes. The USEPA delegates its authority to 10 executive offices in the United States each of which is responsible for the execution the USEPA programs within several states and territories. New Mexico is within the jurisdiction of Region 6.

The USEPA has instituted various regulation measures to reduce GHGs. One of these efforts is under 40 CFR 98 that require mandatory reporting of GHG emissions (i.e., CO2, CH4, N2O, sulfur hexafluoride, hydrofluorocarbons, and other fluorinated gases) for certain industrial operations. Most of these industrial operations include electricity generation facilities, oil refineries, and manufacturing operations. Mandatory reporting is also required for combustion sources, such as boilers and stationary engines, which emit more than 25,000 metric tons of CO2-equivalents (MTCO2eq) per year.

Bernalillo County is moderate maintenance for CO in the Albuquerque Area. Table F-3 provides a summary of NAAQS Attainment for Bernalillo County.

**Table F-3. NAAQS Attainment Status of Bernalillo County**

| Pollutant | [1]National Attainment Status |
|---|---|
| 1-Hour Ozone | Attainment |
| 8-Hour Ozone | Attainment |
| $PM_{2.5}$ | Attainment |
| $PM_{10}$ | Attainment |
| Carbon Monoxide | Moderate Maintenance (Albuquerque Area) |
| Nitrogen Dioxide | Attainment |
| Sulfur Dioxide | Attainment |
| Lead | Attainment |

Source: 1 EPA 2018a.

Under current operations, there are emissions from training exercises that result from support vehicles consisting of light duty diesel vehicles (i.e., 0 to 8,500 pounds of gross vehicle weight rating), used for OPFOR personnel, and aircraft maintenance/emergency repair. Annual emissions resulting from current operation of these vehicles are summarized in table F-4. Detailed calculations of these emissions are included in the following attachment. The emissions from the small pyrotechnic equipment used for OPFOR training arms firing and munitions would be inconsequential compared to the vehicle emissions and are not discussed further.

**Table F-4. Current Operations Annual Emissions**

| Emission Source | VOC (tpy) | CO (tpy) | $NO_x$ (tpy) | $PM_{10}$ (tpy) | $PM_{2.5}$ (tpy) | $SO_2$ (tpy) | $CO_2eq$ (MTPY) |
|---|---|---|---|---|---|---|---|
| VMT | 0.08 | 1.22 | 0.13 | 0.00 | 0.00 | 0.00 | 108.74 |
| Aircraft | 0.13 | 3.04 | 9.97 | 1.34 | 1.04 | 0.85 | 2,345.94 |
| Total | 0.21 | 4.26 | 10.09 | 1.34 | 1.04 | 0.85 | 2,454.67 |
| Conformity Threshold | None | 100 | None | None | None | None | None |
| Significant? | No | No | No | No | No | No | No |

Notes:
- CO carbon monoxide
- $CO_2eq$ carbon dioxide equivalent
- MTPY metric tons per year
- NO nitrogen oxide
- $NO_2$ nitrogen dioxide
- $NO_x$ nitrogen oxides (NO and $NO_2$)
- $PM_{2.5}$ respirable particulate matter 2.5 microns in diameter and smaller
- $PM_{10}$ respirable particulate matter 10 microns in diameter and smaller
- $SO_2$ sulfur dioxide
- tpy tons per year
- VMT vehicle miles traveled
- VOC volatile organic compound

**Vehicle Miles Traveled Emissions Calculation Summary**

| | Annual Emissions from VMT (tpy) | | | | | | Annual Emissions MTPY |
|---|---|---|---|---|---|---|---|
| **Action** | **VOC** | **CO** | **$NO_x$** | **$PM_{10}$** | **$PM_{2.5}$** | **$SO_2$** | **$CO_2$** |
| Proposed Action | 0.09 | 1.36 | 0.14 | 1.95E-03 | 1.95E-03 | 1.12E-03 | 121.19 |
| Alternative 1 Action | 0.08 | 1.22 | 0.13 | 1.75E-03 | 1.75E-03 | 1.00E-03 | 108.74 |
| No Action Alternative | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Vehicle Category | LDDT[a] Paved | Unit of Measure |
|---|---|---|
| VOC Emission Factor | 0.318 | g/mile |
| CO Emission Factor | 4.853 | g/mile |
| NOx Emission Factor | 0.507 | g/mile |
| SO2 Emission Factor | 0.004 | g/mile |
| PM10 Emission Factor | 0.007 | g/mile |
| PM2.5 Emission Factor | 0.007 | g/mile |
| CO2 Emission Factor | 478.339 | g/mile |
| NH3 Emission Factor | 0.008 | g/mile |

| Total Annual VMT | | |
|---|---|---|
| Proposed Action | 253,359 | miles/yr |
| Alternative 1 Action | 227,318 | miles/yr |

**Source:**

a Emission factor source: Air Force Civil Engineer Center 2016 Air Emissions Guide for Air Force Mobile Sources

**Notes:**

g grams

LDDT light duty diesel truck (GVWR 0 to 8500 pounds)

MTPY metric tons per year

tpy tons per year

VMT vehicle miles traveled

yr year

**Vehicle Miles Traveled Analysis**

| HLZ Identifier | County | Current | | | | | | Proposed | | | | | | Vehicle Type | Vehicle Trip Distance One Way (miles) | Two Way Factor | Current/ Alt 2 (miles) | Proposed (miles) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CV-22 | | HH-60 | | UH-1N | | CV-22 | | HH-60 | | UH-1N | | | | | | |
| | | Sortie Sets per Year | Vehicles Trips per Sortie Set | Sortie Sets per Year | Vehicles Trips per Sortie Set | Sortie Sets per Year | Vehicles Trips per Sortie Set | Sortie Sets per Year | Vehicles Trips per Sortie Set | Sortie Sets per Year | Vehicles Trips per Sortie Set | Sortie Sets per Year | Vehicles Trips per Sortie Set | | | | | |
| 6 | Cibola | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 47 | 2 | - | - |
| 7 | Cibola | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 49 | 2 | - | - |
| 13 | Valencia | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 30 | 2 | - | - |
| 15 | Valencia | 0 | 0 | 40 | 1.5 | 40 | 1 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 31 | 2 | 6,158 | 3,695 |
| 16 | Valencia | 0 | 0 | 40 | 1.5 | 40 | 1 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 30 | 2 | 6,088 | 3,653 |
| 17 | Cibola | 0 | 0 | 40 | 1.5 | 40 | 1 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 49 | 2 | 9,708 | 5,825 |
| 18 | Valencia | 0 | 0 | 40 | 1.5 | 40 | 1 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 35 | 2 | 6,902 | 4,141 |
| 18A | Valencia | 320 | 2 | 0 | 0 | 0 | 0 | 320 | 2 | 0 | 0 | 0 | 0 | Pickup truck | 35 | 2 | 44,423 | 44,423 |
| 19 | Valencia | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 35 | 2 | - | - |
| 20 | Valencia | 0 | 0 | 40 | 1.5 | 40 | 1 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 33 | 2 | 6,673 | 4,004 |
| 21 | Valencia | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 36 | 2 | - | - |
| 22 | Cibola | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 40 | 2 | - | - |
| 22B | Cibola | 0 | 0 | 40 | 1.5 | 40 | 1 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 40 | 2 | 7,986 | 4,792 |
| 23 | Valencia | 0 | 0 | 40 | 1.5 | 40 | 1 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 40 | 2 | 8,083 | 4,850 |
| 24 | Valencia | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 40 | 2 | - | - |
| 27 | Cibola | 0 | 0 | 40 | 1.5 | 40 | 1 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 48 | 2 | 9,614 | 5,768 |
| 28 | Cibola | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 51 | 2 | - | - |
| 29 | Cibola | 0 | 0 | 40 | 1.5 | 40 | 1 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 50 | 2 | 9,968 | 5,981 |
| 30 | Sandoval | 0 | 0 | 40 | 1.5 | 40 | 1 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 30 | 2 | 6,090 | 3,654 |
| 31 | Sandoval | 320 | 2 | 0 | 1.5 | 0 | 1 | 320 | 2 | 0 | 1.5 | 0 | 1 | Pickup truck | 33 | 2 | 42,217 | 42,217 |
| 32 | Sandoval | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 44 | 2 | - | - |
| 33 | Sandoval | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 43 | 2 | - | - |
| 34 | Sandoval | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 40 | 2 | - | - |
| 36 | Valencia | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 37 | 2 | - | - |
| 37 | Cibola | 320 | 2 | 0 | 1.5 | 0 | 1 | 320 | 2 | 0 | 1.5 | 0 | 1 | Pickup truck | 42 | 2 | 53,706 | 53,706 |
| 38 | Cibola | 0 | 0 | 40 | 0 | 40 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 44 | 2 | - | - |
| 42 | Cibola | 0 | 0 | 40 | 1.5 | 40 | 1 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 49 | 2 | 9,702 | 5,821 |
| 19a | Valencia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 35 | 2 | - | - |
| 19b | Valencia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 35 | 2 | - | - |
| C | Socorro | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 45 | 2 | - | - |
| D | Socorro | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 47 | 2 | - | - |
| O | Valencia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 51 | 2 | - | - |
| P | Valencia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 52 | 2 | - | - |
| Q | Valencia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 55 | 2 | - | - |
| R | Valencia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 55 | 2 | - | - |
| N | Valencia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 32 | 2 | - | - |
| CR1 | Guadalupe | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 97 | 2 | - | 11,600 |
| CR2 | De Baca | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 110 | 2 | - | 13,230 |
| 22A | Valencia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 24 | 0 | None | 40 | 2 | - | - |
| 37A | Valencia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 42 | 2 | - | 5,001 |
| 37B | Valencia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 42 | 2 | - | 5,019 |
| 37C | Valencia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 42 | 2 | - | 5,021 |
| 37D | Valencia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 1.5 | 24 | 1 | Pickup truck | 42 | 2 | - | 4,990 |
| OF1 | Sandoval | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Pick up only. No air operations | 50 | 2 | - | 2,388 |
| OF2 | Sandoval | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Pick up only. No air operations | 50 | 2 | - | 2,385 |

| HLZ Identifier | County | Current | | | | | | Proposed | | | | | | Vehicle Type | Vehicle Trip Distance One Way (miles) | Two Way Factor | Current/ Alt 2 (miles) | Proposed (miles) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CV-22 | | HH-60 | | UH-1N | | CV-22 | | HH-60 | | UH-1N | | | | | | |
| | | Sortie Sets per Year | Vehicles Trips per Sortie Set | Sortie Sets per Year | Vehicles Trips per Sortie Set | Sortie Sets per Year | Vehicles Trips per Sortie Set | Sortie Sets per Year | Vehicles Trips per Sortie Set | Sortie Sets per Year | Vehicles Trips per Sortie Set | Sortie Sets per Year | Vehicles Trips per Sortie Set | | | | | |
| OF3 | Sandoval | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Pick up only. No air operations | 48 | 2 | - | 2,292 |
| OF4 | Sandoval | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Pick up only. No air operations | 46 | 2 | - | 2,199 |
| OF5 | Socorro | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Pick up only. No air operations | 45 | 2 | - | 2,179 |
| OF6 | Socorro | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Pick up only. No air operations | 46 | 2 | - | 2,203 |
| OF7 | Socorro | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Pick up only. No air operations | 48 | 2 | - | 2,322 |
| | | 960 | | 960 | | 960 | | 960 | | 960 | | 960 | | | | **Annual VMT** | **227,318** | **253,359** |

Notes:

1. CV-22B and the HH-60G use two vehicles during training (i.e., one vehicle per aircraft sortie).
2. HH-60 requires two pickup trucks for 50 percent of its sortie sets and one pickup truck for the other 50 percent (i.e., sortie sets/2*[2 trips/sortie set + 1 trip/sortie set] = 3/2 trips per sortie set)
3. Current opfor training occurs 2X per sortie and has one truck that travels within 5 miles of HLZ site
4. Proposed opfor sites only use a truck and no air vehicle
5. Sandoval county is between 30 and 50 miles from Kirtland AFB
6. Valencia and Cibola Counties are between 30 and 55 miles from Kirtland AFB

**Air Craft Emissions Calculation Summary**

| | TPY | | | | | | MTPY |
|---|---|---|---|---|---|---|---|
| **Proposed Action** | **VOC** | **CO** | **NOx** | **PM10** | **PM2.5** | **SOX** | **CO2eq** |
| CV-22 | 0.02 | 1.13 | 8.02 | 0.94 | 0.84 | 0.63 | 1741.19 |
| HH-60G | 0.01 | 1.65 | 1.80 | 0.39 | 0.18 | 0.18 | 506.39 |
| UH-1N | 0.10 | 0.26 | 0.15 | 0.01 | 0.01 | 0.04 | 98.36 |
| **Total** | **0.13** | **3.04** | **9.97** | **1.34** | **1.04** | **0.85** | **2345.94** |

| | TPY | | | | | | MTPY |
|---|---|---|---|---|---|---|---|
| **Alternative 2** | **VOC** | **CO** | **NOx** | **PM10** | **PM2.5** | **SOX** | **CO2eq** |
| CV-22 | 0.02 | 1.13 | 8.02 | 0.94 | 0.84 | 0.63 | 1741.19 |
| HH-60G | 0.01 | 1.65 | 1.80 | 0.39 | 0.18 | 0.18 | 506.39 |
| UH-1N | 0.10 | 0.26 | 0.15 | 0.01 | 0.01 | 0.04 | 98.36 |
| **Total** | **0.13** | **3.04** | **9.97** | **1.34** | **1.04** | **0.85** | **2345.94** |

**Proposed Action**

**Aircraft CV-22; Engine T406-AD-400**

| Mode | | tpy | lb/cycle | cycles/yr | TIM (min/ cycle)[a] | FFR (lbs fuel/hr)[a] | EF (lb/1000 lb fuel)[a] | FERF (%) | No. of Engines |
|---|---|---|---|---|---|---|---|---|---|
| **Idle** | CO | 0.77 | 0.81 | 1920 | 8 | 362 | 8.35 | 100 | 2 |
| | NOx | 0.38 | 0.40 | 1920 | 8 | 362 | 4.15 | 100 | 2 |
| | PM10 | 0.15 | 0.15 | 1920 | 8 | 362 | 1.58 | 100 | 2 |
| | PM2.5 | 0.13 | 0.14 | 1920 | 8 | 362 | 1.42 | 100 | 2 |
| | SOX | 0.10 | 0.10 | 1920 | 8 | 362 | 1.06 | 100 | 2 |
| | VOC | 0.01 | 0.01 | 1920 | 8 | 362 | 0.1 | 100 | 2 |
| | CO2eq | 299.69 | 312.18 | 1920 | 8 | 362 | 3233.87 | 100 | 2 |
| **Intermediate** | CO | 0.25 | 0.26 | 1920 | 4.53 | 948 | 1.82 | 100 | 2 |
| | NOx | 1.08 | 1.13 | 1920 | 4.53 | 948 | 7.87 | 100 | 2 |
| | PM10 | 0.22 | 0.23 | 1920 | 4.53 | 948 | 1.58 | 100 | 2 |
| | PM2.5 | 0.20 | 0.20 | 1920 | 4.53 | 948 | 1.42 | 100 | 2 |
| | SOX | 0.15 | 0.15 | 1920 | 4.53 | 948 | 1.06 | 100 | 2 |
| | VOC | 0.00 | 0.00 | 1920 | 4.53 | 948 | 0.02 | 100 | 2 |
| | CO2eq | 444.41 | 462.92 | 1920 | 4.53 | 948 | 3233.87 | 100 | 2 |
| **Max Continuous** | CO | 0.11 | 0.11 | 1920 | 4.53 | 2507 | 0.29 | 100 | 2 |
| | NOx | 6.55 | 6.83 | 1920 | 4.53 | 2507 | 18.03 | 100 | 2 |
| | PM10 | 0.57 | 0.60 | 1920 | 4.53 | 2507 | 1.58 | 100 | 2 |
| | PM2.5 | 0.52 | 0.54 | 1920 | 4.53 | 2507 | 1.42 | 100 | 2 |
| | SOX | 0.39 | 0.40 | 1920 | 4.53 | 2507 | 1.06 | 100 | 2 |
| | VOC | 0.00 | 0.00 | 1920 | 4.53 | 2507 | 0.01 | 100 | 2 |
| | CO2eq | 1175.24 | 1224.20 | 1920 | 4.53 | 2507 | 3233.87 | 100 | 2 |

| TPY | | | | | | MTPY |
|---|---|---|---|---|---|---|
| VOC | CO | NOx | PM10 | PM2.5 | SOX | CO2eq |
| 0.02 | 1.13 | 8.02 | 0.94 | 0.84 | 0.63 | 1741.19 |

Notes:

| | |
|---|---|
| a | Emission factor source: Air Force Civil Engineer Center 2016 Air Emissions Guide for Air Force Mobile Sources |
| lb | pounds |
| EF | emission factor |
| FERF | fuel emission reduction factor |
| FFR | fuel flow rate |
| min | minutes |
| TIM | time in mode |
| tpy | tons per year |
| yr | year |

**Proposed Action**
**Aircraft HH-60G; Engine T700-GE-700**

| Mode | | tpy | lb/cycle | cycles/yr | TIM (min/cycle) | FFR (lbs fuel/hr) | EF (lb/1000 lb fuel) | FERF (%) | No. of Engines |
|---|---|---|---|---|---|---|---|---|---|
| **Ground Idle** | CO | 1.19 | 1.65 | 1440 | 8 | 134 | 46.24 | 100 | 2 |
| | NOx | 0.09 | 0.12 | 1440 | 8 | 134 | 3.36 | 100 | 2 |
| | PM10 | 0.04 | 0.05 | 1440 | 8 | 134 | 1.48 | 100 | 2 |
| | PM2.5 | 0.03 | 0.04 | 1440 | 8 | 134 | 0.98 | 100 | 2 |
| | SOX | 0.03 | 0.04 | 1440 | 8 | 134 | 1.06 | 100 | 2 |
| | VOC | 0.01 | 0.02 | 1440 | 8 | 134 | 0.5 | 100 | 2 |
| | CO2eq | 83.20 | 115.56 | 1440 | 8 | 134 | 3233.87 | 100 | 2 |
| **Flight Max** | CO | 0.24 | 0.33 | 1440 | 4.53 | 626 | 3.51 | 100 | 2 |
| | NOx | 0.81 | 1.12 | 1440 | 4.53 | 626 | 11.87 | 100 | 2 |
| | PM10 | 0.15 | 0.21 | 1440 | 4.53 | 626 | 2.22 | 100 | 2 |
| | PM2.5 | 0.06 | 0.09 | 1440 | 4.53 | 626 | 0.93 | 100 | 2 |
| | SOX | 0.07 | 0.10 | 1440 | 4.53 | 626 | 1.06 | 100 | 2 |
| | VOC | 0.00 | 0.00 | 1440 | 4.53 | 626 | 0.01 | 100 | 2 |
| | CO2eq | 220.09 | 305.68 | 1440 | 4.53 | 626 | 3233.87 | 100 | 2 |
| **Overspeed** | CO | 0.22 | 0.31 | 1440 | 4.53 | 725 | 2.81 | 100 | 2 |
| | NOx | 0.90 | 1.25 | 1440 | 4.53 | 725 | 11.43 | 100 | 2 |
| | PM10 | 0.21 | 0.29 | 1440 | 4.53 | 725 | 2.61 | 100 | 2 |
| | PM2.5 | 0.10 | 0.13 | 1440 | 4.53 | 725 | 1.21 | 100 | 2 |
| | SOX | 0.08 | 0.12 | 1440 | 4.53 | 725 | 1.06 | 100 | 2 |
| | VOC | 0.00 | 0.00 | 1440 | 4.53 | 725 | 0.01 | 100 | 2 |
| | CO2eq | 254.90 | 354.03 | 1440 | 4.53 | 725 | 3233.87 | 100 | 2 |

| TPY | | | | | | MTPY |
|---|---|---|---|---|---|---|
| VOC | CO | NOx | PM10 | PM2.5 | SOX | CO2eq |
| 0.01 | 1.65 | 1.80 | 0.39 | 0.18 | 0.18 | 506.39 |

Notes:

| | |
|---|---|
| a | Emission factor source: Air Force Civil Engineer Center 2016 Air Emissions Guide for Air Force Mobile Sources |
| lb | pounds |
| EF | emission factor |
| FERF | fuel emission reduction factor |
| FFR | fuel flow rate |
| min | minutes |
| TIM | time in mode |
| tpy | tons per year |
| yr | year |

**Proposed Action**

**Aircraft UH-1N; Engine T400-CP-400**

| Mode | | tpy | lb/cycle | cycles/yr | TIM (min/cycle) | FFR (lbs fuel/hr) | EF (lb/1000 lb fuel) | FERF (%) | No. of Engines |
|---|---|---|---|---|---|---|---|---|---|
| **Ground Idle** | CO | 0.24 | 0.51 | 960 | 8 | 136 | 27.94 | 100 | 1 |
| | NOx | 0.02 | 0.04 | 960 | 8 | 136 | 2.2 | 100 | 1 |
| | PM10 | 0.00 | 0.01 | 960 | 8 | 136 | 0.44 | 100 | 1 |
| | PM2.5 | 0.00 | 0.01 | 960 | 8 | 136 | 0.4 | 100 | 1 |
| | SOX | 0.01 | 0.02 | 960 | 8 | 136 | 1.06 | 100 | 1 |
| | VOC | 0.10 | 0.20 | 960 | 8 | 136 | 10.99 | 100 | 1 |
| | CO2eq | 28.15 | 58.64 | 960 | 8 | 136 | 3233.87 | 100 | 1 |
| **Cruise** | CO | 0.02 | 0.04 | 960 | 4.53 | 279 | 1.79 | 100 | 1 |
| | NOx | 0.05 | 0.10 | 960 | 4.53 | 279 | 4.66 | 100 | 1 |
| | PM10 | 0.00 | 0.01 | 960 | 4.53 | 279 | 0.36 | 100 | 1 |
| | PM2.5 | 0.00 | 0.01 | 960 | 4.53 | 279 | 0.32 | 100 | 1 |
| | SOX | 0.01 | 0.02 | 960 | 4.53 | 279 | 1.06 | 100 | 1 |
| | VOC | 0.00 | 0.00 | 960 | 4.53 | 279 | 0 | 100 | 1 |
| | CO2eq | 32.70 | 68.12 | 960 | 4.53 | 279 | 3233.87 | 100 | 1 |
| **Intermediate (Military)** | CO | 0.00 | 0.00 | 960 | 4.53 | 406 | 0 | 100 | 1 |
| | NOx | 0.09 | 0.18 | 960 | 4.53 | 406 | 5.91 | 100 | 1 |
| | PM10 | 0.00 | 0.01 | 960 | 4.53 | 406 | 0.25 | 100 | 1 |
| | PM2.5 | 0.00 | 0.01 | 960 | 4.53 | 406 | 0.22 | 100 | 1 |
| | SOX | 0.02 | 0.03 | 960 | 4.53 | 406 | 1.06 | 100 | 1 |
| | VOC | 0.00 | 0.00 | 960 | 4.53 | 406 | 0 | 100 | 1 |
| | CO2eq | 47.58 | 99.13 | 960 | 4.53 | 406 | 3233.87 | 100 | 1 |

| TPY | | | | | | MTPY |
|---|---|---|---|---|---|---|
| **VOC** | **CO** | **NOx** | **PM10** | **PM2.5** | **SOX** | **CO2eq** |
| 0.10 | 0.26 | 0.15 | 0.01 | 0.01 | 0.04 | 98.36 |

Notes:

| | |
|---|---|
| a | Emission factor source: Air Force Civil Engineer Center 2016 Air Emissions Guide for Air Force Mobile Sources |
| lb | pounds |
| EF | emission factor |
| FERF | fuel emission reduction factor |
| FFR | fuel flow rate |
| min | minutes |
| TIM | time in mode |
| tpy | tons per year |
| yr | year |

**Alternative 2**
**Aircraft CV-22; Engine T406-AD-400**

| Mode | | tpy | lb/cycle | cycles/yr | TIM (min/cycle) | FFR (lbs fuel/hr) | EF (lb/1000 lb fuel) | FERF (%) | No. of Engines |
|---|---|---|---|---|---|---|---|---|---|
| **Idle** | CO | 0.77 | 0.81 | 1920 | 8 | 362 | 8.35 | 100 | 2 |
| | NOx | 0.38 | 0.40 | 1920 | 8 | 362 | 4.15 | 100 | 2 |
| | PM10 | 0.15 | 0.15 | 1920 | 8 | 362 | 1.58 | 100 | 2 |
| | PM2.5 | 0.13 | 0.14 | 1920 | 8 | 362 | 1.42 | 100 | 2 |
| | SOX | 0.10 | 0.10 | 1920 | 8 | 362 | 1.06 | 100 | 2 |
| | VOC | 0.01 | 0.01 | 1920 | 8 | 362 | 0.1 | 100 | 2 |
| | CO2eq | 299.69 | 312.18 | 1920 | 8 | 362 | 3233.87 | 100 | 2 |
| **Intermediate** | CO | 0.25 | 0.26 | 1920 | 4.53 | 948 | 1.82 | 100 | 2 |
| | NOx | 1.08 | 1.13 | 1920 | 4.53 | 948 | 7.87 | 100 | 2 |
| | PM10 | 0.22 | 0.23 | 1920 | 4.53 | 948 | 1.58 | 100 | 2 |
| | PM2.5 | 0.20 | 0.20 | 1920 | 4.53 | 948 | 1.42 | 100 | 2 |
| | SOX | 0.15 | 0.15 | 1920 | 4.53 | 948 | 1.06 | 100 | 2 |
| | VOC | 0.00 | 0.00 | 1920 | 4.53 | 948 | 0.02 | 100 | 2 |
| | CO2eq | 444.41 | 462.92 | 1920 | 4.53 | 948 | 3233.87 | 100 | 2 |
| **Max Continuous** | CO | 0.11 | 0.11 | 1920 | 4.53 | 2507 | 0.29 | 100 | 2 |
| | NOx | 6.55 | 6.83 | 1920 | 4.53 | 2507 | 18.03 | 100 | 2 |
| | PM10 | 0.57 | 0.60 | 1920 | 4.53 | 2507 | 1.58 | 100 | 2 |
| | PM2.5 | 0.52 | 0.54 | 1920 | 4.53 | 2507 | 1.42 | 100 | 2 |
| | SOX | 0.39 | 0.40 | 1920 | 4.53 | 2507 | 1.06 | 100 | 2 |
| | VOC | 0.00 | 0.00 | 1920 | 4.53 | 2507 | 0.01 | 100 | 2 |
| | CO2eq | 1175.24 | 1224.20 | 1920 | 4.53 | 2507 | 3233.87 | 100 | 2 |

| TPY | | | | | | MTPY |
|---|---|---|---|---|---|---|
| **VOC** | **CO** | **NOx** | **PM10** | **PM2.5** | **SOX** | **CO2eq** |
| 0.02 | 1.13 | 8.02 | 0.94 | 0.84 | 0.63 | 1741.19 |

Notes:

| | |
|---|---|
| a | Emission factor source: Air Force Civil Engineer Center 2016 Air Emissions Guide for Air Force Mobile Sources |
| lb | pounds |
| EF | emission factor |
| FERF | fuel emission reduction factor |
| FFR | fuel flow rate |
| min | minutes |
| TIM | time in mode |
| tpy | tons per year |
| yr | year |

**Alternative 2**
**Aircraft HH-60G; Engine T700-GE-700**

| Mode | | tpy | lb/cycle | cycles/yr | TIM (min/cycle) | FFR (lbs fuel/hr) | EF (lb/1000 lb fuel) | FERF (%) | No. of Engines |
|---|---|---|---|---|---|---|---|---|---|
| **Ground Idle** | CO | 1.19 | 1.65 | 1440 | 8 | 134 | 46.24 | 100 | 2 |
| | NOx | 0.09 | 0.12 | 1440 | 8 | 134 | 3.36 | 100 | 2 |
| | PM10 | 0.04 | 0.05 | 1440 | 8 | 134 | 1.48 | 100 | 2 |
| | PM2.5 | 0.03 | 0.04 | 1440 | 8 | 134 | 0.98 | 100 | 2 |
| | SOX | 0.03 | 0.04 | 1440 | 8 | 134 | 1.06 | 100 | 2 |
| | VOC | 0.01 | 0.02 | 1440 | 8 | 134 | 0.5 | 100 | 2 |
| | CO2eq | 83.20 | 115.56 | 1440 | 8 | 134 | 3233.87 | 100 | 2 |
| **Flight Max** | CO | 0.24 | 0.33 | 1440 | 4.53 | 626 | 3.51 | 100 | 2 |
| | NOx | 0.81 | 1.12 | 1440 | 4.53 | 626 | 11.87 | 100 | 2 |
| | PM10 | 0.15 | 0.21 | 1440 | 4.53 | 626 | 2.22 | 100 | 2 |
| | PM2.5 | 0.06 | 0.09 | 1440 | 4.53 | 626 | 0.93 | 100 | 2 |
| | SOX | 0.07 | 0.10 | 1440 | 4.53 | 626 | 1.06 | 100 | 2 |
| | VOC | 0.00 | 0.00 | 1440 | 4.53 | 626 | 0.01 | 100 | 2 |
| | CO2eq | 220.09 | 305.68 | 1440 | 4.53 | 626 | 3233.87 | 100 | 2 |
| **Overspeed** | CO | 0.22 | 0.31 | 1440 | 4.53 | 725 | 2.81 | 100 | 2 |
| | NOx | 0.90 | 1.25 | 1440 | 4.53 | 725 | 11.43 | 100 | 2 |
| | PM10 | 0.21 | 0.29 | 1440 | 4.53 | 725 | 2.61 | 100 | 2 |
| | PM2.5 | 0.10 | 0.13 | 1440 | 4.53 | 725 | 1.21 | 100 | 2 |
| | SOX | 0.08 | 0.12 | 1440 | 4.53 | 725 | 1.06 | 100 | 2 |
| | VOC | 0.00 | 0.00 | 1440 | 4.53 | 725 | 0.01 | 100 | 2 |
| | CO2eq | 254.90 | 354.03 | 1440 | 4.53 | 725 | 3233.87 | 100 | 2 |

| TPY | | | | | | MTPY |
|---|---|---|---|---|---|---|
| VOC | CO | NOx | PM10 | PM2.5 | SOX | CO2eq |
| 0.01 | 1.65 | 1.80 | 0.39 | 0.18 | 0.18 | 506.39 |

Notes:

| | |
|---|---|
| a | Emission factor source: Air Force Civil Engineer Center 2016 Air Emissions Guide for Air Force Mobile Sources |
| lb | pounds |
| EF | emission factor |
| FERF | fuel emission reduction factor |
| FFR | fuel flow rate |
| min | minutes |
| TIM | time in mode |
| tpy | tons per year |
| yr | year |

**Alternative 2**
**Aircraft UH-1N; Engine T400-CP-400**

| Mode | | tpy | lb/cycle | cycles/yr | TIM (min/cycle) | FFR (lbs fuel/hr) | EF (lb/1000 lb fuel) | FERF (%) | No. of Engines |
|---|---|---|---|---|---|---|---|---|---|
| **Ground Idle** | CO | 0.24 | 0.51 | 960 | 8 | 136 | 27.94 | 100 | 1 |
| | NOx | 0.02 | 0.04 | 960 | 8 | 136 | 2.2 | 100 | 1 |
| | PM10 | 0.00 | 0.01 | 960 | 8 | 136 | 0.44 | 100 | 1 |
| | PM2.5 | 0.00 | 0.01 | 960 | 8 | 136 | 0.4 | 100 | 1 |
| | SOX | 0.01 | 0.02 | 960 | 8 | 136 | 1.06 | 100 | 1 |
| | VOC | 0.10 | 0.20 | 960 | 8 | 136 | 10.99 | 100 | 1 |
| | CO2eq | 28.15 | 58.64 | 960 | 8 | 136 | 3233.87 | 100 | 1 |
| **Cruise** | CO | 0.02 | 0.04 | 960 | 4.53 | 279 | 1.79 | 100 | 1 |
| | NOx | 0.05 | 0.10 | 960 | 4.53 | 279 | 4.66 | 100 | 1 |
| | PM10 | 0.00 | 0.01 | 960 | 4.53 | 279 | 0.36 | 100 | 1 |
| | PM2.5 | 0.00 | 0.01 | 960 | 4.53 | 279 | 0.32 | 100 | 1 |
| | SOX | 0.01 | 0.02 | 960 | 4.53 | 279 | 1.06 | 100 | 1 |
| | VOC | 0.00 | 0.00 | 960 | 4.53 | 279 | 0 | 100 | 1 |
| | CO2eq | 32.70 | 68.12 | 960 | 4.53 | 279 | 3233.87 | 100 | 1 |
| **Intermediate (Military)** | CO | 0.00 | 0.00 | 960 | 4.53 | 406 | 0 | 100 | 1 |
| | NOx | 0.09 | 0.18 | 960 | 4.53 | 406 | 5.91 | 100 | 1 |
| | PM10 | 0.00 | 0.01 | 960 | 4.53 | 406 | 0.25 | 100 | 1 |
| | PM2.5 | 0.00 | 0.01 | 960 | 4.53 | 406 | 0.22 | 100 | 1 |
| | SOX | 0.02 | 0.03 | 960 | 4.53 | 406 | 1.06 | 100 | 1 |
| | VOC | 0.00 | 0.00 | 960 | 4.53 | 406 | 0 | 100 | 1 |
| | CO2eq | 47.58 | 99.13 | 960 | 4.53 | 406 | 3233.87 | 100 | 1 |

| TPY | | | | | | MTPY |
|---|---|---|---|---|---|---|
| **VOC** | **CO** | **NOx** | **PM10** | **PM2.5** | **SOX** | **CO2eq** |
| 0.10 | 0.26 | 0.15 | 0.01 | 0.01 | 0.04 | 98.36 |

Notes:

| | |
|---|---|
| a | Emission factor source: Air Force Civil Engineer Center 2016 Air Emissions Guide for Air Force Mobile Sources |
| lb | pounds |
| EF | emission factor |
| FERF | fuel emission reduction factor |
| FFR | fuel flow rate |
| min | minutes |
| TIM | time in mode |
| tpy | tons per year |
| yr | year |