June

2024

Final

Environmental Assessment

Addressing Operations and Training Support Facilities and Activities at White Sands Missile Range, New Mexico

United States Army
White Sands Missile Range

OPSEC Completed: January 2024
Controlled by: Directorate of Public Works
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PRIVACY ADVISORY

This Environmental Assessment (EA) was provided for public comment in accordance with the National Environmental Policy Act of 1969 (42 United States Code § 4331 et seq.), implemented by the Council on Environmental Quality Regulations (40 Code of Federal Regulations [CFR] Parts 1500–1508) and 32 CFR Part 651, Environmental Analysis of Army Actions.

Written comments and inquiries regarding this document were directed by mail to the Department of the Army, U.S. Army Garrison White Sands Environmental Division, Building 163/DPW, ATTN: Customer Support Branch, White Sands Missile Range, NM 88002-5000, and via email to USARMYGarrisonWSMREnvironmentalAssessments@army.mil.

Public commenting allowed the Army to make better, informed decisions. Written comments are included in this Final EA. As required by law, all comments are addressed in this Final EA which was made available to the public. Providing personal information was voluntary. Personal information provided was used only to identify the desire to make a comment or to fulfill requests for copies of the EA or associated documents. Personal home addresses and phone numbers are not included in this Final EA.

FINAL FINDING OF NO SIGNIFICANT IMPACT
WHITE SANDS MISSILE RANGE, NEW MEXICO

Name of the Proposed Action: Environmental Assessment (EA) Addressing Operations and Training Support Facilities and Activities at White Sands Missile Range (WSMR), New Mexico.

Description of the Proposed Action: WSMR is proposing to construct and improve facilities and designate existing training areas to support the operations of tenant and transient units, such as the Special Operations Forces – Training and Experimentation Center (SOF-TEC), at WSMR. SOF-TEC was formally activated as a tenant directorate at WSMR, New Mexico in March 2022 under the operational control of 1st Special Forces Command to become the premier irregular warfare training and experimentation center. The Proposed Action includes the construction or improvement of barracks, shower and laundry facilities, a vehicle wash station, and a bivouac area. The Proposed Action also includes the designation of existing areas used for operational testing mission sets (i.e., when testing of various military systems is used in a tactical training environment) for training mission sets. Although no construction dates have been established, construction is anticipated to take a year to complete.

This EA considers the potential environmental impacts of the ongoing and proposed training activities conducted at WSMR to ensure the appropriate best management practices are applied during training activities and that the proposed activities remain within the scope of this EA. All training activities conducted on WSMR will continue to require the completion of an annual environmental review outlining all activities anticipated to occur within the calendar year.

Purpose and Need: The purpose of the Proposed Action is to support mission requirements of tenant and transient units, such as SOF-TEC, by improving facilities for transient troops and designating existing areas used for operational testing mission sets for training mission sets. The Proposed Action would allow units to better accommodate and provide training for a quarterly influx of up to 500 soldiers. The Proposed Action would provide tactical operations areas to field test military equipment and communication networks and train special forces in a realistic combat setting. The Proposed Action would also improve the quality of life for transient soldiers at WSMR.

The mission at WSMR continues to grow and evolve, as do demands for facility improvements. The need for the Proposed Action is to provide troop readiness and improve the quality of life for units training at WSMR.

Environmental Consequences: This EA contains the results of an impact analysis of the Proposed Action and alternatives on the environment. The environmental resources evaluated in this analysis include land use, air quality, geological resources, water resources, biological resources, cultural resources, infrastructure, hazardous materials and wastes, and safety. No significant impacts on the environment have been identified for the Proposed Action and no cumulative impacts are expected. Mitigation measures and best management practices to avoid or reduce potential impacts are described within the EA.

Conclusion: Based on the EA and consideration of the described mitigation measures, and in accordance with the guidelines for determining the significance of proposed federal actions (40 CFR § 1508.27) and Army criteria for initiating an Environmental Impact Statement (EIS) (32 CFR § 651.41), WSMR has concluded that the Proposed Action will not result in a significant

effect on the environment. Applicable federal, state, and local laws and regulations would be followed. Additionally, mitigation measures would include consulting with the U.S. Fish and Wildlife Service regarding migratory bird and eagle provisions, implementing control measures for the possible dissemination of invasive plant species during ground-disturbing activities, revegetating disturbed areas with native vegetation to further reduce the establishment of invasive species, implementing erosion control measures to reduce potential impacts, among others detailed in this EA. The Army and WSMR have determined that an EIS pursuant to the National Environmental Policy Act is not required, and this Finding of No Significant Impact is hereby submitted.

20 MAY 2024

David A. Mitchell
Colonel, U.S. Army
Commanding

Date

U.S. ARMY WHITE SANDS MISSILE RANGE
WHITE SANDS MISSILE RANGE, NEW MEXICO 88002-5048
ENVIRONMENTAL ASSESSMENT

Title: Environmental Assessment Addressing Operations and Training Support Facilities and Activities at White Sands Missile Range, New Mexico.

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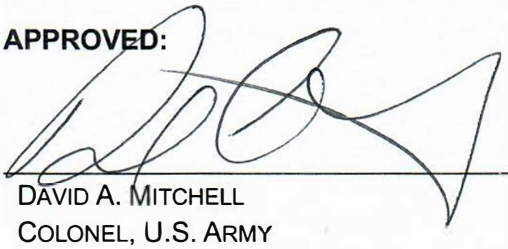

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14. ABSTRACT

This Environmental Assessment supports a proposal by U.S. Army Garrison (USAG)-WSMR to construct and improve facilities and designate existing training areas to support the operations of tenant and transient units, such as the Special Operations Forces – Training and Experimentation Center (SOF-TEC), at WSMR. SOF-TEC was formally activated as a tenant directorate at WSMR, New Mexico in March 2022 under the operational control of 1st Special Forces Command to become the premier irregular warfare training and experimentation center. The Proposed Action includes the construction or improvement of barracks, shower and laundry facilities, a vehicle wash station, and a bivouac area. The Proposed Action also includes the designation of existing areas used for operational testing mission sets (i.e., when testing of various military systems is used in a tactical training environment) for training mission sets. Although no construction dates have been established, construction is anticipated to take a year to complete.

15. SUBJECT TERMS

Environmental Assessment, Infrastructure Improvements, Training Activities, Operations Support

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
ACM	asbestos-containing material
AFFF	aqueous film forming foam
AOPI	Area of Potential Interest
APE	area of potential effects
Army	U.S. Army
BCC	Bird of Conservation Concern
BMP	best management practice
CAA	Clean Air Act
CC	Compliance-Related Cleanup
CEMA	Cyber-Electromagnetic Activities
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	equivalent emissions of CO_2
CWA	Clean Water Act
DoD	Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESMC	Endangered Species Management Component
FARP	Forward Arming and Refueling Point
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
GIS	Geographic Information System
GPS	global positioning system
HSR	Human Systems Research, Inc.
INCRMP	Integrated Natural and Cultural Resources Management Plan
INRMP	Integrated Natural Resource Management Plan
IPaC	Information for Planning and Consultation
IPM	Integrated Pest Management
IR	Installation Restoration
LBP	lead-based paint
LUASP	Land Use and Air Space Strategy Plan
MBTA	Migratory Bird Treaty Act
MGPY	million gallons per year
MR	Munitions Response
MSS	Mission-sensitive Species
MWEPA	Mexican Wolf Experimental Population Area
N/A	not applicable
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NIE	Network Integration Evaluation
NMCRIS	New Mexico Cultural Resources Inventory System

NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NOP	North Oscura Peak
NO_X	nitrogen oxides
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
O_3	ozone
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Act
PA	Preliminary Assessment
PCB	polychlorinated biphenyl
pCi/L	picocuries per liter
PFAS	per- and polyfluoroalkyl substances
PIF	Partners in Flight
PM_{10}	particulate matter measured less than or equal to 10 microns in diameter
$PM_{2.5}$	particulate matter measured less than or equal to 2.5 microns in diameter
PPE	personal protective equipment
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RF	radio frequency
SARC	Small Arms Range Complex
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer
SI	Site Inspection
SMR	Small Missile Range
SOF-TEC	Special Operations Forces – Training and Experimentation Center
SOP	Standard Operating Procedure
SO_X	sulfur oxides
TCP	Traditional Cultural Property
tpy	tons per year
USAG	U.S. Army Garrison
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UXO	Unexploded Ordnance
VEC	Valued Environmental Components
VOC	volatile organic compound
WOTUS	Waters of the United States
WSMR	White Sands Missile Range
WSMRR	WSMR Regulation
WSNP	White Sands National Park

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1 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

White Sands Missile Range (WSMR) is located within a remote region of southern New Mexico (see **Figure 1-1**). The installation encompasses approximately 2.2 million acres within a contiguous boundary, extending approximately 118 miles north to south and 40 miles east to west. The installation spans five counties in New Mexico to include Socorro, Sierra, Doña Ana, Otero, and Lincoln. Terrain at WSMR is diverse and the elevation across the installation ranges from 3,887 to 8,500 feet above mean sea level.

The terrain at WSMR consists of mountains and canyons, dunes, lava flows, semi-arid yucca and grassland basins, large playas, scattered springs, riparian areas, and man-made earthen tanks. Highway 70 crosses the southern portion of the installation. WSMR is bordered by mountains to the west, Fort Bliss to the south, and Holloman Air Force Base to the east. The largest populated community to the south of WSMR is El Paso, Texas; to the southwest is Las Cruces, New Mexico; to the northwest is Socorro, New Mexico; and to the east is Alamogordo, New Mexico.

WSMR has a tri-service installation presence (Army, Air Force, and Navy) and is managed and supported by the U.S. Army Garrison (USAG) WSMR. WSMR encompasses the White Sands Test Center, a Major Range and Test Facility Base, and is used to support research, development, test, and evaluation of military systems and similar high-technology commercial products. WSMR currently functions as an outdoor laboratory consisting of a large complex of test ranges, launch sites, impact areas, and instrumentation sites.

This Environmental Assessment (EA) details the proposed activities under the Proposed Action. The EA is a planning and decision-making tool that will be used to guide WSMR in deciding how to implement the Proposed Action in a manner that complies with all applicable federal, state, and local environmental laws and regulations and is consistent with U.S. Army (Army) standards for environmental stewardship.

This EA supports a proposal by WSMR to construct and improve facilities and designate existing training areas to support the operations of tenant and transient units, such as the Special Operations Forces – Training and Experimentation Center (SOF-TEC), at WSMR. SOF-TEC was formally activated as a tenant directorate at WSMR, New Mexico in March 2022 under the operational control of 1st Special Forces Command to become the premier irregular warfare training and experimentation center (SOF News 2022).

The Proposed Action includes the construction or improvement of barracks, shower and laundry facilities, a vehicle wash station, and a bivouac area. The Proposed Action also includes the designation of existing areas used for operational testing mission sets (i.e., when testing of various military systems is used in a tactical training environment) for training mission sets. Although no construction dates have been established, construction is anticipated to take a year to complete. The EA will consider the potential environmental impacts of the ongoing and proposed training activities conducted at WSMR. To comply with WSMR Regulation (WSMRR) 200-2, *Environmental Protection During Military & Non-Military Activities*, all training activities will continue to require the completion of annual environmental review outlining all activities anticipated to occur within the calendar year. The environmental review process affords the installation the ability to quantify operational tempo, determine specific permitting needs (i.e., smoke management), monitor land conditions, and determine when restoration efforts need to be applied.

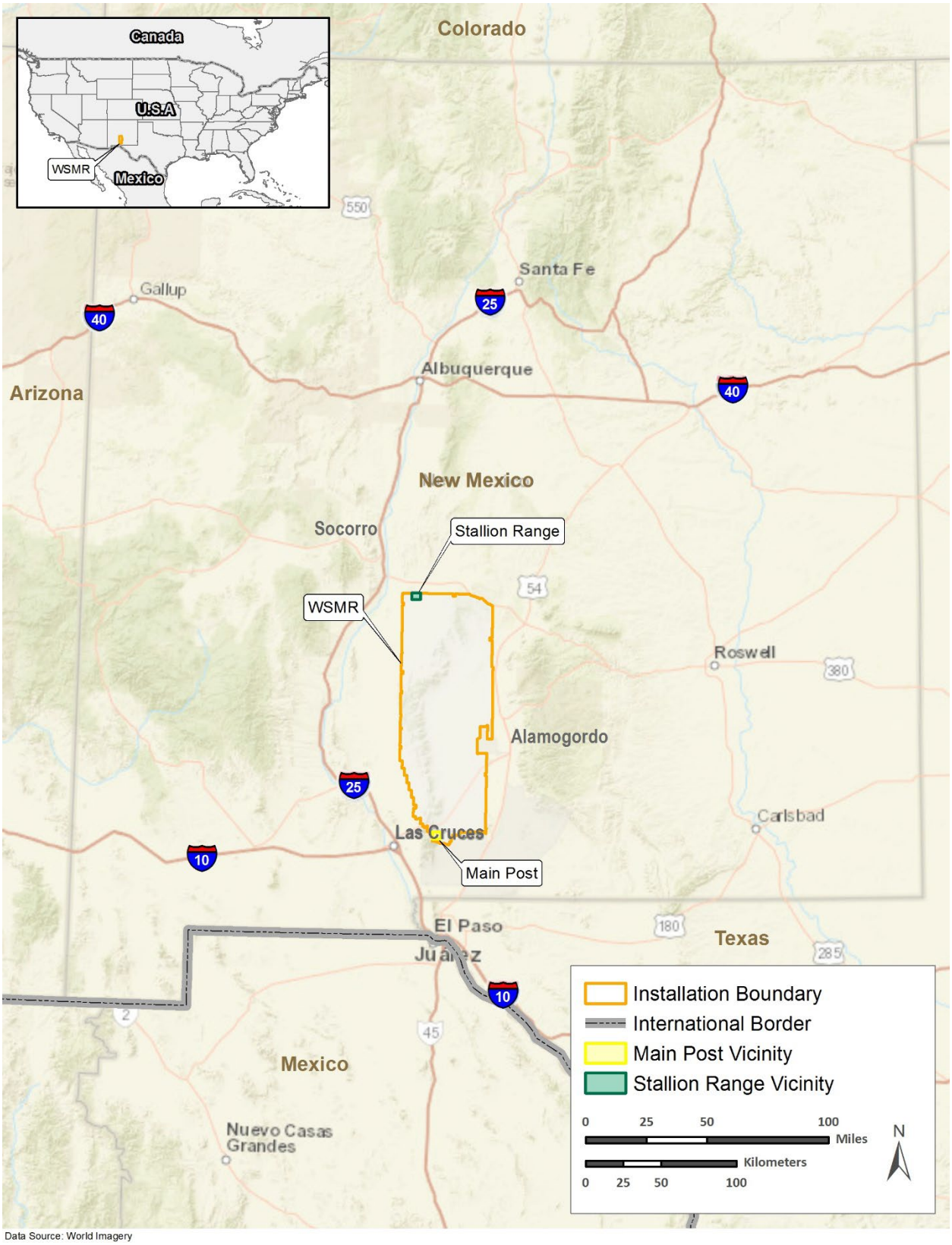

Figure 1-1. WSMR Vicinity Map

1.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to support mission requirements of tenant and transient units, such as SOF-TEC, by improving facilities for transient troops and designating existing areas used for operational testing mission sets for training mission sets. The Proposed Action would allow units to better accommodate and provide training for a quarterly influx of up to 500 soldiers. The Proposed Action would provide tactical operations areas to field test military equipment and communication networks and train special forces in a realistic combat setting. The Proposed Action would also improve the quality of life for transient soldiers at WSMR.

The mission at WSMR continues to grow and evolve, as do demands for facility improvements. The need for the Proposed Action is to provide troop readiness and improve the quality of life for units training at WSMR.

1.3 DECISION TO BE MADE

The EA evaluates whether the Proposed Action would result in significant impacts on the environment. If significant impacts are identified, WSMR would undertake mitigation to reduce impacts to below the level of significance, undertake the preparation of an Environmental Impact Statement (EIS) addressing the Proposed Action, or abandon the Proposed Action. If significant impacts are not identified, then the EA would be finalized and the EA and Finding of No Significant Impact (FONSI) would be signed. The decision would be made by the approving official and could incorporate the Proposed Action, its alternatives, or any combination of the Proposed Action and alternatives. The EA is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code 4331 et seq.), implemented by the Council on Environmental Quality Regulations (40 Code of Federal Regulations [CFR] Parts 1500–1508) and 32 CFR Part 651, *Environmental Analysis of Army Actions*.

1.4 RELATED ENVIRONMENTAL DOCUMENTATION

Army policy (32 CFR § 651.12 and 40 CFR §§ 1502.21 and 1508.28) allows tiering, or incorporation of existing EAs or completed analysis, into other NEPA documents. Tiering allows analysis of actions at a programmatic level for those actions that are similar in nature be used in other analysis efforts in order to keep environmental documents brief (40 CFR §1501.11). Tiering eliminates repetitive discussions of the same issues and allows analysis to focus on the key issues at each level of project review. Existing documents that have been reviewed and incorporated by reference in this EA are listed below. **Table 1-1** also describes the activities relevant to SOF-TEC that are covered under each of the listed NEPA documents.

- *Final Environmental Assessment for 2nd Engineering Battalion Transition at White Sands Missile Range, New Mexico,* July 2007 (WSMR 2007). Hereafter referred to as the 2nd Engineering Battalion EA.
- *Final Environmental Impact Statement for Development and Implementation of Range-Wide Mission and Major Capabilities at White Sands Missile Range, New Mexico*, Volumes 1 and 2, November 2009 (WSMR 2009a). Hereafter referred to as the Range-Wide EIS.
    - EIS adopted the WSMR Land Use and Air Space Strategy Plan (LUASP), which evaluates the suitability of various land use categories with specific military activities. The Proposed Action will require the use of several different land use areas as defined in the LUASP.

- *Final Environmental Assessment for Brigade Combat Team Modernization: Mountain Village Site Program on White Sands Missile Range, New Mexico*, June 2010 (WSMR 2010). Hereafter referred to as the Mountain Village EA.
- *Final Environmental Assessment Network Integration Evaluation White Sands Missile Range, New Mexico*, May 2011 (WSMR 2011). Hereafter referred to as the Network Integration Evaluation (NIE) EA.

Table 1-1. WSMR Activities Approved in Previous NEPA Documents

NEPA Document	Activity	Designated Area
2nd Engineering Battalion EA	Construction of barracks for 296 soldiers	Main Post
Mountain Village EA	Use of a specialized area	Mountain Village
	On-road vehicle use (including use of unmanned ground vehicles)	
	Off-road vehicle use (including use of unmanned ground vehicles)	
	Dismounted operations (including urban entering, clearing operations, foot patrols)	
	Field Operations (including use of unattended ground sensors)	
	Directed energy systems	
	Instrumentation and Communication systems	
	Air vehicle operations (including reconnaissance by unmanned aerial vehicles)	
	Smoke grenades, chaff, and pyrotechnics (including blank rounds)	
Range-Wide EIS[1, 2, 3]	On-road vehicle use	Land Use C
	Off-road vehicle use	Land Use C
	Dismounted operations	Land Use C
	Field operations	Land Use C
	Small arms weapons training	Land Use C
	Surface weapons firing	Land Use A, C, E, F, H, J, K, M, N, O, P, Q
	Directed energy systems	Land Use A, C, E, F, H, J, K, M, N, O
	Instrumentation and communication systems	Land Use C
	Air vehicle operations	Land Use A, C, E, F, G, H, J, K, M, N, O
	Surface danger zones	Land Use A, C, E, F, H, J, K, M, N, O, P, Q

NEPA Document	Activity	Designated Area
NIE EA	Live fire training	Fort Bliss, Mine Site
	Brigade headquarters and support	Condron Field, Network Integration Sites 1, 2, and 3
	Operational objectives[4]	Mountain Village, Yucca Village, Ben Site, Lee Site, Thurgood Site

[1] Refer to Table 5-1 in the Range-Wide EIS for land use capabilities. Refer to Table 2.2-2 in the Range-Wide EIS for detailed descriptions of activities.
[2] Land Use Classifications per the Range-Wide EIS: A = Primary Test Zone, B = Range Centers and Build-Up Area, C = Augmented Test Zone, E = Lava Flows, F = Jornada Experimental Range, G = White Sands National Park Co-Use Area; H = Conservation/Protected Area, J = Special Call-Up Area, K = General Call-Up Area, M = Restricted Area Airspace Only (overlying DoD areas), N = Restricted Area Airspace Only (outside DoD areas), O = High Altitude Restricted Area Airspace, P = Unrestricted Airspace, Q = Non-Contiguous WSMR Land.
[3] In the Range-Wide EIS (Figure 5-1), the Augmented Test Zone (Land Use C) encompasses Mountain Village, Yucca Village, Condron Field, North Oscura Peak, Mine Site, and Training Area off Route 213. The Range Camps and Built-Up Area (Land Use B) includes Main Post and Small Arms Range 19008. Certain activities are limited to Specialized Use Areas within a given Land Use Area. Some specialized areas are Mine Site, North Oscura Peak, and Small Arms Range 19008.
[4] Operational objectives include on- and off-road vehicle use, dismounted and field operations, surface weapons firing (surface to surface), instrumentation and communication systems, weapons impacts, surface danger zone, airspace danger zone, air vehicle operations.

1.5 COORDINATION AND CONSULTATION

Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416, requires federal agencies to provide opportunities for consultation by elected officials of state and local governments that would be directly affected by a federal proposal. In compliance, WSMR notified relevant stakeholders about the Proposed Action and alternatives. EO 13175, *Consultation and Coordination with Indian Tribal Governments*, directs federal agencies to coordinate and consult with Native American tribal governments whose interests may be directly and substantially affected by activities on federally administered lands. In compliance, federally recognized tribes that are historically affiliated with the geographic region were invited to consult on all proposed undertakings.

Further, per the requirements of Section 106 of the National Historic Preservation Act (NHPA) and implementing regulations (36 CFR Part 800), Section 7 of the Endangered Species Act (ESA) and implementing regulations (50 CFR Part 17), and the Migratory Bird Treaty Act (MBTA) (50 CFR Part 21), findings of effect and a request for concurrence were transmitted to the State Historic Preservation Officer (SHPO) and the U.S. Fish and Wildlife Service (USFWS).

The Draft FONSI was published in the *El Defensor Chieftain*, *Las Cruces Sun-News*, and *Alamogordo Daily News* announcing the availability of the Draft EA. Letters were provided to relevant stakeholders informing them that the Draft EA was available for review. Publication of the Draft FONSI initiated a 30-day comment period.

The Draft EA and FONSI were made digitally available on the WSMR Garrison Publication website under Environmental Documents at https://home.army.mil/wsmr/index.php/about/garrison/directorate-public-works-dpw/environmental. Hard copies of the Draft EA and FONSI were made available by request. Additionally, hard copies were also available for review at the following libraries:

Alamogordo Public Library
920 Oregon Avenue
Alamogordo, NM 88310

Socorro Public Library
401 Park Street
Socorro, NM 87801

Thomas Branigan Memorial Library
200 E. Picacho Avenue
Las Cruces, NM 88001

El Paso Public Library – Armijo Branch
620 E 7th Street
El Paso, TX 79901

WSMR Post Library
Dyer Street, Building 465, Room 113
White Sands Missile Range, NM 88002

At the closing of the public review period, applicable comments from the public and interagency and intergovernmental coordination/consultation were incorporated into the analysis of potential environmental impacts performed as part of this Final EA, where applicable, and included in **Appendix A**. A total of three responses were received during the review period:

- **San Andres National Wildlife Refuge.** San Andres National Wildlife Refuge noted that they reviewed the Draft EA and stated that they had no comments on the document but appreciated the invite to review.
- **New Mexico Department of Game and Fish.** The New Mexico Department of Game and Fish (NMDGF) reviewed the Draft EA and recommended implementing the general trenching conservation measures outlined in their Trenching Project Guidelines to help minimize unnecessary mortality of wildlife. Additional BMPs were recommended and have been included in the Final EA (see **Section 3.7.2**).
- **New Mexico Environment Department.** The New Mexico Environment Department (NMED) reviewed the Draft EA and offered additional thoughts regarding potential impacts on air quality, solid waste, groundwater, surface water quality, and petroleum storage tanks. These concerns were addressed in the appropriate sections of this Final EA.

2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 SELECTION CRITERIA

The scope, location, and suitability of each project and activity and their alternatives will undergo review by internal and external stakeholders. Potential alternatives were evaluated against three selection criteria:

- **Selection Criterion 1:** The alternative(s) must meet the purpose of and need for the Proposed Action (see **Section 1.2**). Alternatives must also satisfy the purpose of and need for each individual activity. Proposed activity would not adversely impact the current mission and proposed training area(s) would have the topographic setting that would be compatible with real-world deployment scenarios.
- **Selection Criterion 2:** The alternative(s) must comply with all applicable requirements.
- **Selection Criterion 3:** The alternative(s) shall not have any direct or indirect adverse impacts on safety, cultural or natural resources, or other environmental constraints such as impacts on an environmental restoration site. Sites must meet anti-terrorism setbacks and other safety criteria (e.g., height restrictions, airfield clear zones, surface danger zones).

2.2 DETAILED DESCRIPTION OF THE ALTERNATIVES

2.2.1 Proposed Action

WSMR proposes to construct or improve mission support facilities to accommodate a quarterly influx of up to 500 soldiers at a given time and designate training areas at WSMR for use by tenant and transient units. The facilities proposed for construction or improvement include barracks, shower and laundry facilities, a vehicle wash station, and a bivouac area. Construction projects would be engineered, designed, constructed, and maintained to protect the natural hydrology of the project areas. Proposed training activities include outdoor classroom training, air vehicle operations, small arms range weapons training, maneuver live fire, and Cyber-Electromagnetic Activities (CEMA) exercises. The Proposed Action consists of the activities listed in **Table 2-1** and are described in detail in subsequent sections. Locations for these activities are shown in **Figure 2-1** and detailed figures are provided in **Appendix B**. Some of these activities have been conducted by different groups at WSMR in the past and analyzed for impacts in previous NEPA documents. Therefore, some of the proposed activities described in **Table 2-1** will not be discussed in the Environmental Consequences discussion in **Section 3.0** of the EA.

Table 2-1. Projects and Activities Associated with the Proposed Action

Project/ Activity	Description	Status of NEPA Evaluation
Construction or Improvement of Mission Support Facilities		
Project 1	Construct barracks and mobile shower facilities at Main Post	To be evaluated in this EA
Project 2	Construct permanent shower and laundry facility at Main Post	To be evaluated in this EA
Project 3	Construct vehicle wash rack east of Main Post	To be evaluated in this EA
Project 4	Renovate North Oscura Peak (NOP) buildings for bivouac area	To be evaluated in this EA
Training Activities		
Activity 1	Outdoor classroom training	Analyzed in the NIE EA
Activity 2	Air vehicle operations	Analyzed in the Range-Wide EIS

Project/ Activity	Description	Status of NEPA Evaluation
Activity 3	Small arms weapons training	Analyzed in the Range-Wide EIS
Activity 4	Maneuver live fire training	To be evaluated in this EA
Activity 5	Maneuver fire with simunition training	To be evaluated in this EA
Activity 6	CEMA exercises	To be evaluated in this EA

2.2.1.1 Construction and Improvement of Mission Support Facilities

Project 1: Construct Barracks and Mobile Shower Facilities at Main Post. WSMR proposes to construct standard design barracks, and modular and mobile shower facilities for 500 transient troops. The facilities would be located within a previously disturbed area of the Main Post near the intersection of Hughes and St. Louis Streets (see **Appendix B** for a detailed map of Main Post). Construction would include trenching for associated utilities. The barracks would measure approximately 176,000 square feet and cover approximately 2.79 acres. Tents currently set up in the area to provide temporary sleeping quarters for soldiers would be removed once construction is complete.

The barracks would be three stories and include sleeping rooms, restrooms, laundry area(s), classrooms, and storage rooms. The barracks would include fire protection, detection, and alarm systems, as well as antiterrorism protection measures. Support infrastructure would include electrical, natural gas, water and sewer services, security lighting, fire protection, paving, parking, sidewalks, curbs and gutters, storm drainage, signage and information systems, site improvements, and landscaping. Heat and air conditioning would be provided via self-contained systems. Facilities would be designed for a minimum life of 40 years in accordance with Unified Facilities Criteria 1-200-02, *High Performance and Sustainable Buildings Requirements*.

During the construction period, existing tents and a laydown yard would be staged in previously disturbed areas near the location of the proposed facility. Soil stability would be analyzed prior to construction. If deemed unsuitable, existing soil would be excavated and replaced with engineered fill material.

Project 2: Construct Permanent Shower and Laundry Facility at Main Post. WSMR proposes to construct a shower facility that would include laundry and showers to replace existing temporary facilities located on the Main Post at the corner of Watertown Avenue and Hughes Street (see **Appendix B** for a detailed map of Main Post). Construction would include trenching for associated utilities. This shower facility is associated with the existing tents to be replaced under Activity 1. The new permanent facility would cover approximately 0.80 acres. It would include showers and laundry facilities and accommodate up to 20 people.

Project 3: Construct Vehicle Wash Rack East of Main Post. WSMR proposes to construct a vehicle wash rack, which would cover approximately 0.98 acres, east of the Main Post (see **Appendix B** for a detailed map of Main Post). Construction would include trenching for associated utilities. The vehicle wash rack would fulfill the need for invasive species control analyzed in the Range-Wide EIS. The concrete vehicle wash rack would be designed to remove contaminants, oil, and medium to heavy loads of mud from vehicles as large as Heavy Expanded Mobility Tactical Trucks, which are 8-wheel drive, 10-short ton tactical trucks measuring 32.6 feet long with a wheelbase of 16 feet. The wash rack would also have a closed water collection system that reclaims the used water. If the wash rack is covered for sun protection, the cover would need to be wind proof.

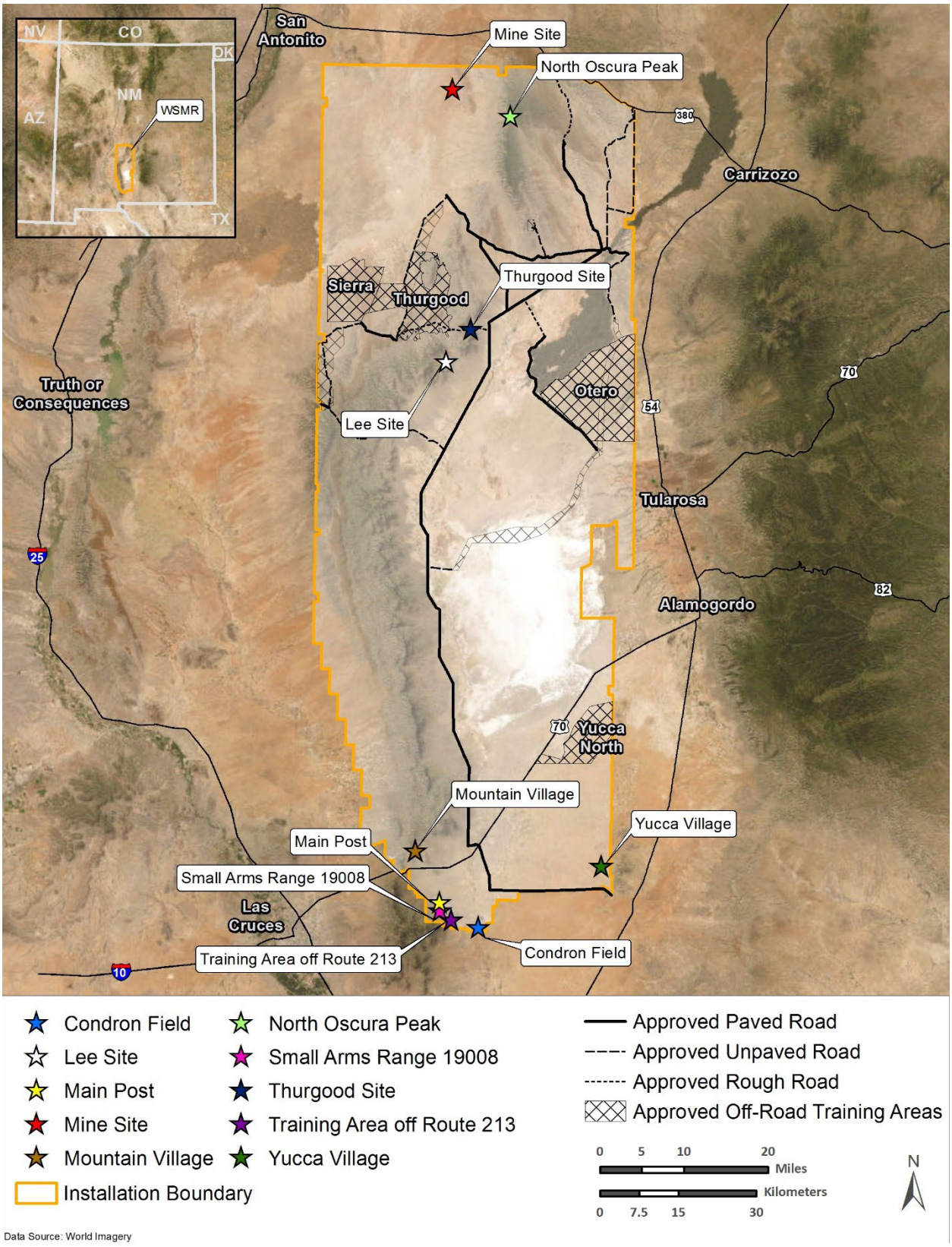

Figure 2-1. Location of Proposed Designated Training Areas

Project 4: Renovate North Oscura Peak (NOP) Buildings for Bivouac Area. Buildings at NOP in the northern portion of the North Oscura Range Center would be repurposed for a bivouac area (see **Appendix B** for a detailed map of NOP). A bivouac area provides a place on the range where troops can stay during extended training events. The bivouac area would include pads for General Purpose tents that would be placed in approved pre-existing disturbed areas. Internal renovations to the existing buildings would be required at NOP. Building renovations would include upgrades to the water system, replacement, or upgrades to the septic systems, painting, minor repairs, and new appliances. Construction could include trenching for associated utilities. WSMR would renovate the existing barracks and provide amenities such as beds, showers, bathrooms, kitchen, and recreation space. Demolition may be required if it is cost prohibitive to refurbish the existing facilities and would follow Army's facility reduction procedures.

2.2.1.2 Training Activities and Designated Areas

WSMR proposes to designate training areas for use by tenant and transient units at WSMR (see **Appendix B** for detailed maps). **Table 2-2** shows the designated training area and the type of activity proposed at each area. Additional information about each designated area and the proposed training activities to be conducted at WSMR is provided in the following sections.

2.2.1.2.1 Designated Training Areas

Training Area off Route 213. This training area, also known as Forward Operating Base Steel, is a 37-acre parcel of land south of Main Post off Route 213 (see **Appendix B** for a detailed map of the training area). The area is fenced and has a pole barn that would be used to store/shelter 'VISMONT' (simulated training targets). Existing dilapidated conex structures at this facility would be removed and replaced with new conex structures.

Condron Field. The airfield is located 4 miles southeast of Main Post (see **Appendix B** for a detailed map of the airfield). In 2009, the airfield supported an average of four fixed-wing aircraft takeoffs and landings per day and supported up to 40 per day during major exercises. Currently, the airfield is used less frequently. Condron Field utilizes two runways: 09/27, a 6,125-foot asphalt strip, and 01/19, a 4,250-foot gravel strip.

Mine Site. The site is an 8.7-acre training area located on the far northern end of WSMR. It has been previously used as a warrior training course and small arms range (see **Appendix B** for a detailed map of Mine Site). Due to its distance from the Main Post, the site is less accessible for daily activities. Locally, Mine Site is known as Mine Site Small Arms Range Complex (SARC). The site is operated and maintained by the New Mexico National Guard; therefore, coordination with the New Mexico National Guard would be required for use of the site. Additionally, training activities at the Mine Site SARC would require scheduling.

Small Arms Range 19008. The range is an 18.06-acre training area located south of Main Post that is used for small arms weapons training (see **Appendix B** for a detailed map of the small arms range). Locally, the range is known as the SARC. The range is suitable for small arms. The range is operated and maintained by the USAG Department of Plans, Training, Mobilization, and Security. Training activities at the Small Arms Range would require scheduling.

Mountain Village. Mountain Village is a mock walled village covering approximately 398.5 acres. It includes buildings, marketplaces, courtyards, alleyways, a town center, and streets. Village buildings consist of prefabricated conex boxes. There are also access roads, a helicopter landing area, an emergency evacuation point, multiple small off-road maneuver boxes, and a forward operating base. The area is used for battlefield simulations, reconnaissance activities, and search

Table 2-2. Training Activities and Designated Areas

Activity	Training Area off Route 213	Condron Field	Mine Site	Small Arms Range 19008	Mountain Village	Yucca Village	Lee Site	Thurgood Site	Range-Wide (Land Use C)[1]
Activity 1: Outdoor classroom training	X								
Activity 2: Air vehicle operations		X	X		X	X	X	X	X
Activity 3: Small arms weapons training			X	X					
Activity 4: Maneuver live fire					X				
On-road vehicle training (mobility)	X	X			X	X	X	X	X
Designated off-road vehicle training		X			X	X	X	X	X
Dismounted and field operations	X	X			X	X	X	X	X
Instrumentation and communications systems operations	X	X			X	X	X	X	X
Surface danger zones	X	X			X	X	X	X	X
Activity 5: Maneuver fire with simunition[2]					X	X	X	X	
Activity 6: CEMA exercises					X	X	X	X	

[1] Refer to the Range-Wide EIS for activities analyzed and approved within specific Specialized Use Areas and Land Use Areas at WSMR. Land Use C encompasses most of the designated training areas, except for Small Arms Range 19008 and Main Post, which fall under Land Use B.
[2] Maneuver fire with simunition training includes the same components as the live-fire training: on- and off-road vehicle training, dismounted and field operations, instrumentation and communications systems operations, and creation of surface danger zones.

and clear operations. Mountain Village is located northwest of the Main Post (see **Appendix B** for a map of Mountain Village).

Yucca Village. Yucca Village is a mock walled village, covering approximately 9.68 acres that consists of buildings, marketplaces, courtyards, alleyways, a town center, and streets like Mountain Village. Yucca Village is located northeast of the Main Post (see **Appendix B** for a map of Yucca Village). The site is located within a Category 3 Unexploded Ordnance (UXO) hazard area; therefore, UXO may be present and necessary precautions would need to be taken.

Thurgood Site. Thurgood Site consists of approximately 20 acres and was originally identified for operational testing activities within a rugged canyon in the San Andres Mountains (see **Appendix B** for a detailed map of the Thurgood Site). The canyon has a relatively broad floor with very steep towering slopes turning to vertical cap-rock at the uppermost elevations. The cliffs have hanging vegetative gardens throughout. Vegetation is dominated by mixed lowland desert scrub, desert grasses, and woodlands in the higher elevations. The canyon drains into Salt Creek, which is White Sands pupfish habitat, and is very dynamic because of the amount of ephemeral water that moves through the system during periodic, intense rainstorms.

Lee Site. Lee Site consists of approximately 20 acres and was originally identified for operational testing activities within a rugged canyon in the San Andres Mountains (see **Appendix B** for a detailed map of the Lee Site). The canyon has a relatively broad floor with very steep towering slopes turning to vertical cap-rock at the uppermost elevations. Vegetation is similar to the Thurgood Site. There is a historic ranch in the canyon; however, it is an off-limits area for training. Objectives would consist of temporary structures and defensive positions similar to Mountain Village.

WSMR Road Network. WSMR has approximately 700 miles of roads to maneuver into designated off-road training areas (see **Appendix B** for a map of the WSMR road network).

2.2.1.2.2 Training Activities

Activity 1: Outdoor Classroom Training. Units would hold pre-training rehearsals similar to the exercises analyzed in the NIE EA. These exercises include the evaluation and testing of field equipment which may require ground disturbance, as well as dry run field exercises.

Activity 2: Air Vehicle Operations. Training units would use designated areas for the takeoff and landing of aircraft, including helicopters, C-130s, unmanned aerial vehicles, unmanned aircraft systems, as well as for other air vehicle operations. The units would need to stage a temporary Forward Arming and Refueling Point (FARP) at Condron Field. The FARP would provide fuel and ammunition necessary for the sustainment of aviation maneuver units during operations. The Range-Wide EIS evaluated the use of certain airfields, including Condron Field, for test and training purposes.

Activity 3: Small Arms Weapons Training. Training units would hold small arms weapons training at WSMR. Both the proposed designated areas, Mine Site and Small Arms Range 19008, have been analyzed for small weapons practice in the Range-Wide EIS. The training would be carried out during the day and night.

Activity 4: Maneuver Live Fire Training. Maneuver live fire exercises would be used to train and test soldiers on the skills necessary to detect, identify, engage, and hit stationary and moving infantry targets. Soldiers would perform reconnaissance from observation posts and then move upon the objective sites to assault the personnel posing as opposition forces. Soldiers would advance towards their targets on foot, using tactical vehicles, or unmanned aerial systems. Firing

distance would range from 500 to 0 meters from the target. Additionally, sensors would be placed in the village to simulate noises and inject smoke typical with combat activities. Sniper training would occur during the day and night and would involve the use of five to six self-standing, steel targets. The targets are mobile and would be removed after an exercise. A typical sniper training event would involve a maximum of 20 rounds of .300 Winchester Magnum, 7.62 NATO, simunitions, blanks, and universal training munitions.

Approximately 100 personnel would be involved in the live fire exercises. Exercises would require 1 day for site preparation, 12 iterations of the 1-hour assault exercises with up to 6 companies per iteration, and half a day for cleanup and recovery. Exercises would be held during the day and night, approximately once per quarter, and would require pack-in/pack-out procedures to include the cleanup and proper disposal of brass, lead, and other debris. Pack-in/pack-out procedures would be coordinated with the Environmental Division Compliance Branch.

Training units would use the WSMR road network to conduct on- and off-road vehicle training. Approved off-road training areas are located within Sierra, Thurgood, Otero, and Yucca North (see **Figure 2-2**). Use of off-road training areas would involve maneuvering vehicles through designated operational areas at WSMR during mounted and dismounted force-on-force training exercises. Operational areas have been previously identified in the NIE EA and include Mountain and Yucca villages and Ben, Lee, and Thurgood Sites. Approximately 1 percent of the road network would require the development of pullouts. Off-road training and pull-out development would be limited to designated off-road areas that have no jurisdictional, environmental, or other constraints, which would be determined through the environmental review process.

Some dismounted and field operations may be necessary for soldier maneuvers, special forces operations, environmental conservation actions, and recovery operations. Ground disturbance, such as digging, may be necessary during some operations.

Soldiers would use non-hazardous electromagnetic equipment and other systems, such as emitters, radars, microwave equipment, target control, telemetry, optical tracking, and communications systems.

Soldiers would also create safety hazard zones to assist with the evacuation of personnel on the ground during designated missions and events.

Activity 5: Maneuver Fire with Simunition Training. Simunition, short for simulated ammunition, is the replacement of live fire ammunition with non-lethal marked or blank rounds. Sensors would be placed in the village to simulate noises and inject smoke typical with combat activities. The training would be carried out during the day and night, approximately once per quarter, and would require pack-in/pack-out procedures to include the cleanup and proper disposal of brass, lead, and other debris. Pack-in/pack-out procedures would be coordinated with the Environmental Division Compliance Branch.

Maneuver fire with simunition training would include the same components as the live-fire training. These components are on- and off-road vehicle training, dismounted and field operations, instrumentation and communications systems operations, and creation of surface danger zones.

Activity 6: CEMA Exercises. Training units would incorporate the following CEMA exercises at WSMR. Activities would include:

- Use of non-ionizing radio frequency (RF) radiation including directed energy threats;

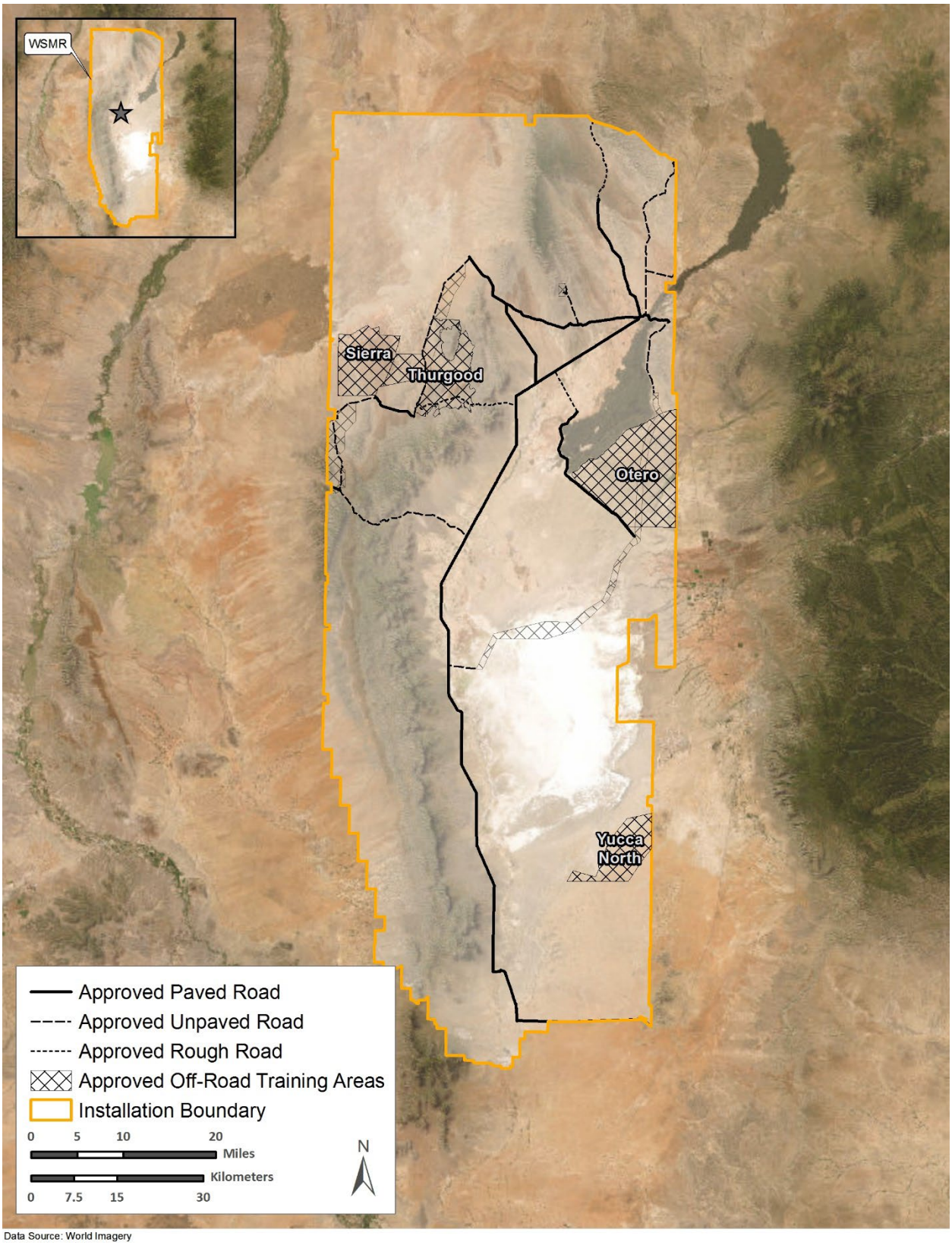

Figure 2-2. Designated Off-Road Training Areas at WSMR

- Unconfined use of directed energy weapons, devices, and countermeasures;
- Non-destructive electromagnetic attack measures;
- Digital reconnaissance – passive surveys of the electromagnetic spectrum, to include Digital Force Protection of Friendly emissions;
- Pattern of life development (RF signal identification, monitoring, and characterization);
- Assault force – electromagnetic attack of opposition force's RF systems, signals, position, timing and navigation (global positioning system [GPS]) system, lasers, and passive characterization of digital environment;
- Opposition force – electromagnetic attack of friendly RF systems, signals, position, timing and navigation (GPS) system, lasers, and passive characterization of digital environment;
- Testing and evaluation of GPS-user equipment and integrated GPS-based guidance and navigation systems.

Cyber activities would be implemented via ground-based platforms such as mounted and dismounted, and aerial platforms such as air-to-ground advanced tactical laser. It would include operations at outdoor directed energy test beds. Training would be carried out during the day and night.

2.2.1.3 Projects and Activities to be Evaluated in this EA

Many activities associated with the Proposed Action have been analyzed for environmental impacts in previous NEPA documents as outlined in **Section 1.4**.

The projects and activities that would be evaluated as part of this Proposed Action include:

- Project 1: Construct barracks to accommodate up to 500 soldiers;
- Project 2: Construct permanent shower and laundry facilities;
- Project 3: Construct vehicle wash rack east of Main Post;
- Project 4: Renovate NOP buildings for bivouac area;
- Activity 4: Maneuver live fire training;
- Activity 5: Maneuver fire with simunition training; and
- Activity 6: CEMA exercises.

2.2.2 No Action Alternative

Under the No Action Alternative, WSMR would lack the proper infrastructure to accommodate and provide training for a quarterly influx of up to 500 soldiers and provide troop readiness and improve the quality of life for units training at WSMR. Soldiers would be limited to existing facilities and training grounds and any activities that have been evaluated by previous NEPA documents. The No Action Alternative would not meet the purpose of or need for the Proposed Action as described in **Section 1.2**.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

The following alternatives were eliminated from further consideration based on the selection criteria outlined in **Section 2.1** and other reasons as explained below.

2.3.1 Alternative for Training at Mountain and Yucca Villages

WSMR considered the option of holding all training activities planned for Mountain and Yucca villages to be held at Fort Bliss. These activities would include training with simulated sensors and noises, as well as live fire and light explosives. However, holding trainings at Fort Bliss would cause scheduling conflicts with existing Army activities, which would fail to meet Selection Criterion 1.

2.3.2 Alternative Location for Maneuver Live Fire Training

WSMR considered the option of holding maneuver live fire training at Yucca Village. However, live fire at Yucca Village is not feasible because there are no natural features to stop munitions and it would be too costly to construct baffles or berms to catch munitions. Additionally, there is unexploded ordnance that would pose a safety risk for such ground disturbance. Therefore, the conditions do not meet Selection Criteria 2 and 3.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 VALUED ENVIRONMENTAL COMPONENT

A Valued Environmental Component (VEC) analysis was conducted to identify environmental resource areas potentially impacted by the Proposed Action. This analysis considered natural and human environmental resources which are applicable to WSMR and can be impacted by combinations of past, present, and reasonably foreseeable future actions. Potentially useful federal NEPA documents prepared for WSMR were identified and analyzed to establish regional issues, impacts, and their sources. In addition to actions and impacts, useful references and potential mitigation measures were identified for possible inclusion.

Based on this approach, the relationships between agency actions and their impacts on VECs were identified. The VECs were ranked as to the likelihood of an impact from the Proposed Action. Each of the VEC categories described in the Army NEPA Guidance Manual were assigned one of five categories of the anticipated potential for impact:

- None – Impacts are not expected.
- Negligible – Impacts that are perceptible but are at the lower level of detection.
- Minor – Impacts that are slight, but detectable.
- Moderate – Impacts that are readily apparent.
- Major – Impacts that are severely adverse or exceptionally beneficial.

Table 3-1 provides a summary of the discussions had during the VEC analysis conducted by the Environmental Division for this Proposed Action. This VEC analysis was conducted in accordance with the 2007 U.S. Army Environmental Command NEPA Analysis Guidance Manual. This summary does not list all impacts, only those discussed as potential impacts during the VEC analysis. For a comprehensive discussion of all potential impacts, please see **Sections 3.3** through **3.13** of this EA.

Table 3-1. VEC Assessment

VEC	Anticipated Potential for Impact	Comments
Airspace Management	None	Use of unmanned aerial systems and air vehicles would be scheduled with range operations to ensure the airspace is available and there would be no conflicts. Air vehicles would fly within WSMR restricted airspace at approximate altitudes of 1,500 to 11,000 feet above ground level. Air vehicle use was analyzed in the Range-Wide EIS; therefore, this resource area is anticipated to be eliminated from detailed analysis.
Noise	None	Negligible to minor noise impacts on wildlife from generator usage is anticipated. Because of this, noise impacts will be wrapped into the biological resources section. Therefore, this resource area is anticipated to be eliminated from detailed analysis..
Socioeconomics	None	The Proposed Action is entirely within the boundaries of WSMR. The influx of soldiers is ephemeral and associated with a training exercise; and associated civilian/contract support is

VEC	Anticipated Potential for Impact	Comments
		small and would not bring a significant boom to the local economy. Additionally, soldiers would be moving from Fort Bliss to WSMR while on a training exercise and the associated impact would be indirect and not measurable. However, transient troops plus potential support elements (contractors, family, etc.) could increase the pressure on family morale, welfare, and recreational services on Main Post. Additionally, transient troops would add to physical security concerns. Nevertheless, these potential impacts would not be expected to noticeably impact the local economy; therefore, this resource area is anticipated to be eliminated from detailed analysis.
Environmental Justice	None	All activities would be contained within the installation boundaries. Therefore, it is anticipated the Proposed Action would not disproportionately affect communities outside of the installation. This resource area is anticipated to be eliminated from detailed analysis.
Land Use	Negligible to Minor	Hunting could be impacted by all activities at WSMR. However, hunting on WSMR occurs in different areas and at different times of the year.
Air Quality	Negligible to Minor	Consider the use of pyrotechnics, obscurants, chaff, smoke, and obscurants. Climate could have a greater impact on soils, cultural and natural resources, and infrastructure than on air quality. Climate is effectively evaluated in terms of heat, drought, flooding, energy demand, wildfires, land degradation and historical extreme weather.
Geological Resources	Minor	Soils impacted by vehicle movement require time for recovery and should be evaluated. Best management practices (BMPs) for erosion control should be included to address all areas that could be impacted by vehicle movement.
Water Resources	Negligible to Minor	Avoid driving through surface water habitats, especially White Sands pupfish habitats. Natural springs in basins and the mountains would be sensitive receptors to water pollutants. WSMR does not have any adjudicated wetlands. Surface water is important to wildlife and migratory birds, which are protected. Use of BMPs is important.
Biological Resources	Minor to Moderate	Golden Eagles occur within the Mountain Village and NOP area. Other species such as the Oscura Mountain chipmunk, piñon jay, and gray vireo could be located at NOP. Burrowing owls could be impacted by ground-disturbing activities. Monitoring may be required near burrows if they are present. Migratory birds have active nest protections – require a nest survey during nesting season, outdoor lighting mitigations, and raptor protections on power infrastructure. It would be difficult to say if there are any impacts to monarch butterflies as there is no data to support either a positive or a negative finding. Desert Massasauga occurs around Mine Site.
Cultural Resources	Minor	There are historic eligible properties within/near the project areas. Previously completed EAs and EISs capture the idea of avoiding these locations and using markers to identify these as no-go areas. Environmental Liaisons have the mission to work

VEC	Anticipated Potential for Impact	Comments
		with operational units to prevent disturbance to sensitive environmental sites or document damages. If there is an inadvertent finding of cultural artifacts, those artifacts would be evaluated to determine if there is a need for SHPO or Tribal Historic Preservation Officer consultation.
Infrastructure	Minor	The Proposed Action would require the use of facilities on the north side of the installation (NOP and the Mine Site) and on the south side of the installation (Main Post, Mountain Village, Yucca Village, etc.). Vehicles would be traveling between these areas. The WSMR transportation network would be used for on- and off-road activities.
Hazardous Materials and Wastes	Minor to Moderate	The Proposed Action may generate some hazardous waste and may have hazardous material at the operational areas. POLs would be used, and spills may occur. All internal waste management procedures would be followed, and all activities would be coordinated with the Environmental Division. Pyrotechnics and smokes may be used.
Safety	Minor	The Proposed Action would follow appropriate Standard Operating Procedures (SOPs) as required by WSMR Safety when using artillery near or within WSMR impact locations.

3.2 SCOPE OF THE ANALYSIS

3.2.1 Resources Analyzed

Resources in the project area that were analyzed include land use, air quality, geological resources, water resources, biological resources, cultural resources, infrastructure, hazardous materials and wastes, and safety. The following sections provide a characterization of the affected environment and an analysis of the potential direct and indirect impacts each alternative would have on the affected environment. Each alternative was evaluated for its potential to affect physical, biological, and socioeconomic resources. Cumulative and other impacts are discussed in **Section 4.0**. All potentially relevant resource areas were considered in this EA. The following discussion elaborates on the characteristics that might relate to impacts on resources:

- ***Short-term or long-term*.** These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur only with respect to a particular activity, for a finite period, or only during the time required for construction or installation activities. Long-term impacts are those that are more likely to be persistent and chronic.
- ***Direct or indirect.*** A direct impact is caused by and occurs contemporaneously at or near the location of the action. An indirect impact is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct impact of erosion on a stream might include sediment-laden waters near the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.
- ***Negligible, minor, moderate, or major.*** These relative terms are used to characterize the magnitude or intensity of an impact. Negligible impacts are generally those that might be perceptible but are at a lower level of detection. A minor impact is slight but detectable.

A moderate impact is readily apparent. A major impact is one that is severely adverse or exceptionally beneficial.

- ***Adverse or beneficial.*** An adverse impact is one having unfavorable or undesirable outcomes on the man-made or natural environment. A beneficial impact is one having positive outcomes on the man-made or natural environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource.

- ***Significance.*** Significant impacts are those that, in their context and due to their intensity (severity), meet the thresholds for significance set forth in CEQ regulations (40 CFR § 1508.27).

- ***Context.*** The context of an impact can be localized or more widespread (e.g., regional).

- ***Intensity.*** The intensity of an impact is determined through consideration of several factors, including whether an alternative might have an adverse impact on the unique characteristics of an area (e.g., historical resources or ecologically critical areas), public health or safety, or endangered or threatened species or designated critical habitat. Intensity of impacts are also considered in terms of their potential for violation of federal, state, or local environmental law; their controversial nature; the degree of uncertainty or unknown impacts, or unique or unknown risks; if there are precedent-setting impacts; and their cumulative impacts (see **Section 4.0**).

In accordance with NEPA, CEQ regulations, and 32 CFR Part 651, the following evaluation of environmental impacts focuses on those resources and conditions potentially subject to impacts.

3.2.2 Resources Considered but Eliminated from Detailed Analysis

Based on the scope of the Proposed Alternative, resources with very few to no impacts were identified and removed from detailed analysis in this EA. Additionally, resources below were adequately assessed in previous, related environmental documents including the Range-Wide EIS, 2nd Engineering Battalion EA, Mountain Village EA, and NIE EA. The following describes those resource areas that were considered but eliminated from detailed analysis in this EA and why they were eliminated:

- **Airspace Management.** Under the Proposed Action, no changes to current airspace types, flight activities, or training would occur. Similarly, the No Action Alternative would not change any current flight patterns for aircraft in the area. Air vehicle use was analyzed in the Range-Wide EIS; therefore, airspace management has been eliminated from detailed analysis in this EA.

- **Socioeconomics.** Under the Proposed Action, no adverse impacts on socioeconomics would be expected as all proposed projects and activities would occur entirely within the boundaries of the installation. However, the Proposed Action would be anticipated to result in short-term, negligible, beneficial impacts on socioeconomics from increased payroll tax revenue and the purchase of construction materials from the surrounding area. Construction activities would only require a small number of personnel over the staggered construction periods. The temporary increase in personnel at WSMR would represent a small increase in the total number of persons working on the installation, but no additional facilities (e.g., housing, schools) would be necessary to accommodate the workforce. The

influx of soldiers would be associated with a training exercise and associated civilian and contractor support is small and would not bring a benefit to the local economy. Additionally, the temporary increase would represent a negligible increase in the total number of persons and no additional facilities (e.g., housing, schools) would be necessary to accommodate them. Therefore, socioeconomics has been eliminated from detailed analysis in this EA.

- **Noise.** The Proposed Action would not be expected to subject either the public or installation personnel to noise levels at or above Permissible Noise Exposure Levels as defined by the Occupational Safety and Health Act (OSHA). There would be an increase in noise during construction and training activities; however, these impacts would be expected to be negligible. Consequently, noise is not carried forward for detailed analysis. Noise impacts on biological resources are discussed in **Section 3.7** of this EA.
- **Environmental Justice.** EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, require that federal agencies address the potential effects of policies on minorities, low-income populations, and children. Because all proposed projects and activities would occur entirely within the boundaries of the installation, no off-installation minority, low income, or youth populations would be adversely impacted by the Proposed Action; thus, they would not experience disproportionately high and adverse impacts. Therefore, environmental justice has been eliminated from detailed analysis in this EA.

3.3 LAND USE

The term “land use” refers to the relationship between people and the land, specifically, how the physical world is adapted, modified, or used for human purposes (ILG 2010). In many cases, land use descriptions are codified in local zoning laws. The convention/uniform terminology for describing land use categories was established in the Range-Wide EIS.

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

3.3.1 Affected Environment

Military Land Use. WSMR developed a Land Use Classification system to assist in planning range use. The classifications primarily reflect the administrative status of land areas and overlying airspace and the associated limitations on use. The Land Use Classification system lists 17 discrete classifications involving combinations of land status and airspace designation at WSMR (WSMR 2009a). The project areas associated with the Proposed Action fall under Land Use Classification B, Range Centers and Built-Up Areas, and Land Use Classification C, Augmented Test Zone. All proposed activities would be consistent with WSMR’s Land Use and Airspace Strategy Plan (WSMR 2009a).

Land Use Classification B supports a wide variety of activities, including on-road vehicle use, off-road vehicle use (lightweight), dismounted operations, field operations, airborne weapons release (no evacuation), directed energy systems, instrumentation and communication systems, surface

danger zones, airspace danger zones, and air vehicle operations. Land Use Classification B includes areas in Main Post; Stallion, Rhodes Canyon, Oscura, North Oscura Range Centers,; and Orogrande Base Camp.

Land Use Classification C supports a wide variety of test and management activities, including airborne and surface-based weapons firing, impact zones, and danger zones, directed energy systems, aircraft operations, dismounted operations, communications and instrumentation, field operations, and off-road travel using all types of vehicles (heavy/light, tracked/wheeled). Activities in this land use classification can be constrained by a variety of environmental or operational factors. For example, certain safety buffers, such as around munitions storage facilities, are in effect continuously and preclude siting or occupation of other facilities. The large safety buffers associated with many testing activities at WSMR are temporary, lasting only for the duration of the test, allowing multiple uses at other times (WSMR 2009a).

Recreational Land Use. Hunting on WSMR is conducted for recreation and wildlife population management. Since the 1950s, WSMR and the NMDGF have cooperated in conducting hunts for big- and small-game species on WSMR. WSMR is closed to fishing and sport trapping as well as hunting for black bear, Barbary sheep, and turkey. The collection and/or killing of reptiles and amphibians is prohibited (WSMR 2023).

Public tours of the Trinity Site are offered biannually. The Trinity Site, which was the site of the first atomic bomb detonation in 1945, is a National Historic Landmark. Several races are run per year and include duathlons and triathlons. The annual Bataan Memorial Death March, first held in 1989, consists of a 26.2-mile trek through rugged terrain on WSMR. This event can host thousands of participants (WSMR 2009a).

3.3.2 Environmental Consequences

Actions that would lead to significant land impacts include those that would (1) be inconsistent or in non-compliance with applicable use plans or policies; (2) preclude the viability of an existing use activity; (3) preclude continued use or occupation of an area; (4) be incompatible with adjacent or vicinity use to the extent that public health or safety is threatened; or (5) conflict with range planning criteria established to ensure the safety and protection of human life and property.

3.3.2.1 Proposed Action

Military Land Use. No impacts on land use would occur. Lands affected by Project 1 (Construct Barracks and Mobile Shower Facilities at Main Post), Project 2 (Construct Permanent Shower and Laundry Facility at Main Post), Project 3 (Construct Vehicle Wash Rack East of Main Post), and Project 4 (Renovate NOP Buildings for Bivouac Area) would be compatible with existing land uses. The land use classification for these areas is Land Use Classification B. In addition, within the proposed action areas, there have been similar construction activities that have left the areas highly disturbed. As a result, activities resulting from the implementation of Projects 1 through 4 would not result in any land use changes and would be consistent with real property planning and current Army and WSMR land use management plans and guidance. Additionally, Projects 1 through 4 would not preclude the viability of existing use activity within the project areas or other adjacent areas.

Training activities conducted under Activity 4 (Maneuver Live Fire Training), Activity 5 (Maneuver Fire with Simunition Training), and Activity 6 (CEMA Exercises) would be compatible with existing land uses for the various areas listed in **Table 2-2**. The Training Area off Route 213, Condron

Field, Mine Site, Mountain Village, Yucca Village, Lee Site, Thurgood Site, and Range-Wide fall under Land Use Classification C while the Small Arms Range 19008 falls under Land Use Classification B. All operations for Activities 4 through 6 are permitted under Land Use Classifications B and C (as designated in the Range-Wide EIS). As a result, Activities 4 through 6 would not result in any land use changes and would be consistent with real property planning and current Army and WSMR land use management plans and guidance. Activities 4 through 6 would not adversely affect land use at, or near, the project areas.

Recreational Land Use. Intermittent, short-term, minor, adverse impacts on recreational hunting would occur. Training areas may be closed to scheduled and unscheduled hunting to protect public safety. During these closures all persons, including hunters, would be evacuated from the areas and roadblocks would be established along roads to prevent access. Operational activities would be de-conflicted with hunting through scheduling. Mission activities would have scheduling priority over hunting activities.

3.3.2.2 No Action Alternative

Under the No Acton Alternative, the proposed infrastructure would not be constructed and current training activities would not change. The existing conditions discussed in **Section 3.3.1** would remain unchanged. No new impacts on land use would occur as a result of the No Action Alternative.

3.4 AIR QUALITY

Under the Clean Air Act (CAA), the six pollutants defining air quality, called, “criteria pollutants,” are carbon monoxide (CO), sulfur dioxide, nitrogen dioxide, ozone (O_3), suspended particulate matter (measured less than or equal to 10 microns in diameter [PM_{10}] and less than or equal to 2.5 microns in diameter [$PM_{2.5}$]), and lead. The U.S. Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) for the criteria pollutants to protect against adverse health and welfare effects. Areas that are and have historically been in compliance with the NAAQS or have not been evaluated for NAAQS compliance are designated as attainment areas. The USEPA General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas. A general conformity determination is required when the total direct and indirect emissions of nonattainment or maintenance criteria pollutants exceed the *de minimis* level for the pollutant. Effects on air quality are evaluated by comparing the annual net change in emissions for each criteria pollutant against the General Conformity Rule *de minimis* thresholds for nonattainment and maintenance pollutants. For attainment pollutants, emissions are compared against the 250 tons per year (tpy) Prevention of Significant Deterioration (PSD) major source threshold, as defined by USEPA, for all criteria pollutants except for lead. The PSD major source threshold for lead is 25 tpy. For actual operations and regulatory purposes, the PSD major source thresholds only apply to stationary sources; however, they are applied in this analysis to both stationary and mobile sources as a surrogate indicator of significance in an attainment area. If a proposed action’s emissions are below these threshold levels, the proposed action’s impacts on air quality are presumed to be less than significant.

Climate Change and Greenhouse Gases (GHGs). Global climate change refers to long-term fluctuations in temperature, precipitation, wind, sea level, and other elements of Earth’s climate system. Of particular interest, GHGs are gaseous emissions that trap heat in the atmosphere and include water vapor, carbon dioxide (CO_2), methane, nitrous oxide, O_3, and several fluorinated and chlorinated gaseous compounds. To estimate global warming potential, all GHGs are

expressed relative to a reference gas, CO_2, which is assigned a global warming potential equal to one (1). All GHGs are multiplied by their global warming potential, and the results are added to calculate the total equivalent emissions of CO_2 (CO_2e). The dominant GHG emitted is CO_2, accounting for 79 percent of all U.S. GHG emissions as of 2020, the most recent year for which data are available (USEPA 2022).

EO 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*, signed January 20, 2021, reinstated the *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*, issued on August 5, 2016, by CEQ that required federal agencies to consider GHG emissions and the effects of climate change in NEPA reviews (CEQ 2016). The CEQ *National Environmental Policy Act Interim Guidance on Consideration of Greenhouse Gas Emissions and Climate Change*, issued on January 9, 2023, recommends determining the social cost of GHG emissions from a proposed action where feasible as a means of comparing the GHG impacts of the alternatives. The "social cost of carbon" is an estimate of the monetized damages associated with incremental increases in GHG emissions (CEQ 2023). The interim social cost of carbon established by the Interagency Working Group for the year 2025 is estimated at 56 dollars per metric ton of CO_2 (in 2020 dollars; IWG-SCGHG 2021). Per the 2023 CEQ Interim Guidance, the social cost of carbon was calculated for the estimated total emissions of CO_2e during the construction period and the foreseeable annual CO_2e emissions from operational activities under the Proposed Action. It also examines potential future climate scenarios to determine whether elements of the Proposed Action would be affected by climate change. This analysis does not attempt to measure the actual incremental impacts of GHG emissions from the Proposed Action, as there is a lack of consensus on how to measure such impacts. Global and regional climate models have substantial variation in output and do not have the ability to measure the actual incremental impacts of a project on the environment.

EO 14008, *Tackling the Climate Crisis at Home and Abroad*, further strengthens EO 13990 by implementing objectives, including requiring federal agencies to develop and implement climate action plans, to reduce GHG emissions and bolster resilience to the impacts of climate change. USEPA implements the GHG Reporting Program, requiring certain facilities to report GHG emissions from stationary sources, if such emissions exceed 25,000 metric tons of CO_2e per year (40 CFR Part 98). Major source permitting requirements for GHGs are triggered when a facility exceeds the major threshold of 100,000 tpy for CO_2e emissions. Because the Proposed Action does not include installation or operation of new stationary emissions sources, GHG reporting and permitting requirements do not apply.

3.4.1 Affected Environment

WSMR covers five counties in New Mexico: Doña Ana, Otero, Socorro, Sierra, and Lincoln. The USEPA has designated portions of Doña Ana County as marginal nonattainment for the 2015 8-hour O_3 NAAQS and moderate nonattainment for the 1987 PM_{10} NAAQS. WSMR is not within these nonattainment areas. The rest of Doña Ana County and the entirety of the other four counties that contain WSMR have been designated as in attainment for all criteria pollutants (USEPA 2023a). As such, the General Conformity Rule is not applicable to emissions of criteria pollutants within WSMR.

Even though WSMR is in an attainment area, there are temporary periods with high levels of particulate matter, generally occurring from natural sources, such as dust storms or high winds, which commonly occur from late winter through early spring. Prevailing winds during these events are from the west and southwest. A plan to address high airborne particulate concentrations

during these episodic, natural events was developed by the NMED Air Quality Bureau in conjunction with stakeholders (NMED 2011). However, military installations are exempt from dust control regulations (20.2.23.108.B(4) New Mexico Administrative Code).

WSMR is a major source under Title V and PSD regulations. The installation has a Title V Operating Air Permit (Permit no. P085R1), renewed in 2017, which specifies allowable emissions of criteria pollutants and hazardous air pollutants from stationary sources. Stationary sources of emissions covered by the permit include aggregate processing, concrete production, natural gas boilers, fuel dispensing, internal combustion engines, fuel storage, surface coating, and woodworking. Existing emissions sources near the project areas include vehicle exhaust and dust generated on dirt and gravel roads.

Climate Change and GHGs. GHG emissions near the project areas can be attributed to passenger and military vehicle traffic and operation of vehicles and other equipment maintenance during training activities. WSMR experiences an average high temperature of 95 degrees Fahrenheit (°F) from June through August with an average low temperature of 26°F from December through February. The average annual precipitation is 10 inches with the majority of rainfall occurring July through September (NPS 2019). Ongoing climate change in southern New Mexico has contributed to rising temperatures, decreased water availability, extreme heat, and increased severity, frequency, and extent of wildfires, which expand deserts and change landscapes. High air temperatures can affect agriculture and cause adverse health effects such as heat stroke and dehydration, especially in vulnerable populations (i.e., children, elderly, sick, and low-income populations). In addition, warmer air can increase the formation of ground-level O_3, which has a variety of health effects including aggravation of lung diseases and increased risk of death from heart and lung disease (USEPA 2016). In 2020, New Mexico produced 45.2 million metric tons of CO_2 emissions, and was ranked the 37th highest producer of CO_2 in the United States (USEIA 2022).

3.4.2 Environmental Consequences

3.4.2.1 Proposed Action

This air quality analysis estimates the effects on air quality and climate change that would result from the Proposed Action. Because WSMR is not within a nonattainment or maintenance area for any criteria pollutant, the General Conformity Rule is not applicable to emissions of criteria pollutants from the Proposed Action. Therefore, effects on air quality were evaluated by comparing the annual net change in emissions from the Proposed Action against the 250 tpy PSD threshold (25 tpy for lead). **Table 3-2** provides the estimated annual net change in emissions that would result from construction and improvement of mission support facilities under the Proposed Action. For the purposes of this analysis, it was assumed each construction or improvement component of the Proposed Action would be constructed over a 2-year period (i.e., January 2024 through December 2025). Detailed emissions calculations are included in **Appendix C**.

Table 3-2. Estimated Net Annual Air Emissions from Construction and Improvements

Year	VOC (tpy)	NO_X (tpy)	CO (tpy)	SO_X (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	Lead (tpy)	CO_2e (tpy)
2024	0.964	5.436	6.954	0.018	15.357	0.204	<0.001	1,743.4
2025	3.251	4.484	6.633	0.014	1.871	0.173	<0.001	1,378.4
PSD threshold	**250**	**250**	**250**	**250**	**250**	**250**	**25**	**N/A**
Exceeds threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Key: N/A = not applicable; SO_X = sulfur oxides; VOC = volatile organic compound; NO_X – nitrogen oxides

Short-term, minor, adverse impacts on air quality would result from the construction or improvement of the barracks, shower and laundry facilities, vehicle wash station, and bivouac area. Emissions of criteria pollutants and GHGs would be directly produced from construction activities such as operation of heavy equipment; heavy duty diesel vehicles hauling construction materials and debris to and from the project areas; workers commuting daily to and from the project areas in their personal vehicles; and ground disturbance. All such emissions would be temporary in nature and produced only when construction activities are occurring.

The air pollutant with the highest emissions during construction would be particulate matter (see **Table 3-2**), such as fugitive dust, which is generated from ground disturbing activities (e.g., site grading and excavation) and combustion of fuels in construction equipment. Fugitive dust emissions would be greatest during initial site preparation and site grading activities in the first year of construction. Fugitive dust emissions would vary from day to day based on the work phase, level of activity, and prevailing weather conditions. To reduce particulate matter emissions, dust suppression techniques would be used during construction and earth moving activities. These techniques could include application of water, soil stabilizers, or vegetation; use of wind break enclosures; use of covers on soil stockpiles and dump truck loads; use of silt fences; and suspension of earth-movement activities during high-wind conditions (gusts exceeding 25 miles per hour [USEPA 2016]). In addition, work vehicles would be well-maintained and use diesel particulate filters to reduce emissions of criteria pollutants. These BMPs and environmental control measures could reduce particulate matter emissions from the construction site by approximately 50 percent. Annual emissions of all criteria pollutants during the construction period would not exceed the PSD threshold of 250 tpy (25 tpy for lead); therefore, the Proposed Action would not result in short-term, significant impacts on air quality.

Intermittent, short-term, negligible to minor, adverse impacts on air quality would occur from operation of new permanent facilities and from training activities. Operational air emissions would be directly produced from heating new permanent facilities, including the barracks and shower and laundry facilities. These operational emissions would begin following the construction period, or in approximately 2026, and would continue indefinitely. The estimated annual operational air emissions from facility operations are summarized in **Table 3-3**. The annual net change of criteria pollutant emissions starting in 2026 would not exceed the PSD threshold of 250 tpy (25 tpy for lead) and would not result in a violation of any NAAQS.

Table 3-3. Estimated Net Annual Air Emissions from Operation of New Permanent Facilities

Year	VOC (tpy)	NO_X (tpy)	CO (tpy)	SO_X (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	Lead (tpy)	CO_2e (tpy)
2026 and Later	0.043	0.784	0.659	0.005	0.060	0.060	<0.001	944.0
PSD threshold	**250**	**250**	**250**	**250**	**250**	**250**	**25**	**N/A**
Exceeds threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Training activities analyzed under the Proposed Action that could impact air quality include maneuver live fire training and maneuver fire with simunition training. Emissions from these activities are primarily from vehicle engine operation, vehicle movement on unpaved roads, use of smoke, and munitions firing and detonations. CEMA exercises under the Proposed Action would not involve emissions sources and therefore would not have impacts on air quality.

Air pollutants emitted from gasoline and diesel engines include CO_2, CO, NO_X, SO_X, and minor amounts of particulate matter. Emissions from combustion engines in maneuver vehicles would be temporary and would disperse rapidly through the atmosphere. Vehicles used for maneuver

training on unpaved roads would cause soil disturbance resulting in emissions of particulate matter in the form of fugitive dust. Emissions would be confined within the relatively small maneuver areas and would dissipate widely through WSMR. Much of the particulate matter kicked up by track or tire movements would deposit quickly on the ground surface; however, during periods of high surface winds, particulates could transport further from the maneuver areas. To reduce the potential for airborne dust, vehicles on unpaved roads could be operated at lower speeds and maneuver training could be reduced during high-wind periods. Smoke planned for release during maneuver training would emit particulate matter and may also be transported further from maneuver areas during high-wind periods. Use of smoke that is regulated under the CAA would be reported to the WSMR Air Quality Manager for Title V annual reporting purposes. BMPs to reduce potential impacts would be provided by the Environmental Division during the annual environmental review process.

Live and simunition (blank or inert) munitions would be used during maneuver training activities at a maximum rate of 20 rounds per exercise (80 rounds per year). Although blank munitions do not include a projectile, they still involve a combustion reaction and can produce air emissions. The mix of live and simunition fire could result varying quantities of air emissions; however, emissions of any criteria pollutant would not exceed 0.001 tpy (USEPA 2008, DAC LRTAO 2021). Detailed emissions calculations from live and simunition fire are included in **Appendix C**. The temporary and intermittent increases in air emissions from maneuver live fire and simunition training activities would not be great enough to exceed the PSD thresholds and would not result in a violation of any NAAQS.

Climate Change and GHGs. As shown in **Table 3-2**, a total of approximately 3,122 tons (2,832 metric tons) of CO_2e would be produced during the construction period. Emissions calculations for CO_2e are included in **Appendix C**. In accordance with the 2023 CEQ Interim Guidance, comparisons were calculated to equate GHG emissions in familiar terms using the USEPA GHG equivalencies calculator. By comparison, 2,832 metric tons of CO_2e is the GHG footprint of 630 passenger vehicles driven for 1 year or 357 homes' energy use for 1 year (USEPA 2023c). Over the construction period, the social cost of carbon would be equal to $158,592 (2,832 metric tons CO_2e x $56 per metric ton CO_2e = $158,592).

In 2020, New Mexico produced 45.2 million metric tons of CO_2 (USEIA 2022). Emissions from construction during the highest CO_2e emission year (i.e., 2024) would represent less than 0.004 percent of the CO_2 emissions in the state. As such, the Proposed Action would not considerably increase the total CO_2e emissions produced by the state during construction and would not meaningfully contribute to the potential effects of global climate change. Therefore, GHG emissions during construction would result in short-term, negligible, adverse impacts on air quality.

CO_2e emissions from the operation of new permanent facilities would be approximately 944 tons (856 metric tons) per year, which is the GHG footprint of 191 passenger vehicles driven for 1 year or 108 homes' energy use for 1 year. The social cost of carbon for the estimated annual emissions of CO_2e would be equal to $47,824 per year. Annual emissions from stationary sources (i.e., heating systems for new permanent facilities) would not exceed USEPA's annual 25,000 metric tpy reporting threshold when combined with existing annual CO_2e emissions; therefore, WSMR would not be required to report annual GHG emissions. CO_2e emissions from operation of maneuver vehicles would be negligible and CO_2e emissions from live fire and simunition training would be less than 0.0001 tpy; therefore, long-term impacts on air quality from GHG emissions would be negligible.

Ongoing changes to climate patterns in southern New Mexico are described in **Section 3.3.1**. These ongoing climate changes are unlikely to affect the Army's ability to implement the Proposed Action. The Proposed Action would not adversely contribute to the occurrence of rising temperatures, extreme heat, decreased water availability, increased extent of wildfires, and other results from ongoing climate change. However, hotter and drier conditions due to climate change could increase the potential for airborne dust from vehicle movements during maneuver training. Dust control techniques, such as moving at lower speeds, could be implemented during vehicle movements on dirt or gravel roads to reduce the potential for airborne dust. Extreme heat could limit construction crews and troops to working or training during cooler hours of the day. In addition, high temperatures or high winds could restrict the use of pyrotechnics.

3.4.2.2 No Action Alternative

Under the No Action Alternative, proposed construction and improvement of support facilities and training activities would not occur. Air quality conditions would remain as described in **Section 3.4.1**. Therefore, there would be no change in criteria pollutant or GHG emissions, and no impact on air quality would result.

3.5 GEOLOGICAL RESOURCES

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

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their ability to support vegetation communities and construction activities or types of land use.

3.5.1 Affected Environment

Regional Geography and Geology. The project areas for the Proposed Action are within the Basin and Range physiographic region of New Mexico, specifically within WSMR. This region is characterized by the Tularosa Basin that is surrounded by the San Andres Mountains to the west and the Sacramento Mountains to the east. There are five different geologic units within the project areas. The characteristics of these units are listed below in **Table 3-4** (USGS 2023).

Topography. The topography of the project areas exhibits a range of topographic relief depending on the specific project area. Elevation ranges from approximately 3,900 (Condron Airfield) to 7,900 (NOP) feet above mean sea level (Google Earth 2023).

Soils. Fourteen different soil types are present within the project areas (see **Appendix B**, **Figures B-12** to **B-19**). The characteristics of these soils are provided in **Table 3-5** (USDA 2023). Overall, soil associations found within the project areas consist of moderately deep soils with depths ranging from 20 to 80 inches below ground surface to subsoil and are gravelly-sandy to loamy in texture. There are no designated important farmland soils within the project areas.

Table 3-4. Geologic Characteristics

Proposed Action	Map Unit	Geological Unit Name	Characteristics
Projects 1–3 (Main Post Construction Projects)	Qp	Piedmont alluvial deposits	Stream alluvium; includes deposits of higher gradient tributaries bordering major stream valleys
Project 4 (Renovate NOP)	PA	Pennsylvanian rocks, undivided	Sedimentary rock
Activity 4 (Maneuver live fire) – Route 213 Training area, Condron Field, Mountain and Yucca Villages, Lee and Thurgood Sites	QTs	Upper Santa Fe Group	Clastic, unconsolidated deposits; includes Camp Rice, Fort Hancock, Palomas, Sierra Ladrones, Ancha, Puye, and Alamosa Formations; middle Pleistocene to uppermost Miocene
	Yg	Igneous, intrusive	Plutonic volcanic rock
	Qp	Piedmont alluvial deposits	Stream alluvium; includes deposits of higher gradient tributaries bordering major stream valleys
	Qa	Alluvium	Alluvium
Activities 5 & 6 (Maneuver fire with simunition training & CEMA exercises) – Mountain and Yucca Villages, Lee and Thurgood Sites	QTs	Upper Santa Fe Group	Clastic, unconsolidated deposits; includes Camp Rice, Fort Hancock, Palomas, Sierra Ladrones, Ancha, Puye, and Alamosa Formations; middle Pleistocene to uppermost Miocene
	Yg	Igneous, intrusive	Plutonic volcanic rock
	Qp	Piedmont alluvial deposits	Stream alluvium; includes deposits of higher gradient tributaries bordering major stream valleys

Source: USGS 2023

Table 3-5. Soil Characteristics

Proposed Action	Map Unit	Soil Name	Depth (inches)	Farmland Designation	Soil Characteristics	Acreage
Projects 1–3 (Main Post Construction Projects)	4	Agustin-Vado-Riverwash complex, 1 to 10 percent slopes	0 – 60	None specified	Very gravelly sandy loam; somewhat excessively drained	154.90
	48	Mallet-Kimrose-Stronghold complex, 5 to 20 percent slopes	0 – 60	None specified	Gravelly fine sandy loam; somewhat excessively drained	0.86
	59	Pajarito sandy loam, 0 to 9 percent slopes	0 – 65	None specified	Loamy fine sand to fine sandy loam; well drained	1157.83
	66	Queencreek-Agustin-Stagecoach complex, 0 to 14 percent slopes	0 – 63	None specified	Very to extremely gravelly sand; excessively drained	252.50
	67	Queencreek-Riverwash complex, 0 to 5 percent slopes	0 – 60	None specified	Extremely gravelly sand; excessively drained	120.84
					Total approximate acreage	**1686.93**
Project 4: Renovate NOP	22	Deama-Penagua-Rock outcrop complex, 35 to 90 percent slopes	0 – 28	None specified	Very cobbly loam, well drained	0.06
	25	Desario-Cuate complex, 5 to 35 percent slopes	0 – 41	None specified	Very gravelly loam to clay loam; well drained	2.78
					Total approximate acreage	**2.83**
Activity 4 (Maneuver live fire) – Route 213 Training area, Condron Field, Mountain and Yucca Villages, Lee and Thurgood Sites	6	Aladdin-Eppenauer family-Petrocalcic Paleustolls complex, 1 to 60 percent slopes	0 – 60	None specified	Gravelly sandy loam; somewhat excessively drained	356.93
	48	Mallet-Kimrose-Stronghold complex, 5 to 20 percent slopes	0 – 60	None specified	Gravelly fine sandy loam; somewhat excessively drained	15.19
	67	Queencreek-Riverwash complex, 0 to 5 percent slopes	0 – 60	None specified	Extremely gravelly sand; excessively drained	5.97
	89	Woodcutter-Rock outcrop complex, 30 to 90 percent slopes	0 – 20	None specified	Very gravelly loamy sand to sandy clay loam; well drained	20.34

Proposed Action	Map Unit	Soil Name	Depth (inches)	Farmland Designation	Soil Characteristics	Acreage
	54	Mcnew-Copia complex, 1 to 15 percent slopes	0 – 80	None specified	Sandy to loamy fine sand; excessively drained	37.55
	61	Pajarito-Mcnew complex, 1 to 8 percent slopes	0 – 65	None specified	Loamy fine sand; well drained	9.48
	26	Dona Ana-Chutum complex, 1 to 10 percent slopes	0 – 60	None specified	Loamy fine sand to sandy loam; well drained	47.40
					Total approximate acreage	**492.87**
Activities 5 & 6 (Maneuver fire with simunition training & CEMA exercises) – Mountain and Yucca Villages, Lee and Thurgood Sites	6	Aladdin-Eppenauer family-Petrocalcic Paleustolls complex, 1 to 60 percent slopes	0 – 60	None specified	Gravelly sandy loam; somewhat excessively drained	356.93
	48	Mallet-Kimrose-Stronghold complex, 5 to 20 percent slopes	0 – 60	None specified	Gravelly fine sandy loam; somewhat excessively drained	15.19
	67	Queencreek-Riverwash complex, 0 to 5 percent slopes	0 – 60	None specified	Extremely gravelly sand; excessively drained	5.97
	89	Woodcutter-Rock outcrop complex, 30 to 90 percent slopes	0 – 20	None specified	Very gravelly loamy sand to sandy clay loam; well drained	20.34
	54	Mcnew-Copia complex, 1 to 15 percent slopes	0 – 80	None specified	Sandy to loamy fine sand; excessively drained	0.20
	61	Pajarito-Mcnew complex, 1 to 8 percent slopes	0 – 65	None specified	Loamy fine sand; well drained	9.48
					Total approximate acreage	**408.11**

Source: USDA 2023

Geologic Hazards. Rockfalls, sinkholes, and minor earthquakes are common in New Mexico. Exposed rock outcrops are subject to these gravity-driven geologic hazards. Sinkholes are common from the dissolution of minerals at depth. In all parts of New Mexico, carbonate strata and interbedded salts are dissolved over time, which can lead to sinkholes. There are sinkholes on the eastern portion of WSMR, adjacent to Holloman Air Force Base. Earthquakes can happen when rock strata on either side of a geologic fault move relative to one another. While earthquakes are common in New Mexico, they are generally minor and do not cause structural damage to buildings (NMBGMR 2023).

3.5.2 Environmental Consequences

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

Impacts on geology and soils would be adverse if they would alter the lithology (i.e., the character of a rock formation), stratigraphy (i.e., the layering of sedimentary rocks), and geological structures that dictate groundwater systems; change the soil composition, structure, or function within the environment; or increase the risk of geological hazards. Additionally, scarification of soils and the removal of vegetation can take up to 15 to 30 years for recovery. As climate patterns shift, the rate of recovery may take longer. Geological resources may become more vulnerable as soil humidity declines and when followed by a high wind or heavy rainstorm.

3.5.2.1 Proposed Action

Regional Geology. Long-term, negligible to minor, adverse impacts on geology would be expected from the Proposed Action. WSMR is an area with a history of military training and activities. Activities associated with the proposed construction and maintenance of Projects 1 through 4 would not alter lithology, stratigraphy, or the geological structures that control the distribution of aquifers and confining beds. Field operations from Activities 4 through 6 (potential use of live fire during training exercises) would have negligible to minor impacts on geological resources. These impacts would be confined to designated training areas affected by the live fire and would be mitigated by the clean-up of debris after training exercises are complete.

Topography. Short-term, negligible, adverse impacts on topography would be expected from earthmoving and grading activities during construction. Topography would be mildly altered to provide flat surfaces for the proposed access roads. Impacts would be negligible because the site does not contain substantially steep slopes and is generally level already. Earthmoving and grading would not be required for maintenance and operations (Activities 4 through 6); therefore, no impacts on topography would be expected from these activities post-construction.

Soils. Short- and long-term, negligible to minor, adverse impacts on soils would result from disturbance of ground surfaces, earthmoving activities, and grading within the project areas during both construction of Projects 1 through 4 and Activities 4 through 6. These activities would excavate soils and expose rock materials, remove vegetation in some areas, and expose soils to erosion. The use of trucks and other construction equipment would result in soil compaction, which could also lead to increased rates of erosion and alter soil structure. Specific construction limitations and considerations would depend on the type of construction activity and the specific subsurface composition encountered.

In general, accelerated erosion of soils would be temporary, during construction activities and minimized by appropriately siting and designing facilities taking into consideration soil limitations, employing construction and stabilization techniques appropriate for the soil and climate, and implementing BMPs and erosion control measures. Construction contractors would adhere to soil erosion BMPs from both the USEPA and the U.S. Forest Service. Such BMPs would include the installation of silt fencing and sediment traps, application of water to disturbed soil to reduce dust, and revegetation of disturbed areas as soon as possible following ground disturbance, as appropriate.

Construction materials would be appropriately stabilized with temporary erosion control measures during construction, and with long-term measures according to the Stormwater Pollution Prevention Plan (SWPPP) during construction and maintenance of the proposed roads. Impacts would be localized to the proposed disturbance area due to the implementation of these measures and BMPs. Therefore, impacts would be minor.

Short- and long-term, minor, adverse impacts from the addition of up to approximately 1,690 acres of impervious surfaces would also be expected. Reduced soil infiltration and soil productivity and increased runoff from additional impervious surfaces would occur; however, permanent runoff control measures would be implemented to prevent erosion and flooding in surrounding areas. These measures combined with construction BMPs would reduce potential impacts from maintenance and operations.

Geologic Hazards. Short- and long-term, negligible, adverse impacts could occur due to geological hazards. While earthquakes are common in New Mexico, they are generally minor and do not cause structural damage to buildings (NMBGMR 2023). The proposed facilities would meet all building requirements outlined in applicable state and local building codes to minimize potential impacts from earthquakes.

New construction would generally occur on level terrain; however, maintenance of training facilities may include highly sloped areas. Implementation of BMPs and erosion control measures, as well as other appropriate preventative measures identified by federal, state, and local agencies, would be implemented where applicable to minimize potential impacts from rockfalls. These preventative measures could include regular drain and culvert maintenance, drainage ditch and channel maintenance, vegetation maintenance, and implementation of roadside stabilization measures.

3.5.2.2 No Action Alternative

Under the No Action Alternative, proposed construction and improvement of support facilities and training activities would not occur. Geological conditions would remain as described in **Section 3.5.1**. No new impacts on geological resources would be expected.

3.6 WATER RESOURCES

Water resources are natural and man-made sources of water that are available for use by, and for the benefit of, humans and the environment. Water resources relevant to WSMR in New Mexico include groundwater, surface water, wetlands, and floodplains.

Groundwater. Groundwater is water that exists in the saturated zone beneath the Earth's surface that collects and flows through aquifers and is used for drinking, irrigation, and industrial purposes. Groundwater typically can be described in terms of depth from the surface, aquifer or well capacity, water quality, and recharge rates.

Surface Water. Surface water includes natural, modified, and man-made water confinement and conveyance features above groundwater that may or may not have a defined channel and discernable water flow. Stormwater is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade surface waters, such as lakes, rivers, or streams. The Energy Independence and Security Act Section 438 (42 U.S.C. § 17094) establishes into law stormwater design requirements for federal development projects that disturb a footprint of greater than 5,000 square feet. Under these requirements, pre-development site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow.

The Clean Water Act (CWA) establishes federal limits for regulating point and non-point discharges of pollutants into Waters of the United States (WOTUS) and quality standards for surface waters. WOTUS has a broad meaning under the CWA and incorporates deep water aquatic habitats and special aquatic habitats (including wetlands and playas). EO 11990, *Protection of Wetlands*, requires federal agencies to determine whether a proposed action would occur within a wetland and to avoid new construction in wetlands wherever there is a practicable alternative.

Wetlands. Wetlands are considered WOTUS if they are determined to be jurisdictional by USACE. USFWS maintains the National Wetland Inventory (NWI) for public use, which provides maps of current status, extent, characteristics, and functions of wetland, riparian and deepwater habitats. A ruling instituted by USACE revised the definition of WOTUS protected under the CWA. The ruling came into effect on March 20, 2023. Under the 2023 Rule, WOTUS include: (1) traditional navigable waters, the territorial seas, and interstate waters; (2) impoundments of qualifying waters; (3) tributaries to qualifying waters; (4) wetlands adjacent to qualifying waters; and (5) certain intrastate lakes and ponds, streams, and wetlands.

Floodplains. Floodplains are areas of low, level ground present along rivers, stream channels, or coastal waters that are subject to periodic or infrequent inundation because of rain or melting snow. Flood potential is evaluated by the Federal Emergency Management Agency, which defines the 100-year floodplain as an area within which there is a 1 percent chance of inundation by a flood event in a given year, or a flood event in the area once every 100 years. EO 11988, *Floodplain Management*, requires federal agencies to determine whether a proposed action would occur within a floodplain and to avoid floodplains to the maximum extent possible wherever there is a practicable alternative. EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, requires agencies to prepare for and protect federally funded buildings and projects from flood risks. More specifically, it requires agencies to determine specific federal building or project dimensions (i.e., how high, wide, and expansive a building or project should be) in order to manage and mitigate any current or potential flood risks. Additionally, Directive-type Memorandum 22-003, *Flood Hazard Area Management for DoD Installations*, directs the DoD to avoid development within a flood hazard area to the maximum extent practicable.

3.6.1 Affected Environment

Groundwater. Most of the water used at WSMR is used on Main Post. Water is supplied to Main Post via 15 groundwater wells. Data indicates average groundwater usage per year at WSMR between 2007 and 2014 was 446 million gallons per year (MGPY). However, average water usage has decreased since 2013 with water conservation efforts. A hydrogeological and groundwater assessment determined the groundwater aquifers used by the Main Post water supply system have a safe long-term yield of 645 MGPY (Lewis 2016). Water usage peaks in the summer months.

Groundwater recharge rates in the region are highly variable due to climate cycles and precipitation rates. Precipitation in the San Andres and Oscura Mountains recharge the aquifer through infiltration. Precipitation on Main Post does not recharge the aquifer. The sub-basin (Sotol Creek), which feeds the WSMR supply wells receives approximately 14 inches of precipitation annually, of which only 4-5 percent is estimated to become groundwater. 143,000 cubic meters per day of recharge is estimated to enter the basin-fill aquifer from subbasins that rim the Tularosa Basin (Huff 2005).

Well and test hole observations on Main Post and adjacent areas of WSMR determined a continuous decline of the water table has occurred since production began in 1949 (Kelly 1973).

Surface Water. One perennial stream, Salt Creek, is located in the northern portion of WSMR. The water source for Salt Creek is snow melt and precipitation runoff originating from the Organ Mountain range located in the western portion of WSMR. Apart from Salt Creek, there are riparian areas, malpaís, and mound springs that provide surface water and have some elements of a wetland. However, surface water resources within WSMR are limited due to the arid region, high evaporation rates, and well drained soils. None of these surface waters are present within the project areas.

Wetlands. The NWI indicates no mapped wetlands or WOTUS are present in the proposed project areas (NWI 2023). According to the NWI, there are no wetland, riparian, or deepwater habitats at WSMR. No jurisdictional wetlands or WOTUS have been identified on WSMR.

Floodplains. The proposed project areas are located outside the 500-year floodplain and are also determined outside 1% and 0.2% annual chance floodplain (FEMA 2023).

3.6.2 Environmental Consequences

3.6.2.1 Proposed Action

Groundwater. The Proposed Action is expected to have short-term, indirect, negligible to minor adverse impacts on groundwater resources. The construction projects under the Proposed Action (Projects 1 through 4) are intended to accommodate for an increase of personnel which is anticipated to increase water usage from the aquifer. However, this usage, when compared to overall aquifer volume and usage, is negligible. Contaminated runoff into the aquifer used for potable water on WSMR is possible as runoff from the Main Post supplies the aquifer along with runoff from the San Andres and Oscura Mountains. No impacts on groundwater are anticipated from Activities 4 through 6. BMPs would be implemented to decrease or eliminate potential adverse impacts on groundwater resources.

Surface Water. Projects 1 and 2 are expected to have short- and long-term, indirect, minor, adverse impacts on surface water. Construction and operation of new infrastructure would result in increased impervious surface areas, but it would not be anticipated to cause major disruptions to flow and runoff volume. Increased sediment may run off during construction, which could be harmful to stream ecosystems. Dave's Playa could be an end point for some contaminants as it is downhill and a low point from arroyos on the Main Post. Additionally, arroyos could be silted in during flood events and silt generated from construction projects would be an added potential impact. Project 3 is expected to have short- and long-term, indirect, minor, adverse impacts on surface water due to the operation of the wash rack. Contaminated water would be stored in a closed water collection system to be reclaimed. There is potential for overflow if water volume exceeds the storage capacity or if stormwater causes the storage to overflow. Therefore, there would be a potential for this contaminated water to flow into wetlands which could cause harmful effects to the ecosystem. However, construction projects would be engineered, designed, constructed, and maintained to protect the natural hydrology of the project areas and WSMR

would strive to maintain the natural drainage system of the project areas. Additionally, following construction, a vegetated buffer zone would be maintained along all watercourses, to include ephemeral arroyos, sufficient to minimize erosion and sediment delivery.

Activities 4 through 6 are expected to have no impact on surface water as activities would not occur within or near any surface waters at WSMR. Activities are not expected to cause increased surface runoff or sediment volume. BMPs would be utilized to decrease or eliminate potential adverse impacts on surface water.

Wetlands. The Proposed Action is not expected to have impacts on wetlands as none are present within or near the proposed project areas.

Floodplains. The Proposed Action is expected to have short- and long-term, indirect, negligible to minor, adverse impacts on floodplains. Floodplains are present surrounding Main Post (FEMA 2023); however, no new construction would occur within the floodplain or directly expand or exacerbate the floodplain zone. Indirect impacts on floodplains may occur from increased impervious surface area due to altered hydrological patterns. No hazards associated with flooding or downstream resources would be impacted by the Proposed Action. No impacts on floodplains are anticipated from Activities 4 through 6. BMPs, such as stormwater management plans, would be implemented for construction activities to mitigate effects of potential flooding.

3.6.2.2 No Action Alternative

Under the No Acton Alternative, the proposed infrastructure would not be constructed, and current training activities would not change, and the existing conditions discussed in **Section 3.6.1** would remain unchanged. No new impacts on water resources would occur as a result of the No Action Alternative.

3.7 BIOLOGICAL RESOURCES

Biological resources include native or naturalized plants and animals and the habitats in which they occur, and native or introduced species found in landscaped or disturbed areas. Protected species are defined as those listed as threatened, endangered, or proposed or candidate for listing by the USFWS or NMDGF. Federal species of concern and candidate species are not protected by the ESA; however, these species could become listed, and therefore are given consideration when addressing impacts on biological resources.

Section 7 of the ESA of 1973 requires all federal agencies to use their authorities to conserve endangered and threatened species in consultation with USFWS. The ESA gives the Secretary of the Interior the responsibility of deciding whether a species' survival has been so jeopardized that it warrants conservation actions. Authority for administering the ESA has been delegated to USFWS. Under the ESA, when a species is formally "listed" (i.e., added to the Federal List of Endangered and Threatened Wildlife and Plants) federal agencies are directed to use their legal authorities to carry out conservation programs to support continued survival of the species (USFWS 1999). The New Mexico Wildlife Conservation Act [17-2-40.1 New Mexico Statutes Annotated 1978] has similar provisions and covers species that are native to New Mexico.

Sensitive habitats include those areas designated by the USFWS as critical habitat under the ESA and sensitive ecological areas as designated by state or federal rulings. Sensitive habitats also include wetlands/playas, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer/winter habitats). Further, the Army is responsible for the protection of migratory birds under the MBTA and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*.

WSMR's Integrated Natural Resource Management Plan (INRMP) provides interdisciplinary strategic guidance for natural resource management on the installation for a period of 5 years. Implementation of the INRMP ensures that the installation continues to support present and future mission requirements while preserving, improving, and enhancing ecosystem integrity (WSMR 2023). The 2023 INRMP was used as a baseline to develop an understanding of the resources in the project areas.

3.7.1 Affected Environment

WSMR encompasses one of the largest expanses of relatively undeveloped land remaining in the southwestern United States, extending into parts of five New Mexico counties and encompassing the majority of two major mountain ranges, the San Andres and Oscura Mountains. White Sands National Park (WSNP) and the San Andres National Wildlife Refuge are located entirely within WSMR's boundaries.

3.7.1.1 Ecoregion

WSMR lies within the Chihuahuan Desert Ecoregion, which consists of a series of basins and mountain ranges, with a central highland that extends from Socorro southward into Mexico. Landforms include plains with low mountains consisting of gentle slopes and local relief of 1,000 to 3,000 feet, plains with high hills and local relief of 1,000 to 3,000 feet, open high hills with relief of 500 to 1,000 feet, and tablelands with moderate relief averaging from 100 to 300 feet (Bailey 1995).

Climate in this ecoregion is characterized by abundant sunshine, low humidity, modest rainfall, and about 250 frost-free days a year at lower elevations. Fall, winter, and spring are typically mild, and summer is hot. Strong westerly winds are most dominant in the spring and most precipitation occurs during thunderstorms in late summer. Daily and annual temperature and precipitation vary considerably, and weather patterns can be dynamic and difficult to predict (Bailey 1995).

WSMR maintains an extensive surface meteorological data-collection system, referred to as the Surface Atmosphere Measuring System, administered by the Army Research Laboratory. The average annual precipitation at WSMR's Southern Basin Climate Station since 1962 is 10.1 inches. According to the climate station records, 2020 was the fifth driest year on record. Four of the five driest years on record have all occurred in the last two decades. Average annual precipitation in WSMR's arid desert basins is less than 10 inches, in semiarid foothills 10 to 16 inches, and highest mountain elevations are almost temperate (WSMR 2023).

Average annual temperature has increased in the southern basin of WSMR from 1962 to 2020. Every year since 2011, temperatures at WSMR have been above average. The average low temperature in January is 29°F and in July, the average high is 95°F. Temperature extremes range from 112°F (recorded at Orogrande in June 1994) to -25°F (recorded at WSNP in January 1962) (WSMR 2023).

3.7.1.2 Vegetation

Several species of thorny shrubs are typical of the Chihuahuan Desert. They frequently grow in open stands, but sometimes form low thickets. They can also be associated with short grasses, such as grama (*Bouteloua sp.*). Extensive arid grasslands cover most of the high plains of the ecoregion. On deep soils, honey mesquite (*Prosopis glandulosa*) is often the dominant plant. Cacti are also abundant, particularly prickly pears (*Opuntia phaeacantha*). The desert is characterized by yuccas (*Yucca elata*) and Creosote bush (*Larrea tridentata*), the most abundant plant of the ecoregion, which is especially common on gravel fans. Species like agave (*Agave*

americana) and common sotol (*Dasylirion wheeleri*) are also abundant. On rocky slopes, the ocotillo (*Fouquieria splendens*) can frequently be found.

The USFWS Information for Planning and Consultation (IPaC) tool identified seven federally listed plant species as potentially occurring at WSMR, including the Kuenzler hedgehog cactus (*Echinocereus fendleri var. kuenzleri*), Pecos sunflower (*Helianthus paradoxus*), Sacramento Mountains thistle (*Cirsium vinaceum*), Sacramento prickly poppy (*Argemone pleiacantha ssp. Pinnatisecta*), Sneed pincushion cactus (*Coryphantha sneedii var. sneedii*), Todsen's pennyroyal (*Hedeoma todsenii*), and Wright's marsh thistle (*Cirsium wrightii*) (USFWS 2023a). Only one of these species has been documented at WSMR, the Todsen's pennyroyal.

Todsen's pennyroyal occurs in the San Andres Mountains and on the western slope of the Sacramento Mountains at elevations of 6,200 to 7,400 feet. There are 15 known populations of Todsen's pennyroyal at WSMR (see **Figure 3-1**). The smallest population covers 0.1 acres and the largest covers 1.22 acres. Todsen's pennyroyal was originally listed as endangered, with critical habitat for two known populations, on January 19, 1981. New Mexico has also listed Todsen's pennyroyal as endangered. The Todsen's Pennyroyal Endangered Species Management Component (ESMC) was developed by WSMR to facilitate protection of this endangered species (WSMR 2023). The ESMC defines the conservation goals and management objectives, and it prescribes management actions for populations of Todsen's pennyroyal at WSMR.

Additionally, four state-listed plant species documented at WSMR include the Mescalero milkwort (*Polygala rimulicola var. Escalerorum*), Night-blooming cereus (*Peniocereus greggii var.greggi*), Organ Mountain pincushion cactus (*Escobaria sneedii organensis*), and Todsen's pennyroyal (WSMR 2023).

3.7.1.3 Wildlife

The borderlands region of New Mexico is a center of biodiversity for mammals, birds, amphibians, retiles, fishes, and insects. The diversity of species at WSMR is high, but few warm-blooded vertebrates are centered in or limited in their distribution to the Chihuahuan Desert (Brown 1994).

Mammals. New Mexico has one of the most diverse mammal communities in the world, with 179 total mammal species documented (WSMR 2023). Seventy-five of these species have been recorded at WSMR. The USFWS IPaC tool identified three federally listed mammal species as potentially occurring at WSMR, including the Mexican gray wolf *(Canis lupus baileyi*), New Mexico meadow jumping mouse (*Zapus hudsonius luteus*), and Penasco Least chipmunk (*Tamias minimus atristriatus*) (USFWS 2023a). None of these species have been documented at WSMR (WSMR 2023). Nevertheless, populations of the Mexican gray wolf (*Canis lupus baileyi*), a federal and state endangered listed species, have improved and continue to expand their range throughout the Mexican Wolf Experimental Population Area (MWEPA) (USFWS 2022).

The Mexican gray wolf is the rarest subspecies of gray wolf in North America and was listed as endangered in 1976 (USFWS 2015). The USFWS began reintroducing Mexican gray wolves back into the wild within the MWEPA in Arizona and New Mexico in 1998. WSMR is a federal cooperating agency for the introduction of the Mexican gray wolf under the 2015 10(j) rule, revision to the regulations for the nonessential experimental population (USFWS 2022, 80 FR 2512, January 16, 2015). WSMR is within management Zone 2 of the MWEPA (87 FR39348, USFWS 2022) and one Mexican wolf has been spotted in the northern portion of WSMR. Management Zone 2 is where Mexican wolves will be allowed to naturally disperse into and occupy and where Mexican wolves may be translocated.

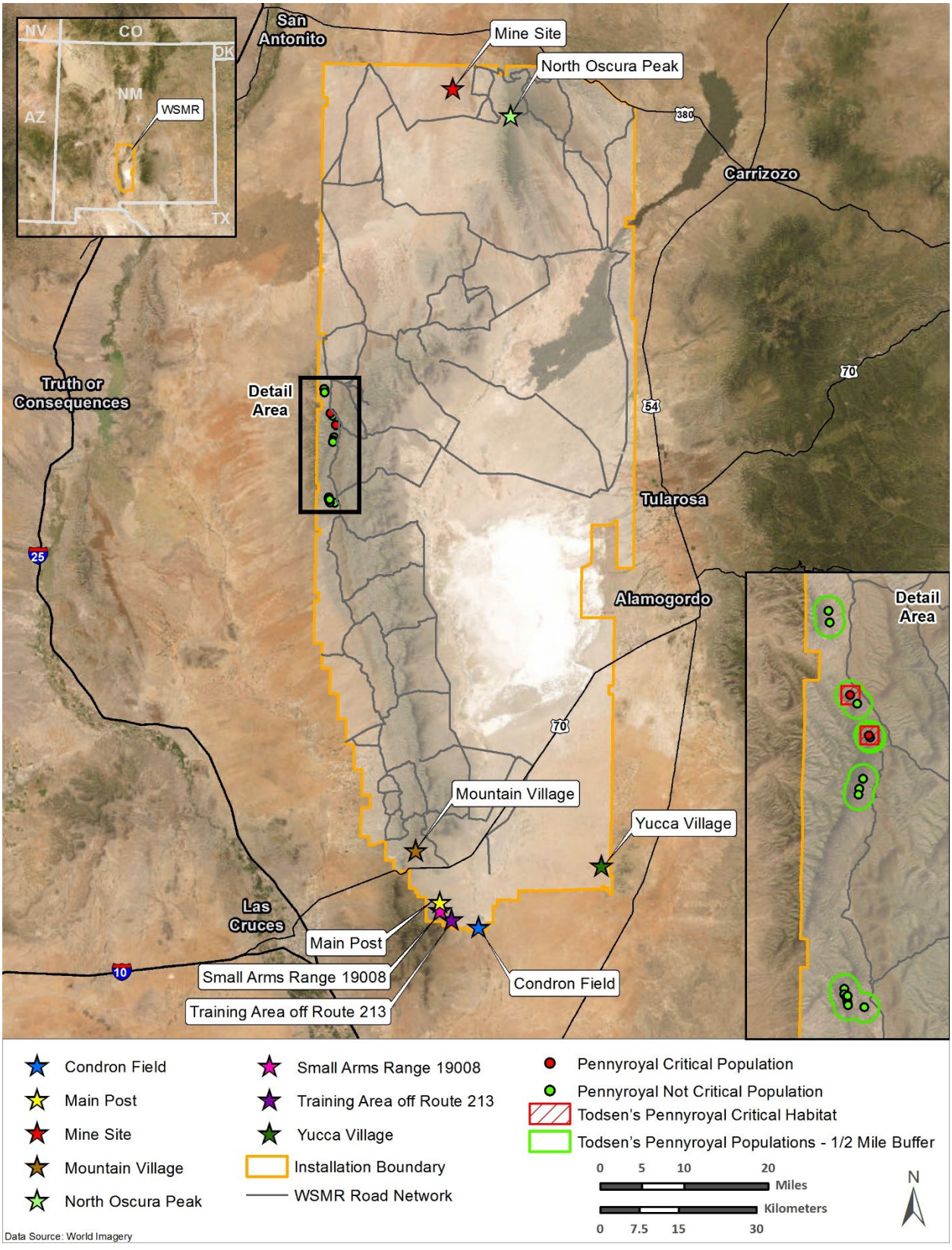

Figure 3-1. Todsen's Pennyroyal Populations and Protected Areas

There are three NMDGF threatened mammal species that have been documented at WSMR, including the Organ Mountains Colorado chipmunk (*Neotamias quadrivittatus organensis*), Oscura Mountains Colorado chipmunk (*Neotamias quadrivittatus oscuraensis*), and spotted bat (*Euderma maculatum*). A single mammal, the Townsend's big-eared bat (*Corynorhinus townsendii*), is listed by NMDGF as a Species of Greatest Conservation Need (SGCN) and has been documented at WSMR (WSMR 2023). One mammal on the Army Priority List of At-Risk Species (the Oscura Mountains Colorado chipmunk) has been documented at WSMR (U.S. Army 2010).

Birds. Due to its wide diversity of habitats, New Mexico has recorded the second highest number of bird species of any non-coastal state in the United States (NMACP 2016). WSMR itself has documented 313 bird species (WSMR 2023). The USFWS IPaC tool identified five federally listed bird species as potentially occurring at WSMR, including the Mexican spotted owl (*Strix occidentalis lucida*), northern aplomado falcon (*Falco femoralis septentrionalis*), piping plover (*Charadrius melodus*), southwestern willow flycatcher (*Empidonax traillii extimus*), and yellow-billed cuckoo (*Coccyzus americanus*) (USFWS 2023a). Additionally, on August 17, 2023, it was announced that the piñon jay (*Gymnorhinus cyanocephalus*) is under review for listing with the USFWS (USFWS 2023b).

Similarly, WSMR has documented 10 species with NMDGF listed status, including the northern aplomado falcon, southwestern willow flycatcher, bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), broad-billed hummingbird (*Cynanthus latirostris*), Costa's hummingbird (*Calypte costae*), Bell's vireo (*Vireo bellii*), gray vireo (*Vireo vicinior*), Baird's sparrow (*Centronyx bairdii*), and varied bunting (*Passerina versicolor*) (WSMR 2023). Thirteen bird species listed by NMDGF as SGCN have been documented at WSMR, including the Bendire's thrasher (*Toxostoma bendirei*), Black-chinned sparrow (*Spizella atrogularis*), burrowing owl (*Athene cunicularia*), Chestnut-collared longspur (*Calcarius ornatus*), flammulated owl (*Psiloscops flammeolus*), Loggerhead shrike (*Lanius ludovicianus*), long-billed curlew (*Numenius americanus*), Olive-sided flycatcher (*Contopus cooperi*), piñon jay, snowy plover (*Charadrius nivosus*), Virginia's warbler (*Leiothlypis virginiae*), yellow-billed cuckoo (WSMR 2023).

The 1988 amendment to the Fish and Wildlife Conservation Act mandates the USFWS to identify species, subspecies, and populations of all migratory nongame birds that without additional conservation action are likely to become candidates for listing under ESA. The Birds of Conservation Concern (BCC) distinction identifies migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the highest conservation priorities of USFWS. WSMR is located within USFWS Bird Conservation Region 35, which lists 30 bird species as BCC (USFWS 2021). Of these 30 species, 27 species may be present at WSMR at some time during their lifecycle.

Department of Defense (DoD) Partners in Flight (PIF) has identified, through a detailed technical analysis, 15 bird species occurring on DoD lands that may be at risk of becoming listed under the federal ESA. DoD PIF designated these as "Mission-sensitive Species" (MSS) due to their high potential to impact the military mission should ESA listing be warranted. There are two bird species that occur at WSMR that are considered MSS, the burrowing owl and piñon jay (DoD PIF 2021).

In addition to the MSS list, DoD PIF also categorized an additional 37 species as "Tier 2" species. Most of these species are experiencing long-term declines and have some potential relevance to future mission impacts if federally listed, but they are not considered highest priority based on DoD PIF's current review criteria. There are 14 Tier 2 species that occur at WSMR, the long-billed

curlew, flammulated owl, golden eagle (*Aquila chrysaetos*), greater yellowlegs (*Tringa melanoleuca*), black-chinned sparrow, Kentucky warbler (*Geothlypis formosa*), olive-sided flycatcher, Sprague's pipit (*Anthus spragueii*), Virginia's warbler, loggerhead shrike, Lewis's woodpecker (*Melanerpes lewis*), gray vireo, chestnut collared longspur (*Calcarius ornatus*), and Baird's sparrow (DoD PIF 2021).

Amphibians and Reptiles. WSMR contains habitat that supports a diverse array of herpetofauna, including 7 species of amphibians and 48 species of reptiles. Possible species that may never be documented due to their secretive nature and scarcity include the New Mexico milk snake (*Lampropeltis gentilis*) and many-lined skink (*Plestiodon multivirgatus*). The nonnative Mediterranean gecko (*Hemidactylus turcicus*) was detected on Main Post in 2013 (WSMR 2023). The USFWS IPaC tool identified one federally listed amphibian species as potentially occurring at WSMR, the Chiricahua leopard frog (*Rana chiricahuensis*). However, this species has not been documented at WSMR. Additionally, NMDGF lists both the Banded Rock Rattlesnake (*Crotalus lepidus*) and Western Massasauga Rattlesnake (*Sistrurus catenatus*) as SGCN (BISON-M 2023). Three reptiles on the Army Priority List of At-Risk Species (the little white whiptail lizard [*Aspidoscelis gypsi]*, White Sands prairie lizard [*Sceloporus undulatus cowlesi]*, and Desert tortoise [*Gopherus agassizii*]) have been documented at WSMR (U.S. Army 2010).

Fishes. Field surveys at WSMR have documented nonnative fish in ponds and springs, including the Largemouth bass (*Micropterus salmoides*), goldfish (*Carrasius auratus*), and mosquitofish (*Gambusia affinis*) at Guilez and Barrel Springs. A population of bluegill (*Lepomis macrochirus*) was discovered in Martin Ranch Pond (WSMR 2023). Nonnative fish have since been eradicated at all locations at WSMR.

The USFWS IPaC tool identified two federally listed fish species as potentially occurring at WSMR, including the Rio Grande Cutthroat Trout (*Oncorhynchus clarkii virginalis*) and Rio Grande Silvery Minnow (*Hybognathus amarus*) (USFWS 2023a). However, neither of these species have been documented at WSMR.

New Mexico state threatened White Sands pupfish (*Cyprinodon tularosa*) were first recorded as occurring in Salt Creek as early as 1911. The first fish collected at WSMR were of White Sands pupfish from the headspring of Malpaís Spring in 1927 and from Salt Creek in 1947 (WSMR 2023). Pupfish have been translocated to three locations at WSMR (South Mound Spring, North Mound Spring, and Main Mound Spring) as well as one location on Holloman Air Force Base (Lost River). The White Sands pupfish is also listed on the Army Priority List of At-Risk Species (U.S. Army 2010).

Snails. The USFWS IPaC tool identified two federally listed endangered snail species as potentially occurring at WSMR, including the Chupadera Springsnail (*Pyrgulopsis chupaderae*) and Socorro Springsnail (*Pyrgulopsis neomexicana*) (USFWS 2023a). However, neither of these species have been documented at WSMR.

Insects. Insect surveys have been conducted in several different habitats throughout WSMR. Butterfly surveys and incidental encounters at WSMR have detected more than 100 butterfly species (WSMR 2023). Although there are no federal or state listed species of insects at WSMR, USFWS has determined that listing the monarch butterfly (*Danaus plexippus*) under the ESA is warranted but precluded at this time by higher priority listing actions (USFWS 2020). With this finding, the monarch becomes a candidate for listing. The monarch has been documented throughout WSMR. Investigators recommend further monitoring of the monarch and Poling's hairstreak (*Satyrium polingi*), which has a rare endemic subspecies (*S. p. organensis*) occurring

at WSMR. The probable range of *S. p. organensis* appears to be restricted to a narrow montane corridor that starts in the Organ Mountains, extending along the San Andres Mountains and possibly the Oscura Mountains up to U.S. 380. At WSMR, this subspecies has only been recorded at two sites. As of January 2022, USFWS has proposed endangered listing for the Sacramento Mountain Checkerspot (*Euphydryas anicia cloudcrofti*). Surveys for this endemic subspecies had previously been conducted in 2005. While the Sacramento Mountain Checkerspot was not found at that time, the survey effort did find host and food plants for that species at several sites; consequently, Environmental Division personnel have proposed follow-up surveys to confirm presence/absence of this potential endangered species (WSMR 2023).

Table 3-6 summarizes the species identified as federal and/or state listed as well as species of concern occurring at WSMR. For additional information regarding the status of the species listed below, consult WSMR's 2023–2027 INRMP (WSMR 2023).

3.7.2 Environmental Consequences

3.7.2.1 Proposed Action

Vegetation. Short- and long-term, direct and indirect, minor, adverse impacts on vegetation would occur. Short-term, direct effects on vegetation from removal and crushing and indirect effects from soil compaction and the potential for establishment of invasive species would occur. However, long-term, negligible, beneficial impacts would result from revegetation or landscaping of disturbed sites with native species supporting the native plant community on the installation.

Crushing and soil compaction would occur when vehicles and equipment access, park, and maneuver around the project areas during construction and training activities. Additionally, ground disturbance and transportation of construction and training activity equipment could increase the potential for the establishment of invasive plant species. Adverse impacts on vegetation would be minimized with the use of appropriate BMPs, such as cleaning equipment prior to entering the project areas. In accordance with EO 13112, *Invasive Species*, active measures would be implemented to help prevent and control dissemination of invasive plant species during ground-disturbing activities. Revegetation of disturbed areas with native vegetation would further reduce the establishment of invasive species.

Wildlife Species and Habitat. Short- and long-term, minor, adverse impacts on wildlife species and their habitats would occur. Construction and training activities would result in both permanent (due to new construction footprint) and temporary (due to disruption from construction and maintenance activities), minor degradation of habitat. To help mitigate these impacts, WSMR would conduct surveys for listed species prior to any construction and have a monitor onsite during construction when necessary. The need for surveys would be a condition of use and determined through the environmental review process. Additionally, the presence of monitors would be species/habitat driven. An updated species list from USFWS would be required to be obtained within 90 days of starting any construction activities.

Table 3-6. Federal and State Listed Species and Species of Concern Potentially Occurring at WSMR

Species	Federal Status	State Status*	DoD Status	Occurrences at WSMR
Mammals				
Mexican Gray Wolf *(Canis lupus baileyi)*	E; Experimental Population, Non-Essential	E	-	None.
New Mexico Meadow Jumping Mouse *(Zapus hudsonius luteus)*	E	-	-	None.
Organ Mountains Colorado Chipmunk *(Tamias quadrivittatus)*	-	T	-	A small area of habitat within WSMR occurs in portions of Texas and Ash Canyons in the Organ Mountains.
Oscura Mountains Colorado Chipmunk *(Neotamias quadrivittatus oscuraensis)*	-	T	-	Stable populations occur within piñon/juniper habitats in the Oscura Mountains.
Penasco Least Chipmunk *(Tamias minimus atristriatus)*	PE	-	-	None.
Spotted Bat *(Euderma maculatum)*	-	T	-	Few specimens documented at WSMR, apparently uncommon to rare.
Townsend's Big-eared Bat *(Corynorhinus townsendii)*	-	SGCN	-	Significant roost site at Victorio Peak and Fairview Mining District. Captured at 5 of 16 sites at WSMR during 2014.
Birds				
Baird's Sparrow *(Ammodramus bairdii)*	BCC	T	DoD PIF Tier 2 Species	Infrequently encountered in Stallion Basin grasslands.
Bald Eagle *(Haliaeetus leucocephalus)*	BGEPA	T	-	Occasional during migration or winter months.
Bell's Vireo *(Vireo bellii)*	-	T	-	Rarely encountered.
Bendire's Thrasher *(Toxostoma bendirei)*	BCC	SGCN	DoD PIF MSS	No confirmed sightings at WSMR and unlikely to occur east of the Rio Grande.
Black-chinned Sparrow *(Spizella atrogularis)*	BCC	SGCN	DoD PIF Tier 2 Species	Uncommon and local in chaparral and similar arid hillsides with brushy vegetation.
Broad-billed Hummingbird *(Cynanthus latirostris)*	-	T	-	Rare migrant.
Burrowing Owl *(Athene cunicularia)*	BCC	SGCN	DoD PIF MSS	Uncommon and local in open grasslands.

Species	Federal Status	State Status*	DoD Status	Occurrences at WSMR
Birds (continued)				
Chestnut-collared Longspur *(Calcarius ornatus)*	BCC	SGCN	DoD PIF Tier 2 Species	Common locally to uncommon in grasslands.
Costa's Hummingbird *(Calypte costae)*	BCC	T	-	Rarely encountered at WSMR. No breeding documented.
Flammulated Owl *(Psiloscops flammeolus)*	BCC	SGCN	DoD PIF Tier 2 Species	Uncommon in oak and pine woodlands.
Golden Eagle *(Aquila chrysaetos)*	BGEPA	-	DoD PIF Tier 2 Species	Rare in grasslands, deserts, and other open country, usually in mountainous areas. The WSMR breeding population appears to be stable over the last 10 years, with most breeding territories filled by adult breeding pairs.
Gray Vireo *(Vireo vicinior)*	-	T	DoD PIF Tier 2 Species	Breeds at WSMR. Common in canyons of the San Andres Mountains and piñon/juniper woodlands of Oscura Mountains.
Loggerhead Shrike *(Lanius ludovicianus)*	-	SGCN	DoD PIF Tier 2 Species	Common throughout WSMR.
Long-billed Curlew *(Numenius americanus)*	BCC	SGCN	DoD PIF Tier 2 Species	Uncommon in open grasslands.
Mexican Spotted Owl *(Strix occidentalis lucida)*	T	-	-	None.
Northern Aplomado Falcon *(Falco femoralis septentrionalis)*	Experimental Population, Non-Essential	E	-	Rare year-round resident possibly extirpated. Last confirmation at WSMR - 8/15/2015.
Olive-sided Flycatcher *(Contopus cooperi)*	BCC	SGCN	DoD PIF Tier 2 Species	Uncommon. Uses riparian corridors.
Peregrine Falcon *(Falco peregrinus)*	Delisted	T	-	Nest in nearby Organ Mountains Occasionally observed at WSMR. May nest in the Oscura Mountains.
Piñon Jay *(Gymnorhinus cyanocephalus)*	Under Review for Listing,	SGCN	DoD PIF MSS	Declining in juniper and piñon/juniper habitats at WSMR.
Piping Plover *(Charadrius melodus)*	T	-	-	None.
Snowy Plover *(Charadrius nivosus)*	BCC	SGCN	DoD PIF Tier 2 Species	Rare migrant.

Species	Federal Status	State Status*	DoD Status	Occurrences at WSMR
Birds (continued)				
Southwestern Willow Flycatcher *(Empidonax traillii extimus)*	E	E	-	Willow Flycatchers pass through during migration, but WSMR lacks adequate breeding habitat for the Southwestern subspecies, which has not been documented at WSMR.
Sprague's Pipit *(Anthus spragueii)*	BCC	SGCN	DoD PIF Tier 2 Species	Uncommon and local in grasslands.
Varied Bunting *(Passerina versicolor)*	BCC	T	-	Infrequently encountered.
Virginia's Warbler *(Leiothlypis virginiae)*	BCC	SGCN	DoD PIF Tier 2 Species	Uncommon. Uses piñon/juniper woodlands and riparian areas.
Yellow-billed Cuckoo *(Coccyzus americanus)*	T	SGCN	-	A rare migrant confirmed sporadically. No breeding cuckoos have been documented, and breeding habitat does not occur at WSMR.
Amphibians and Reptiles				
Banded Rock Rattlesnake *(Crotalus lepidus)*	-	SGCN	-	Found in Oscura, Mockingbird, and San Andres Mountains.
Chiricahua Leopard Frog *(Rana chiricahuensis)*	T	-	-	None.
Western Massasauga Rattlesnake *(Sistrurus catenatus)*	-	SGCN	-	Found in the northern Jornada Basin.
Fishes				
Rio Grande Cutthroat Trout *(Oncorhynchus clarkii virginalis)*	C	-	-	None.
Rio Grande Silvery Minnow *(Hybognathus amarus)*	E	-	-	None.
White Sands Pupfish (Cyprinodon tularosa)	-	T	-	Found in Tularosa Basin, Mound Spring, Salt Creek, Malpaís Spring, and Lost River.
Snails				
Chupadera Springsnail *(Pyrgulopsis chupaderae)*	E	-	-	None.
Socorro Springsnail *(Pyrgulopsis neomexicana)*	E	-	-	None.

Species	Federal Status	State Status*	DoD Status	Occurrences at WSMR
Insects				
Monarch Butterfly *(Danaus plexippus)*	C	-	-	Found throughout WSMR.
Sacramento Mountain Checkerspot *(Euphydryas anicia cloudcrofti)*	PE	-	-	None found during surveys; however, survey effort did find host and food plants for the species at several sites.
Plants				
Alamo Beardtongue (*Penstemon alamosensis*)	-	S3	-	Single occurrence located in the mouth of Bear Canyon.
Castetter's Milkvetch (*Astragalus castetteri*)	-	S3	-	Collected from the San Andres Mountains.
Kuenzler Hedgehog Cactus *(Echinocereus fendleri var. kuenzleri)*	T	-	-	None.
La Jolla Prairie Clover *(Dalea scariosa)*	-	S3	-	Found in the Bosque Canyon in the San Andres Mountains.
Mescalero Milkwort *(Polygala rimulicola var. Escalerorum)*	-	E	-	Two small populations are known—both at elevations of 5,700–6,300 feet at WSMR.
Mosquito Plant *(Agastache cana)*	-	S3	-	Lower canyons and slopes of Organ Mountains.
New Mexico Beardtongue *(Penstemon neomexicanus)*	-	S4	-	Occurs in Oscura Mountains.
New Mexico Rockdaisy *(Perityle staurophylla var.staurophylla)*	-	S3	-	Occurs in San Andres Mountains.
Night-blooming Cereus *(Peniocereus greggii var.greggi)*	-	E	-	Occurs in San Andres Mountains.
Organ Mountain Pincushion Cactus *(Escobaria sneedii organensis)*	-	E	-	Occurs in Texas Canyon and is likely to occur in Organ Mountains.
Organ Mountains Evening Primrose (*Oenothera organensis*)	-	S2	-	Documented in the Organ and San Andres Mountains.
Pecos Sunflower *(Helianthus paradoxus)*	T	-	-	None.
Plank's Catchfly or Campion *(Silene plankii)*	-	S2	-	Found on Salinas Peak and at Mockingbird Gap.
Sacramento Mountains Thistle *(Cirsium vinaceum)*	T	-	-	None.
Sacramento Prickly Poppy *(Argemone pleiacantha ssp. Pinnatisecta)*	E	-	-	None.

Species	Federal Status	State Status*	DoD Status	Occurrences at WSMR
Plants (continued)				
San Andres Rockdaisy (*Perityle staurophylla var.homoflora)*	-	S2	-	Occurs in the San Andres Mountains.
Sandberg's Pincushion Cactus *(Escobaria sandbergii)*	-	S2	-	Occurs in the southern San Andres Mountains.
Silver Mock Orange (*Philadelphus microphllus)*	-	S3	-	Occurs in the San Andres Mountains and Chalk Hills.
Sivinskis Scorpionweed *(Phacelia sivinskii)*	-	S3	-	Occurs in the San Andres Mountains and Chupadera Hills.
Sneed Pincushion Cactus *(Coryphantha sneedii var. sneedii)*	E	-	-	None.
Todsen's Pennyroyal *(Hedeoma todsenii)*	E	E	-	Occurs in the San Andres and Sacramento Mountains.
Vasey's Bitterweed (*Hymenoxys vaseyi*)	-	S2	-	Occurs in the southern San Andres and Organ Mountains.
Warner's Dodder (*Cuscuta warneri*)	-	S1	-	Anecdotal evidence shows this plant occurs in Sierra County.
Wright's Marsh Thistle *(Cirsium wrightii)*	PT	-	-	None.

Source: WSMR 2023, USFWS 2023b

*New Mexico State Status (Natural Heritage): S1 = Critically Imperiled Species, S2 = Imperiled Species, S3 = Vulnerable Species, S4 = Apparently Secure

BCC	Bird of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
C	Candidate
DoD MSS	Department of Defense Mission-Sensitive Species
DoD PIF	Department of Defense Partners in Flight
E	Endangered
PE	Proposed Endangered
PT	Proposed Threatened
SGCN	Species of Greatest Conservation Need
T	Threatened

Temporary and permanent displacement of mobile wildlife from noise, lighting, and other disturbances would occur from both construction and training activities. High-impact activities that require heavy equipment could cause more-mobile mammals, reptiles, and birds, including breeding migratory birds, to temporarily or permanently relocate to nearby similar habitat. This disturbance is expected to be minor, and it is assumed that displaced wildlife would return soon after activities conclude. However, to avoid nest abandonment and other adverse impacts, surveys would be conducted prior to the start of potentially disturbing activities. These impacts would be expected to be short-term and BMPs would be implemented to minimize any adverse impacts.

Individuals of smaller, less-mobile species could be inadvertently killed or injured during ground-disturbing activities or transportation of equipment and personnel. Burrowing animals, such as rodents and reptiles, could be impacted. However, vehicles associated with construction activities would be used primarily on the established roads, which limits the potential for impacts on burrowing species.

BMPs that could be implemented include employing seasonal avoidance measures during construction and training activities as well as non-disturbance buffer zones around occupied nests during the nesting period. Preconstruction surveys would be conducted during the breeding season, and if found, one of the following mitigation activities would be conducted (1) seasonal avoidance measures would be implemented until birds have vacated the affected nests (i.e., construction activities would not occur during the breeding season of March 1 to September 30; (2) spatial buffers of at least 0.25 mile from construction activities would be implemented; or (3) relocation activities would be implemented using USFWS-recommended relocators. Additionally, WSMRR 200-2 requires personnel to participate in Environmental Awareness Training prior to beginning activities at WSMR.

Construction and training activities would result in temporary, minor degradation of wildlife habitat, while construction of the new facilities would result in permanent, minor degradation of habitat. Adherence to BMPs would minimize unnecessary disturbances to habitat.

Threatened and Endangered Species. Short- and long-term, negligible to minor, adverse impacts on federally listed threatened and endangered, or candidate species, would be expected to occur from the Proposed Action, specifically from desert mobility training and the use of pyrotechnics. Only one federally listed species, the Todsen's pennyroyal, and one candidate species, the monarch butterfly, have been documented at WSMR. Todsen's pennyroyal has only been documented in the San Andres and Sacramento Mountains, neither of which fall within any of the proposed project areas. Critical habitat has also been designated for the species within the San Andres Mountains within the boundaries of WSMR (see **Figure 3-1**). However, no proposed project areas are located near the designated critical habitat; therefore, no impacts on Todsen's pennyroyal populations are expected to occur.

The monarch butterfly has been documented throughout WSMR. However, with the implementation of BMPs, adverse impacts on the species would be expected to be negligible to minor. Construction and training activities have the potential to result in both temporary and permanent loss of habitat for the species and temporary displacement of individuals from noise, lighting, and other disturbances. However, construction activities are not planned to occur within any known habitat. Additionally, WSMR would conduct surveys prior to any construction and have a monitor onsite during construction when necessary.

State-listed species potentially occurring at WSMR include the Organ Mountains Colorado chipmunk, Oscura Mountains Colorado chipmunk, spotted bat, Baird's sparrow, bald eagle, Bell's vireo, broad-billed hummingbird, Costa's hummingbird, gray vireo, northern aplomado falcon, peregrine falcon, varied bunting, White Sands pupfish, Mescalero milkwort, night-blooming cereus, and Organ Mountain pincushion cactus. Most of the species listed above rarely occur at WSMR and only one species has the potential to be impacted, the White Sands pupfish. This species could be impacted by desert mobility activities if a tactical vehicle were to fall into the Malpaís Spring or Salt Creek. BMPs would be implemented to reduce any impacts, to include reducing speed limits on the road that passes the Malpaís Spring as well as not allowing any road activity through potential habitat.

BMPs and Mitigation Measures. As previously stated, WSMR has the responsibility of ensuring that BMPs and mitigation measures are implemented. In addition to those listed above, the following BMPs and mitigation measures would be applied to minimize impacts on biological resources:

- Support vehicles would use existing roads to the fullest extent possible.
- Off-road travel would be limited to designated areas only and when necessary, use a single path in and out. Personnel would be informed of restricted areas per the guidance of the Environmental Awareness Training.
- Staging areas would be located in previously disturbed areas, where possible, and kept as small as possible.
- Surveys for migratory birds would be conducted 7 days before construction activities occur during nesting season. Survey personnel would be required to meet the standards and qualifications of the Environmental Division Conservation Program.
- All openings, inside and outside of buildings and structures that allow wildlife (e.g., rodents, birds, snakes, etc.) entry would be blocked.
- Workers would be instructed to not harass, collect, possess, harm, disturb, or destroy wildlife or their parts to include, but not limited to, snakes, bats, birds, nests, eggs, or nestlings.
- Workers would be made aware of local wildlife species that have potential for negative interactions and instructed not to feed wildlife, water wildlife, or leave food or trash in areas that may attract wildlife. In areas with potential bear issues, the trash receptacles would be required to be bearproof.
- Workers would be instructed to report to the Environmental Division any injured or dead birds or active nests with eggs or nestlings discovered at the project sites.
- Removal or modification of vegetation would be conducted outside bird nesting season (March through September).
    - When vegetation removal or modification must be conducted during bird nesting season, surveys would be conducted by qualified biologists and coordinated with the Environmental Division; and
    - The Environmental Division would be contacted regarding any issues regarding migratory birds, raptors, lizards, snakes, or other wildlife species of concern.

- Disturbed areas would be restored to the fullest extent feasible, and native vegetation would be allowed to reseed naturally as approved by the Environmental Division.

- If bird nests are found during surveys, the Environmental Division would be consulted to determine actions to be taken.

- The Environmental Division would consult with the USFWS regarding MBTA and ESA issues.

- The Environmental Division would coordinate with the NMDGF regarding SGCN and state-listed or game species when needed.

- Eagle biologists (via the Environmental Division) would monitor the eagle nests at or adjacent to each project and activity area to determine which nests are active during a given breeding season.

- Human and vehicle activity would remain outside of the 0.5-mile buffer area for any active eagle nest throughout the nesting season of mid-January through July and outside of the 0.25-mile buffer area for any active burrowing owl habitats.

- WSMRR 200-2 requires all personnel to participate in Environmental Awareness Training prior to beginning activities.

- All power poles would be eagle-safe in accordance with the WSMR Avian Protection Plan.

- LED lighting would be installed in accordance with UFC 3-530-01, including fully shielded luminaires and lights pointing down (at a 0-degree tilt) straight at ground.

- When possible, trenching would occur within previously disturbed areas and during the cooler months (i.e., October to March). Concurrent trenching, pipe- or cable-laying, and backfilling would occur whenever possible, and crews would be kept as close together as possible to minimize the amount of open trench at any given time. When trenching activities are temporarily halted, wildlife would be protected from accessing any open trench prior to backfilling.

- Water would be diverted around construction sites whenever possible.

- Natural areas within the project site would be preserved. WSMR would strive to maintain the natural drainage system of the site, including natural stream channels, wetlands, and floodplains. The site would be designed, constructed, and maintained to protect the natural hydrology.

- If erosion control blankets be used following construction, blankets would not include fused mesh corners (e.g., use woven mesh) would reduce the chances of unintentional entanglement of wildlife, and blanket edges would be buried. Erosion control blankets would be regularly checked after placement to identify and release any wildlife that should become entangled.

- Properly engineered drainage swales and other vegetated channel systems would be used instead of storm sewers, lined channels, curbs, and gutters. Vegetated swales would be gently sloped (4:1) so that small wildlife would be able to maneuver them.

3.7.2.3 No Action Alternative

Under the No Action Alternative, proposed construction and improvement of support facilities and training activities would not occur. Biological conditions discussed in **Section 3.7.1** would remain unchanged. No new impacts on biological resources would occur as a result of the No Action Alternative.

3.8 CULTURAL RESOURCES

Cultural resources are historic sites, buildings, structures, objects, or districts considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural or engineering resources, and traditional cultural resources. Federal laws and Eos that pertain to cultural resources management include the NHPA (1966), the Archeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990). The installation's Integrated Natural and Cultural Resources Management Plan (INCRMP) and Section 3.5 of the Range-Wide EIS (WSMR 2009b) are the guidance documents for cultural resources for planning and proposed activities at WSMR.

Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (e.g., projectile points and bottles), but standing structures do not remain. Architectural resources include standing buildings, bridges, dams, other structures, and designed landscapes of historic or aesthetic significance. Generally, architectural resources must be more than 50 years old to warrant consideration for the National Register of Historic Places (NRHP). More recent structures might warrant protection if they are of exceptional importance or if they have the potential to gain significance in the future. Resources of traditional, religious, and cultural importance can include archaeological resources, sacred sites, structures, neighborhoods, prominent topographic features, habitat, plants, animals, or minerals considered essential for the preservation of traditional culture.

The NHPA defines historic properties as buildings, structures, sites, districts, or objects listed in or eligible for listing in the NRHP. Resources found significant under NRHP criteria are considered eligible for listing in the NRHP. Historic properties are generally 50 years of age or older, are historically significant, and retain sufficient integrity to convey their historic significance. Such resources might provide insight into the cultural practices of previous civilizations, or they might retain cultural and religious significance to modern groups. Cultural resources listed as National Historic Landmarks (NHLs) are historic properties of exceptional national significance.

Under Section 106 of the NHPA, federal agencies must take into consideration the effect of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. Under this process, the federal agency evaluates the NRHP eligibility of resources within the proposed undertaking's area of potential effects (APE) and assesses the possible effects of the proposed undertaking on historic properties in consultation with the SHPO and other consulting or interested parties, including the public.

The APE is defined as the geographic area or areas within which an undertaking (project) may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The APE for the Proposed Action is defined as the combined project areas of the Main Post, NOP, Training Area off Route 213, Mountain Village, Yucca Village, Lee Site, Thurgood Site, Condron Field, and WSMR Road Network.

3.8.1 Affected Environment

A review was conducted of the New Mexico Cultural Resources Inventory System (NMCRIS) database as well as the WSMR cultural resource Geographic Information System (GIS) database to identify all historic properties within the APE. Based on available data, the nine project location boundaries intersect 282 previously recorded archaeological sites. These include 20 sites within the Main Post project areas and 13 sites within the Mountain Village activity areas. The remaining archaeological sites intersect segments of the WSMR Road Network.

A search of the NMCRIS database also identified 94 historic buildings, seven historic structures, and four historic objects recorded in the Historic Cultural Properties Inventory (HCPIs) within the APE. Except for one building, all of these properties are within the Main Post and associated with the Main Post Historic District NHL. The Main Post Historic District has been determined eligible for NRHP listing.

Consultations to comply with Section 106 of the NHPA are currently underway. Previous consultations with the Mescalero Apache and the Ysleta del Sur Pueblo (Tigua) tribes have not identified any Traditional Cultural Properties (TCPs) within the APE. WSMR will continue to consult with the tribes regarding their concerns. WSMR will consult with the Mescalero Apache Tribe and the Ysleta del Sur Pueblo (Tigua) regarding their concerns about properties of traditional cultural and religious importance that may be present.

Main Post. Twenty archaeological sites have been recorded within the Main Post. Nine of these sites have been determined or recommended eligible for the NRHP under Criterion D for their potential to provide information relevant to the history or prehistory of the area. Additionally, seven sites have been recommended eligible for the NRHP under Criteria A and C.

The Project 1 area was covered by a cultural resources survey completed by Human Systems Research, Inc. (HSR) in 1985 (Kirkpatrick 1986) and partially surveyed as part of a 2007 investigation (Trierweile and Swain 2009). This area in the Main Post near the intersection of Hughes and St. Louis Streets is previously disturbed ground. The Project 1 area does not intersect with any known cultural resources, but is adjacent to archaeological site LA 51225, a Mogollon period prehistoric occupation that has been determined eligible for the NRHP under Criterion D. Extensive subsurface testing completed by Ecosystem Management, Inc. in 2005 demonstrated that the site is intact (Burleson 2005).

The Project 2 area, located at the corner of Watertown Avenue and Hughes Street, is the recorded location of HCPI 44801, recorded as a historic building. No information is available within the NMCRIS cultural resource database for this resource. Recent aerial imagery indicates that the building is no longer present. This area was also surveyed by HSR in 1985 (Kirkpatrick 1986).

Within the Project 3 area, according to the GIS database, WSMR conducted an archaeological survey in 2009 (WSMR 2009b). No resources have been recorded within the project construction boundaries. Proposed construction is adjacent to archaeological site LA 184848, recorded as a cemetery for horses from the WSMR Organ Mountain Riding Club.

NOP. In the Project 4 area, HSR completed a cultural resources survey of NOP in 1989 (Kirkpatrick 1989). The survey covered 11.6 acres using pedestrian survey transects spaced at 5-meter intervals. No cultural resources are recorded in the area. The existing facilities proposed for rehabilitation do not meet the NRHP age criteria of 50 years or older.

Training Area off Route 213. Training Area off Route 213 was surveyed by WSMR archaeologist Jim Bowman in 2009. No cultural resources were found at the training area.

Mountain Village. Mountain Village is within an area dense with archaeological sites. Approximately 90 percent of the project location has been covered by cultural resources surveys. Cultural resource surveys between 2010 (Flowers et al. 2010) and 2012 (Ackerly 2013) identified 12 archaeological sites within Mountain Village project location boundaries that have been determined eligible for listing on the NRHP under Criterion D. These sites contain hundreds of prehistoric lithic and ceramic artifacts, possible hearth features, bedrock mortars, and petroglyphs (see **Table 3-7**).

Table 3-7. Recorded Archaeological Sites at Mountain Village

Site Number	Site Description	NRHP Evaluation
LA 165937	Mogollon period lithic and ceramic scatter	Eligible under Criterion D
LA 165938	Mogollon period lithic and ceramic scatter	Eligible under Criterion D
LA 165939	Mogollon period lithic and ceramic scatter	Eligible under Criterion D
LA 165940	Mogollon period lithic and ceramic scatter	Eligible under Criterion D
LA 165941	Mogollon period lithic and ceramic scatter	Eligible under Criterion D
LA 165942	Mogollon period lithic and ceramic scatter	Eligible under Criterion D
LA 165943	Mogollon period lithic and ceramic scatter	Eligible under Criterion D
LA 165944	Mogollon period lithic and ceramic scatter with bedrock milling and petroglyph features	Eligible under Criterion D
LA 165945	Mogollon period lithic and ceramic scatter with bedrock milling and petroglyph features	Eligible under Criterion D
LA 165946	Mogollon period lithic and ceramic scatter with soil stain feature	Eligible under Criterion D
LA 165947	Mogollon period lithic and ceramic scatter with bedrock milling and petroglyph features	Eligible under Criterion D
LA 165948	Mogollon period lithic and ceramic scatter	Eligible under Criterion D
LA 174042	Prehistoric	Unevaluated

Yucca Village. According to the WSMR GIS database, Yucca Village was covered by a 1987 cultural resource survey (no surveys are reported in NMCRIS). No archaeological sites, historic buildings, TCPs, or other resources have been recorded at the proposed training location.

Lee Site. In 2011, Zia Engineering and Environmental Consultants completed a cultural resources survey of 1,221 acres at WSMR for the NIE that included the Lee Site (Flowers et al. 2011). No archaeological sites, buildings, structures, or TCPs were identified at Lee Site.

Thurgood Site. The Thurgood Site was also surveyed by Zia Engineering and Environmental Consultants in 2011 for the NIE (Flowers et al. 2011). No archaeological sites, buildings, structures, or TCPs were identified at the Thurgood Site.

Condron Field. According to the WSMR GIS database, Amaterra completed a cultural resource survey of Condron Field in 2017. No archaeological sites, buildings, structures, or TCPs have been identified at Condron Field.

WSMR Road Network. Tenant and transient units would use the WSMR Road Network to carry out on- and off-road vehicle training. Approximately 1 percent of the road network would require the development of pullouts. However, as stated in **Section 2.2.1.2.2**, off-road training and pull-out development would be limited to designated off-road areas that have no jurisdictional, environmental, or other constraints. The road network intersects approximately 249 known

archaeological sites, most of which have not been evaluated for listing in the NRHP. WSMR Road Network does not intersect any known historic buildings, structures, or TCPs.

3.8.2 Environmental Consequences

Impacts resulting from the proposed action would be considered significant if they were to:

1. Adversely affect known cultural resources considered eligible for inclusion into the NRHP.
2. Adversely affect the significance and the integrity of historic districts.
3. Damage or impact previously unknown and recorded archaeological and historical resources.
4. Cause substantial unauthorized artifact collection by personnel.
5. Adversely affect known TCPs on WSMR.

3.8.2.1 Proposed Action

Main Post. Short-term, negligible to minor, adverse impacts on cultural resources would result from construction under the Proposed Action. Project 1 would occur in previously surveyed and partially disturbed areas. Although Project 1 is adjacent to a known, eligible site, the Proposed Action would not physically impact that site. No historic properties or cultural resources are known to be present in the Project 2 area. The Project 3 area also does not contain cultural resources but is adjacent to an archaeological site identified as a horse cemetery. No physical impacts on cultural resources are anticipated from Project 3. In accordance with WSMRR 200-2, construction crews would be provided Environmental Awareness Training and briefed on no-go and sensitive areas. Should accidental or inadvertent discoveries of cultural resources, including human remains, occur, then site construction activities would cease and SOPs, as outlined in the INCRMP, would be followed. Proposed construction would not adversely impact the significance or integrity of the Main Post Historic District.

NOP. No impacts on known cultural resources would occur under Project 4; however, due to changes in archaeological survey standards, NOP may require additional survey. Components of Project 4 would occur in previously disturbed areas and existing facilities would be repurposed and renovated. Significant ground disturbance is not anticipated.

Mountain Village. Intermittent, short-term, negligible to moderate, adverse impacts on cultural resources at Mountain Village could result from the Proposed Action. Activities 4 and 5 have the potential to adversely impact fragile surface deposits and features. Live munitions could strike previously unidentified archaeological artifacts and features or inadvertently strike known artifacts and features of NRHP-eligible sites. Cleanup and recovery activities could also displace surface artifacts or result in unauthorized artifact collection by personnel. However, in accordance with WSMRR 200-2, personnel would be provided Environmental Awareness Training and briefed on avoidance and protection of cultural resources and materials prior to training activities. Additionally, environmental liaisons could be used to monitor troop activities for environmental disturbances or damage. Therefore, potential impacts on cultural resources from Activities 4 and 5 would likely be avoided or minimized.

Standard options for preservation and mitigation of archaeological sites detailed in the WSMR INCRMP include avoidance and site protection. Impacts on archaeological sites would be avoided by marking them as off-limits with protective fencing or signage (e.g., Siebert Stakes). Eligible or potentially eligible sites at Mountain Village should be marked as off limits with reflective Seibert

stakes. In addition to avoidance efforts, in accordance with WSMRR 200-2, construction crews would be provided Environmental Awareness Training and receive briefings prior to construction activities. Briefings would include identifying restricted areas, noting restrictions on artifact collection and protocols to be followed in the event of inadvertent discoveries of cultural resources, including human remains. Should such an event take place, program personnel would implement the appropriate procedures from the WSMR INCRMP pertaining to inadvertent discoveries. Any ground-disturbing activity would cease and WSMR archaeologists would be notified immediately.

Yucca Village. No cultural resources are known to exist within the Yucca Village activity area; therefore, the Proposed Action would not impact any cultural resources at Yucca Village.

Lee Site. No cultural resources are known to exist within the Lee Site; therefore, the Proposed Action would not impact any cultural resources at the Lee Site.

Thurgood Site. No cultural resources are known to exist within the Thurgood Site; therefore, the Proposed Action would not impact any cultural resources at the Thurgood Site.

WSMR Road Network. Intermittent, short-term, negligible to minor, adverse impacts on cultural resources that intersect the WSMR Road Network could occur. Tenant and transient troops would use the WSMR Road Network to carry out on- and off-road vehicle training. Off-road training and pull-out development would be limited to designated off-road areas that have no jurisdictional, environmental, or other constraints. Cultural resources that intersect the road network and specific locations of off-road training and pull-out locations would be identified or revised to avoid physically impacting cultural resources whenever possible. Additionally, in accordance with WSMRR 200-2, all personnel would receive Environmental Awareness Training prior to off-road training and pull-out development activities.

Condron Field. No cultural resources are known to exist within the Condron Field activity area; therefore, the Proposed Action would not impact any cultural resources at Condron Field.

Training Area off Route 213. No cultural resources are known to exist within the Training Area off Route 213 activity area; therefore, the Proposed Action would not impact any cultural resources at the Training Area off Route 213.

3.8.2.2 No Action Alternative

Under the No Action Alternative, proposed construction and improvement of support facilities and training activities would not occur. The existing conditions described in **Section 3.8.1** would remain unchanged.

3.9 INFRASTRUCTURE

Infrastructure consists of the man-made systems and physical structures that enable a population in a specified area to function. Infrastructure components to be discussed in this section include the temporary facilities on the Main Post, NOP buildings, designated training areas, transportation elements, and utilities. Utilities generally include electrical supply, water supply, natural gas/propane supply, sanitary sewer and wastewater, and stormwater drainage, and solid waste management. However, most of these utilities, along with transportation elements, are currently present at the proposed project area and would not be expected to be added under the Proposed Action. Solid waste management primarily relates to the availability of landfills to support a population's residential, commercial, and industrial needs.

3.9.1 Affected Environment

Transportation/Road Network. Access to all parts of WSMR is provided by an extensive network of roads and highways. Interstate highways I-10 and I-25, and other major highways U.S. 380, 70, and 54 provide access to WSMR. U.S. 70 crosses the southern portion of WSMR with an exit 5 miles north of the Main Post (WSMR 2015).

A large network of limited access range roads has been developed and maintained by WSMR including 1,338 miles of major range roads, 596 miles of secondary roads, 1,490 miles of bladed trails, and an undetermined length of remote two-track, four-wheeled-vehicle trails. WSMR has approximately 700 miles of roads to maneuver throughout designated off-road training areas. Major range roads are two-lane paved or graded surfaces, while all secondary roads are unpaved. WSMR has 15,840 square yards of tank trails located south of the U.S. 70 (WSMR 2009).

Electrical System. Electricity is generated off-site and supplied to WSMR by local commercial utilities. Electricity is distributed across WSMR through approximately four circuit miles of 115 kilovolt overhead transmission lines, 153 circuit miles of overhead power distribution lines, 11 circuit miles of underground lines, and 12 circuit miles of overhead/underground street lighting circuits. Semi-permanent, portable generators are available and provide electrical power to remote test sites at WSMR (WSMR 2015).

Natural Gas System. Main Post has natural gas supplied from El Paso, Texas by the Public Service Company of New Mexico for heating and other industrial and residential uses. Tank-fed propane gas is used for heating and other purposes at all other WSMR facilities (WSMR 2015).

Water Supply Systems. WSMR's potable water supply is provided fully by groundwater sources. Water is drawn from six well fields to supply five state-permitted water systems. As of 2015, there are 16 active drinking water supply wells and several water storage tanks throughout the installation. Main Post is supplied through 13 active wells. The water treatment and distribution system of the Main Post is comprised of the 13 active wells, a central treatment plant, storage tanks, a central booster station and approximately 130 miles of water lines. Outside of the Main Post area, water is obtained from mountain front wells for High Energy Laser Systems Test Facility and Small Missile Range and water for the Stallion Range Center is obtained through two groundwater wells. All other WSMR facilities receive hauled water from the Main Post or Stallion Range Center.

Sanitary Sewer and Wastewater System. There are multiple wastewater treatment facilities at WSMR, the main facility being on Main Post. Water quality is monitored and meets both NMED and USEPA standards (WSMR 2009).

Stormwater Discharge/Collection System. WSMR lies mostly within the Tularosa Basin, which has an average of 10 inches of rainfall per year. Main Post is most affected by runoff due to the large areas of impervious surface. In 1968, a levee was built along the western edge of the Main Post to divert storm water drainage north and south of the Main Post. Storm pipes, inlets, and culverts provide drainage assistance in sections of the northern housing area and the administrative area between Headquarters Avenue and Dryer Street. Stormwater runoff control measures are covered under the Environmental Protection section of the general specifications for contracts supporting military construction projects assigned to the U.S. Army Corps of Engineers at WSMR (WSMR 2009).

Solid Waste Management. There are five landfills located at WSMR, two of which are closed (Main Post Municipal Landfill and Main Post Asbestos Landfill). The three other landfills are the Stallion Range Center Landfill, Permanent High-Explosive Testing Sites Construction and Demolition Landfill, and Main Post Construction and Demolition Landfill. Municipal waste generated from the Main Post housing area and municipal solid waste generated from the industrial and administrative areas of WSMR are disposed of at off-site landfill locations (WSMR 2021a).

3.9.2 Environmental Consequences

3.9.2.1 Proposed Action

Transportation/Road Network. Short-term, negligible to minor, and long-term, negligible, adverse impacts on the existing road network at WSMR would occur. Construction and reconfiguration operations associated with Projects 1 through 4 and Activities 4 through 6 may result in temporary impacts on the transportation system from the closure of roads in the project areas. Most of the impacts would occur during construction and development of the pull-outs. Under the Proposed Action, an increase in vehicle traffic throughout the installation may occur including use of the WSMR road network to conduct on- and off-road vehicle training. Vehicle training would require the development of pullouts on approximately 1 percent of the road network. Off-road vehicle training and pull-out development would be limited to designated off-road areas that have no jurisdictional, environmental, or other constraints. Additional traffic to newly constructed roads, driveways, and vehicle parking areas for construction equipment and contractor vehicles would also be expected. However, these impacts are anticipated to be negligible.

Electrical System. Short-term, minor to moderate, and long-term, negligible, adverse impacts on the electrical system at WSMR would occur. Installation of new electrical lines, overhead or underground, may be required to connect the newly constructed facilities to the electrical grid. Interruptions to the electrical system may occur during connection of the newly constructed and renovated facilities to the electrical grid. However, BMPs would be implemented, to include following the WSMR dig permit process to reduce the potential for impacts. Long-term, intermittent, negligible impacts on the electrical system would be anticipated from training associated with Activities 4 through 6. An increase in electricity would be necessary to support and maintain the new construction and renovation projects and the designated training areas. However, the net change in total electricity consumption at the installation is expected to be minor.

Natural Gas System. Short- and long-term, negligible to minor, adverse impacts on the natural gas supply system at WSMR would occur. Natural gas may be supplied to the newly constructed and renovated facilities via existing mains or additional mains as needed. Interruptions to the natural gas system may occur during connection of the newly constructed and renovated facilities to the natural gas system. However, BMPs would be implemented, to include following the WSMR dig permit process to reduce the potential for impacts. Long-term, intermittent, negligible impacts on the natural gas system would be anticipated from training associated with Activities 4 through 6. An increase in the natural gas supply would be necessary to support and maintain the new construction and renovation projects and the designated training areas. An increased presence of soldiers and training operations would result in a slightly higher consumption of natural gas. The net change in total natural gas consumption at the installation due to the newly constructed facilities is expected to be negligible.

Water Supply System. Short-term, negligible to minor, and long-term, negligible, adverse impacts on the water supply system at WSMR would occur. Existing water supply lines would be accessed, and additional lines may be installed to provide water to the newly constructed and renovated facilities. Interruptions to the water supply system may occur during connection of the newly constructed facilities to the installation's water distribution system. However, BMPs would be implemented, to include following the WSMR dig permit process to reduce the potential for impacts. Additionally, during construction, an increase in water consumption from on-site wells may occur due to the need for drinking water for construction crews and the cleaning of equipment. Long-term, intermittent, negligible impacts on the water supply system would be anticipated from training associated with Activities 4 through 6. An increase in water supply would be necessary to support and maintain the new construction and renovation projects and the designated training areas. An increased presence of soldiers annually would result in a higher consumption of water, increasing the intake of water from groundwater and mountain front wells and increasing the need for workers to transport water to facilities across the installation.

Stormwater Discharge/Collection System. The Proposed Action would not be expected to result in significant impacts on the stormwater discharge/collection system. Construction and training activities would be temporary and BMPs and stormwater runoff control measures would be implemented to reduce the potential for runoff or erosion and sedimentation.

Solid Waste Management. Intermittent, short-term, negligible to minor, adverse impacts on solid waste management would occur. Construction activities would result in temporary increases of solid waste. Construction debris generated from Projects 1 through 4, to include asphalt and concrete waste, would be disposed of in coordination with Compliance, Solid Waste Management. Waste would be diverted from the landfill and recycled to the highest extent possible. Waste disposal would be conducted in accordance with the installation's Integrated Solid Waste Management Plan and all federal, state, and local laws and regulations. The construction and improvement of facilities and designation of existing training areas under the Proposed Action would increase the overall amount of solid waste generated at the installation but would not significantly alter the existing solid waste management system. Construction debris generated would consist primarily of recyclable and reusable building materials, such as concrete, and metals (e.g., conduit, piping, and wiring).

3.9.2.2 No Action Alternative

Under the No Action Alternative, proposed construction and improvement of support facilities and training activities would not occur. Existing conditions discussed in **Section 3.9.1** would remain unchanged. No new impacts on infrastructure would occur as a result of the No Action Alternative.

3.10 HAZARDOUS MATERIALS AND WASTES

Hazardous Materials, Petroleum Products, and Hazardous Wastes. Hazardous materials are defined by 49 CFR § 171.8 as hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR § 172.101), and materials that meet the defining criteria for hazard classes and divisions in 49 CFR Part 173. Petroleum products include crude oil or any derivative thereof, such as gasoline, diesel, or propane. They are considered hazardous materials because they present health hazards to users in the event of incidental releases or extended exposure to their vapors.

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) at 42 United States Code § 6903(5), as amended by the Hazardous and Solid Waste Amendments,

as “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating, reversible illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.” Certain types of hazardous wastes are subject to special management provisions intended to ease management burden and facilitate the recycling of such materials. These materials are called universal wastes and requirements for managing them are established in 40 CFR Part 273, *Standards for Universal Waste Management*. Wastes covered under the universal waste regulations include batteries, pesticides, mercury-containing equipment, lamps, and aerosol cans.

Evaluation of hazardous materials and wastes focuses on the storage, transportation, handling, and use of hazardous materials, as well as the generation, storage, transportation, handling, and disposal of hazardous wastes. In addition to being a threat to humans, the improper release or storage of hazardous materials, hazardous wastes, and petroleum products can threaten the health and well-being of wildlife species, habitats, soil systems, and water resources.

Toxic Substances. Toxic substances are substances that might pose a risk to human health and are addressed separately from hazardous materials and hazardous wastes. Toxic substances include asbestos-containing materials (ACMs), lead-based paint (LBP), and polychlorinated biphenyls (PCBs), all of which are typically found in buildings and utilities infrastructure.

Asbestos is regulated by the USEPA under the CAA; Toxic Substances Control Act; and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The USEPA has established that any material containing more than 1 percent asbestos by weight is considered an ACM. ACMs are commonly found in building materials such as floor tiles, mastic, roofing materials, pipe wrap, and wall plaster. The USEPA has implemented several bans on various ACMs between 1973 and 1990, so ACMs are most likely to be found in older buildings (i.e., constructed before 1990). LBP was commonly used prior to its ban in 1978; therefore, buildings constructed prior to 1978 may contain LBP. PCBs are man-made chemicals that persist in the environment and were widely used in building materials (e.g., caulk) and electrical products prior to 1979. Structures constructed prior to 1979 potentially include PCB-containing building materials.

Environmental Contamination. CERCLA governs response or cleanup actions to address releases of hazardous substances, pollutants, and contaminants into the environment. The Defense Environmental Restoration Program was formally established by Congress in 1986 to provide for the cleanup of DoD property at active installations, Base Realignment and Closure installations, and formerly used defense sites throughout the United States and its territories. The two significant program areas under the Defense Environmental Restoration Program are the Installation Restoration (IR) Program and the Military Munitions Response Program. The IR Program addresses contaminated sites, while the Military Munitions Response Program addresses nonoperational military ranges and other sites suspected or known to contain unexploded ordinances, discarded military munitions, or munitions constituents. Each site is investigated, and appropriate remedial actions are taken under the supervision of applicable federal and state regulatory programs. When no further remedial action is necessary for a given site, the site is closed, and it no longer represents a threat to human health.

Per- and polyfluoroalkyl Substances. Per- and polyfluoroalkyl substances (PFAS) refers to an entire class of substances that includes perfluorooctane sulfonate and perfluorooctanoic acid. PFAS are found in everyday consumer items, as well as industrial products including certain

firefighting foams known as aqueous film forming foam (AFFF). The DoD began using AFFF containing PFAS in the 1970s and is one of many users of AFFF. Other major users of AFFF include commercial airports, the oil and gas industry, and local fire departments.

Radon. Radon is a naturally occurring odorless and colorless radioactive gas found in soils and rocks that can lead to the development of lung cancer. Radon tends to accumulate in enclosed spaces, usually those that are below ground and poorly ventilated. USEPA established a guidance radon level of 4 picocuries per liter (pCi/L) in indoor air for residences, and radon levels above this amount are considered a health risk to occupants.

3.10.1 Affected Environment

Hazardous Materials, Petroleum Products, and Hazardous Wastes. Hazardous materials are used throughout WSMR for various functions, including research, development, testing, and evaluation support; vehicle, equipment, and facility maintenance; and fabrication shop and photographic operations. Hazardous materials and petroleum products used in these functions include solvents, acids, fuels, lubricating oils, antifreeze, paints and thinners, and pesticides and herbicides. WSMRR 200-1, *Environmental Hazardous Waste/Material Management*, is applicable to all organizations, tenants, and contractors on the installation using hazardous materials or generating hazardous wastes (WSMR 2006). WSMRR 200-2 provides necessary guidance to all personnel, guests, and visitors who conduct or observe activities on WSMR to protect the environment (WSMR 2013). Procedures and responsibilities for responding to a hazardous material or petroleum spill or other incident are outlined in the Spill Response and Reporting SOP (WSMR 2022). Pesticides and herbicides used on WSMR must be listed on the Armed Forces Pest Management Board Standard Pesticide List and approved by the WSMR Integrated Pest Management (IPM) Coordinator. Additionally, before pesticides are used, nonchemical control efforts should be used to the maximum extent possible. Application of pesticides and herbicides are conducted by certified applicators, either contractor or WSMR personnel, in accordance with the installation's IPM Plan (WSMR 2021b).

Hazardous wastes commonly generated at WSMR include waste paint, solvent waste, solder waste, used fuel filters, rags and absorbents, and laboratory wastes. WSMR is a RCRA Large Quantity Generator (USEPA identification number NM2750211235). RCRA Large Quantity Generators generate more than 1,000 kilograms of non-acute hazardous waste or more than 1 kilogram of acute hazardous waste per calendar month. Hazardous waste generating activities on WSMR include research, development, testing, and evaluation support; vehicle, equipment, and facility maintenance; fabrication shop and photographic operations; and environmental restoration activities. Additionally, WSMR is a large quantity handler of universal waste. A large quantity handler of universal waste accumulates 5,000 kilograms or more total of universal waste at any time. Universal wastes generated at WSMR include used batteries, mercury-containing equipment, and spent fluorescent bulbs. WSMR has implemented specific procedures to manage and track hazardous waste on the installation. These procedures ensure that hazardous waste is properly managed and tracked from the time it is generated until it leaves the Hazardous Waste Storage Facility for disposal (WSMR 2006).

Toxic Substances. The NOP Transient Training Barracks (Building 33130), which is proposed for renovation under Project 4, was constructed in 1953; therefore, the building is assumed to contain toxic substances such as ACM, LBP, and PCBs. As noted in **Section 2.2.1.1**, demolition of Building 33130 may be required. Demolition would follow the Army's facility reduction procedures. Toxic substances may also be found in utility infrastructure on the installation.

Environmental Contamination. WSMR has 74 active IR sites that include known or suspected soil and groundwater contamination associated with landfills, petroleum storage areas, oil/water separators, drainage areas, septic systems, fire training areas, and spill areas. Additionally, the installation has 4 active Munitions Response (MR) sites, and 9 active Compliance-Related Cleanup (CC) sites (USAEC 2022). There are no active IR, MR, or CC sites within or adjacent to the proposed project or activity areas under the Proposed Action; therefore, environmental contamination will not be discussed further.

Polyfluoroalkyl Substances. Areas of Potential Interest (AOPIs) were identified on WSMR for the potential use, storage, or disposal of AFFF or PFAS-containing materials. Samples were collected for a Preliminary Assessment (PA)/Site Inspection (SI) in July and November 2020. Sixteen AOPIs were identified during the PA that were associated with fire training areas, fire stations, storage areas, maintenance shops, photo processing facilities, landfills, and sanitary sewers and SI sampling was conducted at all 16 AOPIs to evaluate the presence or absence of PFAS. Six of the AOPIs had detection levels in the soil that exceeded the Office of the Secretary of Defense risk screen levels for PFAS. No groundwater samples exceeded current screening levels. Based on the results, the six AOPIs that had detection level exceedances for PFAS in the soil were recommended for further study in the Remedial Investigation phase (USAEC 2022). None of the proposed project or activity areas are within or adjacent to the AOPIs being investigated for PFAS; therefore, polyfluoroalkyl substances will not be discussed further.

Radon. USEPA rates Socorro, Sierra, Doña Ana, Otero, and Lincoln counties in New Mexico as radon zone 2. Counties in radon zone 2 have a moderate potential with predicted average indoor radon levels between 2 and 4 pCi/L (USEPA 2023). All housing units and operational facilities on WSMR with basements or subsurface structures have been surveyed and none of the facilities on the installation exceeded USEPA regulatory levels of 4 pCi/L and no remediation was required (WSMR 2006). Therefore, radon will not be discussed further.

3.10.2 Environmental Consequences

3.10.2.1 Proposed Action

Hazardous Materials, Petroleum Products, and Hazardous Wastes. Short-term, negligible, adverse impacts would occur from the use of hazardous materials and petroleum products and the generation of hazardous wastes during construction, renovation, and maintenance associated with Projects 1 through 4. Intermittent, short-term, negligible to minor, adverse impacts would occur from the use of hazardous materials and petroleum products and the generation of hazardous wastes during training activities associated with Activities 4 through 6.

Hazardous materials that could be used include concrete, paints, solvents, welding gases, preservatives, and sealants. Petroleum products such as hydraulic fluid, oils, lubricants, diesel fuel, and gasoline would be used in vehicles and equipment supporting construction and training. Implementation of BMPs and environmental protection measures would reduce the potential for an accidental release of these materials. All equipment and vehicles associated with construction and training would be maintained according to manufacturer's specifications, and drip mats would be placed under parked equipment as needed. Additionally, all hazardous materials; petroleum products; and hazardous, universal, and petroleum wastes used or generated during construction, maintenance, and training would be contained, stored, and managed in accordance with WSMRR 200-1 and 200-2; the Spill Response and Reporting SOP; and federal, state, and Army-applicable regulations to minimize the potential for releases (e.g., secondary containment, inspections, spill kits). As noted in **Section 2.2.1.2.2**, at the conclusion of each training event under Activities 4 and

5, units would practice pack-in/pack-out maintenance procedures for all wastes, to include the cleanup and proper disposal of brass, lead, and other debris.

Maintenance of the proposed project and activity areas could include the use of pesticides and herbicides. All pesticides and herbicides used would be on the Armed Forces Pest Management Board Standard Pesticide List and approved by the WSMR IPM Coordinator. Application of pesticides and herbicides would be conducted by certified applicators, either contractor or WSMR personnel, in accordance with the installation's IPM Plan and all federal, state, and local regulations. Should a pesticide spill occur, the applicator would clean up the spill in accordance with the WSMR Spill Response and Reporting SOP.

Should unknown, potentially hazardous wastes be discovered or unearthed during construction, contractors would immediately cease work, contact appropriate installation personnel, and await sampling and analysis results before taking further action. Any unknown wastes determined to be hazardous would be managed and disposed of in accordance with applicable laws and regulations.

Toxic Substances. Short-term, negligible to minor, adverse impacts from toxic substances would occur during renovation or potential demolition of the NOP Transient Training Barracks (Building 33130) under Project 4. Surveys for toxic substances (i.e., ACMs, LBP, and PCBs) would be completed, as necessary, by a certified contractor prior to work activities to ensure that appropriate measures are taken to reduce potential exposure to, and release of, these substances. Contractors would wear appropriate personal protective equipment (PPE) and would be required to adhere to all federal, state, and local regulations regarding these toxic substances.

ACM- and LBP-contaminated debris would be disposed of at a USEPA-approved landfill. Potential PCB-containing equipment not labeled PCB-free or missing date of manufacture labels would be removed and handled in accordance with federal and state regulations. PCB-containing materials would be transported off installation and disposed of at a certified hazardous waste disposal facility. Long-term, negligible, beneficial impacts would be experienced from a reduced potential for exposure to and maintenance of toxic substances at WSMR.

3.10.2.2 No Action Alternative

Under the No Action Alternative, proposed construction and improvement of support facilities and training activities would not occur. The existing conditions described in **Section 3.10.1** would remain unchanged.

3.11 SAFETY

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

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

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

3.11.1 Affected Environment

Construction Personnel Safety. All personnel performing construction and renovation activities are responsible for following federal and state safety regulations and are required to conduct activities in a manner that does not increase risk to workers or the public. A Health and Safety Plan detailing how safety requirements would be met prior to beginning work would be required.

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

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

The nearest major hospital that offers emergency room services and inpatient care for the general public, to include construction contractor personnel, is the MountainView Regional Medical Center in Las Cruces, New Mexico. MountainView Regional Medical Center also provides general medical care, specialty care, and urgent care (MountainView Regional 2023).

Military and Civilian Personnel Safety. The WSMR health and safety program operates in compliance with a number of regulations and guidance documents, including WSMRR 385-18, *Command Safety Program*; AR 200-1, *Environmental Protection and Enhancement*; AR 385-10, *The Army Safety Program*; AR 385-63, *Range Safety*; AR 385-64, *U.S. Army Explosives Safety Program*; AR 210-21, *Army Ranges and Training Land Program*; DoD Directive 4715.11, *Environmental and Explosives Safety Management on DoD Active and Inactive Ranges within*

the United States; and DoD Directive 6055.9–STD, *DoD Ammunition and Explosives Safety Standards*. These regulations have guided the development of SOPs which all installation users are required to follow. Personnel also are also required to receive the WSMR Wildlife Hazards Brief. Additionally, WSMR participates in the Emergency Operations Plan with other federal, state, and local agencies as part of an extended response network for safety (WSMR 2009a).

UXO poses the highest safety risk at WSMR. UXO exists throughout WSMR and is particularly likely to occur in areas which have been used historically for weapons impact missions or long-term test sites. All residents, employees, and visitors requiring access to WSMR areas outside the Main Post must receive UXO range hazard awareness training. More information about UXO is available in the Range-Wide EIS (WSMR 2009a).

The nearest major hospital that offers emergency room services and inpatient care for military personnel is the William Beaumont Army Medical Center in El Paso, Texas. For regular health care services, the McAfee Health Clinic at WSMR provides daily appointments and offers immunizations and general medical care (WSMR undated). The nearest major hospital that offers emergency room services and inpatient care for the general public, to include civilian personnel, would be the same as those described for construction personnel.

Public Safety. WSMR has its own Range Control, Safety, Fire Department, and Environmental Division offices that all play key roles in safety planning, training, oversight, and response activities. WSMR also participates in the Emergency Operations Plan with other federal, state, and local agencies as part of an extended response network for emergencies (fires, hazardous material spills, mishaps, or multi-hazard events) which requires an expanded team of trained responders, whether on a local or broader regional level.

WSMR lands are generally restricted from public access and public use due to potential safety hazards. For missions that may pose risks to the public outside the installation, WSMR has the ability to enact local highway closures and evacuation of certain private lands. WSMR established a Memorandum of Understanding with the New Mexico Department of Transportation to allow closures of up to 1 hour on U.S. 54 and U.S. 70 (up to 80 minutes in an emergency) and up to 2 hours on U.S. 380, with 48 hours prior notice.

3.11.2 Environmental Consequences

3.11.2.1 Proposed Action

Construction Personnel Safety. Short-term, negligible, adverse impacts on the health and safety of construction personnel would occur. A comprehensive Health and Safety Plan detailing all potential hazards and site-specific guidance would be required to ensure potential safety risks are minimized. The plan would include, at a minimum, emergency response and evacuation procedures; operating manuals; PPE recommendations; procedures for handling, storing, and disposing of hazardous materials and wastes; information on the effects and symptoms of potential exposures; and guidance with respect to hazard identification. Portable latrines would be used for all human waste and would be discharged off-post at an approved facility for proper treatment. Construction personnel would be responsible for compliance with applicable federal, state, and local safety regulations and would be educated through daily safety briefings to review upcoming work activities and associated hazards. Therefore, the Proposed Action would not be expected to result in a significant impact on construction personnel safety.

Military and Civilian Personnel Safety. Short-term, negligible, adverse impact on the health and safety of military and civilian personnel that work near the construction areas would occur. Once complete, the operation of the barracks would result in long-term, minor, beneficial impacts on personnel who were previously sleeping in tents, as the facilities would include fire protection, detection, and alarm systems; as well as antiterrorism protection measures. Operation of the other facilities that are part of the Proposed Action would result in long-term, negligible, beneficial impacts on health and safety as a result of updated infrastructure.

Activities 4 and 5 under the Proposed Action would result in intermittent, short-term, negligible to minor, adverse impacts on the health and safety of military and civilian personnel due to the potential for training mishaps, including live fire or vehicular accidents or injuries related to the stamina and fitness of the individuals. Off-road activities would only be performed in areas surface cleared of UXO. WSMR would continue to implement and enforce all applicable health and safety requirements, conduct safety reviews for all range activities, implement action-specific restrictions and operating conditions, and educate all range users on potential safety risks. In the event that UXO may be found, activities would immediately cease, the area would be secured, and immediate USAG-WSMR representatives would be contacted.

Construction and demolition would comply with all applicable safety requirements and installation-specific protocols and procedures, including appropriately marking potentially hazardous areas and posting warning signs and barriers to limit access to approved construction and oversight personnel only. Therefore, the Proposed Action is not expected to result in significant impacts on the safety of military and civilian personnel.

Public Safety. No impacts on the health and safety of the public would occur. Because the proposed construction and training activities would occur within the boundaries of WSMR, an active military installation that is not open to the public. The Proposed Action would not pose a safety risk to the public or off-installation areas.

3.11.2.2 No Action Alternative

Under the No Action Alternative, proposed construction and improvement of support facilities and training activities would not occur. Existing conditions discussed in **Section 3.11.1** would remain unchanged. Military and civilian personnel would continue to live in temporary housing (which is not suitable for extreme weather events) and activities would continue at existing training grounds. The No Action Alternative would result in no impacts on the health and safety of construction personnel or the public, and long-term, negligible to minor, adverse impacts on military and civilian personnel health and safety.

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

The relationship between short-term uses and enhancement of long-term productivity from implementation of the Proposed Action is evaluated from the standpoint of short-term effects and long-term effects. Short-term effects would be those associated with construction of the new infrastructure and conducting of training activities. The long-term effects would be those associated with operation and maintenance of the infrastructure after implementation of the Proposed Action.

The Proposed Action represents an enhancement of long-term productivity and enhanced capability for mission success at WSMR. The negative effects of short-term impacts from construction activities would be minor compared to the long-term positive impacts by enabling

WSMR to support mission requirements of tenant and transient units by improving facilities for transient troops and designating existing training areas at WSMR to support units with training mission sets. The current temporary tents are not suitable for extreme weather events, and they lack showers and laundry services. The short-term, adverse impacts of construction activities would be minor compared to the long-term, beneficial impacts of enabling WSMR to support mission requirements for tenant and transient units by improving facilities and designating use of existing training areas.

3.13 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

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

Material Resources. Material resources used during construction activities for the Proposed Action would potentially include building materials, concrete and asphalt, and various other construction materials and supplies. However, materials that would be consumed are not in short supply, would not limit other unrelated construction activities, and would not be considered significant.

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

Human Resources. The use of human resources for construction, operation, and maintenance activities is considered an irretrievable loss only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action represents employment opportunities and is considered beneficial.

Biological Resources. The Proposed Action would result in a negligible loss of vegetation and wildlife habitat. Because the project area consists primarily of ground with minimal vegetation, the loss would be negligible and not considered significant; therefore, a less than significant impact on the irretrievable loss of vegetation and wildlife habitat is expected.

Water Resources. The Proposed Action would result in unavoidable impacts to water resources because water would be required during construction activities for the Proposed Action. However, consumption of these water resources would not place a significant demand on water availability in the region. Therefore, less than significant impacts would be expected.

3.14 SUMMARY OF POTENTIAL IMPACTS

Table 3-8 summarizes the potential impacts identified in **Sections 3.3** through **3.13**.

Table 3-8. Summary of Potential Impacts Expected from the Proposed Action and No Action Alternative

Resource Area	Proposed Action					No Action Alternative				
	Project 1	Project 2	Project 3	Project 4	Activities 1-6	Project 1	Project 2	Project 3	Project 4	Activities 1-6
Land Use	/	/	/	/	-◊	/	/	/	/	/
Air Quality	-◊	-◊	-◊	-◊	-◊	/	/	/	/	/
Geological Resources	-◊ -♦	-◊ -♦	-◊ -♦	-◊ -♦	-◊ -♦	/	/	/	/	/
Water Resources	-◊ -♦	-◊ -♦	-◊ -♦	-◊ -♦	-◊ -♦	/	/	/	/	/
Biological Resources	-◊ -♦	-◊ -♦	-◊ -♦	-◊ -♦	-◊ -♦	/	/	/	/	/
Cultural Resources	-◊ -♦	-◊ -♦	-◊ -♦	-◊ -♦	-▼	/	/	/	/	/
Infrastructure	-▼ -•	-▼ -•	-▼ -•	-▼ -•	-○ -•	/	/	/	/	/
Hazardous Materials and Wastes	-○	-○	-○	-○	-◊	/	/	/	/	/
Safety	-○	-○	-○	-○	-◊	/	/	/	/	/

Impact Symbols:
(-) Adverse Impacts (+) Beneficial Impacts (/) No impacts
(○) Short-term, negligible impacts (•) Long-term, negligible impacts
(◊) Short-term, minor impacts (♦) Long-term, minor impacts
(▼) Short-term, moderate impacts (■) Long-term, moderate impacts

4 REASONABLY FORESEEABLE ACTIONS AND CUMULATIVE EFFECTS

CEQ defines cumulative impacts as the "impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR § 1508.7). Cumulative impacts can result from individually minor but collectively significant past, present, and foreseeable future actions. Informed decision-making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

This cumulative impacts analysis summarizes expected environmental impacts from the combined impacts of past, current, and reasonably foreseeable future projects in accordance with CEQ regulations implementing NEPA and CEQ guidance on cumulative effects. The geographic scope of the analysis varies by resource area. For example, the geographic scope of cumulative impacts on resources such as soils and vegetation are narrow and focused on the location of the resource. The geographic scope of air quality and wildlife and sensitive species is much broader and considers more county-or region-wide activities. Projects that were considered for this analysis were identified by WSMR, news releases and published media reports, and publicly available information and reports from federal, state, and local agencies. Projects that do not occur in proximity (i.e., within several miles) of the proposed project site would not contribute to a cumulative impact and are generally not evaluated further.

4.1 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

Past actions are those within the cumulative impacts analysis areas that have occurred prior to the development of this SEA. The impacts of these past actions are generally described in **Section 3**. Present actions include current or funded construction projects, WSMR operations near the proposed site, and current resource management programs and land use activities within the cumulative impacts analysis areas. Reasonably foreseeable future actions consist of activities that have been approved and can be evaluated with respect to their effects. The following activities are present or reasonably foreseeable future actions:

- Salinas Peak Power Distribution Line Replacement,
- Address Watershed Resiliency on Main Post,
- Replacement and Modernization of Main Cantonment Access Gates,
- Replacement and Modernization of Fire Stations (Main Post, Stallion, Nike Avenue, HELSTF, mid-Range),
- Las Cruces Substation Upgrade,
- Expansion and Repair of Stallion AAF Runway,
- Construct 3D Printed Transient Training Barracks (400 PAX),
- Construct UPH Barracks (200 PAX),
- Construct Central Wash Rack,
- Construct Tank Wash Rack,

- Construct GSA Vehicle Car Wash,
- Construct Transient Training Barracks (NOP),
- Missile Assembly Building,
- Survivability Vulnerability and Assessment Directorate facilities modernization,
- Upgrade Condron Airfield,
- Expand Recreational Camping,
- Construction of a Mini-Campus in partnership with a local university, and
- Increase in the number of weapon impact areas used to support Research, Development, Test, and Evaluation of weapon systems.
- 2nd Engineering Battalion EA Actions:
    - Construction of barracks for 296 soldiers
- Mountain Village EA Actions:
    - On-road vehicle use (including use of unmanned ground vehicles),
    - Off-road vehicle use (including use of unmanned ground vehicles),
    - Dismounted operations (including urban entering, clearing operations, foot patrols),
    - Field Operations (including use of unattended ground sensors),
    - Directed energy systems,
    - Instrumentation and Communication systems,
    - Air vehicle operations (including reconnaissance by unmanned aerial vehicles), and
    - Smoke grenades, chaff, and pyrotechnics (including blank rounds).
- Range-Wide EIS Actions:
    - On-road vehicle use,
    - Off-road vehicle use,
    - Dismounted operations,
    - Field operations,
    - Small arms weapons training,
    - Surface weapons firing,
    - Directed energy systems,
    - Instrumentation and communication systems,
    - Air vehicle operations, and
    - Surface danger zones.

- NIE EA Actions:
    - Live fire training,
    - Brigade headquarters and support, and
    - Operational objectives.

4.2 ASSESSMENT OF CUMULATIVE IMPACTS BY RESOURCE

A cumulative impacts analysis must be conducted within the context of the resource areas. The magnitude and context of the impact on a resource area depends on whether the cumulative effects exceed the capacity of a resource to sustain itself and remain productive. The following discusses potential cumulative impacts that could occur as a result of implementing the Proposed Action and other present and reasonably foreseeable future actions. No major, adverse, cumulative impacts were identified in the cumulative impacts analysis.

4.2.1 Land Use

Short- and long-term, negligible impacts on land use are expected from the additive effects of the Proposed Action in combination with other present and reasonably foreseeable future actions. Construction, implementation, and maintenance of the Proposed Action would not alter land use as it is consistent with present land uses. Under the Proposed Action, BMPs would be implemented to ensure negligible impacts on land use.

4.2.2 Air Quality

The Proposed Action would result in short- and long-term, negligible to minor, adverse impacts on air quality from construction and improvement actions and training activities. Because the construction activities analyzed in the 2nd Engineering Battalion EA and the NIE EA were previously completed, the construction actions under the Proposed Action and reasonably foreseeable future actions would not contribute additive air emissions and airborne dust at Main Post when combined with those construction actions. Tenant and transient troop training activities would be similar to those analyzed in the Mountain Village EA, Range-Wide EIS, and NIE EA. The estimated emissions from training activities would result in a negligible increase in total air emissions when combined with the air emissions from training activities that were previously analyzed. Because emissions from the Proposed Action would not be considered significant for the region, cumulative impacts on air quality from the Proposed Action, when combined with the previously analyzed actions and reasonably foreseeable future actions, would not be significant.

4.2.3 Geological Resources

Cumulative impacts would include impacts on topography and soils due to vegetation clearing and soil disturbance from construction activities, such as grading, contouring, trenching, and increase of impervious surfaces. Other cumulative impacts could occur due to construction of structures within areas with geological hazards; however, it is anticipated that all structures would be designed in accordance with applicable state and local building codes to minimize potential impacts. Additionally, compounded construction activities would require the need for a borrow pit and fill, which could result in future contractual issues due to the associated costs. Negligible to minor, cumulative impacts on soils are expected from the additive effects of the Proposed Action in combination with other present and reasonably foreseeable future actions.

4.2.5 Water Resources

The Proposed Action, when combined with other present and reasonably foreseeable future actions occurring in the surrounding area, may result in short- and long-term, minor, cumulative impacts on water resources. Other projects would include construction of buildings and increased impervious surface area, thus increasing potentially contaminated runoff volume into surface water bodies. Additionally, compounded projects could increase the need for water during construction and induce competition for a limited number of water pipe stands. However, BMPs would be implemented which would minimize potential impacts. The Catastrophic Flood Prevention control measures would also include the installation of retention ponds that would have long-term beneficial impacts on surface water and floodplains as runoff would be managed.

4.2.6 Biological Resources

Construction and training activities under the Proposed Action, as well as present and reasonably foreseeable future projects on the installation and within the surrounding areas, would result in impacts on vegetation crushing/removal and soil compaction during ground-disturbing activities, which could result in establishment of invasive species. Adverse impacts on vegetation would be minimized with implementation of appropriate BMPs, such as cleaning equipment prior to entering the project area, and measures would be implemented to help prevent and control dissemination of invasive plant species during ground-disturbing activities. Revegetation of disturbed sites with native vegetation would further reduce the establishment of invasive species.

Project activities that require heavy equipment could cause mobile mammals, amphibians, reptiles, and birds, including breeding migratory birds, to temporarily relocate to nearby similar habitat. This disturbance is expected to be minor, and it is assumed that displaced wildlife would return to areas that had not been improved soon after activities conclude or would move to adjacent areas of similar habitat. Adverse impacts on wildlife would be minimized with appropriate BMPs, such as conducting surveys prior to any construction activities taking place and scheduling project activities to occur outside of the nesting season of March 1 to September 30 to reduce impacts on migratory birds. Although growth and development could be expected to continue outside of WSMR and within the surrounding natural areas, significant adverse impacts on these resources would not be expected. Therefore, the Proposed Action, when combined with other actions both on and off the installation, would not result in a significant cumulative impact on biological resources.

4.2.7 Cultural Resources

With avoidance measures, cumulative impacts on known cultural resources from the Proposed Action and present and reasonably foreseeable future actions would be negligible to minor. Archaeological surveys to identify cultural resources would be conducted as necessary prior to ground-disturbing activities in areas that have not been surveyed. Resurvey of project locations and evaluation of identified resources may be necessary to ensure compliance with current standards.

4.2.8 Infrastructure

The cumulative impacts of the Proposed Action and additional activities previously investigated would result in long-term, minor, adverse impacts on infrastructure at WSMR. The construction and renovations of multiple facilities on the installation would result in long-term, moderate, adverse impacts on the infrastructure due to the increase of consumption and generation of transportation systems, electricity, natural gas, water, wastewater, and solid waste. The Proposed

Action, when combined with previously investigated activities, and present and reasonably foreseeable future actions may result in long-term, minor, cumulative impacts on infrastructure.

4.2.9 Hazardous Materials and Wastes

The Proposed Action, as well as present and reasonably foreseeable future actions at WSMR, would incorporate BMPs and environmental control protection measures to limit and control hazardous materials and wastes into their design and operations plans. Construction and training activities that coincide with the Proposed Action may contribute to slightly increased levels of hazardous materials and petroleum products used and stored and hazardous wastes generated on the installation; however, all such occurrences would be temporary in nature and cease at the completion of such construction and training activities. Therefore, impacts on hazardous materials and wastes management from the Proposed Action, when combined with other present and reasonably foreseeable actions, would not be significant.

4.2.10 Safety

No adverse cumulative impacts on health and safety would be expected from the Proposed Action and present and reasonably foreseeable future actions on the installation or nearby cities. Adherence to established procedures, including the use of PPE, fencing project areas, posting signs, and compliance with OSH, DOD, and OSHA standards would reduce or eliminate health and safety impacts on contractors, military personnel, and the general public. These procedures are typical for construction projects on the installation and in surrounding areas. Therefore, the Proposed Action, when combined with other present and reasonably foreseeable future actions, would not result in a significant cumulative impact on health and safety.

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APPENDIX A

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING AND PUBLIC INVOLVEMENT MATERIALS

Appendix A

Interagency and Intergovernmental Coordination for Environmental Planning and Public Involvement Materials

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Albuquerque NM 87103-1306

State Historical Preservation Office – Distribution List

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

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PO Box 309
Acoma NM 87034

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Hopi Tribal Council
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Kykotsmovi AZ 86039

Governor Vernon B. Abeita
Pueblo of Isleta
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Isleta NM 87022

President Gabe Aguilar
Mescalero Apache Tribe
PO Box 227
Mescalero NM 88340

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

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Santa Fe NM 87506

Chairman Kasey Velasquez
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Apache OK 73006

Chairman Durell Cooper
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Anadarko OK 73005

Chairman Lawrence SpottedBird
Kiowa Tribe of Oklahoma
PO Box 369
Carnegie OK 73015

Chairman Mark Woommavovah
Comanche Nation of Oklahoma
PO Box 908
Lawton OK 73502

Example Public Notice Letter

DEPARTMENT OF THE ARMY
U.S. ARMY GARRISON WHITE SANDS MISSILE RANGE
100 HEADQUARTERS AVENUE
WHITE SANDS MISSILE RANGE, NEW MEXICO 88002-5000

February 21, 2024

Dear Interested Stakeholder,

The White Sands Missile Range has prepared the draft Environmental Assessment for Addressing Operations and Training Support Facilities and Activities at, White Sands Missile Range, New Mexico. The purpose of the proposed action is to construct and improve facilities and designate existing training areas to support the operations of tenant and transient units, such as the Special Operations Forces – Training and Experimentation Center. The proposed action considers construction or improvement of barracks, showers, laundry facilities, a vehicle wash station and bivouac areas. Areas designated for operational testing mission sets are proposed to be used for irregular warfare training.

The draft EA evaluated potential impacts on valued environmental components for implementing four construction projects, such as barracks, shower & laundry facilities, and a wash rack and three activity types such as maneuver live fire training, maneuver fire with simunition training, and cyber-electromagnetic exercises. The environmental analysis shows there will be no significant impact with the implementation of best management practices and mitigations.

Your interest in this draft Environmental Assessment is highly valued. The draft Environmental Assessment and draft Finding of No Significant Impact can be viewed on the WSMR Garrison Publication website under Environmental Documents: https://home.army.mil/wsmr/index.php/about/garrison/directorate-public-works-dpw/environmental. A printed version of the document can be mailed upon request. All correspondence or comments must be received no later than 30-days after the draft Finding of No Significant Impact is published in local area newspapers on 29 February 2024.

Department of the Army
US Army Garrison White Sands
Environmental Division (Bldg. 163/DPW)
ATTN: Customer Support Branch
White Sands Missile Range, New Mexico 88002-5000
E-mail to: USARMYGarrisonWSMREnvironmentalAssessments@army.mil
Fax: (575) 678-2048

Sincerely,

SMITH.JEFFREY.ALAN.1522264276
Digitally signed by SMITH.JEFFREY.ALAN.1522264276
Date: 2024.02.21 16:05:19 -07'00'

Jeffrey Smith
Chief, Environmental Division
Directorate of Public Works

Responses to the Public Notice Letters

From: Nethers, Deborah L (Debbie) CIV USARMY USAG (USA)
To: Hannah Patel; Long, Kristen M CIV USARMY CESPA (USA)
Cc: Weisenberger, Mara E CIV USARMY ID-READINESS (USA)
Subject: [External] - FW: Review of Draft EA
Date: Friday, March 22, 2024 10:48:38 AM
Attachments: Outlook-bqv2phqb.png

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hannah

Sharing comments from the San Andres National Wildlife Refuge.

Debbie

From: Kroschel, Whitney A <whitney_kroschel@fws.gov>
Sent: Friday, March 22, 2024 8:35 AM
To: USARMY Garrison WSMR Environmental Assessments <USARMYGarrisonWSMREnvironmentalAssessments@army.mil>
Subject: Review of Draft EA

Good morning,

San Andres NWR has reviewed the Draft Environmental Assessment Addressing Operations and Training Support Facilities and
Activities at White Sands Missile Range, New Mexico. The Refuge has no comments. We appreciate the invite to review.

Thank you very much,

Whitney Kroschel

Whitney Kroschel, PhD
Refuge Manager
US Fish and Wildlife Service
San Andres National Wildlife Refuge
Las Cruces, NM 88012
575-202-8138 cell
whitney_kroschel@fws.gov
**Flex day every other Monday*

https://www.fws.gov/refuge/san-andres

GOVERNOR
Michelle Lujan Grisham

DIRECTOR AND SECRETARY
TO THE COMMISSION
Michael B. Sloane

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

One Wildlife Way, Santa Fe, NM 87507

Tel: (505) 476-8000 | Fax: (505) 476-8180

For information call: (888) 248-6866

www.wildlife.state.nm.us

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Santa Fe

DR. SABRINA PACK
Silver City

RICHARD STUMP
Santa Fe

20 March 2024

Ms. Debbie Nethers
Environmental Division, Directorate Public Works
AMIM-WSP-E-CS
White Sands Missile Range, NM 88002

RE: Draft Environmental Assessment (EA) Addressing Operations and Training Support Facilities and Activities at White Sands Missile Range (WSMR), New Mexico. NMERT Project No. NMERT-3320.

Dear Ms. Nethers,

The New Mexico Department of Game and Fish (Department) has reviewed the above referenced Draft EA addressing operations and training support facilities and activities at WSMR (Draft EA).

As is described on page 2-2 of the Draft EA for Project 1 (construction of barracks and mobile shower facilities), the Department supports confining new construction to previously disturbed areas wherever possible throughout WSMR. To minimize potential negative impacts of exterior security lighting proposed for Project 1 on nocturnal migratory birds, the Department recommends that exterior lighting be designed in accordance with the New Mexico Night Sky Protection Act. This Act requires that outdoor lighting be fitted with shielding that directs light downward, rather than upward or laterally, to prevent sky glow. This aligns with the "outdoor lighting mitigations" mentioned in the Biological Resources section of Table 3-1 and the final Best Management Practice (BMP) outlined on page 3-34.

Open trenches excavated as part of the actions proposed in the Draft EA for Project 1 and possibly other projects, including Project 4 (renovation of North Oscura Peak buildings for bivouac area), can unintentionally entrap and cause the unnecessary mortality of amphibians, reptiles, and small mammals and can cause injury to large mammals. Trenching may be associated with activities including installation of underground water or septic pipelines, powerlines, or fiber optic communication lines. Trapped animals can die from exposure, starvation, crushing from pipe-laying, entombment from trenching backfilling, drowning, and predation. This unnecessary wildlife mortality can be avoided by implementing conservation measures including:

concurrent trenching, pipe-laying, and backfilling operations to minimize the amount of trench left open overnight or longer; construction of escape ramps; and employing biological monitors to remove trapped animals. Periods of highest activity for amphibians and reptiles vulnerable to entrapment include summer months and wet weather, and they can be active both day and night. Small mammals subject to entrapment are active year-round and generally most active at night.

The Department recommends implementing the general trenching conservation measures outlined in the Department's Trenching Project Guidelines to help minimize unnecessary mortality of wildlife. BMPs should include, at minimum, the following mitigation measures.

- Whenever possible, locate trenching activities within previously disturbed areas, such as existing road or pipeline right-of-ways. To the extent possible, avoid trenching in undisturbed habitat.
- Trench during the cooler months (October – March).
- Utilize concurrent trenching, pipe- or cable-laying, and backfilling. Keep trenching, pipe- or cable-laying, and backfilling crews as close together as possible to minimize the amount of open trench at any given time. When trenching activities are temporarily halted (e.g., overnight, weekends, holidays, weather shutdowns), protect wildlife from accessing any open trench between digging and backfilling operations by using one or more of the methods described below.
- Avoid leaving trenches open overnight. When trenches cannot be backfilled immediately, escape ramps should be constructed at least every 90 meters and preferably every 30 meters. Escape ramps can be constructed parallel or perpendicular to the existing trench. The escape ramp slope should be less than 45 degrees (1:1). If pipe or cable has been installed but backfilling has not occurred, escape ramps may need to be constructed on both sides of the trench, since, unless the pipe is elevated enough to allow animals to move underneath it, the pipe or cable may block access of amphibians, reptiles, and small mammals to the ramps if only constructed on one side.
- Trenches that have been left open overnight should be inspected the following day by a qualified biological monitor and trapped animals removed as soon as possible, especially where state- or federally-listed threatened or endangered amphibians, reptiles, or small mammals occur. Untrained personnel should not attempt to remove trapped wildlife because of the potential to injure animals and the possibility of injury from venomous snakes. Required tools for removal will include snake tongs for removing snakes and a dip net for capturing and removing amphibians and small mammals. Many animals trapped in a trench will burrow under loose soil. To the extent possible, the biological monitor should disturb loose soil in the trench to uncover and remove trapped animals. Animals should be relocated at least 50 meters away from the open trench in undisturbed habitat.
- When pipe has been laid in the trench, end caps should be placed on the open end(s) of the pipe to preclude animals from entering. Pipe staged outside the

trench should be capped until placed in the trench or checked for wildlife before being placed into the trench.

- Most wildlife can be protected by constructing silt fence completely around the open trench. Silt fence should be supported from sagging by t-posts, rebar, or stakes and buried at the base to preclude animals from moving below the fence. If construction of a silt fence is a required BMP for erosion control, then, to preclude the need for a biological monitor, escape ramps, and concurrent backfilling, the guidelines for silt fence installation and maintenance in the Trenching Project Guidelines should be followed.

The Department supports the intent of the proposed vehicle wash rack described for Project 3 (page 2-2), which is invasive species removal. However, the Department requests further clarification regarding how wastewater from the wash rack will be contained and treated and what actions will be taken to avoid spilling or otherwise releasing contaminated water into the surrounding environment.

Page 2-6 of the Draft EA states that the Thurgood site is located within a canyon that "drains into Salt Creek, which is White Sands pupfish habitat, and is very dynamic because of the amount of ephemeral water that moves through the system during periodic, intense rainstorms." To avoid negative impacts to the White Sands pupfish (*Cyprinodon tularosa*) from use of this site, the Department recommends that all activities (e.g., off-road vehicle training) remain within previously disturbed areas and avoid driving in, or adding sediment to, the arroyo that drains into Salt Creek. The disturbance of or addition of sediment to this system increases the chances of sedimentation in Salt Creek following intense rainstorms, which would be detrimental to the White Sands pupfish.

Page 3-7 of the Draft EA states "Training areas may be closed to scheduled and unscheduled hunting to protect public safety. During these closures all persons, including hunters, would be evacuated from the areas and roadblocks would be established along roads to prevent access. Operational activities would be de-conflicted with hunting through scheduling." The Department supports closing training areas to hunting as required to ensure public safety. The Department requests that WSMR coordinate these closures with the Department and share a schedule of anticipated closures so the Department can inform hunters as appropriate.

Page 3-19 of the Draft EA states that "Construction and operation of new infrastructure would result in increased impervious surface areas," and that "Increased sediment may run off during construction, which could be harmful to stream ecosystems." Construction areas and other impervious surfaces can have significant impacts on surface waters by increasing the amount of sediment and other pollutants that are washed into these waters, increasing the velocity and volume of water, and reducing infiltration into groundwater. Reducing the total area of impervious surfaces and phasing construction will reduce these impacts. The Department recommends developing a Storm Water Pollution Prevention Plan and provides the following additional recommendations to minimize or eliminate impacts to wildlife and wildlife habitat:

- Divert water around construction sites whenever possible.
- Preserve natural areas within the project site. Strive to maintain the natural drainage system of the site, including natural stream channels, wetlands, and floodplains. Design, construct, and maintain the site to protect (or restore) the natural hydrology.
- Following construction, disturbed areas should be re-vegetated using native species that approximate the pre-disturbance plant community composition or native plant communities appropriate for the site, including from a region that represents potential future climatic conditions at the site, whichever is more beneficial to wildlife. Short-term erosion control seed mixes are available for temporary control of surface erosion during project implementation; native mixes should be used for temporary as well as permanent erosion control. Native plants and materials should also be used for landscaping. All seed mixtures should be certified as weed-free. New Mexico grass ecotypes for commercial seeding are available through the Los Lunas Plant Materials Center and New Mexico State University. Seeding guidelines are available from the Natural Resources Conservation Service and the Colorado Natural Areas Program.
- If erosion control blankets are used post-construction, burying the blanket edges, and using blankets without fused mesh corners (e.g., use woven mesh) can reduce the chances of unintentional wildlife entanglement. Regularly check the erosion control blankets after applying them to identify and release any wildlife that does become entangled.
- Maintain a vegetated buffer zone along all watercourses, including ephemeral arroyos, sufficient to minimize erosion and sediment delivery.
- Use properly engineered drainage swales and other vegetated channel systems instead of storm sewers, lined channels, curbs, and gutters. Vegetated swales should be gently sloped (4:1) so that small wildlife is able to maneuver them.
- Efforts should be made during construction to minimize impacts on vegetative communities. Existing roads and rights-of-way should be used for all transportation. Off-road driving should be avoided. Staging areas should be located in previously disturbed sites, where possible, and kept as small as possible.

Page 3-22 of the Draft EA states “Additionally, four NMDGF listed plant species documented at WSMR include the Mescalero milkwort (*Polygala rimulicola var. Escalerorum*), Night-blooming cereus (*Peniocereus greggii var.greggi*), Organ Mountain pincushion cactus (*Escobaria sneedii organensis*), and Todsen's pennyroyal (WSMR 2023).” The Department has no jurisdiction over state-listed endangered plants in New Mexico; it is the Forestry Division of the New Mexico Energy, Minerals and Natural Resources Department (NM EMNRD) that has the authority to list plants as endangered in New Mexico. Therefore, the Department recommends this statement be revised to say “four NM EMNRD Forestry Division-listed plant species documented at WSMR include…”

Section 3.7 of the Draft EA outlines the federally- and state-listed wildlife species that might be impacted by the proposed actions on WSMR. However, there is no mention of

the game species (e.g., elk, deer, cougar, etc.) or Species of Greatest Conservation Need (SGCN) that may be impacted by these proposed actions. Much of WSMR, including the San Andres and Organ mountains, constitutes important habitat for multiple big game species and SGCN. The Department recommends inclusion of game species and SGCN that occur on WSMR in Section 3.7 of the Draft EA, consideration of any impacts the proposed actions may have on them, and any mitigation measures that WSMR will adopt. For example, training activities adjacent to the San Andres and Organ Mountains could be avoided during the big game fawning/calving season (May – July).

While page 3-32 of the Draft EA references seasonal avoidance measures during construction and training activities, the Department recommends inclusion of more specific reference to migratory birds and additional seasonal and buffer distances as described below. All migratory birds are protected against direct take under the federal Migratory Bird Treaty Act (16 U.S.C. Sections 703-712), and hawks, falcons, vultures, owls, songbirds, and other insect-eating birds are protected under New Mexico State Statutes (17-2-13 and 17-2-14 NMSA), unless permitted by the applicable regulatory agency. To minimize the likelihood of adverse impacts to migratory birds, nests, eggs, or nestlings, the Department recommends that ground disturbance and vegetation removal activities be conducted outside of the primary migratory bird breeding season of April 15-September 1. Breeding season may begin earlier for raptors or when working in low-elevation habitats such as deserts. If ground disturbing and clearing activities must be conducted during the breeding season, the area should be surveyed for active nest sites (with birds or eggs present in the nesting territory) and avoid disturbing active nests until young have fledged. For active nests, establish adequate buffer zones to minimize disturbance to nesting birds. Buffer distances should be at least 100 feet from songbird and raven nests; 0.25 miles from most raptor nests; and 0.5 miles for ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos canadensis*), peregrine falcon (*Falco peregrinus*), and prairie falcon (*Falco mexicanus*) nests. Active nest sites in trees or shrubs that must be removed should be mitigated by qualified biologists or wildlife rehabilitators. Department biologists are available to consult on nest site mitigation and can facilitate contact with qualified personnel.

The list of New Mexico SGCN (see link, page 14, table 5) and the federal list of Birds of Conservation Concern should be reviewed to fully evaluate potential effects to migratory birds from your proposed project. Federal agencies are also required under Executive Order 13186 to implement standards and practices that lessen the amount of unintentional take attributable to agency actions. These conservation measures are strongly recommended to ensure persistence of migratory bird species whose populations are small and/or declining within New Mexico.

Page 3-33 of the Draft EA outlines BMPs and mitigation measures that WSMR will take to avoid negative impacts to vegetation and wildlife. The Department recommends adding a new BMP stating that the WSMR Environmental Division will communicate with the Department regarding issues related to SGCN and state-listed or game species.

Section 3.10.2.1 of the Draft EA outlines the environmental consequences of hazardous materials and toxic substances that may be introduced by the proposed actions, including training activities such as small arms weapons training and maneuvering live fire training. However, this section does not address potential lead contamination from bullets and spent ammunition. The Department recommends inclusion of a description of how potential lead contamination associated with spent ammunition, and associated negative environmental impacts, will be mitigated within the sites where firearms training will be conducted on WSMR.

We appreciate the opportunity to comment on this Draft EA. Should you have any questions regarding our comments, please contact Jack Marchetti, Aquatic and Riparian Habitat Specialist, at (505) 479-1269 or jack.marchetti@dgf.nm.gov.

Sincerely,

Virginia Seamster

Digitally signed by Virginia Seamster
Date: 2024.03.20 09:34:22 -06'00'

Virginia Seamster, Ph.D.
Assistant Chief, Ecological and Environmental Planning Division

MICHELLE LUJAN GRISHAM
GOVERNOR

JAMES C. KENNEY
CABINET SECRETARY

April 5, 2024

Department of the Army
US Army Garrison White Sands
Environmental Division (Bldg. 163/DPW)
ATTN: Customer Support Branch
White Sands Missile Range, New Mexico 88002-5000

Submitted electronically to: USARMYGarrisonWSMREnvironmentalAssessments@army.mil

RE: Draft Environmental Assessment Addressing Operations and Training Support Facilities and Activities at White Sands Missile Range, New Mexico

Dear Acting Chief Smith,

The New Mexico Environment Department (NMED) reviewed the Draft Environmental Assessment Addressing Operations and Training Support Facilities and Activities at White Sands Missile Range (WSMR). NMED offers the attached comments for WSMR's consideration to ensure compliance with applicable federal and NMED regulations and standards during the proposed construction and improvement of facilities and designation of existing training areas to support the operations of tenant and transient units.

Strong intergovernmental coordination is essential to ensure protection of human health and the environment. NMED offers a few areas of potential environmental impacts in the attachment for you to evaluate.

Thank you for providing the opportunity to review the project materials. Please reach out to us with any further questions or concerns you may have. We ask that you send all comment requests to env.review@env.nm.gov, it helps expedite a timely review of your request.

Sincerely,

Jonas Armstrong Digitally signed by Jonas Armstrong
Date: 2024.04.05 22:46:43 -06'00'

Jonas Armstrong, Director
Office of Strategic Initiatives

Attachment (1)

Attachment

Introduction

The New Mexico Environment Department (NMED) reviewed the Draft Environmental Assessment (Draft EA) to evaluate impacts related to Operations and Training Support Facilities and Activities at White Sands Missile Range (WSMR). WSMR is proposing to construct and improve facilities and designate existing training areas to support the operations of tenant and transient units.

Comments

Air Quality

Proposed Projects 1, 2, and 3 involve land disturbance activities. On page 3-10 of the Draft EA, WSMR proposes using a variety of dust suppression techniques during construction and earth moving activities to reduce particulate matter emissions. Likewise, on page 3-11, WSMR proposes using a variety of practices to minimize the potential for airborne dust during training exercises. Even though military installations are exempt from 20.2.23.108.B.(4) NMAC, the Air Quality Bureau (AQB) supports the use of all Best Management Practices and dust suppression techniques during construction, land disturbance activities, and training exercises.

Proposed Project 4 involves the renovation of existing structures at the North Oscura Peak (NOP) bivouac area. The Draft EA noted "Demolition may be required if it is cost prohibitive to refurbish the existing facilities." Whether the existing structures at NOP bivouac area undergo renovation (alteration of a facility or facility components) or demolition (wrecking or taking out), an asbestos survey, conducted by a qualified professional, must be conducted to determine if regulated asbestos containing material (RACM) exists in the structure. The survey must demonstrate that all potential asbestos containing materials at the facility have been tested. The survey must be conducted within three years of the start of the asbestos removal. If asbestos is found, the certified inspector will determine if it must be removed prior to the renovation. AQB should be notified when the quantity of regulated asbestos containing material is greater than 260 linear feet (for pipes), 160 square feet for other facility components, or 35 cubic feet of 'off facility' components. However, if demolition will occur, notification is still required whether asbestos was found or not. At no time shall any asbestos containing material be crushed at the site.

In addition to the asbestos survey, WSMR needs to complete the Asbestos NESHAP (National Emission Standards for Hazardous Air Pollutants) Notification form (https://www.env.nm.gov/forms/ Air Quality Bureau>Asbestos>Asbestos NESHAP form). Please scan and email (asbestos.aqb@state.nm.us) or fax (505-476-4375) the signed and dated forms to AQB. Alternately, forms can be mailed to the AQB at the address listed on the asbestos reporting form. Submit a copy of the asbestos survey with the Asbestos NESHAP Notification form. Both must be submitted to the AQB at least 10 working days before renovation begins. Please do not send duplicate copies of the notice to the Bureau.

Projects 1, 2, 3, and 4 could potentially disturb existing water and wastewater supply lines. As previously noted for Project 4, demolition (wrecking or taking out) of cement water and wastewater pipes for system maintenance or capacity expansion requires an asbestos survey be conducted to determine if regulated asbestos-containing material (RACM) exists in the system. The same steps for an asbestos survey and reporting, as outlined above, must be undertaken for any disturbance to existing water and wastewater lines.

Solid Waste

Construction activities would result in temporary increases of solid waste. During the proposed work, materials need to be characterized and disposed of properly, including toxic and solid wastes. Asbestos-containing materials and lead-based paint contaminated debris should be disposed of at a U.S. Environmental Protection Agency approved landfill. Construction debris generated, to include asphalt and concrete waste, should be disposed of in coordination with Solid Waste Management.

Groundwater

On page 1-1, the last paragraph states, "The Proposed Action includes the construction or improvement of barracks, shower and laundry facilities, a vehicle wash station, and a bivouac area."

On page 2-2, the last paragraph states, "Project 3: Construct Vehicle Wash Rack East of Main Post. WSMR proposes to construct a vehicle wash rack, which would cover approximately 0.98 acres, east of the Main Post (see Appendix B for a detailed map of Main Post). The vehicle wash rack would fulfill the need for invasive species control analyzed in the Range-Wide EIS. The concrete vehicle wash rack would be designed to remove contaminants, oil, and medium to heavy loads of mud from vehicles as large as Heavy Expanded Mobility Tactical Trucks, which are 8-wheel drive, 10-short ton tactical trucks measuring 32.6 feet long with a wheelbase of 16 feet. The wash rack would also have a closed water collection system that reclaims the used water."

Vehicle Wash is considered industrial wastewater that contains organic compounds and metals. No car washing operation should discharge wastewater and/or grit trap waste below the ground surface (e.g., to a leachfield) because of the risk of ground water contamination. There will also be sludge accumulation from grit traps. The WSMR must submit an application and apply for a Ground Water Quality Bureau Discharge Permit renewal and modification for the wastewater produced from the barracks, shower and laundry facilities, and vehicle wash station.

If a facility decides to dry out the sludge on property they own, they must satisfy conditions set by the Ground Water Quality Bureau to protect ground water quality in accordance with the New Mexico Water Quality Control Commission (WQCC) Ground and Surface Water Protection Regulations, 20.6.2 NMAC. The car wash facility should file a Notice of Intent (NOI) with the Ground Water Quality Bureau, which should describe how the sludge will be handled and dried. An onsite drying area would need to be bermed and lined with a synthetic liner at least 30 ml in thickness and covered with ½ foot of soil or sand to protect the liner. In addition, if the wastewater from the car wash is not recycled or discharged directly to a city sewer line, the car wash facility should contact the Ground Water Quality Bureau about wastewater disposal.

On page 3-40, the third paragraph states, "Sanitary Sewer and Wastewater System. There are multiple wastewater treatment facilities at WSMR, the main facility being on Main Post. Water quality is monitored and meets both NMED and USEPA [U.S. Environmental Protection Agency] standards (WSMR, PHE, and SAIC 2009)." According to NMED records, the Discharge Permit, DP-297 White Sands Missile Range – HELSTF, has been expired since November 23, 1998; DP-492 WSMR - HELSTF Technical Support Area has been expired since June 10, 2001; and DP-976 WSMR - Main Post WWTP has been expired since February 4, 2007. The WSMR must submit a Discharge Permit renewal application for each of these three discharge permits (DP-297, DP-492 and DP-976).

Surface Water Quality

Operations must ensure protection of all Surface Waters of the State at all times in accordance with NMED regulations. The project identifies Salt Creek as being outside of the proposed project area. However, construction activities within the project area may affect Surface Waters of the State as defined by

regulation in 20.6.4.7 NMAC, including tributaries to Salt Creek that are intermittent and ephemeral arroyos and subject to 20.6.4.97 and 20.6.4.98 NMAC, respectively. Surface Waters of the State shall be free of any water contaminant in such quantity and of such duration as may be reasonable to avoid the probability of injuring human health, animal or plant life or property, or unreasonably interfering with the public welfare or the use of property.

WSMR should use Best Management Practices (BMPs) to ensure no runoff containing aqueous film forming foam (AFFF) reaches the stream as defined in NMED regulations for intermittent and ephemeral streams. Emerging contaminants are defined in 20.6.4.7.E(2) NMAC as contaminants that may cause significant ecological or human health effects at low concentration. Some such emerging contaminants are per- and polyfluoroalkyl substances (PFAS), a known contaminant within AFFF used for Class B firefighting. WSMR should implement BMPs to mitigate AFFF fluids spread to Surface Waters of the State and ensure any leaks or releases are contained.

WSMR is required to report all spills immediately to NMED as required by the New Mexico Water Quality Control Commission regulations (20.6.2.1203 NMAC). For non-emergencies during normal business hours, call 505-428-2500. For non-emergencies after hours, call 866-428-6535 or 505-428-6535 (voice mail, twenty-four hours a day). For emergencies only, call 505-827-9329 twenty-four hours a day (NM Dept of Public Safety).

In addition to the above regulatory standards, SWQB requires the following practices to avoid contamination and to protect surface and groundwater quality:

- Fuel, oil, hydraulic fluid, lubricants, and other petrochemicals must have a secondary containment system to prevent spills and should be stored outside of the flood-prone zone.
- Appropriate spill clean-up materials such as absorbent pads must be available on-site at all times during road construction, site preparations, drilling and reclamation to address potential spills.

Petroleum Storage Tanks

If an abandoned storage tank system or petroleum impacted soil and/or water is discovered during construction, the Petroleum Storage Tank Bureau must be notified (20.5.118 NMAC, etc.). In the event that an abandoned storage tank system or petroleum impacted soil and/or water is discovered during any construction activity, please notify the Petroleum Storage Tank Bureau during business hours via the "Leak of the Week" at: https://www.env.nm.gov/petroleum_storage_tank/ (see box to the right, report a Leak or Spill) or call 505-476-4397. During non-business hours, please call 505-827-9329. Owners, operators, and others dealing with petroleum storage tank systems must comply with all regulations in 20.5 NMAC, New Mexico's Petroleum Storage Tank regulations.

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APPENDIX B

DETAILED MAPS OF THE PROPOSED ACTION

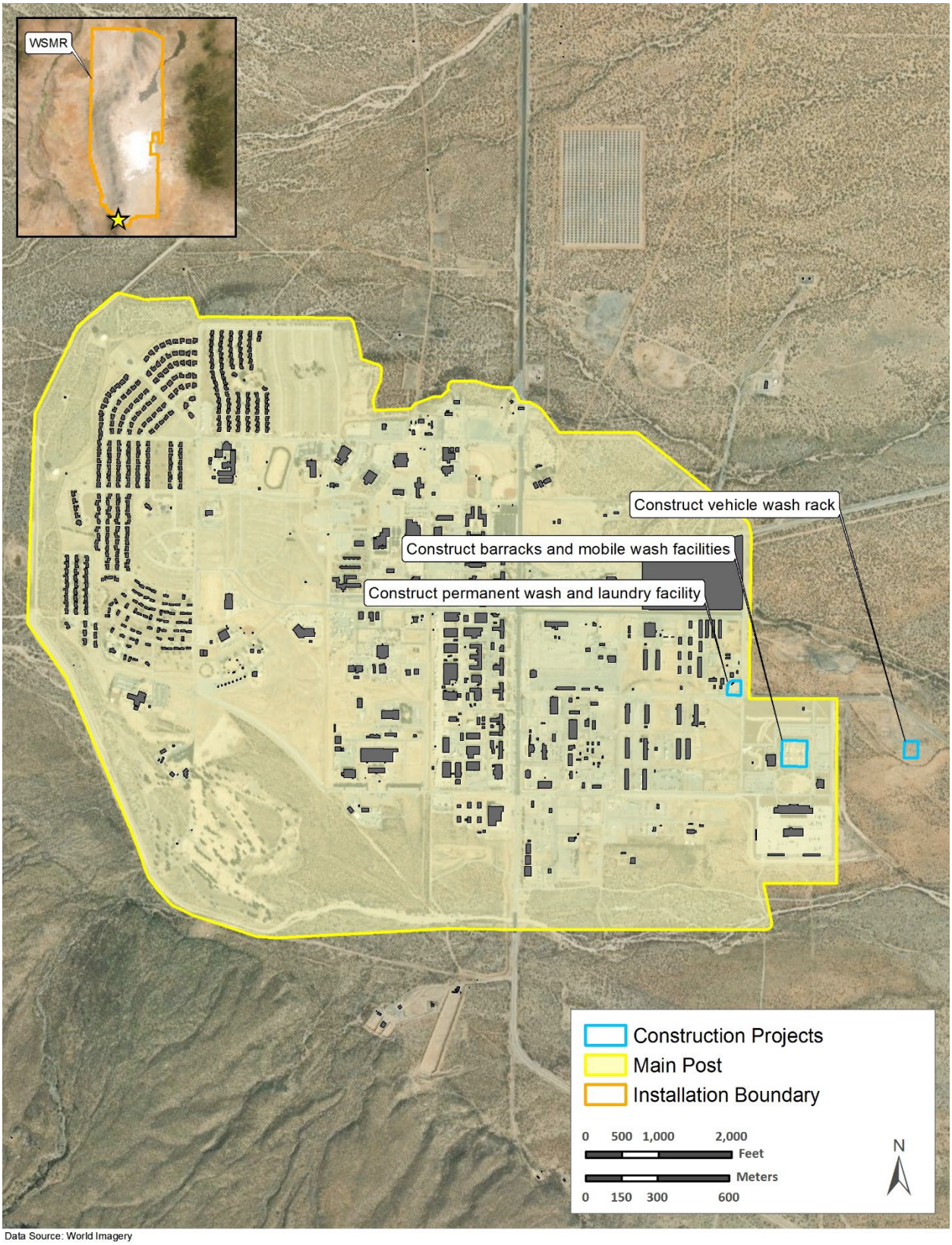

Figure B-1. Map of Main Post

Figure B-2. Map of NOP

Figure B-3. Map of Training Area off Route 213

Figure B-4. Map of Condron Field

Figure B-5. Map of Mine Site

Figure B-6. Map of Small Arms Range 19008

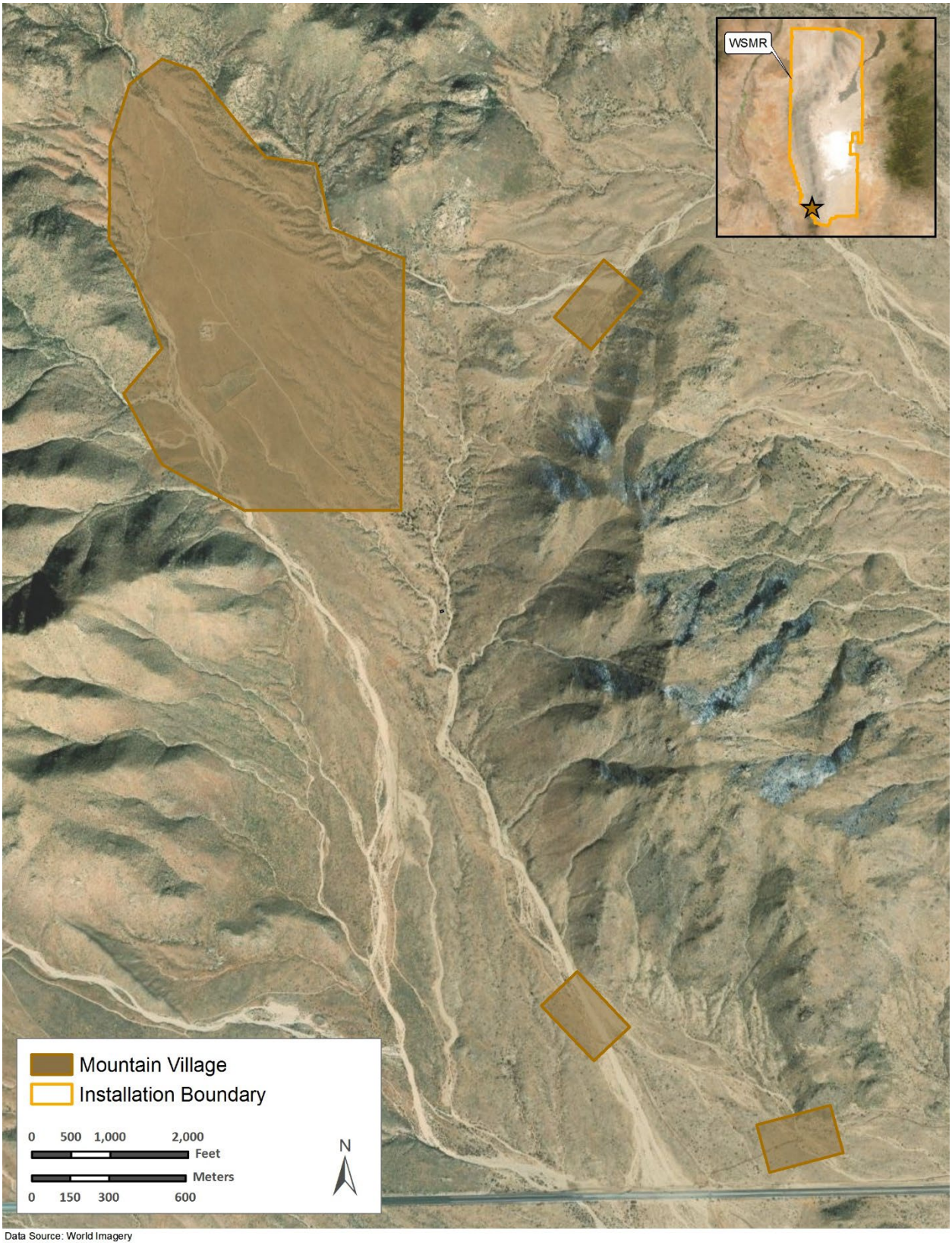

Figure B-7. Map of Mountain Village

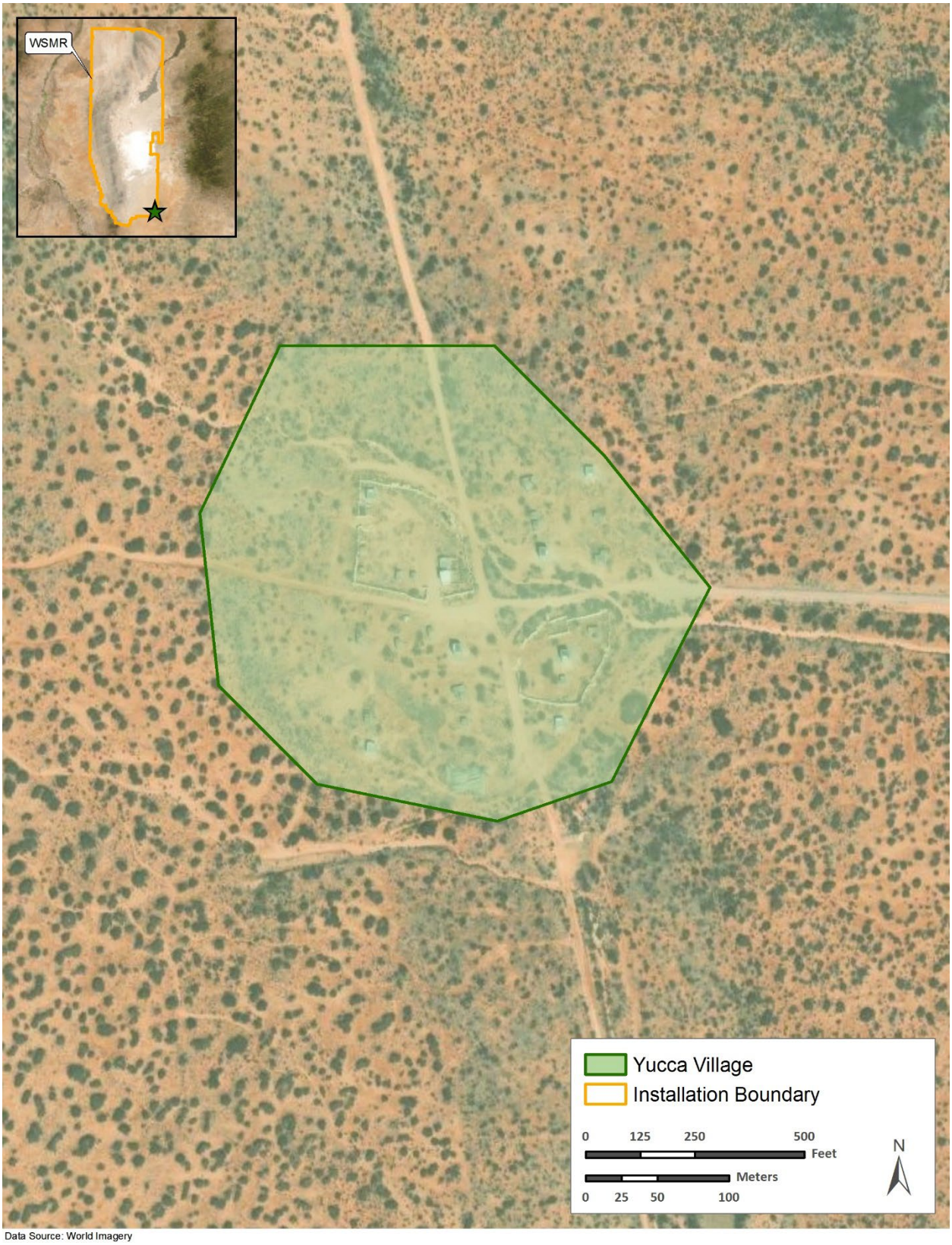

Figure B-8. Map of Yucca Village

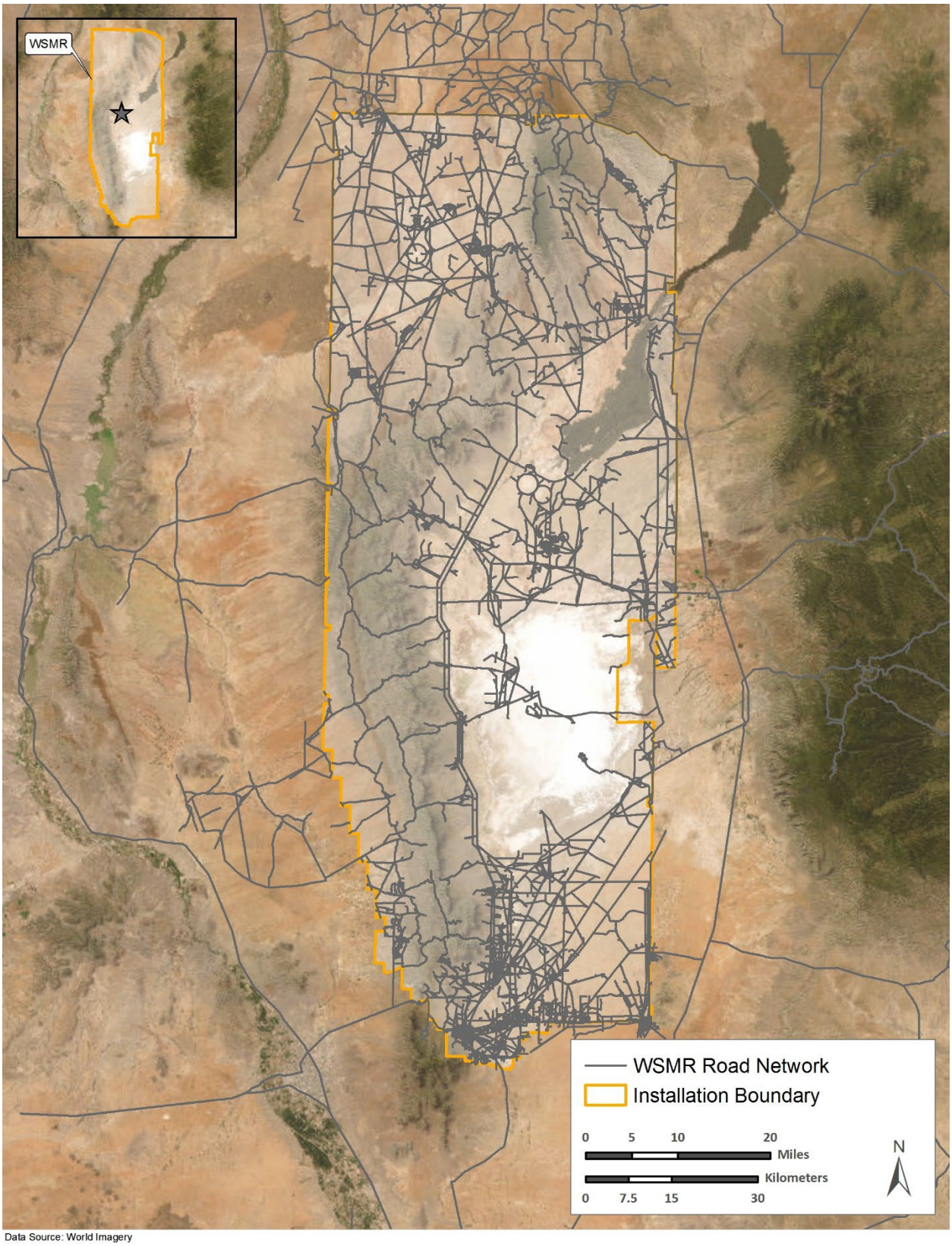

Figure B-9. Map of WSMR Road Network

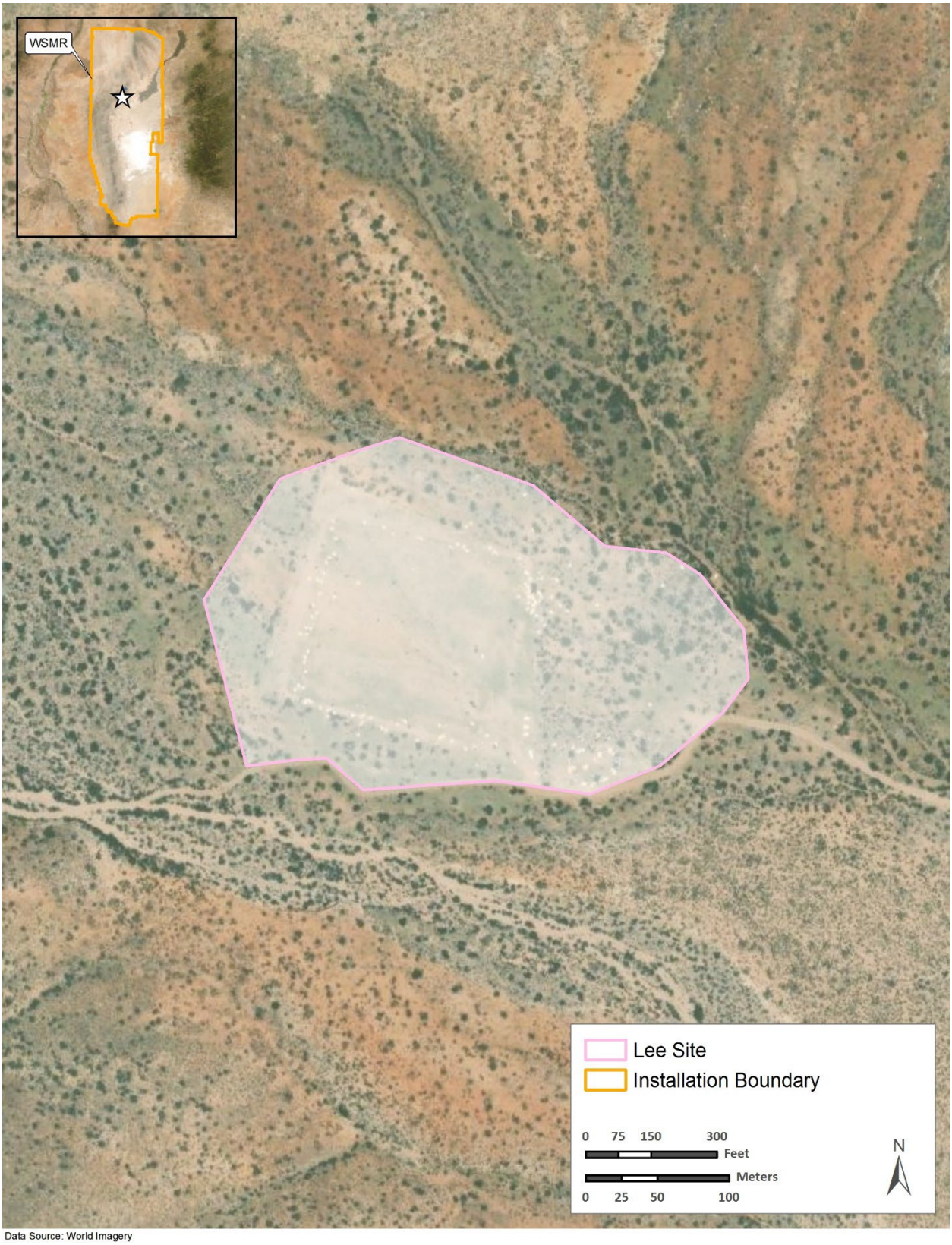

Figure B-10. Map of Lee Site

Figure B-11. Map of Thurgood Site

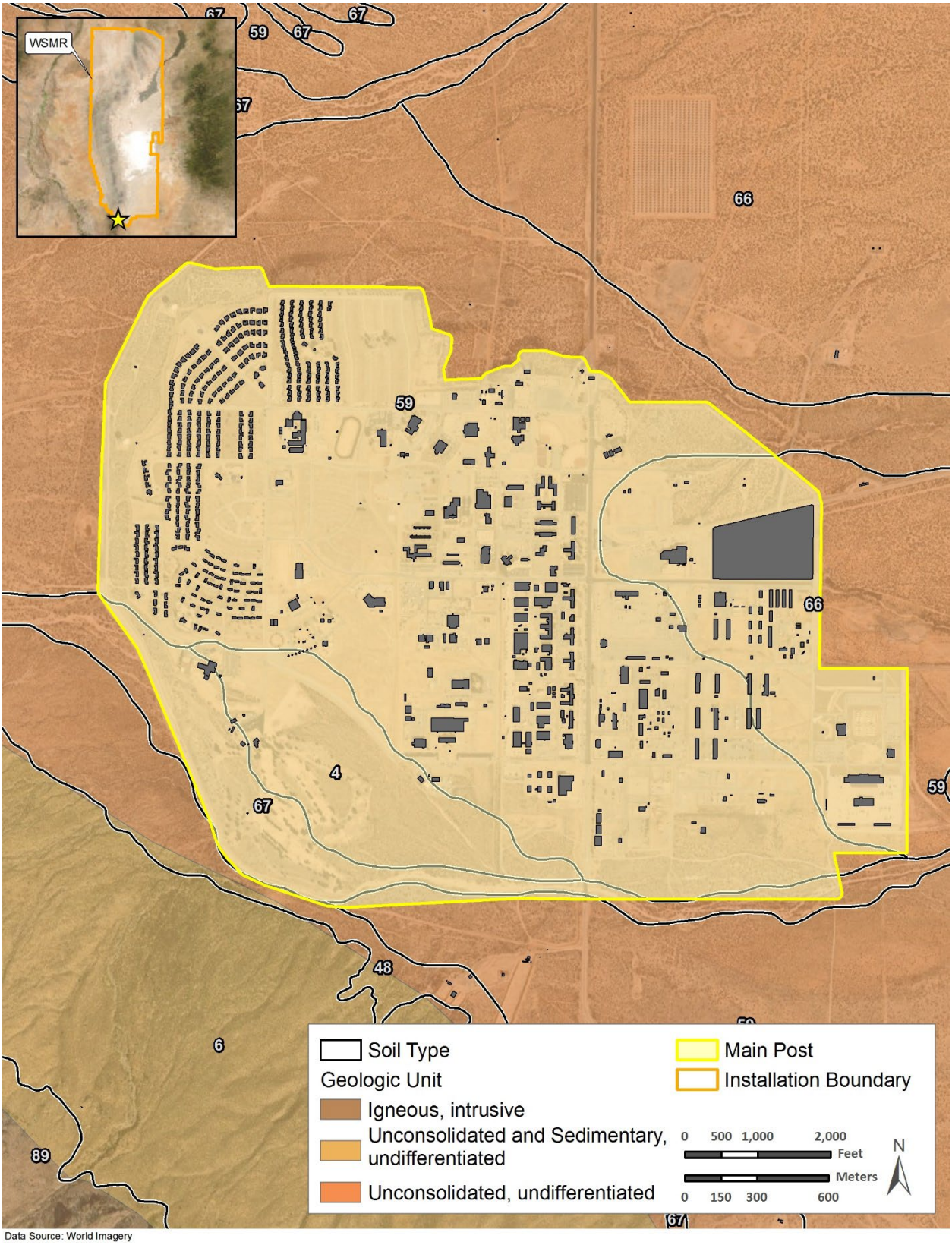

Figure B-12. Soils and Geology of WSMR Main Post

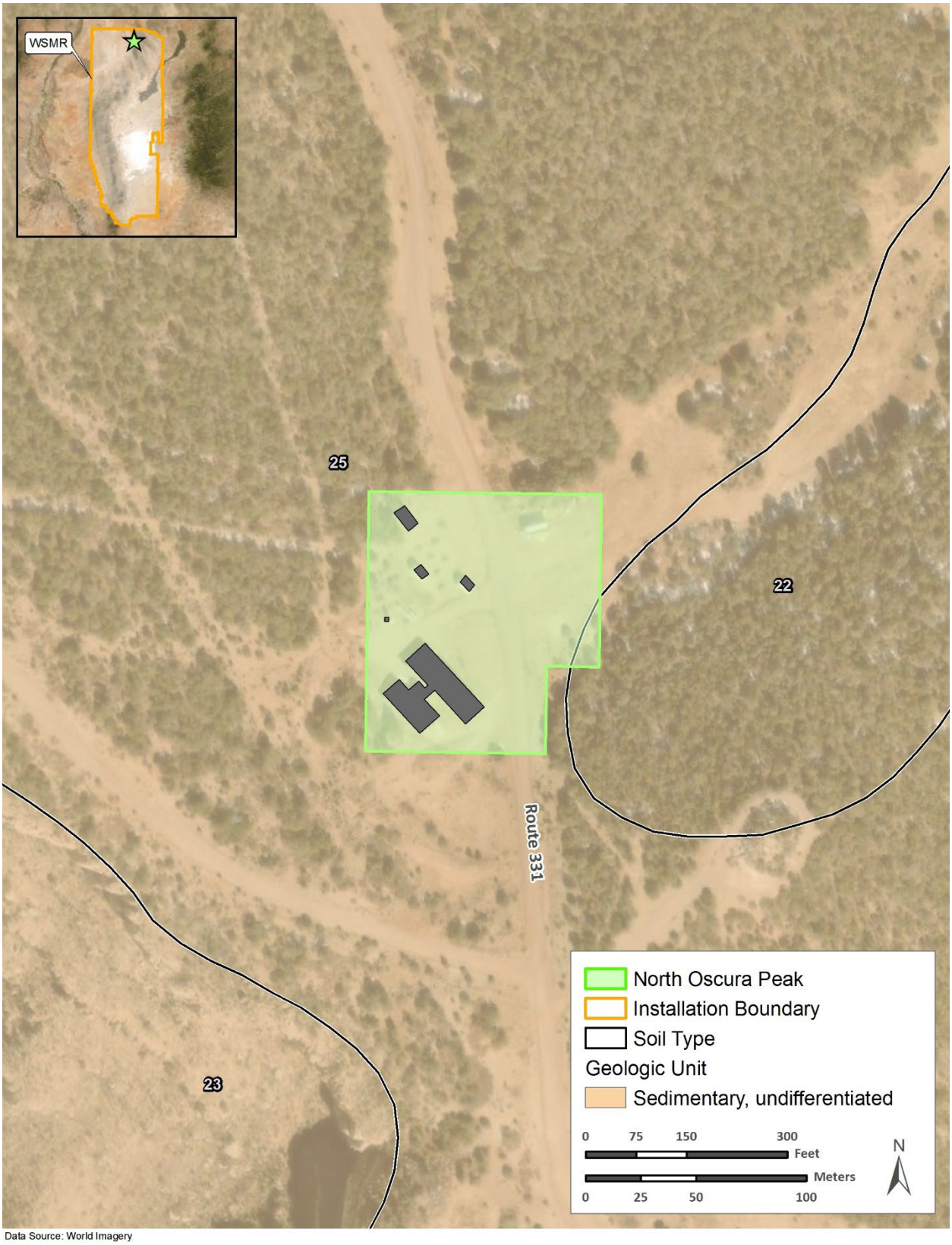

Figure B-13. Soils and Geology of NOP

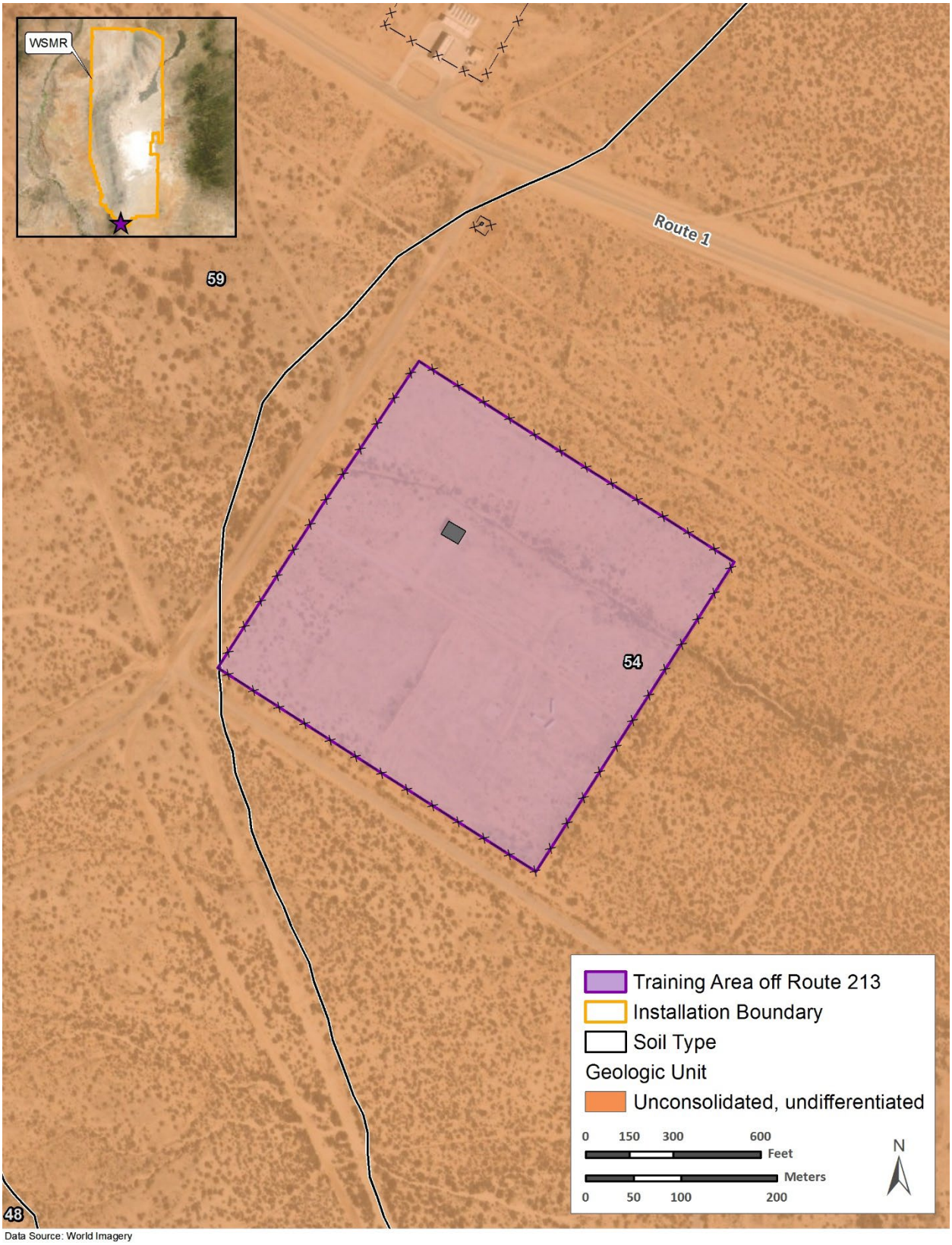

Figure B-14. Soils and Geology of the Route 213 Training Area

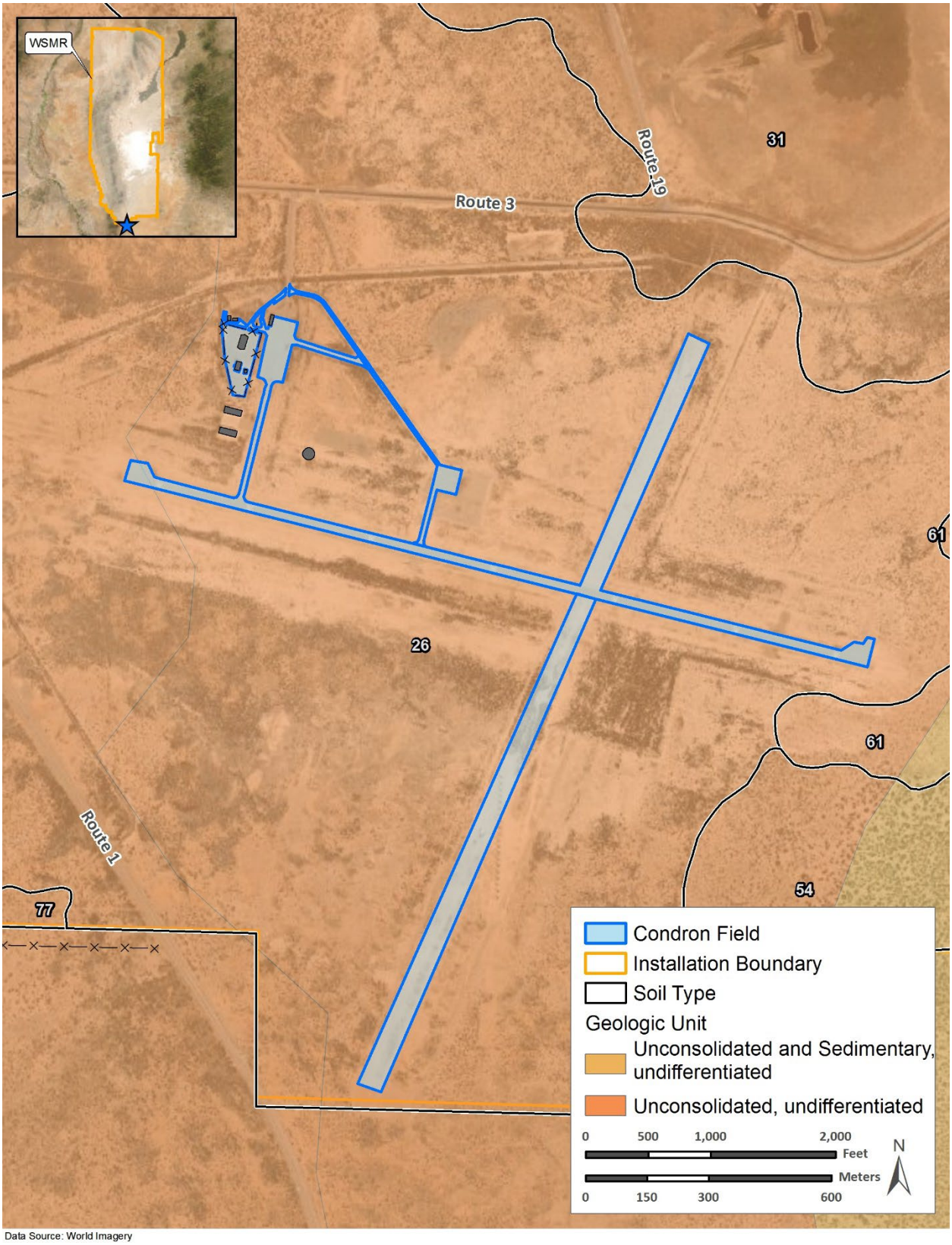

Figure B-15. Soils and Geology of Condron Field

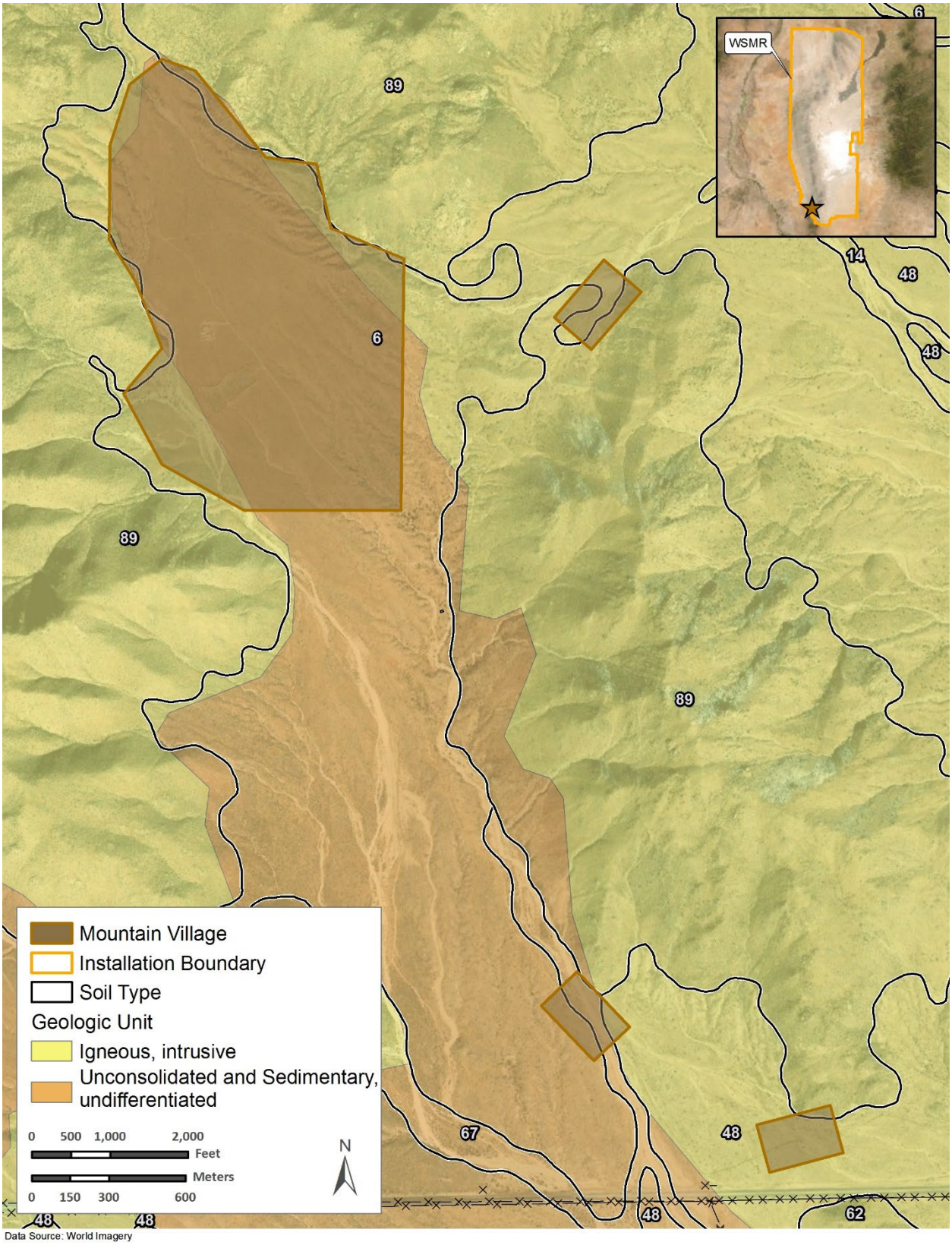

Figure B-16. Soils and Geology of Mountain Village

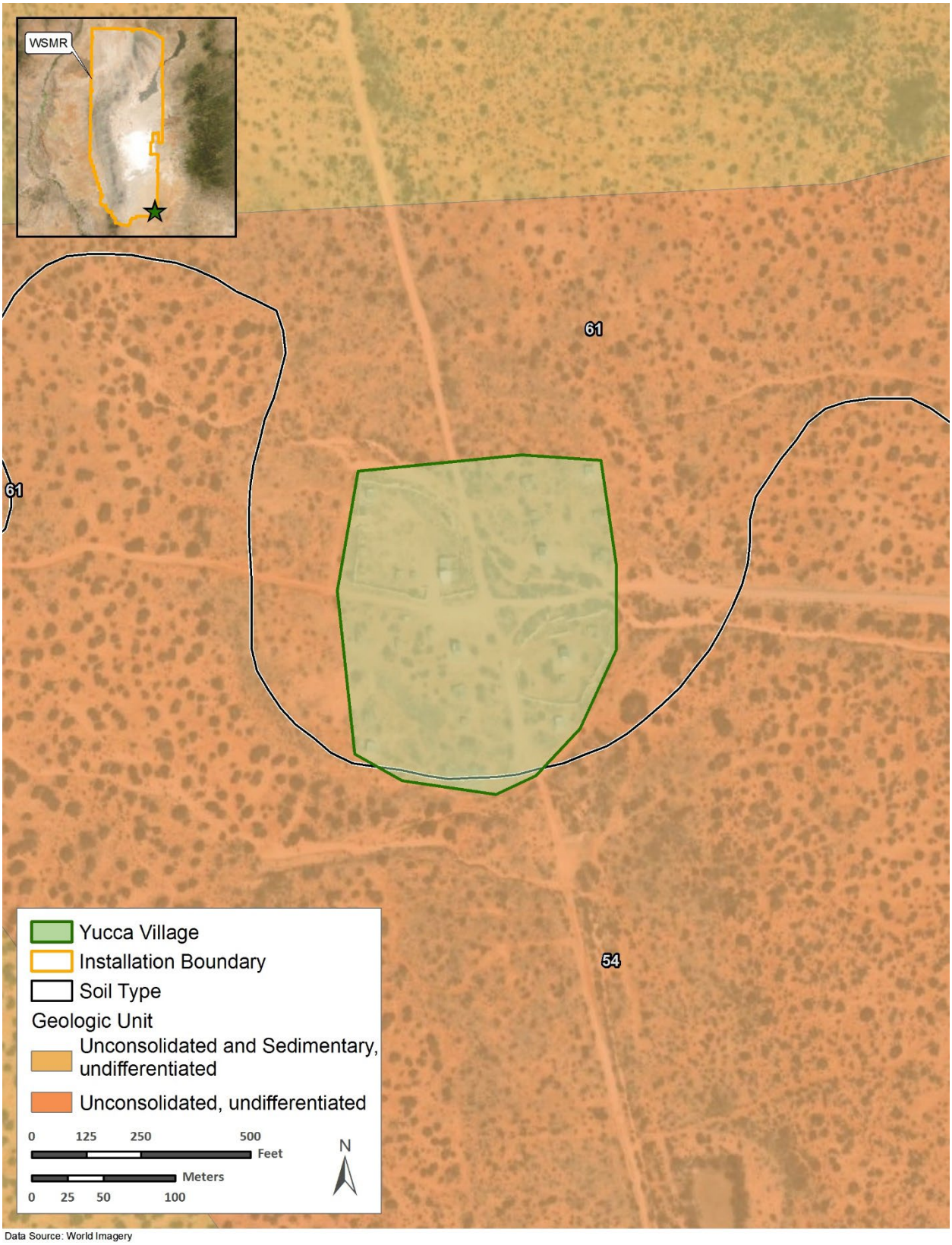

Figure B-17. Soils and Geology of Yucca Village

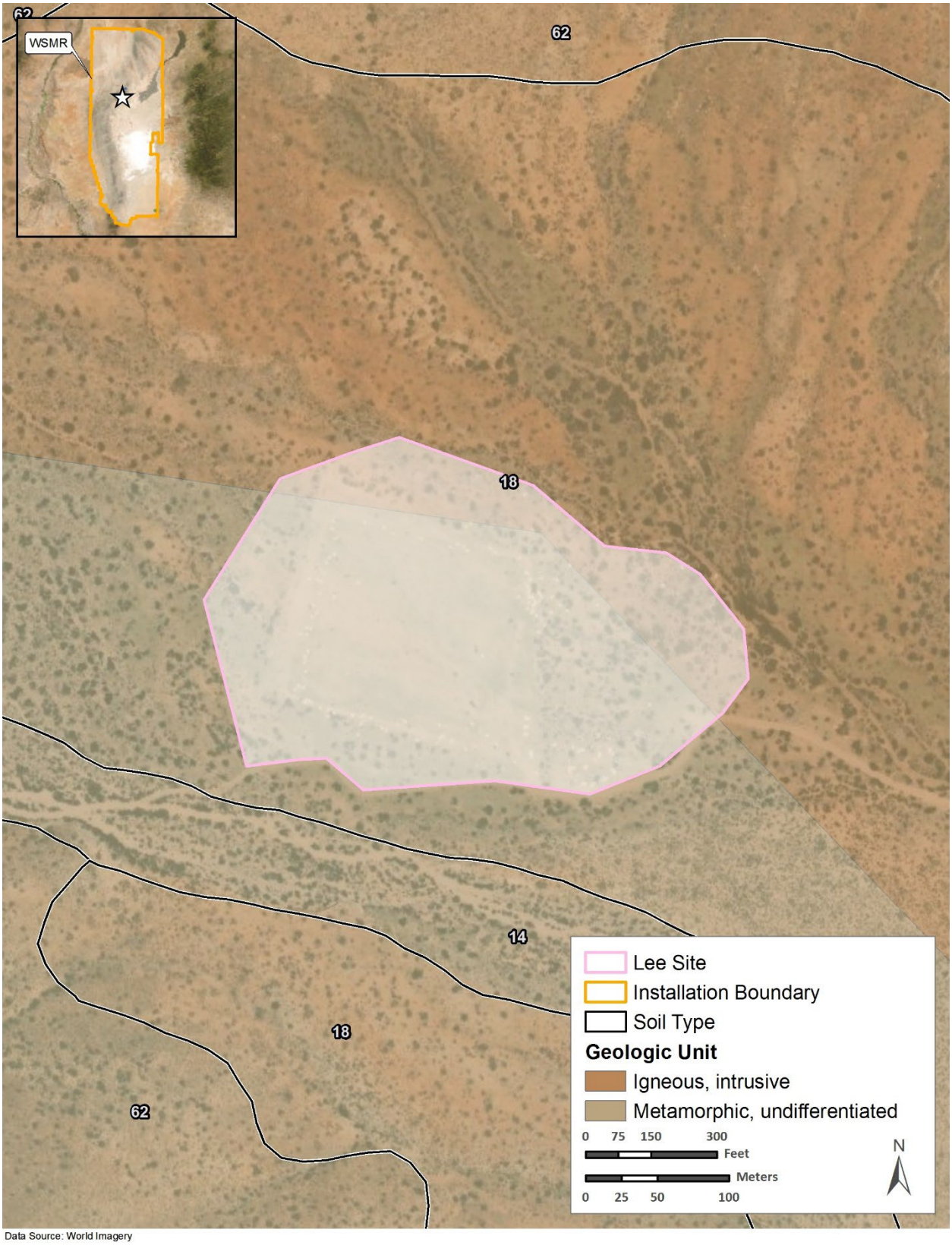

Figure B-18. Soils and Geology of Lee Site

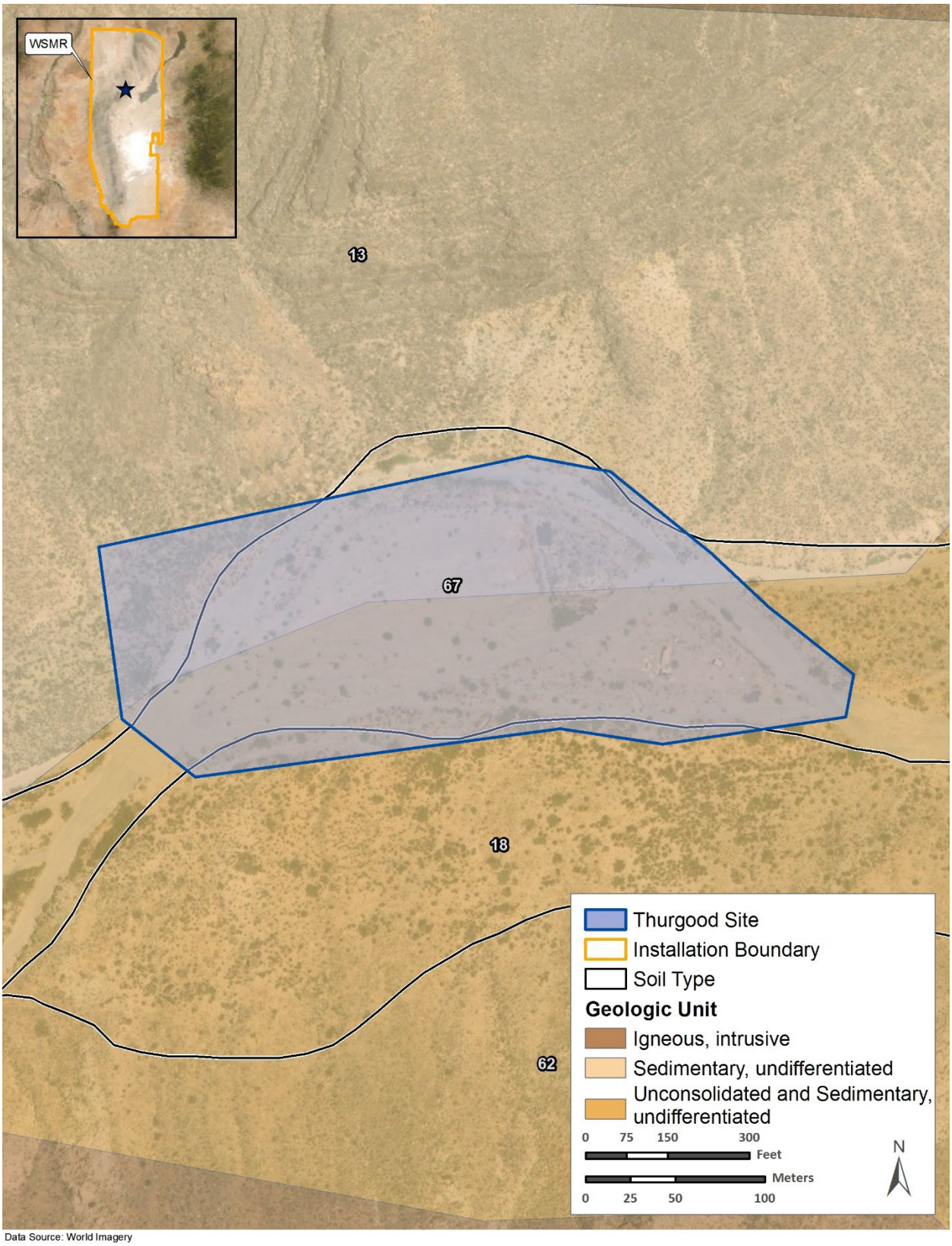

Figure B-19. Soils and Geology of Thurgood Site

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APPENDIX C

AIR QUALITY SUPPORT DOCUMENTATION

APPENDIX C: AIR QUALITY CALCULATIONS

The Army has considered net emissions generated from all sources of air emissions that may be associated with the Proposed Action. More specifically, project-related direct emissions would result from the following:

- *Construction and improvement activities* – Use of heavy construction equipment, worker vehicles traveling to and from the project area, use of paints and architectural coatings, paving off gases, and fugitive dust from ground disturbance.
- *Training activities* – maneuver live fire training and maneuver fire with simunition training (CEMA exercises under the Proposed Action would not involve emissions sources).

Emissions factors are representative values that attempt to relate the quantity of a pollutant released with the activity associated with the release of that pollutant. These factors are usually expressed as the weight of pollutant emitted per unit weight, volume, distance, or duration of the pollutant emitting activity. In most cases, these factors are simply an average of all available data of acceptable quality and are generally assumed to be representative of long-term averages for all emitters in the source category. The emission factors presented in this appendix are generally from the *Compilation of Air Pollutant Emission Factors* (AP-42) and *WebFIRE* (USEPA's online emissions factor database).

All direct and indirect emissions associated with the Proposed Action were estimated. Emissions from construction and improvement of mission support facilities were estimated using predicted equipment use for site grading, trenching/excavation, construction, architectural coatings, and paving. It was assumed 1) removal of existing tents would not produce appreciable air emissions and 2) no emergency generators or other stationary sources of air emissions would be required. Training emissions were estimated for use of live and simunition (i.e., blank or inert) munitions during maneuver training using an estimated maximum of 20 rounds per exercise (80 rounds per year).

C.1 CONSTRUCTION AND IMPROVEMENTS

C.1.1 Methodology

The construction period would involve the use of various non-road equipment, power generators, and trucks. Information regarding the number of pieces and types of construction equipment to be used on the project, the schedule for deployment of equipment (monthly and annually), and the approximate daily operating time (including power level or usage factor) were estimated for each individual project on a schedule of construction activity. The individual projects include construction of barracks and mobile wash facilities at Main Post, construction of permanent wash and laundry facility at the Main Post, construction of vehicle wash rack east of the Main Post, and renovation of NOP buildings for bivouac area. Each project was assumed to occur over a 2-year construction period from January 2024 through December 2025.

The following on-road vehicle type abbreviations and their definitions are used throughout this appendix.

LDGV: Light-Duty Gasoline Vehicle (Passenger Cars)
LDGT: Light-Duty Gasoline Truck (0–8,500 Pounds Gross Vehicle Weight Rating [GVWR])
HDGV: Heavy-Duty Gasoline Vehicle (8,501 to > 60,000 Pounds GVWR)
LDDV: Light-Duty Diesel Vehicle (Passenger Cars)

LDDT: Light-Duty Diesel Truck (0–8,500 Pounds GVWR)
HDDV: Heavy-Duty Diesel Vehicle (8,501 to > 60,000 Pounds GVWR)
MC: Motorcycles (Gasoline)

C.1.1.1 Site Grading Phase

6.1.1.1.1 Assumptions

Average days worked per week: 5

Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Scrapers Composite	3	8
Tractors/Loaders/Backhoes Composite	3	8

Vehicle Exhaust

Average Hauling Truck Capacity (cubic yards): 20
Average Hauling Truck Round Trip Commute (miles): 20

Vehicle Exhaust Vehicle Mixture (%)

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

Worker Trips

Average Worker Round Trip Commute (miles): 20

Worker Trips Vehicle Mixture (%)

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

6.1.1.1.2 Emission Factors

Construction Exhaust Emission Factors (pounds/hour)

Excavators Composite								
	VOC	**SO_X**	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2e**
Emission Factors	0.0559	0.0013	0.2269	0.5086	0.0086	0.0086	0.0050	119.70
Graders Composite								
	VOC	**SO_X**	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_X**	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_X**	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Scrapers Composite								
	VOC	**SO_X**	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2e**
Emission Factors	0.1495	0.0026	0.8387	0.7186	0.0334	0.0334	0.0134	262.81
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_X**	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

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

	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
LDGV	000.192	000.002	000.099	002.870	000.004	000.004	000.000	000.024	00303.869
LDGT	000.209	000.003	000.175	003.239	000.006	000.005	000.000	000.026	00396.310
HDGV	000.856	000.006	000.851	013.446	000.024	000.021	000.000	000.051	00912.039
LDDV	000.074	000.001	000.080	003.109	000.003	000.002	000.000	000.008	00307.078
LDDT	000.081	000.001	000.120	002.137	000.003	000.003	000.000	000.009	00358.668
HDDV	000.118	000.004	002.424	001.549	000.042	000.039	000.000	000.032	01234.892
MC	002.457	000.003	000.660	012.092	000.022	000.020	000.000	000.054	00389.894

6.1.1.1.3 Formulas

Fugitive Dust Emissions per Phase

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

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

Construction Exhaust Emissions per Phase

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

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

Vehicle Exhaust Emissions per Phase

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

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

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

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

Worker Trips Emissions per Phase

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

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

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

C.1.1.2 Trenching/Excavating Phase

6.1.1.1.4 Assumptions

Average Days worked per week: 5

Construction Exhaust

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

Vehicle Exhaust

Average Hauling Truck Capacity (cubic yards): 20
Average Hauling Truck Round Trip Commute (miles): 20

Vehicle Exhaust Vehicle Mixture (%)

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

Worker Trips

Average Worker Round Trip Commute (miles): 20

Worker Trips Vehicle Mixture (%)

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

6.1.1.1.5 Emission Factors

Construction Exhaust Emission Factors (pounds/hour)

Excavators Composite								
	VOC	**SO_X**	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2e**
Emission Factors	0.0559	0.0013	0.2269	0.5086	0.0086	0.0086	0.0050	119.70
Graders Composite								
	VOC	**SO_X**	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2e**
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89
Other Construction Equipment Composite								
	VOC	**SO_X**	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2e**
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
Rubber Tired Dozers Composite								
	VOC	**SO_X**	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Scrapers Composite								
	VOC	**SO_X**	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2e**
Emission Factors	0.1495	0.0026	0.8387	0.7186	0.0334	0.0334	0.0134	262.81
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_X**	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

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

	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
LDGV	000.192	000.002	000.099	002.870	000.004	000.004	000.000	000.024	00303.869
LDGT	000.209	000.003	000.175	003.239	000.006	000.005	000.000	000.026	00396.310
HDGV	000.856	000.006	000.851	013.446	000.024	000.021	000.000	000.051	00912.039
LDDV	000.074	000.001	000.080	003.109	000.003	000.002	000.000	000.008	00307.078
LDDT	000.081	000.001	000.120	002.137	000.003	000.003	000.000	000.009	00358.668
HDDV	000.118	000.004	002.424	001.549	000.042	000.039	000.000	000.032	01234.892
MC	002.457	000.003	000.660	012.092	000.022	000.020	000.000	000.054	00389.894

6.1.1.1.6 Formulas

Fugitive Dust Emissions per Phase

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

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

Construction Exhaust Emissions per Phase

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

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

Vehicle Exhaust Emissions per Phase

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

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

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

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

Worker Trips Emissions per Phase

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

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

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

C.1.1.3 Building Construction Phase

6.1.1.1.7 Assumptions

Average Days worked per week: 5

Construction Exhaust

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

Vehicle Exhaust

Average Hauling Truck Round Trip Commute (miles): 20

Vehicle Exhaust Vehicle Mixture (%)

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

Worker Trips

Average Worker Round Trip Commute (miles): 20

Worker Trips Vehicle Mixture (%)

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

Vendor Trips

Average Vendor Round Trip Commute (miles): 40

Vendor Trips Vehicle Mixture (%)

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

6.1.1.1.8 Emission Factors

Construction Exhaust Emission Factors (pounds/hour)

Cranes Composite								
	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2e
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2e
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2e
Emission Factors	0.0287	0.0006	0.2329	0.2666	0.0080	0.0080	0.0025	61.057

	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872
	VOC	**SO_X**	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**	**CH_4**	**CO_2e**
Emission Factors	0.0214	0.0003	0.1373	0.1745	0.0051	0.0051	0.0019	25.650

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

	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
LDGV	000.192	000.002	000.099	002.870	000.004	000.004	000.000	000.024	00303.869
LDGT	000.209	000.003	000.175	003.239	000.006	000.005	000.000	000.026	00396.310
HDGV	000.856	000.006	000.851	013.446	000.024	000.021	000.000	000.051	00912.039
LDDV	000.074	000.001	000.080	003.109	000.003	000.002	000.000	000.008	00307.078
LDDT	000.081	000.001	000.120	002.137	000.003	000.003	000.000	000.009	00358.668
HDDV	000.118	000.004	002.424	001.549	000.042	000.039	000.000	000.032	01234.892
MC	002.457	000.003	000.660	012.092	000.022	000.020	000.000	000.054	00389.894

6.1.1.1.9 Formulas

Construction Exhaust Emissions per Phase

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

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

Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (square feet)
BH: Height of Building (feet)
(0.42 / 1000): Conversion Factor cubic feet to trips (0.42 trip / 1,000 cubic feet)
HT: Average Hauling Truck Round Trip Commute (miles/trip)

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

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

Worker Trips Emissions per Phase

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

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

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

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Vendor Trips Emissions per Phase

VMT_{VT} = BA * BH * (0.38 / 1000) * HT
VMT_{VT}: Vendor Trips Vehicle Miles Travel (miles)
BA: Area of Building (square feet)
BH: Height of Building (feet)
(0.38 / 1000): Conversion Factor cubic feet to trips (0.38 trip / 1,000 cubic feet)
HT: Average Hauling Truck Round Trip Commute (miles/trip)

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

C.1.1.4 Architectural Coatings Phase

6.1.1.1.10 Assumptions

Average Days worked per week: 5

Worker Trips

Average Worker Round Trip Commute (miles): 20

Worker Trips Vehicle Mixture (%)

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

6.1.1.1.11 Emission Factors

Worker Trips Emission Factors (grams/mile)

	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
LDGV	000.192	000.002	000.099	002.870	000.004	000.004	000.000	000.024	00303.869
LDGT	000.209	000.003	000.175	003.239	000.006	000.005	000.000	000.026	00396.310
HDGV	000.856	000.006	000.851	013.446	000.024	000.021	000.000	000.051	00912.039
LDDV	000.074	000.001	000.080	003.109	000.003	000.002	000.000	000.008	00307.078
LDDT	000.081	000.001	000.120	002.137	000.003	000.003	000.000	000.009	00358.668
HDDV	000.118	000.004	002.424	001.549	000.042	000.039	000.000	000.032	01234.892
MC	002.457	000.003	000.660	012.092	000.022	000.020	000.000	000.054	00389.894

6.1.1.1.12 Formulas

Worker Trips Emissions per Phase

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

800: Conversion Factor square feet to man days (1 square foot / 1 man * day)

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

Off-Gassing Emissions per Phase

VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0
VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (square feet)
2.0: Conversion Factor total area to coated area (2.0 square foot coated area / total area)
0.0116: Emission Factor (pounds/square foot)
2000: Conversion Factor pounds to tons

C.1.1.5 Paving Phase

6.1.1.1.13 Assumptions

Average Days worked per week: 5

Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	8
Rollers Composite	2	6

Vehicle Exhaust

Average Hauling Truck Round Trip Commute (miles): 20

Vehicle Exhaust Vehicle Mixture (%)

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

Worker Trips

Average Worker Round Trip Commute (miles): 20

Worker Trips Vehicle Mixture (%)

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

6.1.1.1.14 Emission Factors

Construction Exhaust Emission Factors (pounds/hour)

Excavators Composite								
	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2e
Emission Factors	0.0559	0.0013	0.2269	0.5086	0.0086	0.0086	0.0050	119.70
	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2e
Emission Factors	0.0676	0.0014	0.3314	0.5695	0.0147	0.0147	0.0061	132.89

	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2e
Emission Factors	0.0442	0.0012	0.2021	0.3473	0.0068	0.0068	0.0039	122.60
	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2e
Emission Factors	0.1495	0.0026	0.8387	0.7186	0.0334	0.0334	0.0134	262.81
	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

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

	VOC	SO_x	NO_x	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
LDGV	000.192	000.002	000.099	002.870	000.004	000.004	000.000	000.024	00303.869
LDGT	000.209	000.003	000.175	003.239	000.006	000.005	000.000	000.026	00396.310
HDGV	000.856	000.006	000.851	013.446	000.024	000.021	000.000	000.051	00912.039
LDDV	000.074	000.001	000.080	003.109	000.003	000.002	000.000	000.008	00307.078
LDDT	000.081	000.001	000.120	002.137	000.003	000.003	000.000	000.009	00358.668
HDDV	000.118	000.004	002.424	001.549	000.042	000.039	000.000	000.032	01234.892
MC	002.457	000.003	000.660	012.092	000.022	000.020	000.000	000.054	00389.894

6.1.1.1.15 Formulas

Construction Exhaust Emissions per Phase

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

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

Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (square feet)
0.25: Thickness of Paving Area (feet)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 cubic yard / 27 cubic feet)
HC: Average Hauling Truck Capacity (cubic yards)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC cubic yard)
HT: Average Hauling Truck Round Trip Commute (miles/trip)

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

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

Worker Trips Emissions per Phase

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

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Workdays (days)
WT: Average Worker Round Trip Commute (miles)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

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

Off-Gassing Emissions per Phase

$VOC_P = (2.62 * PA) / 43,560$
VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (pounds/acre)
PA: Paving Area (square feet)
43560: Conversion Factor square feet to acre (43,560 square feet / acre)^2 / acre)

C.1.2 Construction and Improvements Air Emissions Analysis

Action Location

State: New Mexico
County: Doña Ana, Otero, Socorro
Regulatory Areas: Not in a Regulatory Area

Construction Period

Start: January 2024
End: December 2025

C.1.2.1 Action Description

The Proposed Action is to construct and improve facilities and designate existing training areas to support SOF-TEC operations at WSMR. Construction and improvements analyzed include constructing barracks and mobile wash facilities at Main Post, constructing a permanent wash and laundry facility at Main Post, constructing a vehicle wash rack east of Main Post, and renovation of North Oscura Peak buildings for a bivouac area. Training activities analyzed include maneuver live fire training within Mountain Village, maneuver fire with simunition within Mountain and Yucca Villages and Lee and Thurgood Sites, and CEMA exercises in Mountain Village and Yucca Village.

For the purposes of this analysis, the following assumptions were used (1) construction and improvements would occur over a 2-year period from 2024 through 2025, (2) if required, a heat pump or electric heating system will be installed at the to supply heat, natural gas-, propane-, or oil-fired heaters would not be used, and (3) no emergency generators or other stationary sources of air emissions would be required.

6.1.1.1.16 Construction of Barracks and Mobile Wash Facilities at Main Post

The facilities would be constructed over a 24-month period from January 2024 through December 2025.

Site grading would occur on approximately 2.79 acres (121,532 square feet). Site grading would begin in January 2024 and last approximately 6 months. It was assumed 6,000 cubic yards of soil would be hauled on-site for the building foundation.

Trenching would be required for utility lines (approximately 500 linear feet). A 3-foot trench width was assumed. Therefore, the total trenched area would be 1,500 square feet. Trenching would begin in July 2024 and last approximately 2 months.

Construction would include the approximately 176,000-square foot, 3-story barracks for a maximum of 480 soldiers. Construction would begin in September 2024 and last approximately 15 months.

Architectural coatings would be applied to the new facility (176,000 square feet). Coating application would begin in December 2025 and last approximately 1 month.

6.1.1.1.17 Construction of Permanent Wash and Laundry Facility at Main Post

The facility would be constructed over a 24-month period from January 2024 through December 2025.

Site grading would occur on approximately 0.8 acres (34,848 square feet). Site grading would begin in January 2024 and last approximately 8 months. It was assumed no materials are required to be hauled on- or off-site due to site grading or trenching; excavated spoils will be used on-site.

Construction would include the approximately 34,848-square foot facility. The height of the building was assumed to be 12 feet. Construction would begin in September 2024 and last approximately 15 months.

Architectural coatings would be applied to the new facility (34,848 square feet). Coating application would begin in December 2025 and last approximately 1 month.

6.1.1.1.18 Construction of a Vehicle Wash Rack East of Main Post

The facility would be constructed over a 24-month period from January 2024 through December 2025.

Site grading would occur on approximately 0.98 acres (42,689 square feet). Site grading would begin in January 2024 and last approximately 8 months. It was assumed no materials are required to be hauled on- or off-site due to site grading or trenching; excavated spoils will be used on-site.

Trenching would be required for the entire site to prepare for installation of concrete and the closed water collection system, for a total of 42,689 square feet. Trenching would begin in September 2024 and last approximately 8 months.

Paving for the wash rack would occur on approximately 42,689 square feet. Paving would begin in May 2025 and last approximately 8 months.

6.1.1.1.19 Renovation of NOP Buildings for Bivouac Area

The buildings would be renovated over a 24-month period from January 2024 through December 2025.

The total square footage of the buildings is approximately 10,500 square feet. It was assumed 25 percent of the total square footage of the buildings (25 percent of 10,500 square feet = 2,625

square feet) is construction and was used to equate the renovations. Construction would begin in January 2024 and last approximately 24 months.

C.1.2.2 Assumptions

6.1.1.1.20 Construction of Barracks and Mobile Wash Facilities at Main Post

Site Grading Phase
Start: January 2024
Phase duration: 6 months
Area of site to be graded (square feet): 121,532
Amount of material to be hauled onsite (cubic yards): 6,000

Trenching/Excavating Phase
Start: July 2024
Phase duration: 2 months
Area of site to be trenched/excavated (square feet): 1,500
Amount of material to be hauled on or offsite (cubic yards): 0

Building Construction Phase
Start: September 2024
Phase duration: 15 months
Area of building (square feet): 176,000
Number of Units: 480

Architectural Coatings Phase
Start: December 2025
Phase duration: 1 month
Total square footage (square feet): 176,000

6.1.1.1.21 Construction of Permanent Wash and Laundry Facility at Main Post

Site Grading Phase
Start: January 2024
Phase duration: 8 months
Area of site to be graded (square feet): 34,848
Amount of material to be hauled offsite (cubic yards): 0

Building Construction Phase
Start: September 2024
Phase duration: 15 months
Area of building (square feet): 34,848
Height of building (feet): 12

Architectural Coatings Phase
Start: December 2025
Phase duration: 1 month
Total square footage (square feet): 34,848

6.1.1.1.22 Construction of a Vehicle Wash Rack East of Main Post

Site Grading Phase
Start: January 2024

Phase duration: 8 months
Area of site to be graded (square feet): 42,689
Amount of material to be hauled offsite (cubic yards): 0

Trenching/Excavating Phase
Start: September 2024
Phase duration: 8 months
Area of site to be trenched/excavated (square feet): 42,689
Amount of material to be hauled on or offsite (cubic yards): 0

Paving Phase
Start: May 2025
Phase duration: 8 months
Paving area (square feet): 42,689

6.1.1.1.23 Renovation of North Oscura Peak Buildings for Bivouac Area

Building Construction Phase
Start: January 2024
Phase duration: 24 months
Area of building (square feet): 2,625
Height of building (feet): 12

C.1.2.3 Construction and Improvements Emissions Summary

Proposed Action Total Estimated Construction Emissions – Construction of Barracks and Mobile Wash Facilities at Main Post (tons)

	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
Emissions	2.578366	0.009666	3.114388	4.11114	7.399778	0.115818	0	0.00273	943.7

Proposed Action Total Estimated Construction Emissions – Construction of Permanent Wash and Laundry Facility at Main Post (tons)

	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
Emissions	0.89733	0.008787	2.884258	3.728224	2.881115	0.107661	0	0.00251	858.5

Proposed Action Estimated Operations Emissions – Construction of a Vehicle Wash Rack East of Main Post (tons)

	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
Emissions	0.502801	0.008851	2.716496	3.735856	6.907552	0.112775	0	0.001925	855.8

Proposed Action Estimated Operations Emissions – Renovation of North Oscura Peak Buildings for Bivouac Area (tons)

	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
Emissions	0.236401	0.004826	1.205351	2.011813	0.040278	0.040218	0	0.001451	463.6

Proposed Action Total Estimated Construction Emissions by Year (tpy)

	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
2024	0.964	0.018	5.436	6.954	15.357	0.204	0.000	0.004	1743.4
2025	3.251	0.014	4.484	6.633	1.871	0.173	0.000	0.005	1378.4
2026 (steady state)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

C.2 BUILDING OPERATION

C.2.1 Methodology

6.1.1.1.24 Assumptions

Operations would include heating/cooling of new the facilities. It was assumed only the new permanent facilities (i.e., barracks and wash and laundry facility) would have permanent heating system and the renovated buildings at North Oscura Peak would not require new heating systems. If required, a heat pump or electric heating system will be installed at the temporary mobile wash facility to supply heat. Heating would not be required for the vehicle wash rack east of Main Post.

6.1.1.1.25 Emission Factors

Heating Emission Factors (pounds/1,000,000 standard cubic feet)

VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6	0.0	0.0	120390

6.1.1.1.26 Formulas

Heating Fuel Consumption cubic feet per Year

FC_{HER}= HA * EI / HV / 1,000,000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (square feet)
EI: Energy Intensity Requirement (MMBtu/square foot)
HV: Heat Value (MMBTU/cubic foot)
1000000: Conversion Factor

Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

C.2.2 Operations Air Emissions Analysis

C.2.2.1 Heating of New Permanent Facilities

6.1.1.1.27 Action Description

Heating and cooling systems would be required for the barracks (176,000 square feet) and wash and laundry facility (34,848 square feet), for a total of 210,848 square feet. Boilers would be fueled by natural gas. It was assumed operation of the facilities would begin following the construction period, or starting in 2026.

6.1.1.1.28 Assumptions

Area of floorspace to be heated (square feet): 210,848
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hours)
Heat Value (MMBtu/cubic foot): 0.00105
Energy Intensity (MMBtu/square foot): 0.0781

6.1.1.1.29 Emissions Summary

Proposed Action Total Estimated Annual Facility Operations Emissions by Year (tpy)

	VOC	SO_X	NO_X	CO	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
2026 and later	0.043128	0.004705	0.784154	0.658689	0.059596	0.059596	0.000000	0.000000	944.0

C.3 TRAINING

C.3.1 Methodology

Live and simunition (blank, or inert) munitions would be used during maneuver training activities at a maximum rate of 20 rounds per exercise (80 rounds per year). Although blank munitions do not include a projectile, they still involve a combustion reaction and can produce air emissions. Emission factors for representative munitions were obtained from USEPA's AP-42 *Compilation of Air Pollutant Emissions Factors*. Emissions factors are provided in **Table C.3-1**. Emissions factors for the following munitions were used to estimate live fire and simunitions in this analysis:

Live fire: Department of Defense Identification Code (DODIC) A212, M2 .30 Caliber Ball Cartridge
Simunitions: DODIC A111, M82 7.62-mm Blank Cartridge

Emissions from munitions were calculated using the below equation. Available USEPA emissions factors (AP-42, *Compilation of Air Emissions Factors*) were used (USEPA 2008). **Table C.3-2** provides the detailed results of the calculated annual air emissions for each type of munition.

Pollutant Emissions = EF * Qty/2,000

Pollutant Emissions = emissions for the associated pollutant (tpy)
EF = emissions factor for the associated pollutant (pounds per item)
Qty = quantity (item per year)
2,000 = conversion factor from pounds to tons (1 ton = 2,000 pounds)

Table C.2-1. Munitions Emissions Factors

Munition Type	Pounds per item							
	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	Lead	CO_2e
0.30 Caliber Cartridge[1]	NA	0.000013	0.0030	NA	0.000094	0.000073	0.000018	0.0019
7.62 mm Blank Cartridge[2]	NA	0.000044	0.00068	0.00000035	0.000017	0.000015	0.0000026	0.00095

Key: CO – carbon monoxide; CO_2e – carbon dioxide equivalent; NA – not available; NO_X – nitrogen oxides; PM_{10} - less than or equal to 10 microns in diameter $PM_{2.5}$ – less than or equal to 2.5 microns in diameter; SO_X – sulfur oxides; VOC – volatile organic compound

Notes: [1] DODIC A212, M2 .30 Caliber Ball Cartridge used to represent live fire

[2] DODIC A111, M82 7.62-mm Blank Cartridge used to represent simunition (i.e., blank or inert) fire

Sources: USEPA 2008, DAC LRTAO 2021

C.3.2 Training Emissions Summary

Table C.2-2. Estimated Munitions Emissions from the Proposed Action

Proposed Action Munitions Type	Proposed Action Quantity[1]	Tons per year							
		VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	Lead	CO_2e
0.30 Caliber Cartridge[2]	80	NA	0.00000052	0.00012	NA	0.00000376	0.00000292	0.00000072	0.000076
7.62 mm Blank Cartridge[3]	80	NA	0.00000176	0.0000272	0.000000014	0.00000068	0.0000006	0.000000104	0.000038

Key: CO – carbon monoxide; CO_2e – carbon dioxide equivalent; NA – not available; NO_X – nitrogen oxides; PM_{10} - less than or equal to 10 microns in diameter $PM_{2.5}$ – less than or equal to 2.5 microns in diameter; SO_X – sulfur oxides; VOC – volatile organic compound

Notes: [1] The Proposed Action includes the firing of 80 rounds per year. Emissions for 100 percent live and 100 percent blank cartridge expenditures are provided; however, the 80 rounds per year would likely be a mix of both live and blank cartridges

[2] DODIC A212, M2 .30 Caliber Ball Cartridge used to represent live fire

[3] DODIC A111, M82 7.62-mm Blank Cartridge used to represent simunition (i.e., blank or inert) fire

Sources: USEPA 2008, DAC LRTAO 2021

References

U.S. Environmental Protection Agency (USEPA) 2008. Chapter 15.1: Ordnance Detonation, Small Cartridges <30 mm. In AP-42 Compilation of Air Pollutant Emissions Factors. February 2008. Available online: <https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors>. Accessed April 19, 2023.

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