Final

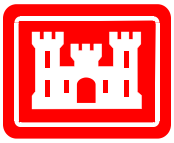
Work Plan
Inner Fence, Parcel 3
Revision 3.0

Fort Wingate Depot Activity
McKinley County, New Mexico

February 28, 2020

Contract No. W912BV-16-C-0033

Prepared for:



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DOCUMENT CERTIFICATION

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FEBRUARY 2020

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The document presents the organization structure, personnel responsibilities, communication, technical procedures for implementing the subsurface MEC removal action from the Inner Fence area.

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FORT WINGATE DEPOT ACTIVITY
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List of Acronyms

AECOM	AECOM Technical Services, Inc.
AOC	Area of Concern
AMSL	Above Mean Sea Level
APP	Accident Prevention Plan
AR	Department of the Army Regulation
Army	United States Army
ATF	Alcohol, Tobacco and Firearms
bgs	Below Ground Surface
BMDO	Ballistic Missile Defense Office
BIP	Blown in Place
BLU	Bomb Live Unit
BRAC	Base Realignment and Closure
CAMU	Corrective Action Management Unit
CE	Conditional Exemption
CFR	Code of Federal Regulations
COC	Chain of Custody
COPEC	Contaminant of Potential Ecological Concern
COR	Contracting Officer's Representative
DA	Department of Army
DAF	Dilution Attenuation Factor
DDESB	Department of Defense Explosives Safety Board
DGM	Digital Geophysical Mapping
DHSR	Daily Health and Safety Report
DID	Data Item Description
DoD	Department of Defense
DOI	Department of the Interior
DQCR	Daily Quality Control Report
DSR	Daily Site Report
ECM	Earth Covered Magazine
EM	Engineer Manual
ENG	Engineering

EPC	Exposure Point Concentration
ESL	Ecological Screening Level
ESS	Explosive Safety Submission
ER	Engineer Regulation
EZ	Exclusion Zone
FWDA	Fort Wingate Depot Activity
ft	Foot/Feet
GIS	Geographic Information System
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Operations and Emergency Response
HE	High-Explosive
HNC	Huntsville Center
H&S	Health and Safety
HTRW	Hazardous, Toxic, and Radioactive Waste
HWMU	Hazardous Waste Management Unit
Hz	Hertz
IAW	In Accordance With
ICM	Improved Conventional Munitions
ID	Identification
ISO	Industry Standard Object
ITRC	Interstate Technology and Regulatory Council
ITS	Instrument Test Strip
IVS	Instrument Verification Strip
KO	Contracting Officer
KOA	Kickout Area
MC	Munitions Constituent
MD	Munitions Debris
MDAS	Material Documented As Safe
MDEH	Material Documented as an Explosive Hazard
MEC	Munitions and Explosives of Concern
mm	Millimeter
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard

MRS	Munition Response Site
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MSD	Minimum Separation Distance
NAD83	North American Datum 1983
NAVD88	North American Vertical Datum 1988
NEW	Net Explosive Weight
NFA	No Further Action
NM	New Mexico
NMED	New Mexico Environment Department
NMSHPO	New Mexico State Historic Preservation Office
NN	Navajo Nation
No.	Number
NOAEL	No-Observed-Adverse-Effect Level
NONEL	Nonelectric
OB/OD	Open Burn/Open Detonation
OE	Ordnance and Explosives
OESS	Ordnance and Explosives Safety Specialist
OSHA	Occupational Safety and Health Administration
PAM	Pamphlet
PM	Project Manager
POC	Point of Contact
POZ	Pueblo of Zuni
PPE	Personal Protective Equipment
PWS	Performance Work Statement
QA	Quality Assurance
QASP	Quality Assurance Surveillance Plan
QC	Quality Control
QCP	Quality Control Plan
RA	Removal Action
RCRA	Resource Conservation Recovery Act
RRD	Range-Related Debris
RSL	Regional Screening Level
RTK	Real-Time Kinematic

SLERA	Screening Level Ecological Risk Assessment
SOP	Standard Operating Procedures
SSHP	Site Safety and Health Plan
SSL	Soil Screening Level
SUXOS	Senior UXO Supervisor
SWMU	Solid Waste Management Unit
TM	Technical Manual
TP	Technical Paper
TRV	Toxicity Reference Value
UCL	Upper Confidence Limit
U.S.	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTL	Upper Tolerance Limit
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOQP	UXO Qualified Personnel
UXOSO	UXO Safety Officer
UXOTII	UXO Technician II
UXOTIII	UXO Technician III
VOC	Volatile Organic Compound
WMM	Waste Military Munitions
WP	Work Plan

1.1 PROJECT AUTHORIZATION

In accordance with (IAW) Contract Number W912BV-16-C-0033, AECOM Technical Services, Inc. (AECOM) will conduct a subsurface removal action (RA) of waste military munitions (WMM) and WMM scrap from the Inner Fence Area of the Fort Wingate Depot Activity (FWDA) Kickout Area (KOA) Munitions Response Site (MRS). The location of FWDA is shown on **Figure 1-1** and the Inner Fence Area is shown on **Figure 1-2**. Throughout this Work Plan (WP), WMM and WMM scrap will be referred to as Munitions and Explosives of Concern (MEC), Unexploded Ordnance (UXO) including Improved Conventional Munitions (ICM), Material Potentially Presenting an Explosive Hazard (MPPEH), Material Documented as an Explosive Hazard (MDEH), and/or Munitions Debris (MD). This WP is written for the United States (U.S.) Army (Army) in order to comply with and implement the FWDA Resource Conservation Recovery Act (RCRA) Permit Number NM6213820974 and follows the New Mexico Environment Department (NMED)-approved Final WP, Munitions and Explosives of Concern Removal and Surface Clearance Kickout Area (PIKA 2015a). AECOM will perform this work under the direction of the U.S. Army Corps of Engineers (USACE) Tulsa District and USACE Fort Worth District to implement the Army's Base Realignment and Closure (BRAC) mission to close FWDA and revert this property to the Department of the Interior (DOI). An Explosive Safety Submission (ESS) has been prepared and approved for use at the KOA, including the Inner Fence Area (PIKA 2015b). A Deviation Approval and Risk Acceptance Document has been prepared and submitted to USACE for staffing and approval according to Army and Department of Defense (DoD) policy.

This WP was developed IAW USACE Engineer Manual (EM) 200-1-15, EM 385-1-97, Change 1, and the FWDA RCRA Permit (dated December 2005 and revised in 2014). This chapter identifies the site setting and background information for the KOA (and Inner Fence Area) and describes the methods and procedures to be employed for the MEC RA.

1.2 PROJECT PURPOSE AND SCOPE

The purpose of this WP is to provide a detailed description of the subsurface MEC RA activities that will take place at the Inner Fence Area within the KOA MRS. This RA project is being undertaken to locate, identify, and remove MEC and MPPEH (to include MD and range-related debris [RRD]) from the designated area within the KOA and IAW the NMED issued RCRA Permit No. NM6213820974. Applicable sections of the Permit include: IV.A, IV.B, IV.C, IV.D, IV.F, VIII.B.1, and IX. All activities involving work in areas potentially containing MEC will be conducted in full compliance with the USACE, the U.S. Environmental Protection Agency (USEPA), the DoD Explosives Safety Board (DDESB), and other applicable DoD requirements regarding personnel, equipment, and procedures. The cleanup criteria (with respect to size) for the Inner Fence Area RA will be all MEC (regardless of size) and metallic debris 1.5 inches by 3 inches or larger (approved criteria per NMED email dated March 17, 2014 [**Appendix A]**).

The KOA is defined in the NMED RCRA permit as: "Kickout Area means the combined area of land adjacent to the Open Burn (OB)/Open Detonation (OD) Unit, Solid Waste Management

Unit (SWMU) 14 (Demolition Landfill and Old Burning Ground), SWMU 15 (Old Demolition Area) and SWMU 33 ("Waste Pile" KP1) to which WMM were released during the operation of the OB/OD Unit and to which solid wastes were released during their operation of SWMU 14. The KOA is described in Permit Attachment 1." The OB/OD Unit according to the permit is the Hazardous Waste Management Unit (HWMU). The Inner Fence Area is not mentioned in the permit; however, it lies within the KOA boundary and is therefore part of the KOA.

RA activities within the Inner Fence Area will be initiated following acceptance of this WP. The results and data generated from the work performed under this WP will be presented in a Permit Section IV.D final report for review.

1.2.1 RCRA Permit Compliance

RCRA Permit Section IV, Alternative Requirements for the KOA, provides the regulatory guidance for the Army's remediation of WMM and WMM scrap. This section provides an overview of how this WP implements this section of the Permit.

1.2.1.1 Section IV.A Confirmation of Kickout Area

The Army has complied with Section IV.A of the RCRA permit by defining and identifying the outer boundary of the KOA in 2009 (PIKA 2009). The KOA as defined in the accepted report is shown on **Figure 1-2**.

1.2.1.2 Section IV.B Surface Clearance in the Kickout Area

The Army has complied with Section IV.B of the RCRA permit to conduct investigations and removal of WMM from the surface of the inner fence areas readily accessible by foot without the use of safety equipment on the steep slopes. At this time, it is the Army's intent to retain this property. A KOA clearance report is being written that describes how the Army used the best available technology, applied by trained and qualified personnel, using geophysical equipment to conduct the investigation and surface clearance of the Inner Fence Area located in the south central part of Parcel 3 as depicted on **Figure 1-2**.

1.2.1.3 Section IV.C Clearance of Designated Areas

This WP provides the details necessary for the Army to conduct investigations and removal of WMM and WMM scrap from archaeological sites and cultural resource areas (collectively referred to as designated areas) and provide details for the on-going protection of unknown cultural resources in the Inner Fence Area. Both Tribes will be consulted during the development of this WP and will continue to be an integral part of the team investigating and removing the WMM and WMM scrap from these designated areas.

1.2.1.4 Section IV.D Kickout Area Clearance Report

Within 180 days of the completion of the KOA investigation, clearance, and removal of WMM and WMM scrap from the KOA, the Army will provide the NMED a report summarizing the results of this work. In addition to presenting NMED the findings and conclusions of the investigation and clearances, this report may contain recommendations for the KOA. **Section 2.5** of this WP provides details of the content of this report.

1.2.1.5 Section IV.E Annual Inspection and Removal

This WP does not contain the annual inspection and removal details as these will be provided by the Army at a later date.

1.2.1.6 Section IV.F Transfer of Lands Within the Kickout Area

It is the Army's intent and mission to eventually return, if possible, all of the property in Parcel 3 (which includes the land within the KOA) to the DOI. To accomplish this, the Army has written this WP to fully comply with this section of the Permit. This WP explains that the Army is using the best available technology, applied by trained and qualified personnel, using geophysical equipment to conduct this investigation and clearance of 100% of the detected anomalies to the detection depths of the equipment in the KOA (depicted on **Figure 1-2**).

1.3 INVESTIGATION AND CLEARANCE SUMMARY

The following section of this WP explains how the Army is using the best available technology, applied by trained and qualified personnel, using geophysical equipment to conduct this investigation and clearance of 100% of the anomalies meeting the NMED approved clearance criteria (MEC [regardless of size] and metallic debris measuring 1.5 inches by 3 inches or larger), where these investigations and clearances will occur. MEC and confirmed MPPEH items located at the site will be destroyed through explosive demolition operations. MEC determined acceptable to move will be moved to one of the earth covered magazines (ECMs) in Block B or the 10-day Corrective Action Management Unit (CAMU) permitted temporary storage area for later destruction at the CAMU IAW this WP. In the event such items are determined unacceptable to move, they will be blown in place (BIP) IAW this WP. The team will store donor explosives in the ECMs in Block B for the project.

Discovered MPPEH will be reclassified as MDEH or Material Documented as Safe (MDAS) if certified as free of explosives. MPPEH and MD inspection, handling, and final disposition as MDAS will be conducted IAW USACE EM 385-1-97, Change 1, DoD 4140.62, and DoD 6055.09-M as detailed in **Section 3.7.9.2**. All MDEH will be destroyed using authorized disposal procedures. All MDAS recovered at KOA will be delivered to a metal recycler to be smelted following completion of the RA.

1.4 WORK PLAN ORGANIZATION

The WP consists of five sections:

- **Section 1:** Introduction
- **Section 2:** Technical Management Plan
- **Section 3:** Field Investigation Plan, provides the details of the surface and subsurface investigations and clearance of the Inner Fence Area, excluding the Areas of Concern (AOCs) and SWMUs
- **Section 4:** Quality Control (QC) Plan (QCP), provides the Quality Assurance (QA)/QC procedures for documentation of the MEC RA
- **Section 5:** References

The WP also contains two appendices:

- **Appendix A:** Correspondence
- **Appendix B:** Response to Comments

1.5 PROJECT LOCATION

FWDA is located in northwestern New Mexico in McKinley County, approximately seven miles east of Gallup, New Mexico. FWDA currently occupies approximately 24 square miles (15,277 acres) of land with facilities formerly used to operate a reserve storage facility providing for the care, preservation, and minor maintenance of assigned commodities–primarily conventional military munitions. The terrain is best described as gentle hills to steep inaccessible terrain, with mixed pine and hardwood forests. McKinley County, bisected by the Continental Divide, encompasses the scenic Chuska and Zuni Mountains with peaks ranging up to 8,969 feet (ft) at the summit of Cerros de Alejandro. FWDA is located within the Zuni Mountains. The elevation at FWDA ranges from 6,500 ft above mean sea level (amsl) to 8,250 ft amsl with terrain ranging from rolling hills to impassable sheer cliffs and deep arroyos. The project location is shown on **Figure 1-1**.

1.5.1 Climate and Vegetation

The following information regarding the site conditions at the FWDA is from the United States Geological Survey (USGS) Report 2013-5098 15 (Robertson et al., 2013). The climate of the region is arid to semiarid; precipitation has averaged 11.9 inches at FWDA (1940 to 1966); 11.3 inches at Gallup, New Mexico (1921 to 2005); and, 18.7 inches at McGaffey, New Mexico (1923 to 2005), in the Zuni Mountains. The majority of the precipitation at the FWDA occurs during the monsoon season (midsummer and early fall); however, the slow release of spring snowmelt provides for a higher percentage of infiltration as compared to the precipitation from the intense monsoon thunderstorms (Anderson and others, 2003). The regional climate supports

Ponderosa Pine and mixed fir forests above 7,500 ft and predominantly piñon and juniper forests from 6,800 to 7,500 ft; shrubs and grasses dominate below 6,800 ft.

1.5.2 Regional Geology

The following information regarding the site conditions at the FWDA is from USGS Report 2013-5098 15 (Robertson et al., 2013). The FWDA is located in the Navajo Section of the Colorado Plateau physiographic region within the Gallup sag and at the northwestern edge of the Zuni Mountains (Zuni uplift). The Zuni uplift is a northwest-striking, asymmetric uplift. The uplift gently tilted the bedrock underlying the majority of the FWDA to the northwest at an angle of approximately five degrees from horizontal; subsequent erosion has exhumed the various Triassic sedimentary layers visible across the surface of the FWDA.

The dominant topographic and structural feature at the FWDA is the Nutria monocline, known locally as "The Hogback". The Nutria monocline is a north-northwest to south-southeast trending monocline that dips steeply to the south-southwest and defines the west and southwest margin of the Zuni uplift. The northern boundary of the FWDA terminates in the strike valley (a valley that is eroded parallel to the strike of the underlying rock formations) of the South Fork of the Rio Puerco. This valley represents the transition between the Zuni uplift to the south and the Chaco slope to the north.

Granites and smaller amounts of schist and gneiss of Precambrian age compose the underlying basement formation of the region and are exposed in the Zuni Mountains to the southeast. The preservation of sedimentary deposits now visible at the surface on the FWDA began in the Late Pennsylvanian epoch; the depositional environment changed from marine to continental and restricted marine by the Early Permian period. The Petrified Forest Formation of the Chinle Group is the dominant formation exposed at FWDA and can be up to 800 ft thick. The Petrified Forest Formation is composed of the Blue Mesa, Sonsela, and Painted Desert members. The Chinle Group was elevated from formation to group status, but this change has not been fully accepted. The Chinle Group designation is used for purposes of this report.

1.5.3 Surface Hydrology

The following information regarding the site conditions at the FWDA is from USGS Report 2013-5098 15 (Robertson et al. 2013). FWDA is located approximately 15 miles west of the Continental Divide. While no perennial streams are located within the FWDA's boundaries, the surface water collecting in drainages flows northward to the South Fork of the Rio Puerco. The South Fork of the Rio Puerco joins the Rio Puerco just east of Gallup and is part of the larger Rio Puerco and Little Colorado River watersheds. The FWDA contains multiple unnamed drainages that are high-gradient (100 ft/mile or greater) ephemeral streams and are typically fed by spring snowmelt or monsoon season thunderstorms.

1.5.4 Groundwater Hydrology

The following information regarding the site conditions at the FWDA is from USGS Report 2013-5098 15 (Robertson et al. 2013). There are several water-bearing units underlying the FWDA. These include the San Andres-Glorieta Formations, the Shinarump Formation, and the Sonsela Member and several thin sandstone beds within the Painted Desert Member of the Petrified Forest Formation, as well as the Quaternary alluvium. In the Administration Area, the Quaternary alluvium contains interbedded layers of sediments with variable moisture content in the vertical profile. Groundwater in the region has been produced from the Shinarump Formation and the Sonsela Member of the Petrified Forest Formation. Yields reported from these aquifers range from 5 to 50 gallons per minute.

The San Andres-Glorieta aquifer is the principal aquifer in the region. At the FWDA, the top of the San Andres-Glorieta aquifer is about 1,100 ft below land surface and has a thickness of about 200 ft. The San Andres-Glorieta aquifer is composed of the San Andres Limestone and the Glorieta Sandstone. The two units are considered a single aquifer because no impermeable bed separates them and extensive interfingering makes determination of the contact difficult.

1.6 KICKOUT AREA DESCRIPTION

The KOA totals 3,252 acres (approximately 2,729 are accessible with the exclusion of 523 acres designated too steep to access). The KOA is shown on **Figure 1-2**. The KOA encompasses all of Parcel 3 and parts of Navajo Trust Land (west of FWDA) and portions of Parcels 1, 2, & 20 (south, north, & east of Parcel 3, respectively). The KOA is defined in the NMED RCRA permit as: "Kickout Area means the combined area of land adjacent to the OB/OD Unit, SWMU 14 (Demolition Landfill and Old Burning Ground), SWMU 15 (Old Demolition Area) and SWMU 33 ("Waste Pile" KP1) to which WMM were released during the operation of the OB/OD Unit, and to which solid wastes were released during their operation of SWMU 14. The Kickout Area is described in Permit Attachment 1." The OB/OD Unit according to the permit is the HWMU. The Inner Fence Area, AOCs, and SWMUs not mentioned in the permit (such as 90, 91, and 92) lie within the KOA boundary, and are therefore part of the KOA. WMM in the KOA were expelled or "kicked out" during detonation activities.

For this WP, RA activities will include subsurface clearance of MEC, MD, and other metallic debris in the Inner Fence Area of the KOA only, associated activities specific to the CAMU for disposal efforts, and ECMs under conditional exemptions (CEs) for storage, as well as maintenance of the CAMU and ECMs. Reference to the KOA for this WP excludes all MEC/MD clearance of SWMUs 14, 15, 33, and 74, and AOCs 76, 89, 90, 91, and 92 located in the KOA.

1.7 FORT WINGATE DEPOT ACTIVITY HISTORY

The FWDA is located in McKinley County, New Mexico, approximately seven miles east of Gallup, New Mexico and currently occupies approximately 15,277 acres. The FWDA was

originally established by the Army in 1862. In 1918, the mission of the FWDA changed from tribal issues to World War I related activities. Beginning in 1940, the FWDA's mission was primarily to receive, store, maintain, and ship explosives and military munitions, as well as disassemble and dispose of unserviceable or obsolete explosives and other military munitions. In January 1993, the active mission of the FWDA ceased, and the installation closed as a result of the Defense Base Realignment and Closure Act of 1990. In 2005, environmental activities began under Permit USEPA identification (ID) Number (No.) New Mexico (NM) 6213820974 (FWDA RCRA Permit), which was finalized in December 2005 (NMED 2005). In 2014, Permit NM6213820974 was modified for activities in the CAMU located in Parcel 3. FWDA is currently undergoing final environmental characterization and restoration activities prior to final property transfer/return and reuse.

1.8 PREVIOUS INVESTIGATIONS AT FORT WINGATE DEPOT ACTIVITY

In 1995, UXB International, Inc. (under contract to USACE Huntsville District) conducted a MEC clearance to a depth of 1 ft in 512 grids, each measuring 100 ft x 200 ft along 6,600 ft of the western boundary (a portion of the proposed fence corridor) of Parcel 3. Sixty-nine live items were recovered and disposed of ranging from tracers to 90-millimeter (mm) high-explosive (HE) projectiles (models unknown). Most of the items were found on the surface or near surface. Eleven items found required BIP procedures. The munitions included five M83 fragmentation "Butterfly" bomblets, one 40mm HE projectile, two 75mm projectiles, one M66A1 base fuze, one 3.5-inch rocket fuze, and one base fuze/booster (model unknown).

From November 1998 to May 1999, Environmental Hazards Specialists International, Inc. (2000) performed MEC location and removal actions at FWDA. They conducted a surface removal action of 82, 200 ft x 200 ft grids, and a subsurface removal action to a depth of four feet below ground surface of 88 grids varying from 200 ft x 200 ft to irregular shape. Of the 337 items recovered, 32 were live. The 32 live items were seven 60mm mortars, one M404 fuze, three 57mm armor piercing HE, five 40mm projectiles, two 75mm projectiles, four 37mm projectiles, two M83 fragmentation "Butterfly" bomblets, one M1 burster, one miscellaneous fuze component, two M66 base detonating fuzes, and four M148 fuzes.

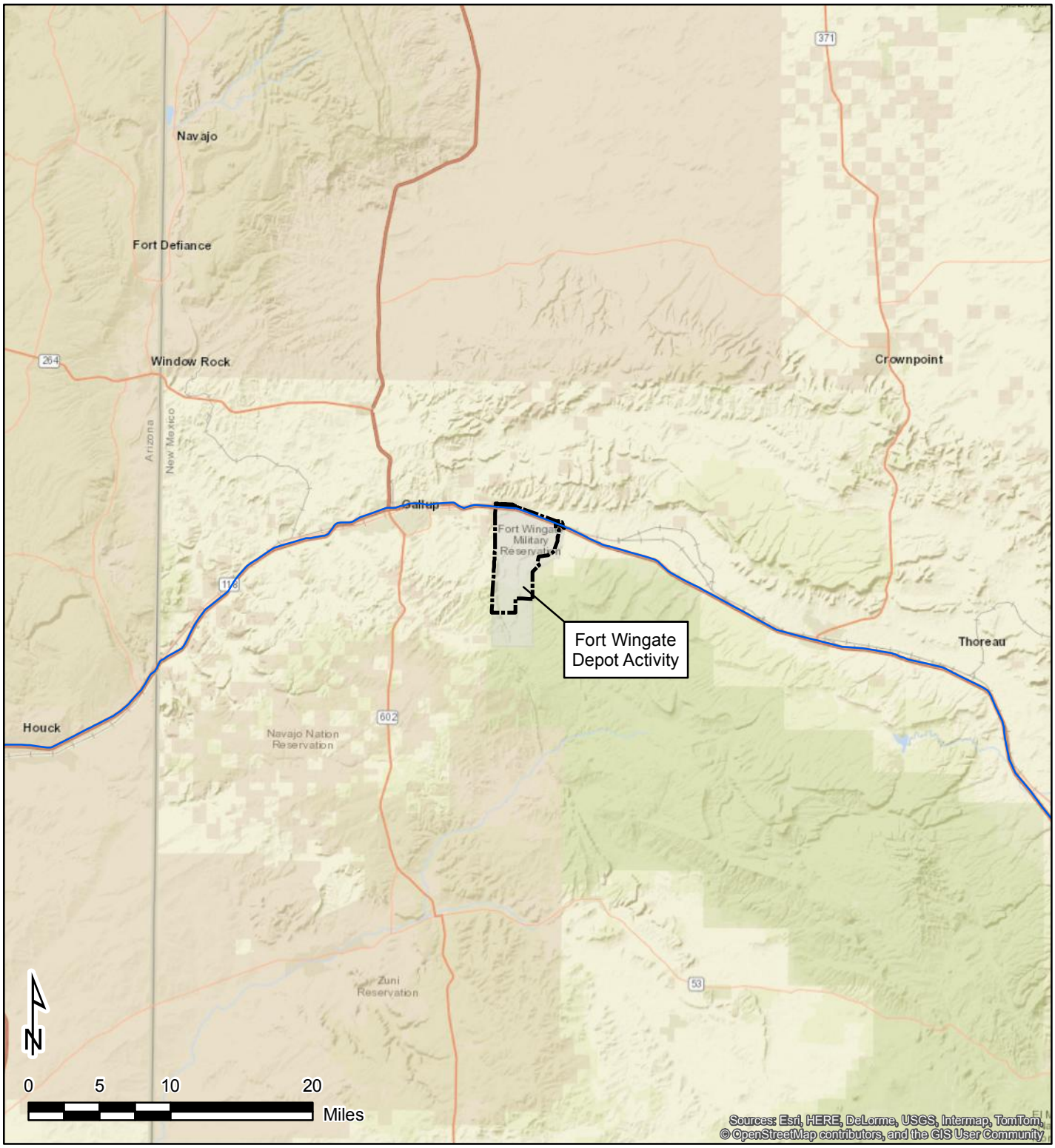
In 2001, USA Environmental, Inc., (for USACE Huntsville District, report dated January 11, 2002) performed MEC fence line construction support at FWDA, which included locating, identifying, and disposing of items.

In 2009, IAW the RCRA Permit Section IV.A, Confirmation of the KOA, the KOA outer boundary was delineated. This delineation established the estimated outer boundary by conducting radial transect investigations and adding 275 ft from the furthest detected WMM or WMM scrap. The Army provided NMED a Site Specific Final Report (PIKA 2009) to document this delineation. This Report was accepted by the USACE and approved by NMED. The present estimated KOA boundary includes Parcel 3, portions of Parcel 1 to the south, Parcel 2 to the north, and Parcel 20 to the east, as well as a segment of Trust Lands bordering the western side of the FWDA Facility.

In 2015, the PIKA-Pirnie Joint Venture began a removal action of WMM and WMM scrap from designated areas of the KOA, including the Inner Fence Area. A surface clearance of the Inner Fence Area is ongoing.

1.9 INITIAL SUMMARY OF MUNITIONS AND EXPLOSIVES OF CONCERN RISK

Parcel 3 is confirmed to contain ICMs. MEC items identified at the Parcel 3 project site include a wide range of MEC and MPPEH to include various ICMs (e.g., Bomb Live Unit (BLU)-3 and BLU-4 bomblets). Other munitions reportedly demolished in Parcel 3 KOA include M83(s), projectiles ranging from 20mm to 240mm, bombs ranging from 3 to 10,000 pounds, and assorted rockets, mortars, missiles, land mines, grenades, flares, and bulk explosives.



Legend

Installation Boundary

FWDA Location Map
Fort Wingate Depot Activity
McKinley County, New Mexico

Drawn By:	Date:	
JZ	10/5/2017	**Figure 1-1**
Checked By:	Project No.	
JC	60517380	

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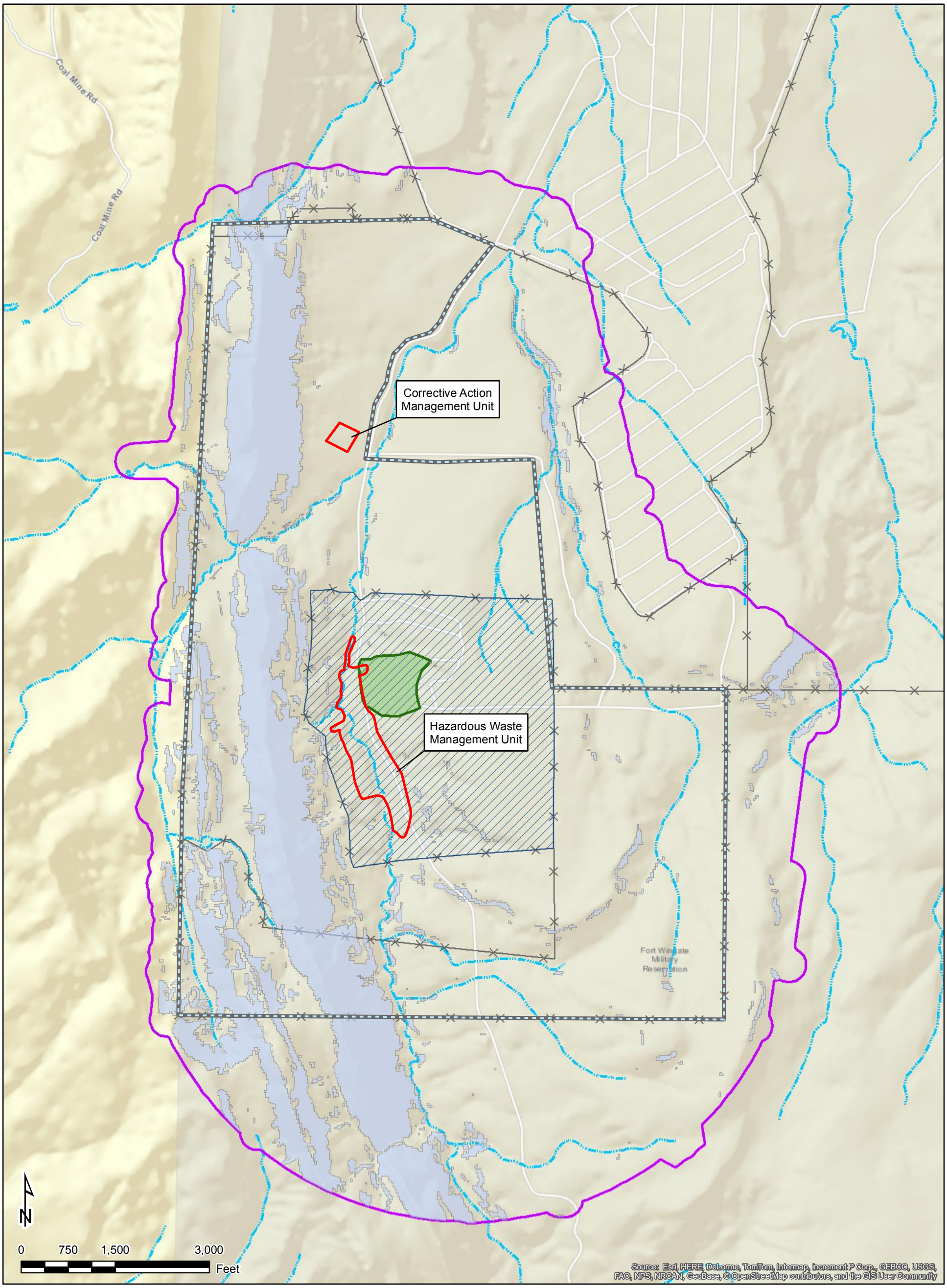
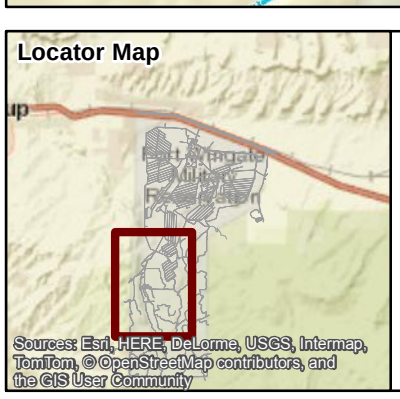




Legend

- Installation Boundary
- HWMU/CAMU Boundary
- Parcel 3 Boundary
- Inner Fence Area
- AOC 92 (Out of Scope)
- Kickout Area
- Inaccessible Area (35% grade or more)
- Arroyo
- Fence

Inner Fence Area Detail Map
Fort Wingate Depot Activity
McKinley County, New Mexico

Drawn By:	Date:	
JZ	11/16/2017	**Figure 1-2**
Checked By:	Project No.	
JC	60517380	

2.1 OBJECTIVES

The objective of this project is to provide all Military Munitions Response Program (MMRP) services under the contract necessary to conduct the following:

- Operations Security Awareness and Level I Antiterrorism Awareness Training;
- Mobilization;
- Site Set-up;
- Cultural Resources Monitoring/Surveys (as needed);
- Limited Vegetation Removal (as needed);
- Survey Operations;
- Subsurface MEC RA;
- MPPEH Inspection/Processing;
- Management of the ECMs under CE Control;
- Operation of CAMU;
- MEC Demolition; and,
- Demobilization.

Specifically, the objective of the MEC RA for this WP is to achieve a MEC subsurface clearance conducted over approximately 319 acres IAW with RCRA Permit IV.C and IV.F. A MEC surface clearance is currently being conducted at the Inner Fence Area under a separate contract. As part of the subsurface MEC RA described in this WP, MEC (regardless of size) and metallic debris 1.5 inches by 3 inches or larger that was inadvertently missed during the surface clearance will also be removed.

This MEC RA will not occur in areas too steep and requiring specialized safety equipment to safely work. The designated clearance area is shown on **Figure 1-2**. The areas designated as too steep to work within, were delineated using Light Detection and Ranging technology by the Army as part of previous investigation efforts. Inaccessible area due to incline averages of approximately 35 percent grade or more are shown on **Figure 1-2**. Parcel 3 is known to contain ICMs; therefore, all personnel working inside of Parcel 3 will meet the requirements of Department of Army (DA) Pamphlet (PAM) 385-63. Areas outside of Parcel 3 are considered non-ICM areas.

All recovered MEC will be destroyed either through BIP, transported to the ECMs under CE control, or the 10-day CAMU permitted temporary storage area for later destruction at the CAMU IAW this WP depending on the final explosive hazard assessment made by the Senior UXO Supervisor (SUXOS) and UXO Safety Officer (UXOSO). MPPEH will be further inspected to make a determination if an explosive hazard exists. If the inspection indicates a known or possible explosive hazard, the MPPEH item will be classified as MDEH. MDEH

items will be destroyed through BIP, transported to the ECMs under CE control, or transported to the 10-day CAMU permitted temporary storage area for later destruction at the CAMU IAW this WP. If the inspection indicates there is no explosive hazard, the MPPEH will be designated as MDAS. All MDAS (to include MD and RRD) certified and verified to be explosive free will be documented on a Form 1348-1A, IAW USACE EM 385-1-97, Change 1.

2.2 ORGANIZATION

The project team consists of:

- Mr. Robert Reed, USACE Contracting Officer (KO);
- Mr. Dennis J. Myers, USACE Contracting Officer's Representatives (COR);
- Mr. Alan Soicher, USACE Project Manager (PM);
- Mr. Steve Smith, USACE Program Manager;
- Mr. Mark Patterson, BRAC Environmental Coordinator;
- Mr. Richard Cruz; FWDA Manager and Site Caretaker;
- Mr. Larry Rogers, Navajo Nation (NN);
- Governor Val Panteah, Pueblo of Zuni (POZ); and
- Other team members responsible for overall contract management.

Figure 2-1 depicts the overall project organization and identifies key personnel.

2.3 PERSONNEL

Table 2-1 identifies primary roles/responsibilities of the personnel assigned to the project. **Figure 2-1** identifies key personnel.

2.4 CULTURAL RESOURCES MONITORING

Section 1.2.1.3 of this WP discusses removal actions in designated areas for compliance with RCRA Permit Section IV.C. A Programmatic Agreement among the U.S. Army, the NN, the POZ, and the New Mexico State Historic Preservation Office (NMSHPO) was signed in 2008 and currently provides the framework at the FWDA for federal actions that may impact cultural resource sites. IAW Section 106 of the National Historic Preservation Act, USACE has consulted with the NN, the POZ, and the NMSHPO. Both the POZ and NN have determined there are potential cultural resources within the sites that will likely be affected by operations.

The NN and the POZ will be contacted to renew previous contracts for cultural support of this project. Subcontracts will be established with both the NN and the POZ outlining the expectations from each Tribe (document review, cultural awareness training, and assisting the

field teams) to ensure the project objectives are met. Site personnel will be trained on Tribal concerns and potential cultural resources that may be encountered. If culturally sensitive issues arise, or suspect items are encountered, the team leader will contact the SUXOS, who will in turn contact the PM/Ordnance and Explosives Safety Specialist (OESS). The PM/OESS will notify the Army personnel.

2.5 DELIVERABLES

An Inner Fence Removal Report will be prepared describing the MEC RA activities conducted over the course of the project. This report will contain findings of the investigations and clearance actions, conclusions, and if necessary, recommendations about changes to the fence footprint, or additional protective actions. A draft report will be prepared for review and comment, corresponding revisions will be incorporated, and the document submitted as 'Final' to the Tribes and NMED (with a copy to the Army) for review and comment. Revisions will be prepared as needed based on Tribal and NMED comments. Geographic Information System (GIS) data files will be provided in the final report.

2.6 SCHEDULE

The Army has developed a proposed baseline project schedule for the completion of all tasks and it is presented in **Figure 2-2**.

2.7 PERIODIC REPORTING

All written and verbal (i.e., person-to-person or via telephone) correspondence will be documented and routed to the PM. Incoming written communications will be annotated with the date received. Project-related telephone communications to office personnel will be recorded on a Telephone Conversation/Correspondence Record form. Of critical importance is the documentation of activities stopping work or requiring a communication to or from the USACE PM/COR.

2.7.1 Project Records

Project records will be maintained in project files for the contract duration. Project records will be maintained electronically and in hard copy format in the project offices. Relevant project records will also be maintained in the office trailer. A description of the daily reports completed during fieldwork is provided below.

2.7.1.1 Daily Site Reports

For each day of fieldwork, the SUXOS will complete a Daily Site Report (DSR) that will present a list of contractor personnel, list of subcontractor personnel, a description of work completed, and include MEC and MD findings. DSRs will be consolidated and submitted weekly, via email,

to the USACE PM and USACE OESS. A compilation of DSRs will be included with the Inner Fence Removal Report at the conclusion of the project.

2.7.1.2 Daily Quality Control Reports

A QCP has been developed for this project and is included as **Section 4**. During each day of fieldwork, the UXO Quality Control Specialist (UXOQCS) will complete a Daily Quality Control Report (DQCR) that includes the following information:

- Contract information (e.g., Agency, PM, Contract Number, Task Order Number).
- A description of the definable feature work completed.
- What phase of control that a definable feature of work is currently in.
- UXOQCS inspections conducted (if applicable).
- List of subcontractor work performed (if applicable).
- Compliance of any materials and equipment received.
- Verification inspections of any material and equipment leaving the site.
- Quality management information pertaining to field activities.

DQCRs will be consolidated and submitted weekly, via email, to the USACE PM and USACE OESS. A compilation of DQCRs will be included in the Inner Fence Removal Report.

2.7.1.3 Daily Health and Safety Reports

An Accident Prevention Plan (APP) has been developed for this project and is provided as a separate submittal. During each day of fieldwork, the UXOSO will complete a Daily Health and Safety Report (DHSR) that includes the following information:

- Contract information (e.g., PM, Contract Number, Task Order Number).
- Description of work completed.
- Safety inspections conducted (if applicable).
- Site weather conditions.
- List of subcontractor work performed (if applicable).
- A description of visitors to the site (if any).
- Safety and risk management information pertaining to field activities.
- Documenting safety incidents, accident, and/or injuries (if applicable).

DHSRs will be consolidated and submitted weekly, via email, to the USACE PM and USACE OESS. A compilation of DHSRs will be included in the Inner Fence Removal Report.

2.8 PUBLIC RELATIONS SUPPORT

Contractor personnel will not make available or publicly disclose any data generated or reviewed under this contract. When approached by any person or entity requesting information about the subject of this data or this contract, contractor personnel shall defer to the USACE COR for response.

2.8.1 Dissemination of Data

Reports and data generated under this contract shall become the property of the Government, and distribution to any other source by the contractor is prohibited unless authorized by the USACE COR.

2.9 FIELD OPERATION MANAGEMENT PROCEDURES

The field management staff will include a Field Site Manager, SUXOS, UXOSO, UXOQCS, and UXO Technician III (UXOTIII) Team Leaders. Each UXO clearance team working within the Inner Fence Area will consist of a UXOTIII, and up to six UXO Technician IIs (UXOTIIs). All technicians will meet the requirements of DA PAM 385-63 and DDESB Technical Paper (TP) 18.

Methods of communication will include daily team kickoff meetings, weekly team planning sessions, and daily reviews with the USACE COR/PM and FWDA personnel, as appropriate. Records of these meetings will be maintained and transmitted within this team and included with the Inner Fence Removal Report. The SUXOS will establish a daily communications protocol with the FWDA Point of Contact (POC) identifying the times the work force enters and leaves the site, daily accounting of personnel and equipment, and radio usage.

Communication will occur routinely with the USACE Site Representative, PM, and FWDA Caretaker to discuss project logistics such as transportation routes, work being performed by other contractors on site, planning and implementing emergency drills, White Sands Range coordination, and shipping document signatures (e.g., bill of lading or waste manifest, as needed). These meetings will be documented in the daily report.

TABLE 2-1
PERSONNEL ROLES AND RESPONSIBILITIES
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO

Title	Roles and Responsibilities
Program Manager	• Primary POC for programmatic and contractual issues with USACE • Negotiate and execute contract and task orders • Oversee contract development and implementation, to include administration, QC, subcontract/teaming agreements, and small business goals • Ensure practical and effective systems are developed to meet contract performance objectives • Ensure quality work is completed safely within schedule and budget, and immediately implement corrective action if performance is not acceptable to USACE • Stop, amend, or curtail work for quality, H&S, regulatory, or operational deficiencies
Project Manager	• Primary POC for developing and implementing plans to meet performance objectives and other requirements • Manage the AECOM Team during project execution, including integration of subcontractor services • Oversee schedule, status reporting, and invoices • Hold regular project review/status meetings with USACE, stakeholders, and relevant AECOM staff • Perform day-to-day coordination with USACE and stakeholders • Stop, amend, or curtail work for quality, H&S, regulatory, or operational deficiencies • Assign project staff, approve budgets and expenditures, and approve deliverables • Report to the USACE PM
Program QA/QC Manager	• Provide an independent assessment of QC procedures employed during site operations • Develop quality program for MMRP/environmental restoration work, oversee quality processes, evaluate recommendations to improve these processes, and implement continuous improvement • Review and approve work plans, QC plans, training, deliverables, and processes to ensure adherence to USACE quality requirements and delivery of high quality products and services to USACE • Oversee the UXOQCS; review and evaluate daily job-site QC activities and reports • Stop, amend, or curtail work for major quality non-conforming conditions • Verify compliance with MMRP-related DoD publications, USACE documents, as well as local, state, and federal statutes and codes • Conduct periodic job-site quality audits • POC for USACE counterparts on quality issues following notifications to USACE and AECOM PM
Program Munitions Response Safety Manager	• Develop, maintain, and ensure the implementation of the AECOM H&S systems • Review and approve APP/SSHP, field safety training, and safety processes and ensure adherence to ESS and USACE safety requirements • Oversee the UXOSO and site-specific safety program; review and evaluate daily job-site safety meetings and daily safety reports • Stop, amend, or curtail work if unsafe or unhealthy conditions exist • Conduct periodic job-site safety audits • POC for USACE counterparts on safety issues following notifications to USACE and AECOM PM
Corporate H&S Officer	• Develop and maintain Corporate Safety Program, including occupational safety training and medical programs • Address overall occupational H&S issues and ensure related laws, regulations, and policies are adhered to at the project planning and execution level • Stop, amend, or curtail work if unsafe or unhealthy conditions exist • Reports to the AECOM corporate management
Program Cultural Resources Specialist	• Develop, maintain, and ensure implementation of cultural resources program • Review and approve Cultural Resources Plan, and oversee fieldwork processes to ensure adherence to Native American requirements pertinent to archaeological and historical resources • Stop, amend, or curtail work if cultural resources are encountered that require mitigation • POC for USACE counterparts on cultural resources issues following notification to USACE and AECOM PMs
Field Site Manager/Field Superintendent	• Oversee AECOM field personnel and field subcontractors, and document field activities • Ensure fieldwork adheres to safety and quality plans • Communicate necessary work plan deviations to AECOM PM and oversee change requests • Direct and oversee non UXO-related corrective actions following communications with Site Manager and AECOM PM • Coordinates with OESS on environmental field activities and schedules with notifications to AECOM PM and SUXOS

TABLE 2-1
PERSONNEL ROLES AND RESPONSIBILITIES
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO

Title	Roles and Responsibilities
SUXOS	• Plan, coordinate, and supervise all on-site munitions activities • Supervise UXO field teams • Certify MDAS as ready for turn-in or disposal in accordance with current policies • Provide MEC response support for explosives safety, MEC destruction, and blast designs • Provide technical input to H&S Design Analyses and emergency response requirements • Stop work if performance is not in compliance with SSHP or QAPP • Direct and oversee UXO-related corrective actions following communications with Site Manager and AECOM's PM • Coordinates with OESS on munitions field activities and schedules with notifications to AECOM's PM and Site Manager
UXO Safety Officer	• Analyze operational risks, explosive hazards, and safety requirements • Develop and implement approved explosives and UXO H&S program in compliance with applicable DoD policy and federal, state, and local H&S statutes, regulations and codes • Establish and ensure compliance with all site-specific explosive operations safety requirements • Enforce personnel limits and safety exclusion zones for explosives-related operations • Conduct, document, and report the results of safety inspections to ensure compliance with all applicable explosives safety policies, standards, regulations and codes • Ensure all protective works and equipment used within the exclusion zone are operated in compliance with applicable DoD policy, DDESB approvals, and federal, state, and local statutes, regulations and codes • Stop, amend, or curtail work for H&S deficiencies • Reports to Program Munitions Response Safety Manager and communicates with SUXOS, Site Manager, and field teams
UXO Quality Control Specialist	• Develop and implement the MEC-specific sections of the work plan for all explosive related operations • Conduct and document QC audits and inspection of all explosive operations for compliance • Identify, document, report and ensure completion of corrective actions to ensure all explosive operations comply with requirements • Stop, amend, or curtail work for quality deficiencies • Reports to Program QA/QC Manager and communicates with SUXOS, Site Manager, and field teams

Notes:
AECOM = AECOM Technical Services, Inc.
APP = Accident Prevention Plan
DDESB = Department of Defense Explosives Safety Board
DoD = Department of Defense
ESS = Explosives Safety Submission
H&S = Health and Safety
MDAS = Material Documented As Safe
MEC = Munitions and Explosives of Concern
MMRP = Military Munitions Response Program
OESS = Ordnance and Explosives Safety Specialist
PM = Project Manager
POC = Point of Contact
QA = Quality Assurance
QC = Quality Control
SSHP = Site Safety and Health Plan
SUXOS = Senior UXO Supervisor
USACE = United States Army Corps of Engineers
UXO = Unexploded Ordnance
UXOQCS = UXO Quality Control Specialist
UXOSO = UXO Safety Officer

Figure 2-1: Project Organizational Chart

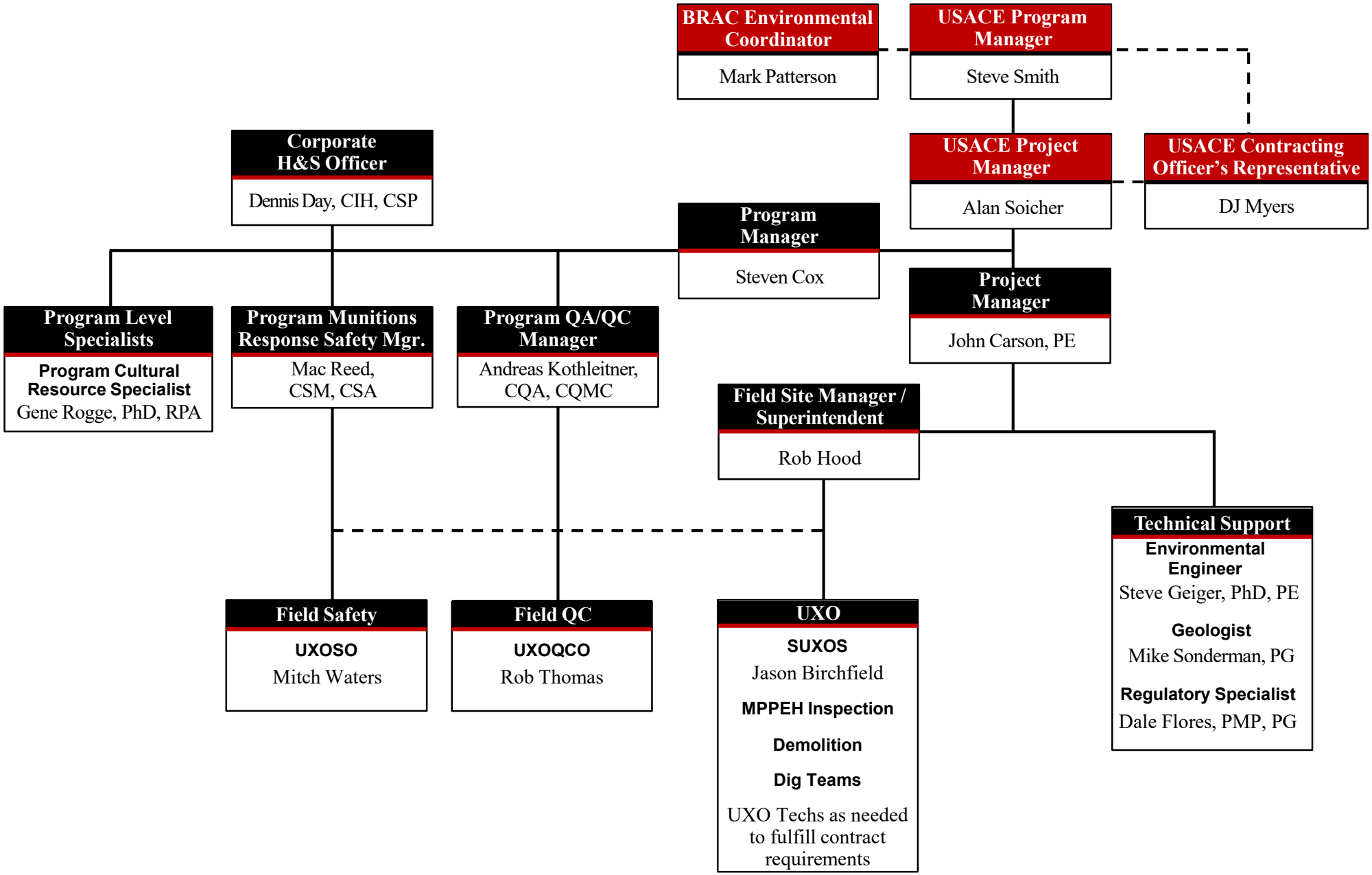
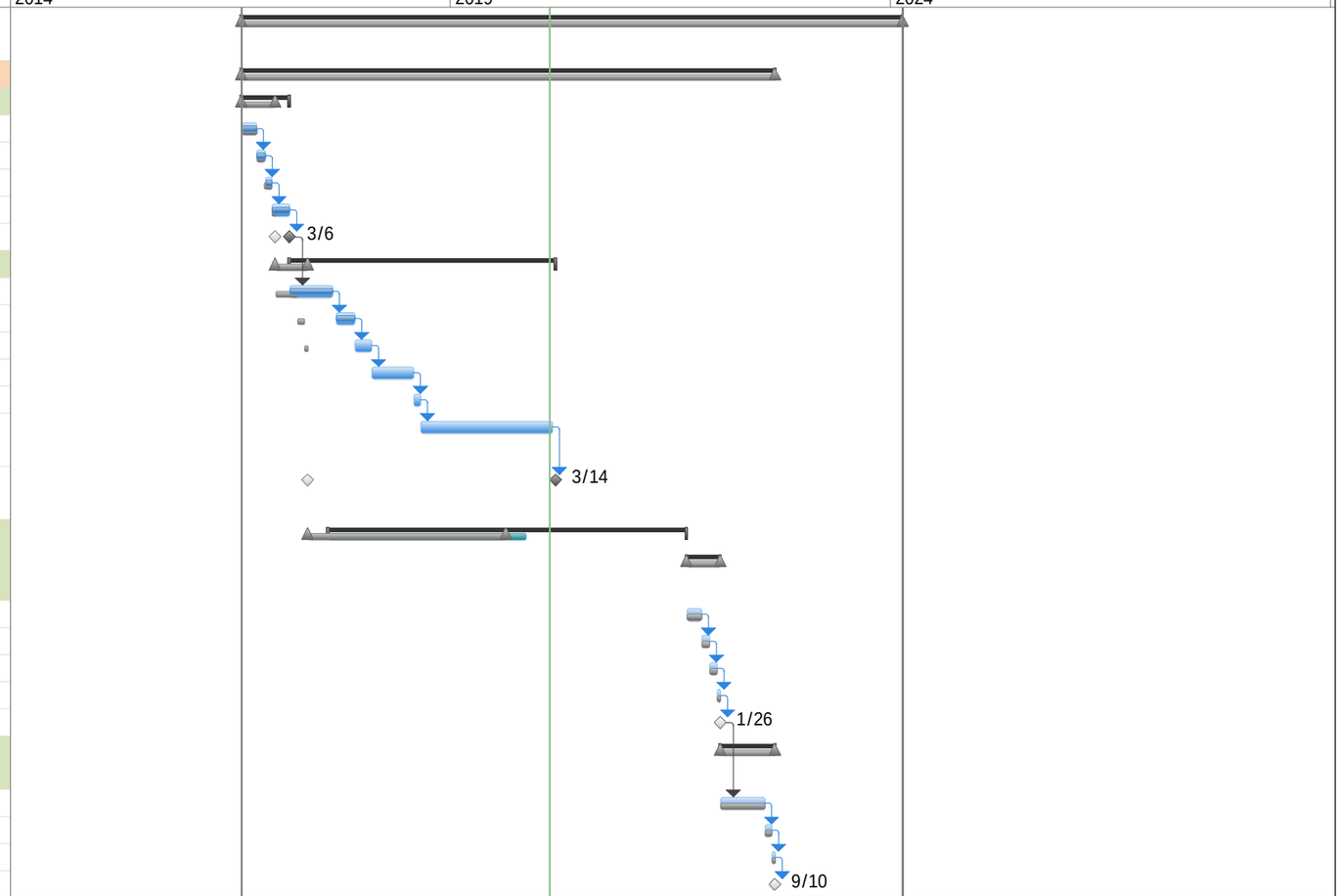


Figure 2-2 Project Schedule

Parcel 3 Closure & Corrective Action,
Fort Wingate Depot Activity, New Mexico

ID	Task Name	Duration	Start	Finish
1	**FWDA Parcel 3 Closure and Corrective Action at Fort Wingate Depot Activity, McKinley County, New Mexico**	**2676 d**	**Fri 8/19/16**	**Thu 2/22/24**
142	***TASK 2 - Inner Fence Work Plan, Fieldwork, and Report***	***2161 d***	***Fri 8/19/16***	***Sat 9/10/22***
143	**Government Approval -Inner Fence Work Plan - Army Final**	**195 d**	**Fri 8/19/16**	**Mon 3/6/17**
144	Prepare and Submit Dft Inner Fence Work Plan	58 d	Fri 8/19/16	Mon 10/17/16
145	Government Review Dft Inner Fence Work Plan	37 d	Tue 10/18/16	Wed 11/23/16
146	RTC (Prepare and Submit Final Version)	28 d	Thu 11/24/16	Thu 12/22/16
147	Government Back-check Final Version	72 d	Fri 12/23/16	Mon 3/6/17
148	Government Approval of Final Inner Fence Work Plan - Army Fi	0 d	Mon 3/6/17	Mon 3/6/17
149	**NMED Approval- Inner Fence Work Plan - NMED Final**	**1077 d**	**Tue 3/7/17**	**Sat 3/14/20**
150	NMED/Tribal Review Final Inner Fence Work Plan	175 d	Tue 3/7/17	Wed 8/30/17
151	RTC (Prepare and Submit Final Version, Rev 1)	73 d	Thu 9/14/17	Wed 11/29/17
152	Government/NMED/Tribal Back-check Final Version, Rev 1	68 d	Thu 11/30/17	Wed 2/7/18
153	RTC (Prepare and Submit Final Version, Rev 2)	172 d	Thu 2/8/18	Tue 7/31/18
154	Government/NMED/Tribal Back-check Final Version, Rev 2	30 d	Wed 8/1/18	Thu 8/30/18
155	RTC (Prepare and Submit Final Version, Approval with Modifications)	531 d	Fri 8/31/18	Fri 2/28/20
156	NMED/Tribal Approval of Final Inner Fence Work Plan - NMED Final	0 d	Sat 3/14/20	Sat 3/14/20
157	**Inner Fence Field Work (Including Optional Quantities)**	**1451 d**	**Sun 8/13/17**	**Wed 9/8/21**
460	**Government Approval-Kick-Out Area (Inner Fence) Final Report - Army Final**	**134 d**	**Thu 9/9/21**	**Wed 1/26/22**
461	Prepare and Submit Dft Inner Fence Final Report	60 d	Thu 9/9/21	Mon 11/8/21
462	Government Review Dft Inner Fence Final Report	30 d	Tue 11/9/21	Sat 12/11/21
463	RTC (Prepare and Submit Final Version)	30 d	Sun 12/12/21	Tue 1/11/22
464	Government Back-check Final Version	14 d	Wed 1/12/22	Wed 1/26/22
465	Government Approval of Final Inner Fence Final Report	0 d	Wed 1/26/22	Wed 1/26/22
466	**NMED Approval-Kick-Out Area (Inner Fence) Final Report - NMED Final**	**224 d**	**Thu 1/27/22**	**Sat 9/10/22**
467	NMED/Tribal Review Final Inner Fence Final Report	180 d	Thu 1/27/22	Wed 7/27/22
468	RTC (Prepare and Submit Final Version)	30 d	Thu 7/28/22	Fri 8/26/22
469	Government/NMED/Tribal Back-check Final Version	14 d	Sat 8/27/22	Sat 9/10/22
470	NMED/Tribal Approval of Final Inner Fence Final Report	0 d	Sat 9/10/22	Sat 9/10/22



Project: FWDA Parcel 3

Task | Summary | Baseline | Baseline Summary | Manual Progress
Milestone | Manual Summary Rollup | Baseline Milestone | Progress

3.1 OVERALL APPROACH TO MUNITIONS RESPONSE ACTIVITIES

The overall objective of this WP is to conduct a subsurface MEC RA of the Inner Fence Area inside the KOA MRS of Parcel 3 to the depth of detection. The removal includes all encountered MEC (regardless of size) and metallic debris measuring 1.5 inches by 3 inches or larger. A surface clearance of the Inner Fence Area is being completed under a separate contract; however, MEC (regardless of size) and metallic debris 1.5 inches by 3 inches or larger that was inadvertently missed by the previous contractor will be removed. The removal will not occur in areas too steep to safely work as shown on **Figure 1-2**. Areas with a slope of approximately 35 percent or more are considered too steep to safely work. If unsafe areas are encountered during the investigation and removal is not conducted, those areas will be documented in the field and depicted on maps presented in future reports.

MEC subsurface clearance of the Inner Fence Area will utilize the existing grid system used for the KOA surface clearance. If necessary, a state-licensed professional land surveyor will certify all surveying requirements to include all control points, grid corners, and boundaries as required. Teams will use Trimble hand held Global Positioning System (GPS) units (with horizontal accuracy of sub-meter or better) to navigate work areas and install interior grids and subdivisions within the work area using stakes of deterioration-resistant material. **Figure 3-1** shows the anticipated existing Inner Fence Area grid system (generally 100 ft x 100 ft).

Areas containing low-lying vegetation will be searched using hand-held analog geophysical instruments and will not require vegetation removal. If an area requires limited vegetation removal for safe performance of an activity, access to MEC, demolition of UXO, or fire prevention prior to demolition efforts, the NN and the POZ will be coordinated with as required to determine vegetation removal extents and limitations. The Tribes will be coordinated with (according to the consultation procedures in Permit Section VIII.B.1) for work in designated access areas for archaeological sites and cultural resources, as applicable. If the area is approved for limited vegetation removal, the UXO team will clear the moderate to dense vegetation using the most feasible low impact means. To handle the limited areas of dense vegetation, the teams will be cautious to not disturb the plant root balls. UXO technicians removing the vegetation will wear personal protective equipment (PPE) as required by EM 385-1-1 and described in the APP.

MEC removal will be conducted implementing an analog survey and removal action approach (i.e., “mag and dig” or “mag, flag, and dig”) using a Schonstedt 52Cx or equivalent and White’s XLT or equivalent. MEC (regardless of size) and metallic debris measuring 1.5 inches by 3 inches or larger will be removed from the surface and subsurface by manual digging of anomalies IAW EM 385-1-97 to depth of detection. Depth of detection varies depending on the size and orientation of the subsurface anomaly. In general, the depth of detection utilizing handheld detectors is 11 times the diameter of that item. Expected MEC types and approximate geophysical detection depths are shown in **Table 3-1**. UXO teams will survey each grid using a combination of handheld ferrous and non-ferrous (e.g., White’s XLT or equivalent) metal detectors to obtain complete coverage. MEC items not acceptable to move will be BIP. MEC items acceptable to move will be transported to the ECMs under CE control (**Figure 3-2**), or the

10-day CAMU permitted temporary storage area until they can be disposed of, when required, using demolition explosives in the CAMU. MDAS will be separated and stored in independent secure storage containers.

Based on previous activities and geophysical surveys, it is likely that some portions of the Inner Fence Area will exhibit subsurface conditions that are "HWMU-like" (i.e., contaminated areas that contain a sufficient number of anomalies such that excavation and processing the material through a processing plant would be more efficient and safer than manual excavation). Such areas will require mechanized MEC procedures in accordance with EM 385-1-97 instead of the analog survey and manual excavation procedures. Details of how "HWMU-like" areas within the Inner Fence Area will be cleared and sampled are provided in **Section 3.12**.

The arrival of the work force will be scheduled in a manner designed to facilitate immediate productivity. All personnel mobilized to the site will meet requirements for Occupational Safety and Health Administration (OSHA) hazardous waste operations training and medical surveillance requirements as specified in the APP/Site Safety and Health Plan (SSHP). Site personnel will also be trained to perform the specific tasks to which they are assigned. At no time will site personnel be tasked with performing an operation or duty for which they do not have appropriate training.

3.2 DATA QUALITY OBJECTIVES

3.2.1 Data Quality Objectives

The process used for development of the data quality objectives for the MEC RA in the Inner Fence Area to achieve NMED No Further Action (NFA) is described in the sections below.

3.2.2 Statement of Problem

The surface and subsurface of the Inner Fence Area are contaminated with WMM or WMM scrap. WMM may include: MEC, MD, UXO (such as primed, fuzed, armed, or otherwise prepared for action, fired, dropped, launched, projected), and may remain unexploded by malfunction, design, or any other cause. WMM scrap may include: munitions packaging, banding, fragmentation, packing or shipping debris, or other facility production scrap that may be on site.

The current condition of the Inner Fence Area does not comply with Sections IV.C, IV.D and IV.F of the RCRA Permit. This WP is designed to allow the Army to achieve compliance with Sections IV.C, IV.D, and IV.F of the RCRA Permit.

3.2.3 Identification of Project Goals

To comply with the RCRA Permit and to achieve an NFA determination from NMED, this WP is written with the intent to conduct an investigation and removal of WMM or WMM scrap from the Inner Fence Area.

3.2.4 Identification of Inputs to Achieve the Goals

3.2.4.1 Establishing Clean up Criteria

MEC (regardless of size) or metallic debris 1.5 inches by 3 inches and larger will be removed to detection depths. The clean-up criteria are in compliance with RCRA Permit Sections IV.C, IV.D and IV.F and approved by NMED (email dated March 17, 2014). This WP is written to achieve these Inner Fence Area clean-up criteria.

3.2.4.2 Identification of Defining Acceptance of the Cleanup Criteria

Once the investigation and removal is completed in each established grid, the UXOQCS will conduct QC inspection IAW the QCP (**Section 4**). Following QC acceptance, the grids will be turned over for QA inspection by the USACE OESS IAW the Quality Assurance Surveillance Plan (QASP). When the investigation area(s) are determined to be within the boundaries and meeting the cleanup criteria, the Army will issue a signed Engineering (ENG) Form 6048 (Munitions Response Quality Assurance Report Form), stating the area(s) have met the established cleanup criteria for the investigation and removal.

3.2.5 Define the Boundaries of the Study

As required by Section IV.A, the Army has confirmed and delineated the KOA of FWDA. In addition, this project will focus on Inner Fence Area (319 acres) of the KOA.

3.2.6 Technical Approach to Achieve the Goal

Section 3.7 of this WP provides specific details of the investigation and removal. In summary, the Inner Fence Area will be divided into grids, which will be further sub-divided into investigation/clearance lanes. UXO technicians, using hand-held analog geophysical instruments, will investigate each lane to locate, identify, and remove MEC (regardless of size) or metallic debris 1.5 inches by 3 inches and larger from the surface and subsurface to depth of detection.

3.2.7 Confirmation of Achievement of the Goal

Section 4 of this WP provides specific details of the QC and QA procedures and protocols used to ensure that the removal of all surface and subsurface MEC (regardless of size) or metallic debris 1.5 inches by 3 inches and larger on the surface or subsurface to depth of detection has been achieved. The USACE issuance of a signed ENG Form 6048 will confirm the removal of surface and subsurface MEC or MD for each established grid. The Army will comply with Section IV.D of the RCRA Permit and a Final Report will be provided to NMED summarizing the clearance actions and include all necessary supporting documentation for the Inner Fence Area. This report will provide the NMED with documentation that the Army has complied with Sections IV.B, IV.C, IV.D, and IV.F of the RCRA Permit establishing eligibility for NFA.

3.3 IDENTIFICATION OF AREAS OF CONCERN

AOC 92 located in the KOA is not addressed in this WP, but will be delineated and marked during this phase of the MEC RA. As previously stated in **Section 1.2**, the investigation and clearance of AOC 92 will be completed as part of a separate contract. There are no other AOCs related to the MEC RA identified for this phase of the WP.

3.4 INSTRUMENT TEST STRIP

An instrument test strip (ITS) will be established to verify functionality and to simulate the techniques needed to detect MEC while traversing the established grids for the Inner Fence Area surface and subsurface clearance. The ITS will be approximately 50 ft long and 5 ft wide and coordinates will be collected for documentation and retrieval purposes. The ITS will be cleared of all anomalies prior to its use. The ITS will be swept at the beginning of fieldwork activities each day by the analog geophysical instruments.

The purpose of the ITS is a QC measure demonstrating the functionality of the detection equipment being used during the RA operations and the ability of the equipment operator to detect items that may be encountered in the field. The UXOQCS will place small, medium, and large Industry Standard Objects (ISOs) at various depths and orientations. ISOs have been defined as schedule 40 pipe nipples, threaded at both ends, made from black welded steel, manufactured to an American Society for Testing and Materials specification. The objects are available through McMaster-Carr as well as most hardware and plumbing stores. The three ISO sizes being used are listed in **Table 3-2**. The location of each item placed will be marked with the depth, orientation, and size on a stake adjacent to each item. If an instrument is found to be functioning improperly during the daily function test, it will be replaced and removed during the field activities until it has been repaired and passes the function test.

3.5 LOCATION SURVEYS AND MAPPING PLAN

The existing grid system will be surveyed and implemented during the previous KOA RA. If additional surveying is required, then a New Mexico state licensed professional surveyor will perform such location surveying and mapping at the Inner Fence Area. A survey team will re-establish the boundaries of the clearance zone within the Inner Fence Area. The surveyed Inner Fence Area will be marked, if necessary, with deterioration-resistant stakes. All surveyed points will be established at “Class I, Third Order, with tolerances of 0.001 meters and 0.01 ft. The survey data will be reported in North American Datum 1983 (NAD83), Universal Transverse Mercator zone 12N, with vertical datum North American Vertical Datum 1988 (NAVD88) (with units of U.S. survey feet).

The site boundary data will include a map of the entire area with the boundaries shown in relation to other pertinent site features. Boundary coordinates will be presented as a tabulated list in Microsoft Excel spreadsheets.

All grid corner stakes will be painted orange, yellow stakes will be used for line of sight, white stakes will be used for MRS boundaries, and red stakes (or pin flags, flagging, or marking paint) will be used to mark areas to be avoided due to hazardous conditions.

3.5.1 Munitions and Explosives of Concern Safety Provisions

During all field and intrusive operations, the survey crew will be accompanied by a UXO escort implementing MEC and anomaly avoidance procedures in accordance with EM 385-1-97, Change 1. The UXO technician will perform a visual survey for surface MEC before the survey crew enters the area. Then using an analog geophysical instrument, they will conduct a survey of each intrusive activity site to ensure the survey/staking point is anomaly-free before the survey crew begins setting monuments, driving stakes, or establishing other points.

3.5.2 Control Points

Existing permanent monuments will be used, where available. If existing permanent monuments are limited or not present, the surveyor will establish additional monuments.

3.5.2.1 Accuracy

A tabulated list of all control points and monuments, including their final adjusted coordinates, will be provided. A tabulated list of the boundary will also be provided showing the adjusted control point coordinates to the nearest 0.01 ft.

3.5.2.2 Monument Caps

Existing permanent monuments will be used, where available. If existing permanent monuments are limited or not present, the surveyor will establish additional monuments.

3.5.2.3 Plotting

All of the control points (monuments, and property corners) recovered and/or established at the site will be plotted at the appropriate coordinate points on reproducible electronic or hard copy media for production of planimetric or topographic maps at scales appropriate for the parcel size.

3.5.3 Mapping

The location, identification, coordinates, and elevations of all the control points recovered and/or established at the site will be plotted on reproducible media for planimetric or topographic maps at the scale specified in the task order. Each control point will be identified on the map by its name, number, and the final adjusted coordinates and elevations (to the closest 0.001 meter and 0.01 foot). Each map will include a grid north, a true north, and a magnetic north arrow and showing the differences between them in degrees, minutes, and seconds. Grid lines or tic marks at systematic intervals with their grid values will be shown on the edges of the map. Also, a legend showing the standard symbols used for the mapping and a map index showing the site in

relationship to all other sites within the boundary lines of the project area will be shown. The coordinates for the grid corners will be shown to the nearest foot (1.0 ft), but may require greater accuracy to meet geophysical mapping and re-acquisition requirements. The locations of individual recovered MEC items will be plotted and identified on the map.

3.6 GEOGRAPHIC INFORMATION SYSTEM PLAN

Spatial data created for the project will be provided in neutral, nonproprietary Spatial Data Transfer Standard format at the completion of the project, as well as in Environmental Systems Research Institute compliant formats (shapefiles, coverages, or geodatabases) during this project. Raster data (e.g., orthophotography, remote sensing imagery) will be provided at the completion of the project. Supporting tabular data will be provided in Microsoft Access format at the end of the project. The final submittal in electronic format will contain all required Project (ArcGIS.mxd) files and Layout files for all plates, figures, and drawings conveyed in the Final Report.

3.7 INTRUSIVE INVESTIGATION

3.7.1 Preliminary Activities

During the initial mobilization, site management personnel will engage in the following preliminary activities:

- Coordination with the designated FWDA POC to finalize access requirements, location of any temporary facilities to be used, and communications requirements;
- Contact and coordination with the FWDA POC and local fire, medical, and other emergency services to ensure availability of services, and the appropriate response actions IAW the WP and APP;
- Coordination with the NN and the POZ for cultural resources training;
- Coordination with the Ballistic Missile Defense Office (BMDO) site caretaker about the investigations being conducted on BMDO properties;
- Contact and coordination with local vendors for accommodations and vendors/suppliers for routine purchases to ensure smooth project start up; and
- Inspection of the work area to identify possible environmental constraints, terrain limitations, and other interferences.

3.7.2 Equipment

To ensure it is in proper working order all equipment will be inspected upon arrival. Any equipment found damaged or defective will be repaired or a replacement will be secured. All instruments and equipment requiring routine maintenance will be checked initially upon its arrival and again prior to its use each day. This system of checks ensures the equipment is

functioning properly. If an equipment check indicates that any piece of equipment is not operating correctly, and field repair cannot be made, the equipment will be tagged and removed from service. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service.

As part of the initial equipment set-up and testing, communication equipment will be installed and tested including the following:

- Security Band Radios (if made available from FWDA) to maintain communication with site caretaker and USACE OESS personnel.
- Hand-held portable radios used to maintain communications between the office trailer, SUXOS, and the field teams.
- Cellular telephones to be used as back up communications between the SUXOS, UXOSO, UXOQCS, and the field teams.

3.7.3 Site-Specific Training

As part of the mobilization process, a site-specific training will be performed for all assigned on-site personnel. The purpose of this training is to ensure all on-site personnel fully understand the operational procedures and methods to be used. Individual responsibilities and safety and environmental concerns associated with operations will also be covered in the training. The UXOSO will conduct the training sessions including the topics identified below:

- Field equipment operation, including the safety and health precautions, field inspection and maintenance procedures being used.
- Interpretation of relevant sections of this WP and APP/SSHP as they relate to the tasks being performed.
- Personnel awareness of potential site and operational hazards associated with site-specific tasks and operations.
- How to respond when approached by any person or entity requesting information about the subject of this data or this contract, specifically, personnel shall defer to the USACE.
- Public relations to ensure personnel will not make any public statements to the media without prior coordination with and approval of USACE Public Affairs Office.
- Environmental concerns and sensitivity including endangered/threatened species and historic, archaeological, and cultural resource issues (this includes the NN and POZ cultural resources training.
- Additional USACE and/or FWDA training as required.
- Identification of features, hazards, and disposal methods of MEC (including ICM) that may be encountered.

3.7.4 Project Notifications

The SUXOS will contact all appropriate local emergency services to verify the availability of requisite services and confirm the means used to summon those services. General notifications will be made to key project personnel at this time as well.

3.7.5 Compliance with Plans and Procedures

The Army will evaluate the requested changes and communicate with NMED via phone or email, and if necessary, communicate with the field teams to ensure that the agreed upon procedures are in place. All changes or deviations from this WP will be explained and documented in the Final Report.

All personnel will adhere strictly to approved plans and established procedures. If operational parameters change, and there is a corresponding requirement to change procedures or routines, careful evaluation of such changes will be conducted by on-site supervisory personnel. Any new course of action or desired change in procedures will be submitted in writing (along with justification for approval) to the USACE on-site personnel and the COR. Approved written changes will be implemented in a manner ensuring procedural uniformity and end-product quality complying with the Permit and/or applicable guidance documents. The USACE PM will be notified of any field change submission requests.

3.7.6 General Site Practices

- All operational activities will be performed under the supervision and direction of UXO qualified personnel (UXOQP). Non-UXOQP will be prohibited from performing any operation unless they are accompanied and supervised by a UXO technician. Throughout the entire project, personnel will adhere to the following general practices:
- **Work Hours:** Operations will be conducted only during daylight hours. Five 10-hour work days are planned each week, as weather and conditions permit. Permission from the KO will be required to modify the work schedule. Due to the inherent risk associated with MEC operations, UXO personnel will be limited to a 60-hour workweek consisting of a maximum of 45 hours of MEC field operations. No single workday will exceed ten hours. Twenty-four hours must separate each MEC field operation workweek. Should extended hours be employed during fieldwork, the SUXOS shall ensure a Fatigue Management Plan is included and approved in the APP IAW EM 385-1-1, Para 01.A.20. These work restrictions apply to all personnel.
- **Basic Procedures and Standard Operating Procedures (SOPs):** During site operations, personnel will adhere to the operational and Environmental Safety & Health procedures outlined in the SOPs.
- **Site Access:** As there are multiple contractors working within the KOA, a weekly managers meeting will be held with the Government and the on-site OESS for forward planning, agreement for all contractors, and Government approval of the weekly schedule. The FWDA POC and the USACE OESS will be coordinated with daily for site access and controls of all

areas. Access to all areas where work is being conducted will be controlled. No hazardous MEC operations will be conducted when non-UXO or unauthorized personnel are inside the defined minimum separation distance (MSD) zone.

- **Handling of MEC:** Only UXOQP, as defined in DDESB TP 18, will handle MEC items. During all operations with the potential for encountering MEC, all personnel will adhere to the general procedures outlined in EM 385-1-97, Explosives Safety and Health Requirements Manual.
- **Visitor Safety:** All visitors entering the site will report to the SUXOS and sign the visitor's log. All site visitors will receive a safety briefing, as outlined in the SSHP, and visitors will be escorted at all times by UXO personnel when inside the MEC area.
- **ICM Areas:** Only personnel meeting the requirements of DA PAM 385-63 will be allowed to perform clearance activities in designated ICM areas. ICMs found outside the designated ICM areas will be handled IAW appropriate guidance and properly marked and reported to the OESS. The OESS will coordinate with USACE PM to determine the path forward for any ICMs found outside of the designated ICM area.

3.7.7 Overall Safety Precautions and Practices

Personnel will conduct safety and operational briefings daily. Additionally, the SUXOS or UXOSO may hold a safety stand-down to conduct training at any time to address site specific safety concerns or incidents. The safety and operational training and briefings will be performed IAW the SSHP for this project as summarized below:

- **Daily Safety Briefing:** Each day, prior to the commencement of work, the UXOSO will conduct a safety briefing for all site personnel. In addition, the UXOQCS or SUXOS will provide input discussion to plan for the day or quality lessons learned. A written record of this meeting will be maintained in the Safety Meeting Attendance Log. The briefing will focus on specific daily hazards, potential hazards and risks that may be encountered, and the safety measures that should be used to eliminate or mitigate those hazards. These briefings will provide personnel with the known or potential task-specific hazards related to the day's operation. The Activity Hazard Analysis forms will be available and used during the safety briefing to inform personnel of the task-related hazards. The Activity Hazard Analysis forms will also be used to inform personnel of the PPE and safe work practices used to mitigate the task hazards. In addition to the daily safety briefing, each Team Leader will hold a daily tailgate safety meeting to discuss the day's operations, individual team assignments, and any other concerns for the day's operations.
- **Environmental Concerns:** The promotion of environmental sensitivity and cultural resources will be an ongoing part of the daily safety and operational briefs.
- **UXO Refresher:** Prior to the performance of field operations all UXO personnel will be given UXO refresher training by the UXOSO, UXOQCS, or SUXOS, on the known MEC/ICM that may be encountered on-site. The refresher will include topics related to explosives and munitions items that may be encountered on-site, including the identification of the MEC, the

hazards, and the disposal methods. Periodic training will be conducted as UXO are encountered and included as part of the daily team tailgate meetings.

- **Additional Training:** The SSHP prepared for this project details additional on-site training.

3.7.8 Vegetation Removal

Limited mechanical brush removal will be conducted within the proposed areas to facilitate MEC removal operations; however, only limited and light vegetation removal is expected and will be required using manual and/or mechanical equipment. Prior to any vegetation removal, the Tribes and FWDA will be coordinated with for any vegetation removal restrictions. Elements such as cottonwood trees and other culturally significant features will be marked and avoided. Prior to, and during vegetation removal, UXO technicians will visually search the area where the vegetation will be removed to ensure the area is free of surface MEC items or other items that may present a physical hazard. During the brush removal, the affected site personnel will utilize all the safety and health PPE specified in the APP. The UXO technicians cutting the vegetation will wear PPE as required by EM 385-1-1. Vegetation will be cut no closer than six inches from the ground surface. During any vegetation removal, strict attention will be given so as not to remove any root ball of the vegetation being cut. Cut vegetation will be removed from the immediate work area and placed outside of the area and allowed to degrade naturally at the project site. The SUXOS will coordinate with FWDA personnel to determine the optimal location(s) to place the vegetation removed from the clearance area. All vegetation removal activities will be completed in accordance with EM-385-1-1, Section 31.

3.7.9 Munitions and Explosives of Concern and Material Potentially Presenting an Explosive Hazard Clearance

The Army is complying with Sections IV.C and IV.F of the Permit by conducting MEC and MPPEH clearances within the Inner Fence Area. This section contains the details of the Army adhering to these RCRA requirements.

The Army's intent is to return, if possible, this property to DOI. This section provides details of the Army's compliance with Section IV.C and IV.F to implement a clearance of the area inside the KOA (excluding AOCs and SWMUs) and designated areas with consultation of the Tribes. The UXO clearance teams will perform MEC surface and subsurface clearance to depth of detection within the Inner Fence Area (**Figure 1-2** depicts this clearance area), excluding the HWMU and AOC 92.

Upon arrival at the assigned grid, Team Leaders will verify location and install any missing grid stakes, as necessary. Team members mark lane divisions using flagging or biodegradable paint as they survey the grid using analog geophysical instruments to identify subsurface target anomalies. Control lanes will run north to south and will be approximately five ft in width with some variations based on terrain and vegetation hazards. Instruments will be maintained on the designated setting proven to locate failure criteria materials as established at the ITS. During grid clearance operations, the UXO Technicians will sweep the instruments through their

respective lanes in a tight forward pattern, following the contours of the terrain and ensuring complete area coverage.

Arroyos located within the Inner Fence Area will be cleared to depth of detection in the arroyo bed and in the lower walls where it is deemed safe to traverse. A competent person will be assigned to monitor clearance activities and ensure they remain within the height and safety factors IAW EM 385-1-1, Section 21.A. Specific zones, which present a collapse or engulfment hazard, will be circumvented; the zones will be marked with red painted stakes and caution tape around the boundaries, and several GPS points will be collected to accurately represent the area in the GIS database. This information will be provided to all teams and used for the subsequent work in the identified arroyos, AOCs, and SWMUs. It is anticipated that any inaccessible areas within the arroyos will be previously identified during the on-going surface clearance of the Inner Fence Area (PIKA 2015a). If additional areas are deemed inaccessible, those areas will be identified and presented to the Army for approval.

Subsurface target anomaly findings meeting the NMED approved clearance criteria (MEC [regardless of size] and metallic debris measuring 1.5 inches by 3 inches or larger) will be removed. Identified subsurface anomalies will be manually excavated IAW EM 385-1-97 to determine the anomaly source. At no time will UXO technicians dig directly over an anomaly until its depth has been determined by digging to the side of the anomaly. An excavator may be used for deeper digs but will not be used within 12 inches of the anomaly. Once the anomaly has been located, it will be visually inspected, identified and assessed for hazards by two appropriately qualified UXO technicians, one of whom will be the UXOTIII. Target anomaly locations will be rechecked after the removal of any material to verify the material is not masking anything below it. Once the target anomaly location has been determined to be resolved, it will be backfilled and hand tamped. If MEC is discovered, it will be marked and managed IAW the procedures described in EM 385-1-97, Change 1.

3.7.9.1 Munitions and Explosives of Concern Items Encountered

The MEC identification process will start when the suspected item is located. The UXO technician locating the item will contact the UXOTIII when the MEC is identified and the UXOTIII will confirm the identity. Once the item has been identified and marked with a pin flag, the SUXOS and UXOSO will be notified and requested to evaluate whether the MEC item is acceptable to move or not. If the MEC item is acceptable to move, it will be transported to the ECMs under CE control, or the 10-day CAMU permitted temporary storage area for later destruction at the CAMU IAW this WP. If the item is determined unacceptable to move, it will be BIP. The USACE OESS will be notified and assistance requested if personnel cannot make a positive identification.

Prior to disposal, the location of each MEC item within the grid and all relevant information related to the item will be recorded. The location of each item will be recorded with GPS equipment. Data associated with MEC locations will include:

- The grid number where the item was found.

- Item number assigned.
- Type of item.
- Location of item in coordinates.
- Depth below ground surface.
- Digital photograph and disposition.

Post-MEC disposal actions include the implementation of the MPPEH inspection process on any remaining material at the shot location. If the MPPEH has an explosive hazard it will be designated as MDEH, if not, it will be designated as MDAS. Items designated as MDEH will undergo explosives demolition operations as discussed for MEC items in **Section 3.10.1**.

3.7.9.2 Material Potentially Presenting an Explosive Hazard Inspection and Munitions Debris/Range Related Debris Storage Requirements

All suspected MPPEH will be 100 percent inspected by the UXO Field Team. Two separate UXOQP will conduct the inspections prior to removing any material from the grid. At a minimum a UXOTII will conduct a 100 percent inspection and a UXOTIII will conduct a 100 percent re-inspection to determine if the item is MDEH, or MDAS (including MD or RRD) and ensuring it does not contain an explosive hazard. Items designated as MDEH will undergo explosive demolition operations as discussed for MEC items in **Section 3.10.1**. MDAS segregated as MD and RRD will be kept in sealed and locked containers in a holding area until final disposition.

The SUXOS will perform random spot checks to ensure and verify the established inspection process is being implemented as required by the WP and that all located MD and RRD being placed in the secure storage containers are free of any explosive hazards and is properly segregated from other removed material to prevent comingling. If the security of the lockable storage containers or drums is breached in any way, the contents must be 100 percent re-inspected by two separate UXO Technicians, as described above.

The UXOQCS will conduct daily audits of the above procedures for processing MPPEH, MD, and RRD to ensure they are being conducted as required by the WP. The UXOQCS will further perform random sampling inspection of designated MDAS, MD, or RRD, as required to verify no items containing explosive hazards are being comingled with the inspected MDAS, MD, or RRD material.

Inspected and certified MDAS (MD/RRD) will be secured in a locked container such as a drum(s) or roll-off container until final disposition to prevent comingling MD with material that has not been inspected. The container will be secure and lockable, clearly labeled on the outside with the following information: Unique identification that will start with USACE/Installation Name/Contractor's Name/0001/Seals unique identification and continue sequentially for each additional container used for the same project site. The seal will be attached in such a manner that the container cannot be opened without damaging the seal.

3.7.9.3 MDAS Final Disposition

The SUXOS will certify the MDAS is free of explosive hazards and the OESS will verify the MPPEH inspection process has been followed.

The Form 1348-1A used to document the description of the container will be used as the certification/verification documentation for each container. All Form 1348-1As must clearly show the typed or printed names of the SUXOS and UXOQCS, organization, signature, contractor's home office, and the field office phone number(s) of the persons certifying and verifying the debris as free of explosive hazards. Also, the following must be present on the Form:

- Basic material content (Type of metal; e.g., steel or mixed);
- Estimated weight;
- Unique identification of each of the containers and seals stated as being turned over;
- Location where MD or RRD was obtained; and,
- Seal identification, if different from the unique identification of the sealed container.

The following certification/verification will be entered on each Form 1348-1A for turnover of MD or RRD and will be signed by the SUXOS and the OESS. This statement will be used on any ranges where RRD is being processed along with MD:

- "This certifies that the material listed has been 100 percent properly inspected and, to the best of our knowledge and belief, is free of explosive hazards, engine fluids, illuminating dials and other visible liquid hazardous, toxic, and radioactive waste (HTRW) materials."

The following certification/verification will be entered on each Form 1348-1A for turnover of MDAS and will be signed by the OESS. This statement will be used where only MD is being processed:

- "This certifies that the material listed has been 100 percent inspected and, to the best of our knowledge and belief, are inert and/or free of explosives or related materials."

The chain of custody (COC) will be maintained and final disposition of the certified and verified materials will be documented. The certified and verified material will only be released to an organization that will:

- Upon receiving the unopened labeled containers, each with its uniquely identified and unbroken seal (ensuring a continued COC), and after reviewing and concurring with all the provided supporting documentation, will sign for having received and agreed with the provided documentation that the sealed containers contained no explosive hazards upon receipt. This will be signed on the recycler's company letterhead and clearly state that the contents of these sealed containers will not be sold, traded, or otherwise given to another party until the contents have been smelted and are only identifiable by their basic content.

- Send notification and supporting documentation to the sealed container-generating contractor documenting that the sealed containers have been smelted and are now only identifiable by their basic content.
- This document will be incorporated into the Final Report as documentation for supporting the final disposition of MD and RRD. If the COC is broken, the MD reverts to MPPEH and must undergo a second 100 percent inspection, a second 100 percent re-inspection, and be documented to verify its explosives safety status (identified as either MD or RRD). Material that has been documented as safe is no longer considered MPPEH as long as the COC remains intact. A legible copy of inspection, re-inspection, and documentation must accompany the material through final disposition and be retained on file for a period of three years.

3.7.10 Soil Sampling of Low-Density MEC Areas

The soil sampling of low-density MEC areas within the Inner Fence is a new addition to the Work Plan in response to the NMED Approval with Modifications Letter (dated September 18, 2018). The purpose of the sampling is to determine if munitions constituent (MC) concentrations in soil are above SSLs/RSLs and to determine if individual MEC items or residual soil contamination in low-density MEC areas poses a risk to human and ecological receptors. The source of MEC items within the Inner Fence is from OB/OD activities at the HWMU (i.e., detonation or airborne dispersion of individual MEC items). Dispersion from the OB/OD activities has resulted in a generally uniform distribution of individual MEC items with the Inner Fence (i.e., no "clusters" of MEC). Therefore, this additional soil sampling will focus on the MEC removal grids that comprise the low-density MEC areas. Low-density MEC areas are those areas/grids that exhibit subsurface conditions that allow for manual MEC removal. Areas/grids that require mechanical MEC removal due to safety concerns (as described in **Section 3.12.1**) are considered HWMU-like areas and soil sampling of those areas is addressed in **Section 3.12.5**.

The Army has evaluated whether incremental soil sampling may be a more appropriate sampling method than discrete soil sampling for the low-density MEC areas. Historically, the NMED has accepted incremental soil sampling for explosives and metals in surface releases from detonation or airborne distribution as the contaminant source. The low-density MEC areas of the Inner Fence are considered surface area releases from detonation or airborne distribution as the potential contaminant source. Therefore, it was determined that that incremental soil sampling is appropriate for low-density MEC areas and will be completed. Incremental soil sampling will be conducted in accordance with the Interstate Technology and Regulatory Council (ITRC) incremental soil sampling guidance (ITRC 2012, including January 2020 Clarifications, or most current).

Risk screening used to evaluate soil sampling results will follow the 2019 NMED risk assessment guidance. Low-density MEC areas will be sampled for explosives and metals. Soil sample analyses selection is presented in Section **3.7.10.2**. The sample risk screening methodology and process are provided in **Section 3.7.11**.

3.7.10.1 Soil Sampling Design

The Visual Sample Plan (VSP) program was utilized to determine the quantity of samples required to statistically demonstrate if residual contamination poses a risk to receptors. VSP is a software tool that supports the development of a defensible sampling plan based on statistical sampling theory and the statistical analysis of sample results to support confident decision making. The program was developed with the support of numerous government agencies (e.g., U.S. Department of Energy, U.S. Environmental Protection Agency, and the Department of Defense) in need of a program that could ensure the right type, quality, and quantity of data are gathered to support decision making.

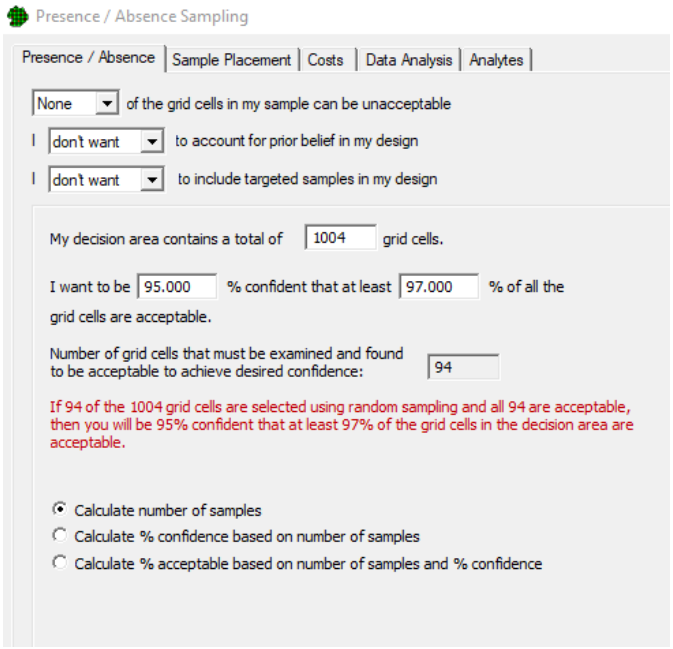
Based on the release mechanism and conditions within the Inner Fence (i.e., dispersion of MEC from OB/OD activities at the HWMU resulting in surface area releases), incremental soil sampling will be performed. The "Show That At Least Some High % of The Sampling Area Is Acceptable, Presence/Absence Sampling" module and sampling goals within VSP were used to determine the number of incremental soil samples needed to characterize the low-density MEC areas. This VSP module allows project teams to input the number of potential sampling grids (e.g., 100-foot by 100-foot MEC removal grids) within a decision unit (e.g., low-density MEC areas of the Inner Fence) and specifies the number of samples that need to be collected in order to achieve a specified level of confidence that the condition of the decision unit is acceptable (e.g., below SSLs/RSLs).

If all sample analyses results from the low-density MEC areas are below SSLs/RSLs, and cumulative risk calculations are below the NMED target risk thresholds of 1.0E-05 for lifetime cancer risk for human receptors and 1.0 for hazard for human and ecological receptors, soil contamination within low-density MEC areas will be considered insignificant. If sample analyses results in low-density MEC areas/grids exceed SSLs/RSLs or cumulative risk calculations exceed target risk thresholds, then additional risk screening refinements in accordance with NMED guidance will be performed. If low-density MEC areas/grids do pose an unacceptable risk to receptors after screening level risk refinements, then the Army will discuss alternatives to address the site with NMED and the Stakeholders.

The VSP assumptions and inputs included:

- The Inner Fence Area is approximately 319 acres; however, approximately 68 acres is expected to be classified as HWMU-like area based on preliminary inspection of site conditions by the contractor in consultation with the onsite USACE OESS. Therefore, 251 acres of low-density MEC areas (or approximately **1,004 grids** sized 100 feet by 100 feet) was used in VSP model.
- The 100-foot by 100-foot sampling unit size was selected so that sampling units will correspond to the subsurface MEC removal grids, which will be the basis for identifying and documenting low-density MEC areas from high-density MEC areas (i.e., the decision to classify areas as low-MEC density or high-MEC density areas will be made on grid-by grid basis). Additionally, 100-foot by 100-foot grids are approximately ¼-acre in size, which is smaller than the typical residential lot used in the NMED risk guidance and therefore considered a conservative approach.

- VSP confidence inputs were as follows: 1) **95 percent confidence** that at least **97 percent** of the grids in the decision unit are acceptable (i.e., below SSLs/RSLs).
- The VSP input screen is shown below:



The VSP dropdown selections and rationale include:

- **None** of the grid cells in my sample can be unacceptable.
- I **don't want** to account for prior belief in my design. If comparable low-density MEC areas adjacent to the or within the Inner Fence had previously been sampled, then it might be possible to account for prior belief in the design by indicating that designers have some level of confidence that the low-density MEC grids are acceptable. Since no low-density MEC area sampling data from FWDA is available, prior belief in the design was not utilized.
- I **don't want** to include targeted samples in my design. If previous experience indicated that certain portions of the low-density MEC areas were more likely to be contaminated than other areas, targeted samples could be included in the design. Low-density MEC areas are expected to exhibit similar conditions (i.e., surface release areas with detonation or airborne distribution as the potential contaminant source); therefore, it is not anticipated that some areas are more likely to be contaminated than others.

Final sample quantities will be based on the actual size of the low-density MEC area.

To provide a 95 percent confidence that 97 percent of all low-density MEC areas/grids are acceptable (i.e., below SSLs/RSLs), an estimated total of 94 low-density MEC grids within the Inner Fence will be sampled, which represents approximately 22 acres. Sampling locations will be selected from the Inner Fence using VSP (or similar random number generator). Professional

judgement will be used to ensure that locations are generally uniform and representative of the site.

3.7.10.2 Incremental Soil Sampling Procedures

Incremental sampling will be completed using a systematic random sampling approach as described in the ITRC incremental soil sampling guidance (ITRC 2012, including January 2020 Clarifications, or most current). The first step will be to mark the boundaries of the sampling unit, which will typically be 100 feet by 100 feet (i.e., same grid size utilized during the MEC removal in low-density MEC areas). Once the boundaries of the sampling unit have been marked, sampling personnel will lay out the systematic random sampling pattern and place soil aliquot markers (PVC pin flags) within each grid cell. After a sampling location has been cleared for sampling by a UXO technician using a magnetic locator, a soil increment will be collected. This process will be repeated until all increments within a sampling unit have been collected. At a minimum, 50 increments will be collected for each incremental soil sample. Sampling unit size will not exceed 100 feet by 100 feet (or 10,000 square feet).

Marking of Sampling Units and Sampling Locations

Using anomaly avoidance procedures, the boundaries of each sampling unit will be marked prior to sampling. The boundaries will be marked in such a way that field personnel will not collect any samples outside the sampling unit boundaries. The following procedures will be used by the field crews to locate and mark the sampling units in the field:

- The field crew will locate the corners of the sampling units by using a GPS with sub-meter accuracy.
- Once located in the field, the sampling unit corners will be marked by the field crew by placing a surveyor's flag into the ground. The sampling unit corners will be clearly marked on the flags with a grease pencil or paint pen to denote the site name and sampling unit.
- Once the sampling unit corners are flagged, twine or cord will be stretched between corners of the sampling units to visibly mark sampling unit boundaries. This will ensure the soil aliquots are collected within the boundary of the proper sampling unit.
- Once the boundaries of a sampling unit have been marked, the sample increment locations will be marked using PVC pin flags (one flag per increment) in the sampling units.

Sampling Equipment

Soil will be collected using a stainless-steel step probe or incremental sampling tool. Sample volumes, container types, and preservation requirements shall be followed per specific method requirements in accordance with USEPA SW-846.

Sample Identification

Samples collected during site activities will have discrete sample identification numbers. These numbers are necessary to identify and track each sample collected for analysis. In addition, the sample identification numbers will be used in the database to identify and retrieve the analytical results received from the laboratory. Each sample is identified by a unique code that indicates the parcel number, site identifier, matrix, sample location identifier, and sample number. The sample locations will be numbered sequentially starting at number 001. The sample parcel number is P3 and the site identifier is "IF" for Inner Fence. The source of the sample is "SS" for surface soil. The type of sample is "IS" for incremental sample. The matrix is "SO" for soil.

An example of the sample ID code for the ninth soil sample collected from within Inner Fence would be P3IF-SS-IS-SO-009. MS/MSD samples are given the same sample ID as the analytical sample but have "MS/MSD" written on the label. Field duplicate and triplicate samples are blind samples to the laboratory and are given a unique sample ID. Soil samples will add "500" or "600", respectively, to the sample number to signify it is a duplicate or triplicate sample.

Field Decontamination

Non-disposable soil sampling devices (i.e., stainless steel step probe) shall be decontaminated prior to each use. The reusable devices shall be decontaminated by the following procedure:

1. Brush equipment with a wire or other suitable brush, if necessary or practicable, to remove large particulate matter;
2. Rinse with potable tap water;
3. Wash with nonphosphate detergent (e.g., Alconox) followed by a tap water rinse;
4. Rinse with 0.1 molar nitric acid (to remove trace metals, if necessary) followed by a tap water rinse;
5. Rinse with methanol (to remove organic compounds, if necessary) followed by a tap water rinse;
6. Rinse with potable tap water; and
7. Double rinse with deionized water.

Following decontamination, equipment will be placed in a clean area or on clean plastic sheeting to prevent contact with contaminated soil. If the equipment is not used immediately after decontamination, the equipment will be covered or wrapped in plastic sheeting, foil, or heavy-duty trash bags to minimize potential contact with contaminants.

Decontamination water generated during decontamination shall be containerized for disposal as investigation derived waste. Decontamination water will be sampled to characterize the waste and results will be provided to an appropriately permitted facility prior to disposal.

Soil Sample Analyses

Based on review of previous MEC items recovered from the Inner Fence Area and common MC found at munitions sites (as presented in EM 200-1-15), a list of analyte groups for the low-density MEC areas has been developed. Each analyte group listed in the RCRA permit was evaluated and rationale for including or excluding certain groups from the low-density MEC area sampling is provided below:

- Metals (will be included in analyte list) - commonly occurring MC in accordance with EM 200-1-15.
- Explosives (will be included in analyte list) - commonly occurring MC in accordance with EM 200-1-15.
- Perchlorate (excluded) - perchlorate is a commonly occurring MC in accordance with EM 200-1-15, but only for certain munition types (e.g., rockets, mines, warheads, flares, incendiaries, tracer rounds, fuzes, simulators). Approximately 1,600 stockpile and confirmation soil samples collected from the HWMU/HWMU-like areas have been collected for perchlorate without any exceedances of SSLs/RSLs or cumulative risk calculations. Since there have been no perchlorate exceedances at the HWMU/HWMU-like areas (i.e., the source area contributing to potential contamination at the Inner Fence), samples collected from the low-density MEC areas will not be analyzed for perchlorate.
- VOCs (excluded) - Per the NMED Disapproval Letter provided on November 7, 2019, VOCs are unlikely to be present as a result of the activities associated with low-density MEC areas. Therefore, samples collected from the low-density MEC areas will not be analyzed for VOCs.
- SVOCs/PCBs/Cyanide/Nitrate (excluded) - SVOCs, PCBs, cyanide, and nitrate are not commonly occurring MCs at munitions response sites. Approximately 1,600 stockpile and confirmation soil samples collected from the HWMU/HWMU-like areas have been collected for these analyte groups without any exceedances of SSLs/RSLs or cumulative risk calculations. Since there have been no exceedances at the HWMU/HWMU-like areas (i.e., the source area contributing to potential contamination at the Inner Fence), samples collected from the low-density MEC areas will not be analyzed for SVOCs, PCBs, cyanide, and nitrate.
- Dioxins/Furans (excluded) - dioxins/furans are not commonly occurring MCs at munitions response sites. Approximately 1,600 stockpile and confirmation soil samples have been collected from the HWMU/HWMU-like areas for these analyte groups with only a single reported exceedance from a stockpile sample (one exceedance [47 mg/kg] of the toxicity equivalency [TEQ] value [45 mg/kg] from more than 1,600 stockpile samples). The single previous exceedance was above the TEQ value at the time of sampling; however, that result is below the current TEQ value (49 mg/kg). Since there have been no exceedances of the current TEQ value at the HWMU/HWMU-like areas (i.e., the source area contributing to potential contamination at the Inner Fence), samples collected from the low-density MEC areas will not be analyzed for dioxins/furans.

Based on this assessment, each incremental soil sample will be submitted to Agricultural Priority Pollutants Laboratory, Inc. for chemical analysis for explosives (Method 8330B) and metals (USEPA Method 6020A).

Soil Sample Collection

For the planned incremental sampling as part of this field activity, a step probe or incremental sampling tool will be used. Incremental samples will be collected from the 0 to 0.5-foot interval using the following procedure:

- The UXO Technician will clear each sampling location/grid immediately prior to sampling and will offset the sample location as necessary to avoid any metallic anomalies in accordance with EM 385-1-97.
- Decontaminate sampling equipment.
- Record the sample location in the field logbook.
- Don a clean pair of nitrile gloves.
- Using a step probe or incremental sampling tool, collect 30 to 50 grams of soil from the 0 to 0.5-foot interval at each sample location. Add sample to bag.
- Pull the pin flag and continue until all increments in a sampling unit have been collected.
- The pin flags will be counted at the end of each sampling to verify the proper number of increments was collected.
- Label the sample containers and place on ice, complete the sample collection field sheet and COC, and pack the cooler(s) for shipment.

Sample Preservation and Storage

In the field, each sample container shall be marked with the sample identification number, date, time of sample collection and the sampler's initials. Sample containers for chemical analysis shall be placed in ice-filled coolers immediately following collection and stored at 4° Celsius prior to and during shipment. Sample containers shall be packaged to avoid breakage during transportation. COC shall be followed in accordance with USEPA SW-846. Preservation requirements for explosives are ≤6° Celsius. Hold times for explosives are 14 days to extraction/40 days to analysis. There are no preservation requirements of metals. Hold times for metals are 180 days to extraction/analysis, except for the mercury hold times which are 28 days to extraction/analysis.

For each sample to be submitted to the analytical laboratory for analysis, an entry shall be made on a COC form supplied by the laboratory. One COC form shall be completed for each cooler for each day of sampling. The information recorded on the COC form includes the sampling date and time, sample identification number, requested analyses and methods, and sampler's name.

COC forms shall be placed in a sealed plastic bag and placed inside of the cooler with the samples. Upon receipt of the sample cooler, the laboratory will verify custody and condition of the samples. Non-conformances in sample receipt (e.g., broken sample containers, samples received out of temperature) shall be documented on the sample receipt form and communicated to the project team immediately who will inform the USACE PM to discuss what corrective action, if any, may need to be taken.

Quality Assurance/Quality Control

Field QA/QC samples are designed to help identify potential sources of external sample contamination and to evaluate potential error introduced by sample collection and handling. Field QC can also provide insights into matrix homogeneity and uncertainty. All QA/QC samples are labeled with QA/QC identification numbers and sent to the laboratory with the other samples for analyses.

Duplicate and Triplicate Samples

Duplicate and triplicate samples are samples collected to assess precision of sampling and analysis. Duplicate and triplicate samples will be collected at the same time as the initial sample and from the same sampling unit. Replicates need to be collected at a rate of 10 percent of the daily sample collection count, or one duplicate and triplicate per day, whichever is more frequent. The duplicate and triplicate soil containers will be handled in the same manner as the primary sample. The duplicate and triplicate samples will be assigned QA/QC identification numbers, stored in an iced cooler, and shipped to the laboratory on the day they are collected. Duplicate and triplicate samples will be collected for the same parameters as the primary sample. Duplicate and triplicate samples will be blind to the laboratory.

The duplicate and triplicate samples will require the same number of increments as the primary sample. This will be done by marking primary, duplicate, and triplicate sample increment locations with three different colored pin flags, such as white for primary sample, red for the duplicate sample, and yellow for the triplicate sample. The sampling crew will collect all increments at locations marked with a white flag. This will be the primary sample. The crew will then collect aliquots at locations marked with a red flag. This will be the duplicate sample. The crew will then collect all the aliquots at locations marked by yellow pin flags. This sample will be the triplicate sample.

Matrix Spike and Matrix Spike Duplicates

The matrix sample, MS, and MSD data are used to evaluate the recovery of the analyte from the matrix (bias) and evaluate the reproducibility of the analyte in the MS/MSD (precision). Samples will be designated for MS/MSD analysis on the COC form and on the bottles. The laboratory will use soil from the processed incremental samples for the MS/MSD. It may be necessary to increase the sample volume for samples where this designation is to be made. MS/MSD samples will be collected from five percent of the total sample locations. In order to

ensure proper spacing, an MS/MSD will be collected at the first soil sample location, then every twentieth sample thereafter.

3.7.11 Risk Screening

3.7.11.1 Human Health

This section describes the general approach that will be used to complete a risk screening for the Inner Fence Area of Parcel 3.

Preliminary Site Conceptual Exposure Model

One of the first steps in formulating a risk screening for a site is developing a conceptual model of the site that identifies relevant exposure pathways and exposure scenarios. The preliminary site conceptual exposure model for the Inner Fence Area is discussed below and presented in **Figure 3-4**. Three groups of human receptors were identified as potentially applicable to the sites. A significant majority of the MEC removed from the Inner Fence area is at depths less than 12 inches below ground surface (bgs). Therefore, surface soil is the primary exposure medium for the Inner Fence. Potentially complete exposure pathways are provided for each receptor population.

- industrial/occupational worker (incidental ingestion of soil, dermal contact with soil, inhalation of airborne soil particulates and volatile emissions);
- resident (incidental ingestion of soil, dermal contact with soil, inhalation of airborne soil particulates and volatile emissions, and beef ingestion); and,
- construction worker (incidental ingestion of soil, dermal contact with soil, inhalation of airborne soil particulates and volatile emissions).

There are no permanent surface water bodies within the Inner Fence Area; therefore, the surface water exposure pathways were considered incomplete. Groundwater within the Inner Fence Area is being addressed as part of a separate RCRA Facility Investigation and not addressed in this Work Plan. If data collected from the Inner Fence Area indicate a more complex exposure pathway, the site conceptual model will be revised accordingly.

Soil Screening Levels

Screening values will include the NMED SSLs for residential, industrial/occupational, and construction worker land use scenarios (NMED 2019, or most current version). If an NMED SSL is not available for an analyte, the most current USEPA Regional Screening Level will be used for that analyte. The potentially complete soil exposure pathways will be evaluated for potential cancer risks and hazards through a risk-based screening process and calculation of cumulative risks as outlined in **Section 3.7.11**. Risk-based screenings and cumulative risk calculations will be conducted in accordance with the 2019 NMED risk assessment guidance. Additionally, in accordance with the 2019 NMED risk assessment guidance, risk refinements

(e.g., target organ assessments) will be used when unacceptable risks are identified for an individual sample.

Target Risk Levels

NMED SSLs are based on 1.0E-05 (1 in 100,000) target excess cancer risk or a target hazard quotient of 1.0 for noncarcinogens. Exceeding NMED SSLs means that further evaluation of chemical concentrations and exposure assumptions may be warranted.

Soil Exposure Intervals

NMED risk assessment guidance (NMED 2019) establishes the industrial/commercial exposure interval as 0 to 1-foot bgs. For residential and construction worker exposures, the interval is 0 to 10 feet bgs. MEC has been removed by non-mechanical means from the Inner Fence area outside of the HWMU and AOC 92. A significant majority of the MEC removed from the Inner Fence area is at depths less than 12 inches below ground surface (bgs). Therefore, the exposure interval for all receptors (residents, construction workers, and industrial/occupational worker) will be 0 to 1 ft bgs to assess potential risks to receptors. If any of the selected MEC sample locations are deeper than 1-foot bgs, then a sample will be collected at that depth and the results assessed for potential residential and construction worker risks.

Preliminary Screening Exposure Concentrations

The exposure concentration used in the preliminary screening will be the concentration for each analyte at each sampling location collected from the Inner Fence Area sample set.

Calculation of Cumulative Human Health Risk

NMED guidance indicates that the potential cumulative risks and hazards should be evaluated in the screening evaluation to conclude whether further evaluation may be necessary. Therefore, consistent with the guidance, screening will be performed by comparing the concentration of each chemical detected at each sample location with NMED SSLs (NMED 2019, or most current version). NMED has published SSLs for a resident, industrial/occupational worker, and construction worker. In the absence of NMED SSLs, USEPA RSLs (USEPA 2019, or most current version) will be selected (carcinogenic RSLs will be adjusted to a risk of 1.0E-05, consistent with NMED SSLs). Residential soil RSLs will be selected for resident. Industrial soil RSLs will be selected for the industrial/occupational worker. USEPA RSLs do not provide a construction worker RSL; therefore, a construction worker SSL will be calculated in accordance with NMED Risk Guidance (NMED 2019, or most current version).

SSLs for individual carcinogenic chemicals are based on a cancer risk of 1.0E-05. SSLs for individual noncarcinogenic chemicals are based on a hazard quotient of 1.0. Cumulative screening risks and hazards will be calculated for each sample as follows:

- Site Screening Risk = (C1/SSL1 + C2/SSL2 + ……Cn/SSLn) x 1.0E-05

- Site Screening Hazard Index = (C1/SSL1 + C2/SSL2 + ……Cn/SSLn) x 1
- Where:

  C1...Cn = Screening exposure concentration for chemical "1" to chemical "n".

  SSL1…SSLn = Soil screening level for chemical "1" to chemical "n" based on an SSL carcinogenic risk of 1.0E-05 or noncarcinogenic hazard of 1.0. Site risks less than the NMED target level of 1.0E-05 and hazard indices less than the NMED target level of 1.0 indicate that concentrations at the site are unlikely to result in adverse health impacts.

Risk Refinement

In accordance with NMED risk guidance (NMED 2019), if the total cancer risk is greater than the target risk level of 1.0E-05 or if the hazard index is greater than one, concentrations at the site may warrant further, site-specific evaluation. Further site-specific evaluation may include refinement of receptor-specific exposure point concentrations (EPCs) via target organ/system assessment for chemicals with a noncarcinogenic endpoint. A target organ/system assessment will be completed if cumulative hazard indices exceed 1.0 to determine if noncarcinogenic effects are additive. The process involves calculating hazard indices for each target organ or system and assessing whether or not the hazard index for an organ or organ system exceeds 1.0. No refinement will be completed if the sample cancer risk exceeds 1.0E-05 because exposure concentrations cannot be modified for the individual sample evaluation.

Soil to Groundwater Pathway

To verify that groundwater is not a medium of concern for the Inner Fence Area, the soil to groundwater pathway will be evaluated by comparing maximum detected site concentrations to the NMED default SSLs for protection of groundwater with a dilution attenuation factor (DAF) of 20 (NMED 2019). If a chemical does not have an NMED soil to groundwater SSL, then the USEPA protection of groundwater RSL would be used and adjusted to a DAF of 20. If a soil to groundwater SSL is exceeded, then the Inner Fence would be reassessed, and lines of evidence reviewed to determine whether or not further investigation of the pathway is warranted.

Beef Ingestion

NMED risk guidance (NMED 2019, Section 2.6) indicates two acres as the size of parcel requiring evaluation of the beef ingestion pathway. The Inner Fence in its entirety could provide enough land surface for grazing purposes. Additionally, grazing is a viable future land use for the area.

Therefore, in accordance with NMED risk guidance (NMED 2019), a qualitative assessment of ingestion of beef from cattle grazing on the Inner Fence Area will be completed and included in the Uncertainties Section of the risk screening.

Uncertainties

There are several sources of uncertainties associated with a human health risk screening. An uncertainties section will be included in the human health risk screening to discuss and address the various uncertainties encountered during the risk screening process.

3.7.11.2 Ecological Risk Screening

The overall objectives of an ecological risk screening are to understand how site-related chemicals may be distributed in relation to ecological receptors (including both habitats and/or species potentially present) and evaluate how the entities may be affected by those chemicals. Ecological risk evaluation procedures will be in general accordance with NMED's Risk Assessment Guidance for Site Investigations and Remediation, Volume 2 (NMED 2017, or most current version). NMED Guidance outlines two phases for completing an ecological risk screening:

- Phase I –Screening Assessments
- Screening Assessment (Tier 1 and 2)
- Phase II – Site-Specific Assessments
- Site-Specific Ecological Risk Screening (Tier 3).

This Work Plan presents the approach for a Phase I ecological risk screening. Tier 1 and Tier 2 screening methodologies are described below:

In Tier 1, maximum site concentrations of Contaminant of Potential Ecological Concern (COPECs) are compared with NMED ecological screening levels (ESLs) for representative receptor species. Based on an Inner Fence Area size of 319 acres, representative receptors specified in NMED ecological risk guidance are the plant community, deer mouse, horned lark, kit fox and red-tailed hawk. Plants may be directly exposed to soils, while higher trophic level receptors (i.e., birds and mammals) are exposed via incidental ingestion of soils, and through food-chain uptake into forage and prey. Tier 1 ESLs developed by NMED are based on toxicity reference values (TRVs) representing no-observed-adverse-effect levels (NOAELs). As surface soil is the primary exposure medium for the Inner Fence Area, a soil interval of 0 to 1 ft bgs will be used to evaluate all receptors.

If a Tier 2 Screening Level Ecological Risk Assessment (SLERA) is warranted following completion of Tier 1, less conservative methodologies are applied:

- Exposures are adjusted for site-specific conditions and less conservative and more representative assumptions are used. Specifically, exposure is quantified using a conservative estimate of the mean (95% UCL) rather than the maximum detected concentration. USEPA's ProUCL 5.1 software is used to calculate the 95% UCL of the mean, provided there are eight or more samples and more than four detections. The lower of the 95% UCL and the maximum

is selected as the EPC. If sample number or detections are too few to calculate a 95% UCL, the maximum detected concentration is used as the EPC.

- An ingestion exposure model approach is recommended by NMED for higher trophic level receptors. The model calculates an average exposure dose based on site media-specific concentrations, a receptors diet, uptake into forage/prey, ingestion rate and body weight, and the size of the area relative to a receptor's foraging range. An average exposure dose is compared with an oral TRV.
- COPECs are evaluated by comparing site EPCs with lowest-observed adverse effect levels rather than NOAEL TRVs.

Following each of the steps in the tiered process, results are evaluated to assess whether or not information is sufficient for making remedial decisions at the site (i.e., a technical decision point), or whether further evaluation may be warranted.

A preliminary ecological site conceptual exposure model is provided in **Figure 3-4**.

There are several sources of uncertainties associated with ecological risk estimates. An uncertainties section will be included in the ecological risk screening to discuss and address the various uncertainties encountered during the risk screening process.

3.8 SITE CONTROL DURING MUNITIONS AND EXPLOSIVES OF CONCERN OPERATIONS

For the purpose of this WP, a MEC operation is defined as any activity involving investigation, inspection, demolition, or the controlled movement of any MEC or explosive materials. Once a MEC operation commences in an area, only essential personnel involved in the on-site activities will be permitted into the MSD. The Explosive Safety Quantity-Distance Arcs for various scenarios are presented in the DDESB-approved ESS (PIKA 2015b).

Prior to the field mobilization, the FWDA POC will be contacted to limit access to the Inner Fence Area to personnel as a means to control site access. Signs will be posted to warn personnel and the public that hazardous operations are being conducted. The posted signs and project personnel will ensure that non-essential personnel are restricted from the exclusion zone (EZ) during MEC operations. Project personnel will maintain sharp vigilance to ensure that non-essential personnel do not encroach around posted signage into the EZ during MEC operations.

3.9 MINIMUM SEPARATION DISTANCES

3.9.1 Minimum Separation Distances

Parcel 3 is confirmed to contain ICM. MEC items identified at the Parcel 3 project site include a wide range of MEC and MPPEH to include various ICMs (e.g., BLU-3 and BLU-4 bomblets). Other munitions reportedly demolished in Parcel 3 at the KOA include M83(s), projectiles

ranging from 20mm to 240mm, bombs ranging from 3 to 10,000 pounds, and assorted rockets, mortars, missiles, land mines, grenades, flares, and bulk explosives. During intentional detonation operations, facilities or structures within the MSD will be vacated. During MEC operations, the SUXOS, UXOSO, and UXO team leaders will ensure that the applicable MSD based on the nature of the activity has been established and is maintained IAW the DDESB-approved ESS. The ESS with associated MSD figures is provided under a separate cover. All MSD restrictions will be established IAW this plan for the Inner Fence Area and will be enforced for all personnel during all operations/activities.

Sandbag or water mitigation may be used as engineering controls to reduce the intentional detonation MSD for MEC items that sandbag or water mitigation is permitted. These controls will be used IAW Huntsville Center (HNC)-ED-CS-98-7, Amendment 2 dated November 2014, HNC Safety Advisory dated 7 November 2011, and DDESB Memo dated 22 May 2014. Water mitigation will be used IAW HNC-ED-CS-S-00-3 Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions, dated September 2000. Tamping (single or multiple items) to reduce the MSD may be used in accordance with DDESB TP 16 and the Buried Explosion Module Version 6.3.3, or most current version. These documents will be available on site.

3.9.2 Minimum Separation Distances for Unintentional Detonations

The applicable MSDs for unintentional detonations for the Inner Fence Area are located in the DDESB-approved ESS.

Preliminary site work such as surveying does not require the establishment of an MSD for Quantity Distance purposes. The MSD restrictions during MEC operations apply to all non-essential personnel. Essential personnel are defined as those Army and subcontractor personnel essential to the safe and effective performance of the MEC removal activities along with those approved and authorized visitors; all others are designated as non-essential.

3.10 DISPOSITION TECHNIQUES

3.10.1 Munitions and Explosives of Concern Disposal

All MEC encountered during site activities will be properly disposed. MEC disposal operations will be supervised by the SUXOS and coordinated with the OESS and other site contractors. MEC disposal operations will be conducted IAW the procedures outlined in USACE EM 385-1-97, Change 1, Explosives Safety and Health Requirements Manual.

Detailed MEC demolition procedures are detailed in **Section 3.10.5**. Physical control of the on-site disposal operations will be accomplished by blocking access roads/trails to the site at the point of the EZ. Control of the disposal operations must be maintained to ensure no unauthorized access of the site by non-essential personnel. During disposal preparation, all non-essential personnel must evacuate to locations outside the applicable MSD to a designated

location, and all essential personnel will be evacuated to a designated safe location prior to the initiation of the disposal shot. Evacuation routes are shown on **Figure 3-3**.

When permitted, MEC disposal operations may be conducted using sandbag or water mitigation as described in **Section 3.9.1**. While preparing MEC for disposal, the UXOSO will ensure the number of personnel on-site is kept to the minimum required to safely accomplish the disposal task. If required, the FWDA POC will be contacted to assist with the coordination for the evacuation of non-essential personnel from all inhabited buildings and storage structures within the MSD IAW with this plan and the approved ESS as amended.

3.10.2 Munitions and Explosives of Concern Transportation

If MEC is encountered that is determined unacceptable to move, BIP operations will be conducted. In the event MEC is determined acceptable to move, transportation of MEC will be done in a specially-equipped pickup truck, dump truck or flatbed truck. MEC determined acceptable to move will be relocated to the ECMs under CE control or the 10-day CAMU permitted temporary storage area for later disposal at the CAMU IAW with this WP.

3.10.3 Planned or Established Demolition Areas

The CAMU will be used as an established demolition area. CAMU operation details are presented in **Section 3.11**.

3.10.4 Collection Points and Consolidated Shots

In-grid collection points are those areas used to temporarily accumulate MEC pending disposal. MEC items at collection points must be laid out as shown in "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites." The maximum net explosive weight (NEW) at a collection point will be limited such that the K40 overpressure distance for the total NEW does not exceed the hazardous fragment distance for the area.

Collecting multiple MEC is anticipated for this project. If determined acceptable to move by the SUXOS and UXOSO, consolidated MEC disposal shots at the CAMU are anticipated for this project, and U.S. Army Engineering and Support Center, Huntsville (USAESCH) publication "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites", dated March 2000 will be used; a copy of this report will be available on site. The maximum NEW for a consolidated shot will be limited such that the K328 overpressure distance for the total NEW (including donor charges) does not exceed the MSD for the intentional detonation.

3.10.5 MEC Demolition Procedures

Prior to beginning disposal operations, an appropriate exclusion zone will be established around the demolition activity. The exclusion zone will be based on MSD calculations for the specific item being disposed of or the MSD established in the approved ESS. For consolidated shots, the

MSD will be selected based upon either the cumulative NEW overpressure distance or the appropriate fragment range, whichever is greater.

Electric demolition, remote firing device, and shock tube/nonelectric (NONEL) are the three methods that may be utilized for demolition operations. The operations will be completed in accordance with in Technical Manual (TM) A-1-1-31 and are generally described below:

- Once the demolition charges have been primed and set and all personnel have returned to the firing point, a head count will be taken. The team will verify that all notifications have been made and all site personnel have taken cover.
- Safety signals will be used in accordance with EM 385-1-1
- If there is no response from the verbal notification, the charge will be initiated.
- After the detonation, a 5-minute wait time will be observed.
- After the 5-minute wait time, the Demolition Team Leader and one other UXOQP Technician will proceed to the shot area. One person will check the shot, and the second will remain at a safe distance to render assistance or aid, if required. The team will complete a thorough search of the shot hole and immediate area with a magnetometer to verify that complete demolition was accomplished.
- The SUXOS will notify all personnel with an audible "all clear" that the shot is clear and they may leave the safe area and open access roads as applicable.

The following will be observed during demolition activities:

- The number of persons involved in MEC disposal operations will kept to a minimum, consistent with safe performance of the work at hand. Personnel will not be allowed to work alone.
- Only the Demolition Team, OESS, SUXOS, UXOSO, and UXOQCS will be permitted in the area where charges are being assembled and demolition operations are being conducted.
- MEC disposal operations will not commence without a functioning communications capability between all disposal team members. The audible signals described in EM 385-1-1, Paragraph 29.H.04 will be sounded before any attempt is made to fire a demolition shot.
- All access roads to the demolition area will be secured and the site will be visually checked for any unauthorized personnel.
- The team will comply with the authorized explosive limits and safe separation distances of teams.
- The team will discontinue explosive operations when an unforeseen hazardous condition develops and will not resume operations until the condition is corrected.
- Smoking, matches, electronic cigarettes, or other flame-producing materials will not be permitted within 100 ft of an area in which explosives are being handled. Smoke only in designated areas.

- During demolition operations, an emergency vehicle will be designated (in addition to the vehicle associated with the Demolition Team) that will remain in the area.
- Demolition operations will only be conducted during daylight hours.
- Explosives and munitions items will be protected from the elements and static electricity.
- Only authorized spark-resistant tools will be used within 15 ft of exposed energetic materials.
- MEC will not be used for donor charges in demolition operations.

3.11 CORRECTIVE ACTION MANAGEMENT UNIT OPERATION

The CAMU, located in Parcel 3, SWMU 14, is operated under Section IX of the FWDA RCRA Permit and will be used for destruction and desensitization of MEC by OB/OD. The CAMU will be operated for destruction and desensitization of MEC (too dangerous to remove from FWDA) determined by the SUXOS, UXOSO, and the OESS. The operations of the CAMU will include detonations and burning as determined by the nature of the MEC.

During periods of operation at the CAMU, dry grass, leaves, and other flammable vegetation will be removed for a distance of at least 200 ft from the treatment units. Live vegetation will not be allowed to exceed a height of six inches within 200 ft of the treatment units. The CAMU will be cleared at the conclusion of each treatment by visually clearing the dirt in the pit, removing the resulting ash after each burn, and all scrap and MD after each detonation.

Designated temporary storage area(s) for recovered MEC will be located within the CAMU and will be used only if treatment and disposal processes are delayed. The temporarily stored materials will be treated/disposed of as soon as the next treatment/demolition day can be scheduled. At no time will items be held within the CAMU for more than 10 calendar days. Any materials placed in the designated temporary storage area will be properly containerized (where possible), segregated, and stacked in a manner minimizing the possibility of spreading contamination. This area (i.e., Parcel 3) provides the required security measures, as it is within a locked and controlled double fence. The FWDA caretaker performs security checks of the area, as required.

The amount of MEC treated at the CAMU will not exceed 200 pounds NEW per event. Treatments will not exceed 1,000 pounds NEW in any seven-day period. A log will be maintained detailing NEW consumption of donor charges and MEC per event/day/week by type, location and methodology to ensure expenditures are maintained within specified limitations.

At the CAMU, MEC, explosive components, and other associated components such as propellants, bulk explosives, metal powders, detonators, and miscellaneous munitions constituents will be treated. Incidental solid wastes such as wooden or metal ammunition boxes, banding material and containers that can be safely separated from the munitions item/constituent, will upon successful inspection, be certified as MDAS IAW DoD and USACE regulations and requirements. These wastes will then be sent off-site for recycling or disposal.

In addition to MEC/MPPEH/MD items being recovered from the project, MEC/MPPEH/MD may also be treated if found on other Parcels of FWDA by USACE or other contractors. These items will be managed through inspection upon receipt, inventory documentation, storage, and treatment/demolition utilizing the same procedures described above.

3.11.1 Corrective Action Management Unit Records

Pursuant to Section IX.M of the Permit, during the operations of the CAMU, the treatment and maintenance operations for the CAMU will continue to be documented. The records will include volume and type of munitions treated, method of treatment, type and volume of ignition source or donor charges, estimated volume of incidental solid waste treated, reason separation (of the solid waste) was not possible, and date and time of each treatment. In addition, a detailed record of the maintenance and repairs conducted to prevent migration of contamination at the CAMU will also be documented. This logbook record will be maintained at the field office, with a copy located at the FWDA information repository (located at: Ft. Wingate Army Depot, 7 Miles East of Gallup, Bldg. 1, Ft. Wingate, NM 87316). The log book will made available for review during normal business hours.

3.12 MECHANIZED MEC REMOVAL AND SOIL SAMPLING

If areas beyond the HWMU boundary, but within the Inner Fence Area are identified as "HWMU-like", then mechanized MEC removal and confirmation soil sampling will be conducted in those areas.

It is also possible that "HWMU-like" surface and subsurface conditions are identified at the outermost decision units of the Inner Fence (i.e., grids that extend up to the fence line). The adjacent soils outside of the fence line will also undergo confirmation soil sampling as described in **Section 3.12.5**. A similar grid system (e.g., 100 ft by 100 ft) will be established along the fence line, adjacent to the outermost contaminated grids to guide soil sampling efforts.

3.12.1 Identification of Areas Requiring Mechanized MEC Removal

Potential areas requiring mechanized MEC removal procedures will be evaluated in the field by both the contractor and Army personnel. The identification process will be completed, tracked, and documented using a grid methodology. As shown **Figure 3-1**, a typical grid in the Inner Fence Area will be 100 ft by 100 ft in size. Field staff will visually inspect the ground surface of each grid and utilize hand-held detectors (e.g., Schonstedt 52Cx or equivalent and White's XLT or equivalent) to evaluate the subsurface conditions of the grid. If the surface and/or subsurface conditions of the grid contain a sufficient number of anomalies such that excavation and processing the material through a processing plant would be more efficient and safer than manual excavation, then the grid will be marked for mechanized MEC removal and confirmation soil sampling. In general, grids requiring mechanized MEC removal will exhibit anomaly densities so high that single point anomalies cannot be acquired.

3.12.2 Excavation Method

Once areas are identified for mechanized MEC removal, debris and incidental soils will be excavated using a large remote controlled excavator. The remote excavator operator will be located inside an armored operating station, positioned beyond the K18 distance in accordance with the DDESB-approved ESS. Additionally, the operator will don the PPE required in accordance with the ESS.

The excavator will start at the edge of an excavation area and excavate lifts of soil from the area. Once a single lift has been completed, the excavator will remove the next lift. As the soils and debris are removed, the excavator will place the soils and debris into a conveyor system for transport to the processing plant (described in **Section 3.12.3**). Excavation operations will generally be completed working from upstream to downstream (south to north) of the arroyo to prevent re-contamination of the areas where excavation work has been performed.

When the limits of an excavation have been reached, UXO technicians will complete an instrument aided visual inspection of each excavation to verify that debris has been removed prior to collecting digital geophysical mapping (DGM) on the excavation. The visual inspection will be completed by a UXO technician equipped with handheld detectors such as a Schonstedt GA-52CX magnetic locator or a White's or Minelab's all metal detector. The UXO technician will visually inspect the surface and use the detector to identify any area that may have a high density of subsurface anomalies and require additional removal. If visual or detector evidence of debris is not identified, the area will be considered ready for DGM collection. Completed excavations will be mapped with DGM equipment to verify and document that the debris has been removed. If the DGM results indicate that additional target anomalies remain in the excavation, the target anomalies will be removed and additional DGM will be collected.

3.12.3 Debris and Soil Processing

The debris and soil processing will be completed using a closed-loop screening and separation plant. The process will separate material 5/8-inch or larger from soils. The process consists of multiple magnets, size reduction equipment, and screens coupled with an eddy current non-ferrous metal separator.

The multi-stage materials screening plant will be erected to receive and process materials. Armoring for the protection of personnel will be in accordance with the DDESB-approved ESS. The plant will be operated from a remote control station, armored in accordance with the DDESB-approved ESS. The screen plant operator will be able to observe and control the conveyors, screens, hammer mill, and electromagnets. The screen plant operator will remain in constant contact with the loader operator, UXO technicians, and site supervision. In addition, all manned inspection locations and the remote control tower will be equipped with an emergency kill switch.

3.12.4 Post-Excavation DGM

After soil within the excavation area has been removed for soil processing, the area will undergo 100 percent DGM to identify where additional debris removal is still required. Large areas of contamination will be subject to additional remote mechanical excavation, while single point target anomalies will be resolved by UXO personnel. Following excavation or resolution of single point target anomalies within each area (i.e., grid, acre), additional DGM will be completed to verify that anomalies have been resolved.

The area will be divided into square grids of approximately 200-foot-by-200-foot (60 meters by 60 meters, or 0.94 acre) to simplify tracking of DGM completion and areas requiring further remediation. Consideration will be given to grids of different dimensions if site conditions or findings call for grids different from 200-foot-by-200-foot squares. The grid-based survey will be conducted through deployment of a fixed line pattern with approximately 2-foot (0.6 meter) line spacing, resulting in consistent data density throughout the survey area. Prior to conducting the survey, grid corner coordinates will be exported from the GIS for location in the field. Grid-based data will be reviewed in GIS and overlain on the survey grid layout.

3.12.4.1 Geophysical Equipment Electromagnetic System

The Geonics, Ltd., EM61 MK2 is a time-domain electromagnetic system and will be the primary DGM system used during the removal. The EM61 sensors detect electrically conductive and magnetically susceptible objects. A current pulse within the transmitter coil creates the primary electromagnetic field. Changes in this primary field set up eddy currents in the nearby conductive objects. The changing eddy currents produce a secondary or induced electromagnetic field emanating from the object. This induced electromagnetic field is associated with the decay of eddy currents in metal objects near the sensor and is measured by the receiver coil, the output signal being proportional to the rate of change of the electromagnetic flux through the receiver coil. The receiver is timed to measure the signal within four time gates (216, 336, 660, and 1,266 microseconds) after the primary electro-magnetic field within the ground has dissipated. An anomalous secondary electromagnetic field implies a metal object is present, and the signal strength of the secondary field can be used to estimate its size. The EM61 can record up to 16 records per second with four time gates per record, typical operations often record 10 records per second with four time gates per record. Two EM61 configurations are anticipated to be utilized at FWDA; a single, man-portable 1.0 by 0.5 meter coil and a three-coil vehicle-towed array. All EM61 coils utilized in the survey will contain both a transmitter and receiver and will be located no higher than 42 centimeters above the ground surface.

3.12.4.2 Navigation and Positioning Equipment

Real-time kinematic (RTK) GPS will be used to determine the location of the EM61 sensors. This system consists of a rover and base station and provides centimeter level accuracy. The RTK GPS base station will be set up based over known benchmarks in close proximity to the excavation area. An RTK Rover will be mounted over the EM61 coil(s) and interfaced with the data logger to record positional data coincident with instrument readings. Correction data will be

radio transmitted from the base station to the rover. The RTK GPS readings will be recorded at a minimum rate of 1 Hertz (Hz). The positional information will be logged in the projected coordinate system; NAD83, State Plane New Mexico, U.S. Survey feet.

3.12.4.3 General Field Procedures

Data will be collected using either a single coil, wheeled, man-portable system or a towed array of more than one coil. The multiple coil towed array will have a synchronization cable between the instrument electronics to allow the sensors (i.e., coils) to operate independently without any significant interference. The coils of the EM61 will be oriented with the long axis perpendicular to the direction of travel. The average velocity of the man-portable data collection system will be 2 mph, and the average velocity of the towed array data collection system will be 2 mph. Using a collection rate of 10 Hz, the man-portable system sampling interval will be at least one reading per 10 centimeters.

3.12.4.4 Standard Data Processing and Target Selection

The most common, standard approach used to select anomalies is referred to as "threshold picking." The standard approach for target selection will be applied to data using the following steps:

- Isolated electromagnetic anomalies will be selected from the gridded data (filtered summation channel) utilizing a peak-picking algorithm (Blakely test or equivalent).
- A grid value cutoff level (threshold) will be determined in agreement with specific requirements as indicated from the geophysical system verification process.
- Data will be reviewed visually by the processor, and any anomalies that may have been missed by the peak-picking algorithm but with peak value above the threshold, or areas masked by larger adjacent anomalies, will be manually selected, and any overlapping or duplicate anomalies will be manually removed.
- Anomalies selected will be summarized in an anomaly table which will include entries for optional columns used in making the dig sheet.

3.12.4.5 Dig Sheet Development

An intrusive investigation target list will be developed based on the various criteria mentioned above. The methodology for final detection and selection of anomalies will be documented and available for review. Anomaly, dig selection, and intrusive results tables will be submitted digitally in accordance with Data Item Description (DID) MMRP-09-004, Geophysics. The dig sheet will include all anomalies which have peak responses above the required threshold as well as those manually picked using analysis of both the footprint and shape of the anomaly. Each target list will include:

- Title information
- Project number

- Location of the survey (grid number)
- Target information
- Unique identification number
- Easting and northing positional data
- Grid value (millivolt reading and channel information)
- Dig results
- Reacquired instrument response
- Dig team
- Anomaly description
- Anomaly type (MEC, MD, RRD)
- Offset distance
- Offset direction
- Depth to top
- Weight
- Length
- Multiple (number of pieces)
- Date and time
- Post-dig target anomaly resolution verification
- Post dig target anomaly resolution verification check
- Verifiers initials
- Date
- UXOQCS target anomaly resolution inspection results (where applicable)

All targets will be reported in NAD83, State Plane, New Mexico West, U.S. Survey feet.

3.12.4.6 Anomaly Reacquisition

The purpose of anomaly reacquisition is to verify that detected and selected anomalies are marked for excavation. The anomaly reacquisition team will reacquire the geophysical anomalies identified for excavation on the dig sheets using the same type of instrument as the original digital survey (i.e., EM61). Each reacquisition team will complete a static background test followed by a cable shake and operator test at the beginning of each day to record instrument background readings, measure electronic drift, locate potential interference spikes, and confirm that cable connections and operators are not a significant noise source. These tests will be

performed if equipment malfunctions and every time equipment is replaced. The morning test will include: 1) a static background collection after a 15-minute instrument warm-up, 2) a cable shake test, and 3) each operator approaching and stepping away from the instrument. An ISO item will then be reacquired in the Instrument Verification Strip (IVS) and the location and instrument response noted in the team log.

The anomaly reacquisition will be conducted by operations using the following general sequence and procedures:

1. Target lists will be generated with unique identification numbers, easting and northing positional data, peak value, and target file name. All selected targets will be reported in NAD83, State Plane New Mexico, U.S. Survey feet, and submitted for internal review and approval.
2. Geophysical and navigational instruments will be set up.
3. After warming up of equipment, opening QC tests will be conducted.
4. The results of QC tests will be written on daily QC forms.
5. If the results of the IVS are within the predicted bounds identified in the initial IVS testing results, the operator may begin reacquisition.
6. The target lists will be given to the intrusive teams, who will relocate the targets using RTK GPS and mark the location with a polyvinyl chloride pinflag and high-visibility paint.
7. After relocation, the team will use the EM61 to locate the peak of the response. They will pass over the anomaly in two perpendicular directions in order to locate the response peak as accurately as possible.
8. Finally, the distance between the flag and position of the recovered material will be recorded on the dig sheets.
9. At the completion of data collection, both the closing QC tests and IVS will be performed.
10. Results will be written on the QC form.
11. At the end of the day, instruments and cables will be visually checked, and batteries will be recharged.
12. Data will be downloaded, backed up, and sent to the data manager. Field logs and documentation will be prepared, signed, and sent.

The anomaly reacquisition team will also document anomalies that cannot be reacquired (false positives) for follow-up by the QC Team.

3.12.5 Confirmation Soil Sampling

Following the completion of post-excavation DGM, soil samples will be collected from the limits of the remedial excavations to characterize the soils remaining for future action(s). Two different soil sampling approaches will be utilized within the Inner Fence Area depending on the

depth of the excavation area or grid being investigated. Based on NMED Comment No. 7 provided on the Final Inner Fence WP, Revision 1 (**Appendix B**), sampling protocols used for the HWMU removal are to be followed for excavations deeper than 2 ft. This approach was also confirmed during a teleconference with NMED held on June 13, 2018. For areas where the excavation is less than 2 ft in depth, a discrete soil sampling methodology will be utilized in lieu of composite soil sampling. Confirmation soil sampling protocols for excavations greater than 2 ft in depth and less than 2 ft in depth are presented in the following subsections.

The locations of the samples will be based upon the final size and orientation of each excavation. Each excavation or grid will be sampled for the constituents listed in Section III.A.4 of the FWDA RCRA Permit. The purpose of the confirmation soil sampling is to determine if the remaining soil in areas requiring mechanical excavation pose a risk to receptors. If unacceptable risk remains after evaluation of the initial confirmation sampling, then additional excavation will be performed and the areas will be resampled and risk will be reassessed. The process will be repeated until an acceptable risk condition is achieved. Acceptable risk is defined as a cumulative excess cancer risk of 1.0E-05 or less and a target hazard index of 1.0 or less. The confirmation sample risk screening methodology and process is provided in **Section 3.12.6**.

Screening values will include values from the NMED approved Soil Background Study and Data Evaluation Report (Shaw 2010) and the NMED SSLs for residential, industrial/occupational, and construction worker land use scenarios (NMED 2019, or most current version). If an NMED SSL is not available for an analyte, the most current USEPA Regional Screening Level will be used for that analyte. When background concentrations of a constituent exceed the NMED residential screening value, then the background concentration for that constituent will be used as the screening value. If the site maximum concentration exceeds the background value, then the NMED SSL will be used to estimate site risks associated with that constituent. If the site maximum concentration is below the background value, then site risk will not be calculated for that constituent. The potentially complete soil exposure pathways will be evaluated for potential cancer risks and hazards through a risk-based screening process and calculation of cumulative risks as outlined in **Section 3.12.6**. Risk-based screenings and cumulative risk calculations will be conducted in accordance with the 2019 NMED risk assessment guidance for each excavation area or grid. Additionally, in accordance with the 2019 NMED risk assessment guidance, risk refinements (e.g., 95% Upper Confidence Limits [UCLs] and/or target organ assessments) will be used when maximum concentrations represent unacceptable risks for an excavation area/grid. The risk screening methodology and process is discussed in more detail in **Section 3.12.6**.

3.12.5.1 Confirmation Soil Sampling Method (Excavations Greater than 2 Feet in Depth)

Samples will be collected from the bottom and sidewalls of each excavation. Each excavation will likely vary significantly in shape and size; therefore, a composite sample will be collected from at least every 100 linear feet of sidewall. The total length of excavation sidewall will be measured and rounded up to the nearest 100 ft to determine the number of composite samples to be collected from the excavation (e.g. an excavation with 347 ft of sidewall will have four samples). The sample locations will be spaced equally along the sidewall (e.g. an excavation

with 347 ft of sidewall will have four composite samples collected, one from each 86 foot segment of sidewall). For excavations having less than 200 ft of sidewall, three composite samples, spaced equally, will be collected from the sidewalls (e.g. an excavation with 180 ft of sidewall will have a composite sample collected from each 60 foot segment of sidewall).

If an excavation is deeper than 20 ft, a composite sample will be collected for every ten ft of depth every 100 ft of sidewall.

A composite sample will be collected from the bottom of each excavation that is less than 100 ft by 100 ft (10,000 square ft). For excavations larger than 100 ft by 100 ft (10,000 square ft), a composite sample will be collected for every 10,000 square ft of bottom area. The total area of excavation bottom will be estimated and rounded up to the nearest 10,000 ft to determine the number of samples to be collected from the excavation (e.g. an excavation with 13,000 square ft of bottom area will have two composite samples).

Each sample area will consist of one discrete soil sample for volatile organic compounds (VOCs) (Method 8260B) and one composite sample collected and analyzed for target analyte list metals (Method 6010B/6020A/7471B), semi-volatile organic compounds (Method 8270D), explosives (Method 8330B), polychlorinated biphenyl aroclors (Method 8082A), nitrate (Method 9056A), cyanide (Method 9014), dioxins/furans (Method 8290), and perchlorate (Method 6850) as stipulated in Section III of the FWDA RCRA Permit. Each composite sample will be comprised of nine subsamples randomly collected from within each sampling area. Each sample will be submitted to Agricultural Priority Pollutants Laboratory, Inc. for chemical analysis. QC samples will be collected at a frequency of 10 percent.

3.12.5.2 Sampling Procedures (Excavations Greater than 2 Feet in Depth)

Sampling Equipment

Soil will be collected using a stainless steel spoon or trowel or disposable sampling equipment. Certified, pre-cleaned sample containers obtained from the laboratory shall be used to store the samples prior to laboratory analyses. Sample volumes, container types, and preservation requirements shall be followed per specific method requirements in accordance with USEPA SW-846.

Sample Identification

Samples collected during site activities will have discrete sample identification numbers. These numbers are necessary to identify and track each of the many samples collected for analysis during the life of this project. In addition, the sample identification numbers will be used in the database to identify and retrieve the analytical results received from the laboratory. Each sample is identified by a unique code that indicates the parcel number, site identifier, matrix, sample location identifier, and sample number. The sample locations will be numbered sequentially starting at number 001. The sample parcel number is P3 and the site identifier is "IF" for Inner Fence. Source of samples IDs will incorporate matrix IDs, include the following:

- SW - Side Wall
- EB - Excavation Bottom
- Grid - Surface soil sample collected from soils in the remainder of the site

An example of the sample ID code for the first soil sample collected from the bottom of grid F10 would be P3IF-GRID-F10-001. Matrix spikes/matrix spike duplicates (MS/MSD) samples are given the same sample ID as the analytical sample but have "MS/MSD" written on the label. Field Duplicate samples are blind samples to the laboratory and are given a unique sample ID. Soil samples will add 100 to the sample number to signify it is a duplicate location.

Field Decontamination

Disposable sampling equipment (e.g., plastic spoons and disposable buckets) does not require decontamination. If non-disposable soil sampling devices are used (e.g., stainless steel spoons), the devices shall be decontaminated prior to each use. The reusable devices shall be decontaminated by the following procedure:

1. Brush equipment with a wire or other suitable brush, if necessary or practicable, to remove large particulate matter;
2. Rinse with potable tap water;
3. Wash with nonphosphate detergent or other detergent approved by NMED followed by a tap water rinse;
4. Rinse with 0.1 molar nitric acid (to remove trace metals, if necessary) followed by a tap water rinse;
5. Rinse with methanol (to remove organic compounds, if necessary) followed by a tap water rinse;
6. Rinse with potable tap water; and
7. Double rinse with deionized water.

Decontamination water generated during decontamination shall be containerized for disposal as investigation derived waste. Decontamination water will be sampled to characterize the waste and results will be provided to an appropriately permitted facility prior to disposal.

Soil Sample Collection

The following procedure should be used to collect surface excavation soil samples:

1. Decontaminate sampling equipment.
2. Record the sample grid location in the field logbook.
3. Don a clean pair of nitrile gloves.

4. Using a decontaminated spoon or trowel, remove soil from separate one square foot areas of each mini-grid until the sampling depth of 0.5 ft is reached.
5. Collect the discrete soil for VOCs using the Terra Core® sampler from the center mini-grid. Fill 40 milliliter volatile organic analysis vials with 5 gram plugs.
6. Collect a composite soil sample for all other parameters using a decontaminated stainless-steel sampling spoon from all mini-grids into a decontaminated stainless steel bowl.
7. Composite the soil by thoroughly mixing the soil in the decontaminated stainless-steel bowl with the sampling spoon. Fill the jar for the specified analyses.
8. Label, store, and document sample
9. Record applicable information on the Sample Collection Field Sheet.

Sample Preservation and Storage

In the field, each sample container shall be marked with the sample identification number, sampling location, date, time of sample collection and the sampler's initials. Sample containers for chemical analysis shall be placed in ice-filled coolers immediately following collection and stored at 4° Celsius prior to and during shipment. Sample containers shall be packaged to avoid breakage during transportation. COC shall be followed in accordance with USEPA SW-846.

For each sample to be submitted to the analytical laboratory for analysis, an entry shall be made on a COC form supplied by the laboratory. One COC form shall be completed for each cooler for each day of sampling. The information recorded on the COC form includes the sampling date and time, sample identification number, requested analyses and methods, and sampler's name.

COC forms shall be placed in a sealed plastic bag and placed inside of the cooler with the samples. Upon receipt of the sample cooler, the laboratory will verify custody and condition of the samples. Non-conformances in sample receipt (e.g., broken sample containers, samples received out of temperature) shall be documented on the sample receipt form and communicated to the project team immediately.

Quality Assurance/Quality Control

Field QA/QC samples are designed to help identify potential sources of external sample contamination and to evaluate potential error introduced by sample collection and handling. All QA/QC samples are labeled with QA/QC identification numbers and sent to the laboratory with the other samples for analyses.

Duplicate Samples

Duplicate samples are samples collected to assess precision of sampling and analysis. A duplicate sample will be collected at the same time as the initial sample from ten percent of the total sample locations. The initial sample containers for a particular parameter or set of

parameters will be filled first then the duplicate sample containers for the same parameter(s), and so on until all necessary sample bottles for both the initial sample and the duplicate sample have been filled. The duplicate soil containers will be handled in the same manner as the primary sample. The duplicate sample will be assigned a QA/QC identification number, stored in an iced cooler, and shipped to the laboratory on the day it is collected. Duplicate samples will be collected for all parameters. The soil will be divided evenly and then homogenized separately. Duplicate samples will be blind to the laboratory.

Matrix Spike and Matrix Spike Duplicates

MS/MSDs are used to assess the potential for matrix effects. Samples will be designated for MS/MSD analysis on the COC form and on the bottles. It may be necessary to increase the sample volume for samples where this designation is to be made. MS/MSD samples will be collected from five percent of the total sample locations.

3.12.5.3 Confirmation Soil Sampling Method (Excavations Less than 2 Feet in Depth)

Samples will be collected from the bottom and sidewalls of each excavation. Each excavation will likely vary significantly in shape and size; therefore, a discrete sample will be collected from at least every 20 linear feet of sidewall. The total length of excavation sidewall will be measured and rounded up to the nearest 20 ft to determine the number of discrete samples to be collected from the excavation (e.g. an excavation with 47 ft of sidewall will have three samples). The sample locations will be spaced equally along the sidewall (e.g. an excavation with 47 ft of sidewall will have three discrete samples collected, one from each 15-foot segment of sidewall).

A discrete sample will be collected from the bottom of each excavation at a rate of one per every 400 square ft. The total area of excavation bottom will be estimated and rounded up to the nearest 400 square ft increment to determine the number of samples to be collected from the excavation (e.g. an excavation with 13,000 square ft of bottom area will have 33 discrete samples).

Each discrete soil sample will be analyzed for VOCs (Method 8260B), target analyte list metals (Method 6010B/6020A/7471B), semi-volatile organic compounds (Method 8270D), explosives (Method 8330B), polychlorinated biphenyl aroclors (Method 8082A), nitrate (Method 9056A), cyanide (Method 9014), dioxins/furans (Method 8290), and perchlorate (Method 6850) as stipulated in Section III of the FWDA RCRA Permit. Each sample will be submitted to Agricultural Priority Pollutants Laboratory, Inc. for chemical analysis. QC samples will be collected at a frequency of 10 percent.

3.12.5.4 Sampling Procedures (Excavations Less than 2 Feet in Depth)

Sampling Equipment

Soil will be collected using a stainless steel spoon or trowel or disposable sampling equipment. Certified, pre-cleaned sample containers obtained from the laboratory shall be used to store the samples prior to laboratory analyses. Sample volumes, container types, and preservation requirements shall be followed per specific method requirements in accordance with USEPA SW-846.

Sample Identification

Samples collected during site activities will have discrete sample identification numbers. These numbers are necessary to identify and track each of the many samples collected for analysis during the life of this project. In addition, the sample identification numbers will be used in the database to identify and retrieve the analytical results received from the laboratory. Each sample is identified by a unique code that indicates the parcel number, site identifier, matrix, sample location identifier, and sample number. The sample locations will be numbered sequentially starting at number 001. The sample parcel number is P3 and the site identifier is "IF" for Inner Fence. Source of samples IDs will incorporate matrix IDs, include the following:

- SW - Side Wall
- EB - Excavation Bottom
- Grid - Surface soil sample collected from soils in the remainder of the site

An example of the sample ID code for the first soil sample collected from the bottom of grid F10 would be P3IF-GRID-F10-EB-001. MS/MSD samples are given the same sample ID as the analytical sample but have "MS/MSD" written on the label. Field Duplicate samples are blind samples to the laboratory and are given a unique sample ID. Soil samples will add 100 to the sample number to signify it is a duplicate location.

Field Decontamination

Disposable sampling equipment (e.g., plastic spoons and disposable buckets) does not require decontamination. If non-disposable soil sampling devices are used (e.g., stainless steel spoons), the devices shall be decontaminated prior to each use. The reusable devices shall be decontaminated by the following procedure:

1. Brush equipment with a wire or other suitable brush, if necessary or practicable, to remove large particulate matter;
2. Rinse with potable tap water;
3. Wash with nonphosphate detergent or other detergent approved by NMED followed by a tap water rinse;

4. Rinse with 0.1 molar nitric acid (to remove trace metals, if necessary) followed by a tap water rinse;
5. Rinse with methanol (to remove organic compounds, if necessary) followed by a tap water rinse;
6. Rinse with potable tap water; and
7. Double rinse with deionized water.

Decontamination water generated during decontamination shall be containerized for disposal as investigation derived waste. Decontamination water will be sampled to characterize the waste and results will be provided to an appropriately permitted facility prior to disposal.

Soil Sample Collection

The following procedure should be used to collect surface excavation soil samples:

1. Decontaminate sampling equipment.
2. Record the sample grid location in the field logbook.
3. Don a clean pair of nitrile gloves.
4. Using a decontaminated spoon or trowel, remove soil from a one square foot area at the discrete soil sample location until the sampling depth of 0.5 ft is reached. Fill the sample container for the specified analyses (i.e., all except for VOCs).
5. Collect the discrete soil for VOCs using the Terra Core® sampler from the sample location. Fill 40 milliliter volatile organic analysis vials with 5 gram plugs.
6. Label, store, and document sample
7. Record applicable information on the Sample Collection Field Sheet.

Sample Preservation and Storage

In the field, each sample container shall be marked with the sample identification number, sampling location, date, time of sample collection and the sampler's initials. Sample containers for chemical analysis shall be placed in ice-filled coolers immediately following collection and stored at 4° Celsius prior to and during shipment. Sample containers shall be packaged to avoid breakage during transportation. COC shall be followed in accordance with USEPA SW-846.

For each sample to be submitted to the analytical laboratory for analysis, an entry shall be made on a COC form supplied by the laboratory. One COC form shall be completed for each cooler for each day of sampling. The information recorded on the COC form includes the sampling date and time, sample identification number, requested analyses and methods, and sampler's name.

COC forms shall be placed in a sealed plastic bag and placed inside of the cooler with the samples. Upon receipt of the sample cooler, the laboratory will verify custody and condition of

the samples. Non-conformances in sample receipt (e.g., broken sample containers, samples received out of temperature) shall be documented on the sample receipt form and communicated to the project team immediately.

Quality Assurance/Quality Control

Field QA/QC samples are designed to help identify potential sources of external sample contamination and to evaluate potential error introduced by sample collection and handling. All QA/QC samples are labeled with QA/QC identification numbers and sent to the laboratory with the other samples for analyses.

Duplicate Samples

Duplicate samples are samples collected to assess precision of sampling and analysis. A duplicate sample will be collected at the same time as the initial sample from ten percent of the total sample locations. The initial sample containers for a particular parameter or set of parameters will be filled first then the duplicate sample containers for the same parameter(s), and so on until all necessary sample bottles for both the initial sample and the duplicate sample have been filled. The duplicate soil containers will be handled in the same manner as the primary sample. The duplicate sample will be assigned a QA/QC identification number, stored in an iced cooler, and shipped to the laboratory on the day it is collected. Duplicate samples will be collected for all parameters. Duplicate samples will be blind to the laboratory.

Matrix Spike and Matrix Spike Duplicates

MS/MSDs are used to assess the potential for matrix effects. Samples will be designated for MS/MSD analysis on the COC form and on the bottles. It may be necessary to increase the sample volume for samples where this designation is to be made. MS/MSD samples will be collected from five percent of the total sample locations.

3.12.6 Risk Screening

3.12.6.1 Human Health

This section describes the general approach that will be used to complete a risk screening for the Inner Fence Area of FWDA.

Comparison with Background

Site metal concentrations will be compared with background concentrations for metals. Except for arsenic and antimony, background values are the 95 percent (%) upper tolerance limits (UTLs) from the 2009 Background document (Shaw 2010). For antimony, the background value is the 95% UTL for soil unit 350ss based on the 2012 background study (USACE 2013). The New Mexico residential SSL for arsenic is 7.07 mg/kg; however, Fort Wingate has site-specific values for arsenic. In accordance with the December 18, 2013 NMED letter, if the arsenic

background value of 5.6 mg/kg is exceeded then the result will be compared to the background study range of 0.2 - 11.2 mg/kg.

Preliminary Site Conceptual Exposure Model

One of the first steps in formulating a risk screening for a site is developing a conceptual model of the site that identifies relevant exposure pathways and exposure scenarios. The preliminary site conceptual exposure model for the Inner Fence Area is discussed below and presented in **Figure 3-4**. Three groups of human receptors were identified as potentially applicable to the sites. Potentially complete exposure pathways are provided for each receptor population.

- industrial/occupational worker (incidental ingestion of soil, dermal contact with soil, inhalation of airborne soil particulates and volatile emissions and inhalation of volatile emissions via vapor intrusion);
- resident (incidental ingestion of soil, dermal contact with soil, inhalation of airborne soil particulates and volatile emissions, inhalation of volatile emissions via vapor intrusion, ingestion of tap water, dermal contact with tap water, inhalation of volatile emissions during domestic use of tap water, and beef ingestion); and,
- construction worker (incidental ingestion of soil, dermal contact with soil, inhalation of airborne soil particulates and volatile emissions).

Confirmation samples will be collected from excavation sidewalls and bottoms. Therefore, the risk screening evaluation will assume that any of the three potentially exposed populations would be exposed to concentrations detected in the confirmation samples, regardless of the location of the sample. This is a conservative approach because the excavations will be backfilled with clean soil; therefore, surface soil exposure would be limited to clean fill not the excavation sidewalls and bottoms.

There are no permanent surface water bodies within the Inner Fence Area; therefore, the surface water exposure pathways were considered incomplete.

Target Risk Levels

NMED SSLs are based on 1.0E-05 (1 in 100,000) target excess cancer risk or a target hazard quotient of 1.0 for noncarcinogens. Exceeding NMED SSLs means that further evaluation of chemical concentrations and exposure assumptions may be warranted.

Soil Exposure Intervals

NMED guidance (NMED 2019) assumes that residents could be exposed to surface (0 to 1 foot below ground surface [bgs]) and subsurface soils (1 to 10 ft bgs) during home maintenance activities, yard work, landscaping, and outdoor play activities, and specify that an exposure interval of 0-10 ft bgs be assumed. NMED guidance (NMED 2019) assumes construction workers are involved in digging, excavation, maintenance, and building construction projects and could be exposed to surface as well as subsurface soil. Therefore, a soil exposure interval of

0-10 feet bgs is considered appropriate for the construction worker. NMED guidance (NMED 2019) assumes that the industrial/occupational worker activities occur at or near the surface at not greater than 1 ft bgs. Therefore, only data from the 0 to 1 ft bgs interval will be used to assess potential risks to industrial workers.

Preliminary Screening Exposure Concentrations

For all exposure intervals, the exposure concentration used in the preliminary screening will be the maximum detected concentration for a specific excavation/grid.

Calculation of Cumulative Human Health Risk

NMED guidance indicates that the potential cumulative risks and hazards should be evaluated in the screening evaluation to conclude whether further evaluation may be necessary. Therefore, consistent with the guidance, screening will be performed by comparing maximum chemical concentrations detected at the site with NMED SSLs (NMED 2019, or most current version). NMED has published SSLs for a resident, industrial/occupational worker, and construction worker. In the absence of NMED SSLs, USEPA RSLs (USEPA 2019, or most current version) will be selected (carcinogenic RSLs will be adjusted to a risk of 1.0E-05, consistent with NMED SSLs). Residential soil RSLs will be selected for resident. Industrial soil RSLs will be selected for the industrial/occupational worker. USEPA RSLs do not provide a construction worker RSL; therefore, a construction worker SSL will be calculated in accordance with NMED Risk Guidance (NMED 2019, or most current version).

SSLs for individual carcinogenic chemicals are based on a cancer risk of 1.0E-05. SSLs for individual noncarcinogenic chemicals are based on a hazard quotient of 1.0. Cumulative site screening risks and hazards will be calculated as follows:

- Site Screening Risk = (C1/SSL1 + C2/SSL2 + ……Cn/SSLn) x 1.0E-05
- Site Screening Hazard Index = (C1/SSL1 + C2/SSL2 + ……Cn/SSLn) x 1
- Where:

  C1...Cn = Screening exposure concentration for chemical “1” to chemical “n”.

  SSL1…SSLn = Soil screening level for chemical “1” to chemical “n” based on an SSL carcinogenic risk of 1.0E-05 or noncarcinogenic hazard of 1.0. Site risks less than the NMED target level of 1.0E-05 and hazard indices less than the NMED target level of 1.0 indicate that concentrations at the site are unlikely to result in adverse health impacts.

Risk Refinement

In accordance with NMED risk guidance (NMED 2019), if the total cancer risk is greater than the target risk level of 1E-5 or if the hazard index is greater than one, concentrations at the site may warrant further, site-specific evaluation. Further site-specific evaluation may include refinement of receptor-specific exposure point concentrations via calculation of 95 percent UCLs

and/or target organ/system assessment for chemicals with a noncarcinogenic endpoint. The UCLs will be calculated in accordance with Section 2.5 of the NMED risk guidance (NMED 2019). USEPA's ProUCL 5.1 software will be used to calculate the 95% UCL of the mean, provided there are eight or more samples. The lower of the 95% UCL and the maximum will be selected as the exposure point concentration (EPC) for the calculation of refined risks for the site. The calculation of 95% UCLs will be limited to the shallow exposure zone (0 to 2 ft bgs) because this data set will be comprised of multiple discrete soil samples. The deeper exposure zone data set for each excavation/grid will be comprised of a single sample.

A target organ/system assessment will be completed if cumulative hazard indices exceed 1.0 to determine if noncarcinogenic effects are additive. The process involves calculating hazard indices for each target organ or system and assessing whether or not the hazard index for an organ or organ system exceeds 1.0. Target organ/system assessments will be completed as necessary, regardless of exposure zone.

Evaluation of Lead Concentrations

Exposure to lead can result in neurotoxic and developmental effects. The primary receptors of concern are children, whose nervous systems are still undergoing development and who also exhibit behavioral tendencies that increase their likelihood of exposure (e.g., pica). These effects may occur at exposures so low they may be considered to have no threshold and are evaluated based on a blood lead level (rather than the external dose as reflected in the reference dose/reference concentration methodology). Therefore, the risk evaluation and toxicological approach used by USEPA and other agencies for lead is unique from other chemicals. For residential exposures, USEPA recommends the Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children for setting site-specific preliminary risk-based remediation goals. The adult lead exposure model (ALM) is the model currently used by USEPA to evaluate adult exposures in the workplace and is based on a pregnant mother's capacity to contribute to fetal blood lead levels. The models for lead back-calculate to a soil concentration that would not exceed an estimated blood-lead concentration of 10 micrograms per deciliter. The NMED lead SSL for residential exposure is 4.00E+02 mg/kg. The NMED lead SSL for the industrial/occupational exposure is 8.00E+02 mg/kg. Hazard Quotients are not calculated for lead because there is no established threshold value. For screening, the maximum detected concentration is presented simply as a comparison with the receptor-specific SSL. Based on the screening comparison, the IEUBK and ALM will be run as necessary.

Soil to Groundwater Pathway

The soil to groundwater pathway will be evaluated by comparing maximum detected site concentrations to the NMED default SSLs for protection of groundwater with a dilution attenuation factor (DAF) of 20 (NMED 2019). If a chemical does not have an NMED soil to groundwater SSL, then the USEPA protection of groundwater RSL would be used and adjusted to a DAF of 20. If a soil to groundwater SSL is exceeded, then the excavation/grid and the Inner Fence as a whole would be reassessed and lines of evidence reviewed to determine whether or not further investigation of the pathway is warranted.

Vapor Intrusion Risks

Volatile organics having a Henry's Law constant greater than 1.0E-05 atmospheres–cubic meter/per mole (atm-m3/mole) and a molecular weight less than 200 grams per mole are considered relevant to evaluation of the vapor intrusion pathway (NMED 2019, or most current version). Currently, there are no buildings located within the Inner Fence Area; therefore, the current vapor intrusion pathway is considered incomplete. Vapor intrusion represents a potentially complete pathway for future receptors if building were constructed in the area and VOC emissions become concentrated in indoor spaces. Sample results from previous work completed at FWDA indicated that VOCs are not detected at high concentrations in areas such as the Inner Fence. Therefore, a qualitative discussion of potential vapor intrusion risk will be completed in accordance with Section 2.5 of the NMED risk guidance (NMED 2019, or most current version). If significant concentrations of VOCs are detected in confirmation samples, then a quantitative evaluation of the vapor intrusion pathway will be completed following the tiered approach outlined in Section 2.5 of NMED Risk Guidance (NMED 2019, or most current version).

Beef Ingestion

NMED risk guidance (NMED 2019, Section 2.6) indicates two acres as the size of parcel requiring evaluation of the beef ingestion pathway. The excavation/grid size for the Inner Fence work is smaller than 2 acres. However, if considered contiguously, the grids could provide enough land surface for grazing purposes. Additionally, grazing is a viable future land use for the area.

Therefore, in accordance with NMED risk guidance (NMED 2019), a qualitative assessment of ingestion of beef from cattle grazing on the Inner Fence Area will be completed and included in the Uncertainties Section of the risk screening.

Uncertainties

There are several sources of uncertainties associated with a human health risk screening. An uncertainties section will be included in the human health risk screening to discuss and address the various uncertainties encountered during the risk screening process.

3.12.6.2 Ecological Risk Screening

The overall objectives of an ecological risk screening are to understand how site-related chemicals may be distributed in relation to ecological receptors (including both habitats and/or species potentially present) and evaluate how the entities may be affected by those chemicals. Ecological risk evaluation procedures will be in general accordance with NMED's Risk Assessment Guidance for Site Investigations and Remediation, Volume 2 (NMED 2019, or most current version). NMED Guidance outlines two phases for completing an ecological risk screening:

- Phase I –Screening Assessments
- Screening Assessment (Tier 1 and 2)
- Phase II – Site-Specific Assessments
- Site-Specific Ecological Risk Screening (Tier 3).

This Work Plan presents the approach for a Phase I ecological risk screening. Tier 1 and Tier 2 screening methodologies are described below:

In Tier 1, maximum site concentrations of COPECs are compared with NMED ecological screening levels (ESLs) for representative receptor species (such as the deer mouse, horned lark, kit fox, pronghorn antelope, red-tailed hawk, shallow- and deep-rooted plants). Tier 1 ESLs developed by NMED are based on toxicity reference values (TRVs) representing no-observed-adverse-effect levels (NOAELs). For all non-burrowing receptors and for shallow-rooted plants, the soil exposure interval is typical of surface conditions and is considered to be between zero (0) and one ft bgs. For all burrowing receptors (and receptors that may use borrows) and deep-rooted plants, the soil interval to be evaluated is 0 - 10 ft bgs.

If a Tier 2 SLERA is warranted following completion of Tier 1, less conservative methodologies are applied:

- Exposure models are adjusted for site-specific conditions and less conservative and more representative exposure assumptions are used. Specifically, exposure is quantified using a conservative estimate of the mean (an upper 95th percent confidence limit of the mean). USEPA's ProUCL 5.1 software is used to calculate the 95% UCL of the mean, provided there are eight or more samples and more than four detections. The lower of the 95% UCL and the maximum is selected as the EPC. If sample number or detections are too few to calculate a 95% UCL, the maximum detected concentration is used as the EPC.
- An ingestion exposure model approach is recommended by NMED for higher-level receptors. The model is used to estimate an average exposure dose to be compared with an oral TRV.
- COPECs are evaluated by comparing site EPCs with lowest-observed adverse effect levels rather than NOAEL TRVs.

Following each of the steps in the tiered process, results are evaluated to assess whether or not information is sufficient for making remedial decisions at the site (i.e., a technical decision point), or whether further evaluation may be warranted.

A preliminary ecological site conceptual exposure model is provided in **Figure 3-4**.

There are several sources of uncertainties associated with ecological risk estimates. An uncertainties section will be included in the ecological risk screening to discuss and address the various uncertainties encountered during the risk screening process.

3.13 BACKFILLING EXCAVATIONS

All excavations created from excavation of anomalies, detonations, and access will be backfilled with soil generated during the excavation that has been determined to be acceptable for reuse. Areas will be restored graded to promote positive drainage.

3.13.1 Munitions and Explosives of Concern Accountability/Daily Reporting

All activities accomplished at the site will be documented, on a grid-by-grid basis. In addition, operational data will be provided to the USACE OESS on a daily basis. Data to be provided includes:

- Personnel on-site.
- Grids started and finished.
- MEC nomenclature located by grid.
- MD and RRD (by pound).
- Daily Safety Briefing.
- The Daily QC Report.

3.13.2 Demobilization

Upon completion of the tasks covered under this Performance Work Statement (PWS), field personnel will demobilize from the site. The demobilization activities will consist of the following steps:

- Remove temporary facilities.
- Recycle/dispose of all material in the ECMs under CE control before returning control to the government.
- Perform final maintenance of the CAMU.
- A final walk through will be performed by the FWDA Caretakers, USACE, and the contractor to correct any identified issues.
- Decontaminate equipment as needed. Demobilize equipment and personnel.

TABLE 3-1
TYPE AND DEPTH OF MEC REMOVED
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO

Group[1]	Maximum Depth of MEC Recovered During Previous Site Investigations (inches bgs)[2]	Approximate Maximum Geophysical Detection Depth (inches bgs)[3]
20mm	0-4	8
Small Items (e.g., 37mm, 40mm, fuzes)	0-10	16-17
Medium Items (e.g., 50mm, 57mm, 60mm, 75mm, 76mm, 81mm, M83 Butterfly Bomb, 2.75-inch rocket, BLU3/4)	0-7	21-35
Large Item (e.g., 90mm, 102mm, 105mm, 120mm, 155mm, 3-inch rocket, 3.5-inch rocket, 5-inch rocket)	0-10	38-67
2000-lb HE Bomb	N/A[4]	>67

Notes:

[1]The 20mm and 2000-lb HE bomb are presented individually and are not grouped as small, medium, or large items.

[2]Excludes recovery depths from the HWMU remediation area. Depth data obtained from FWDA 2017 Military Munitions Summary Table.

[3]Detection depth is variable depending on various conditions, but generally can be detected to 11 times the diameter of the item.

[4]Item found during sloping for excavation safety during the HWMU removal, but within the Inner Fence Area

bgs = below ground surface

BLU = bomb live unit

FWDA = Fort Wingate Depot Activity

HE = high explosive

HWMU = Hazardous Waste Management Unit

lb = pound

mm = millimeter

TABLE 3-2
EQUIVALENT ISO SIMULANT ITEMS
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO

Item	Nominal Pipe Size	Ouside Diameter	Length
Small ISO	1 inch	1.315 inches (33mm)	4 inches (102mm)
Medium ISO	2 inch	3.375 inches (60mm)	8 inches (204mm)
Large ISO	3 inch	4.500 inches (115mm)	12 inches (306mm)

Notes:

ISO = Industry Standard Object

mm = millimeter

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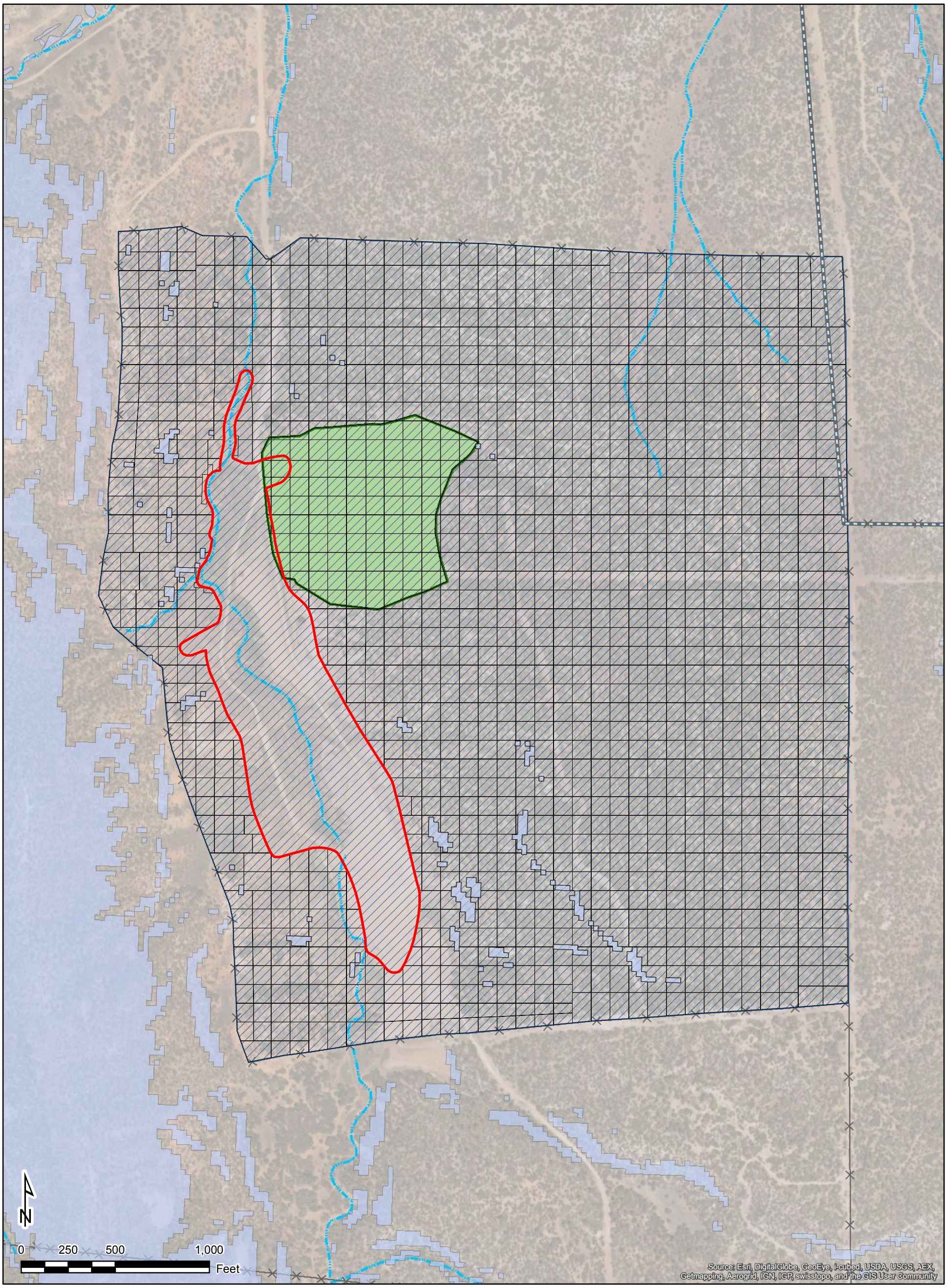
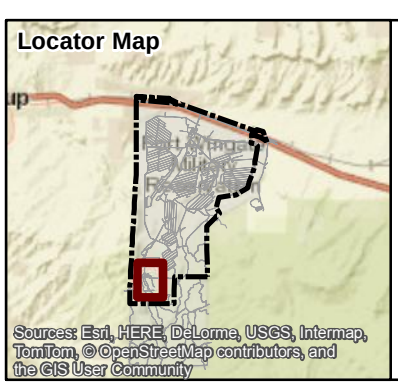


Locator Map

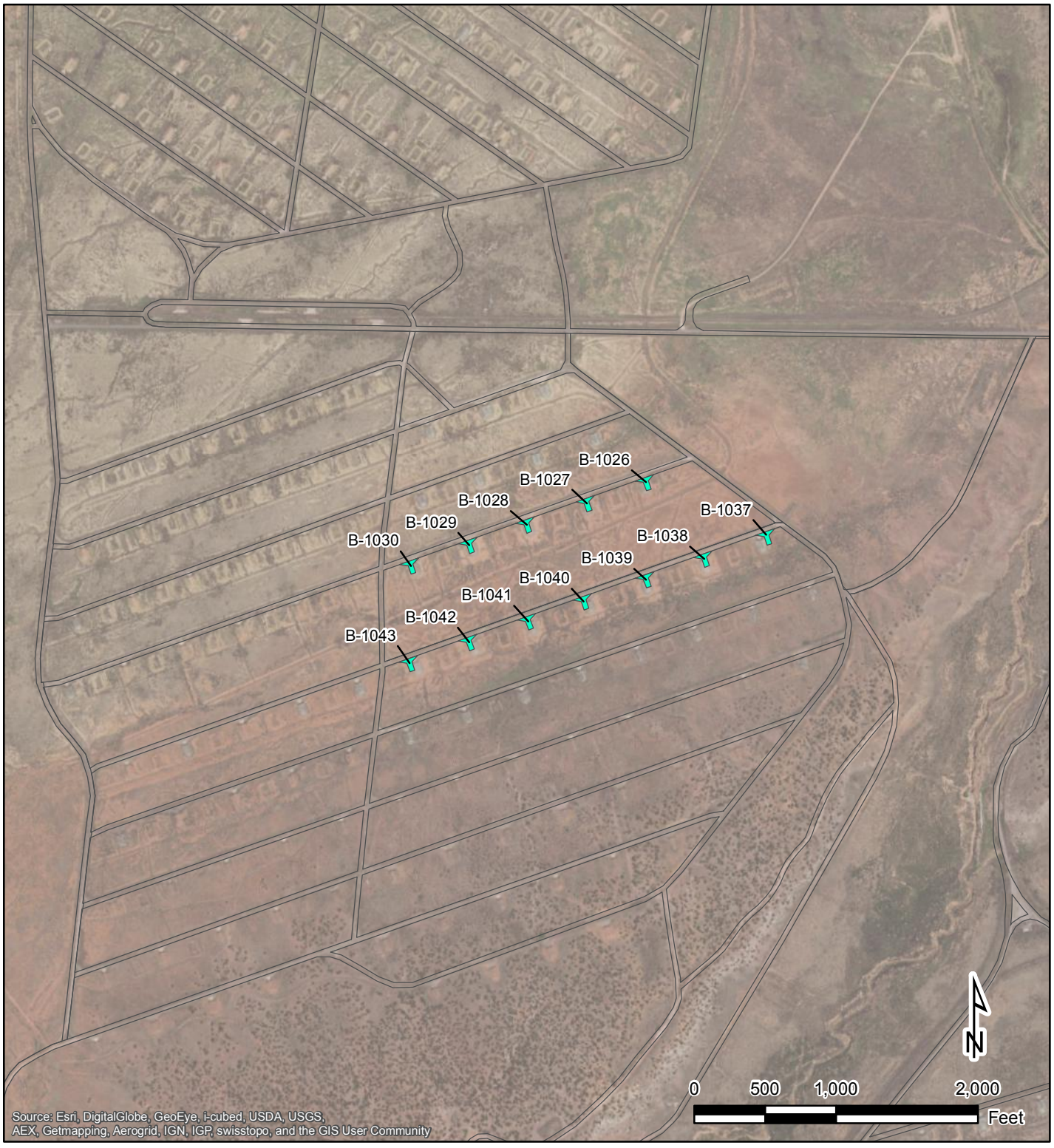


Legend

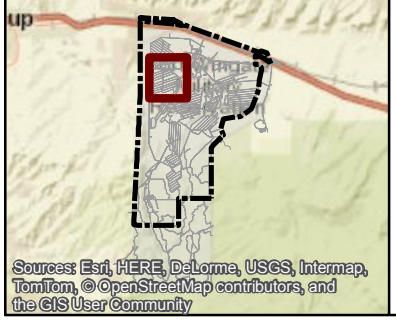
- Installation Boundary
- HWMU Boundary
- Parcel 3 Boundary
- Inner Fence Area
- AOC 92 (Out of Scope)
- Kickout Area
- Inner Fence Area Grid
- Inaccessible Area
- Arroyo
- Fence

Inner Fence Area Grid Map
Fort Wingate Depot Activity
McKinley County, New Mexico

Drawn By:	Date:	
JZ	10/5/2017	**Figure 3-1**
Checked By:	Project No.	
JC	60517380	



Locator Map



Legend

- Installation Boundary
- Earth Covered Magazine
- Road

ECMs at Block B
Fort Wingate Depot Activity
McKinley County, New Mexico

Drawn By:	Date:	
JZ	10/5/2017	**Figure 3-2**
Checked By:	Project No.	
JC	60517380	

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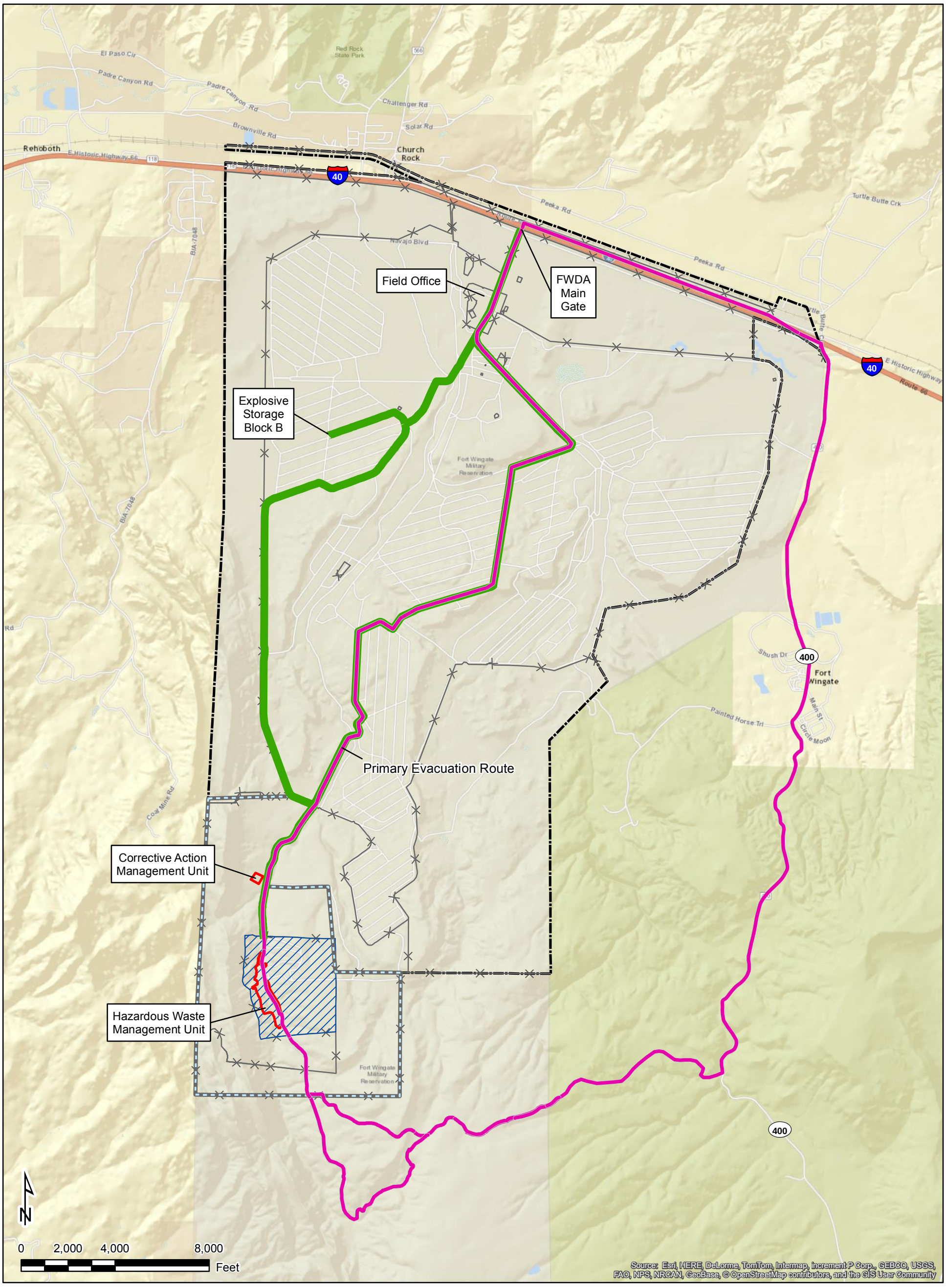


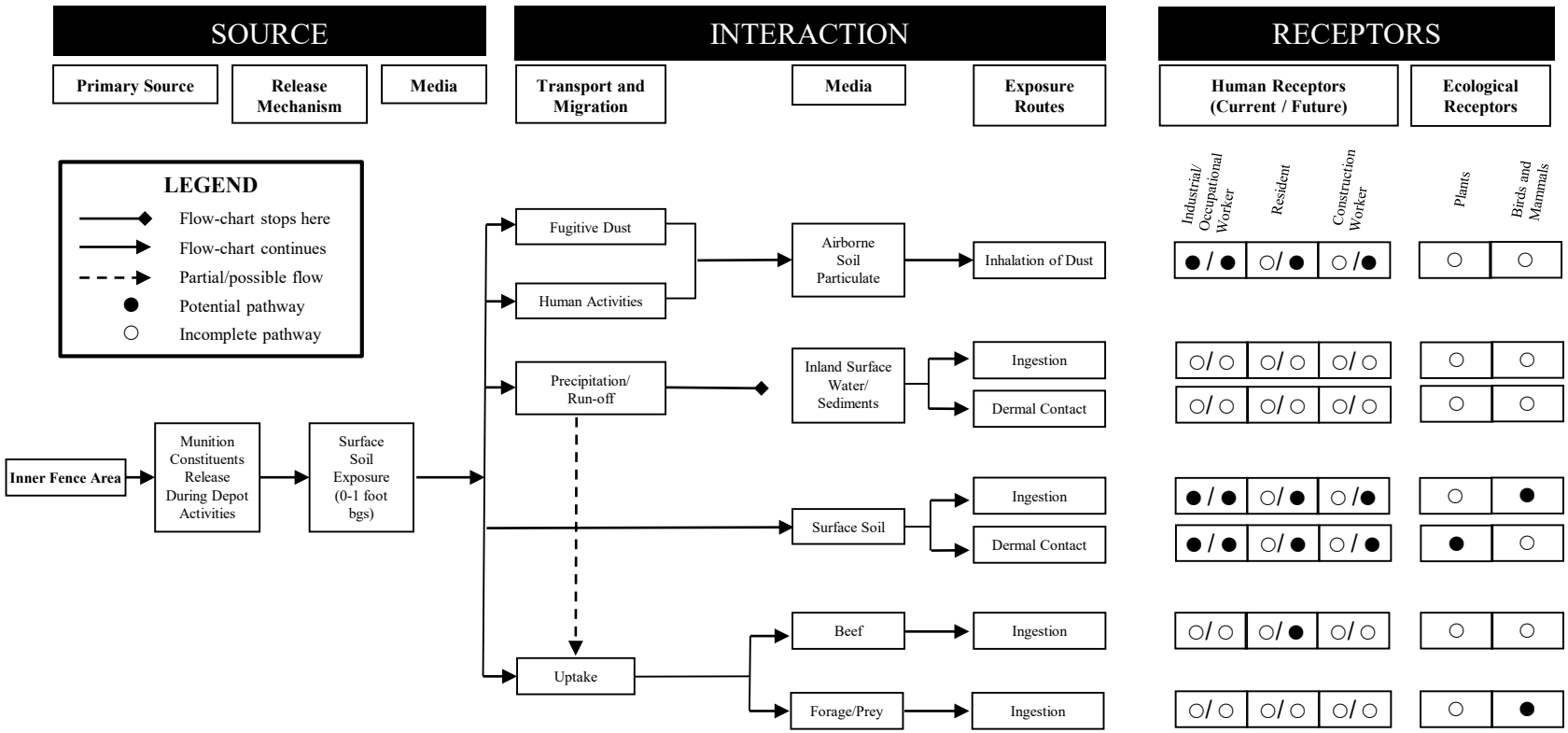
Legend

- Installation Boundary
- HWMU/CAMU Boundary
- Parcel 3 Boundary
- Inner Fence Area
- Evacuation Route
- Haul Route
- Fence

Anticipated Haul and Evacuation Routes
Fort Wingate Depot Activity
McKinley County, New Mexico

Drawn By:	Date:	
JZ	10/5/2017	**Figure 3-3**
Checked By:	Project No.	
JC	60517380	

FIGURE 3-4
SITE CONCEPTUAL EXPOSURE MODEL – INNER FENCE AREA
FORT WINGATE DEPOT ACTIVITY, McKINLEY COUNTY, NEW MEXICO



4.1 CORPORATE COMMITMENT TO QUALITY

This QCP provides the procedures for controlling and measuring the quality of all work performed during site activities. Work procedures and processes covered in this WP and QCP will follow the requirements of the USACE and the RCRA Permit.

This QCP has been developed to ensure compliance with appropriate industry and regulatory standards. It will be used to ensure activities related to this project are conducted in a planned and controlled manner, tasks conform to contractual requirements, and appropriate documentation is generated to support each activity. All QC activities will be performed and documented IAW applicable professional and technical standards and contract requirements.

The procedures specified in the QCP will be considered the minimum acceptable standards. Additional requirements exceeding the strict procedures reflected in this QCP may be specified by the client or regulatory agencies and will be complied with. Procedures less stringent than those specified will not be adopted without prior written approval from the client and the Quality Program Management Team.

This QCP must be reviewed and formally approved before field operations commence. It is the personal responsibility of all personnel associated with this project to understand and maintain the quality issues applicable to their work assignments.

4.2 QUALITY ASSURANCE/QUALITY CONTROL

4.2.1 Quality Assurance

QA surveillance will be performed by the USACE in accordance with the government QASP and appropriate regulations, manuals, pamphlets, and other compliance documents. USACE will evaluate field activities to verify the approved WP is being followed and the project objectives are being met. QA audits and inspections will be performed IAW established USACE guidelines and the project QASP.

4.2.2 Site-Specific Quality Control Plan

This QCP details the quality management procedures to be followed during the site activities. Site-specific information includes, but is not limited to, project personnel, definable features of work, required control operations, equipment tests, specific equipment calibration/response check procedures, audit procedures, and client or regulatory agency requirements. This QCP provides procedures for:

- Determining compliance with this plan and all other elements of the WP.
- Determining the effectiveness of work performed.
- Inspecting the maintenance and accuracy of site records.

- Testing or response checking equipment used to perform tasks.

4.2.3 Program Manager

The Program Manager is ultimately responsible for the effective implementation of the QCP for all field operations. The Program Manager issues the Corporate Policy Statement and directs management and workers to follow the requirements of the QCP.

The Program Manager has delegated QA authority as defined in the following paragraphs. Each designee is held accountable for delegated authorities. The Program Manager will provide the resources necessary to complete the project.

4.2.4 Program QA/QC Manager

The Program QA/QC Manager has the authority and overall responsibility for independently verifying that quality is achieved. The Program QA/QC Manager will:

- Provide an independent assessment of QC procedures employed during site operations.
- Develop quality program for military munitions response/environmental restoration work, oversee quality processes, evaluate recommendations to improve these processes, and implement continuous improvement.
- Review and approve work plans, QC plans, training, deliverables, and processes to ensure adherence to USACE quality requirements and delivery of high quality products and services to USACE.
- Oversee the UXOQCS; review and evaluate daily job-site QC activities and reports.
- Stop, amend, or curtail work for major quality non-conforming conditions.
- Verify compliance with military munitions response-related DoD and Army publications, USACE documents, as well as local, state, and federal statutes and codes.
- Conduct periodic job-site quality audits.
- POC for USACE counterparts on quality issues following notifications to USACE and PM.

4.2.5 Project Manager

The PM is responsible for ensuring the availability of the resources needed to implement the project QCP and will ensure the QC processes are incorporated into the project plans, procedures, and training for the specific project. The PM is responsible for the quality and timeliness of all project activities, including those performed by subcontractors and suppliers. The PM's primary responsibilities are:

- Primary POC for developing and implementing plans to meet performance objectives and other requirements.
- Manage the team during project execution, including integration of subcontractor services.

- Oversee schedule, status reporting, and invoices.
- Hold regular project review/status meetings with USACE, stakeholders, and relevant staff.
- Perform day-to-day coordination with USACE and stakeholders.
- Stop, amend, or curtail work for quality, health and safety (H&S), regulatory, or operational deficiencies.
- Assign project staff, approve budgets and expenditures, and approve deliverables.
- Report to the USACE PM.

4.2.6 Senior Unexploded Ordnance Supervisor

The SUXOS supervises all UXO field teams performing activities and will directly supervise field performance assisting personnel to achieve maximum operational safety and efficiency. He reports directly to the PM. He will implement the approved plans in the field and must review and approve any changes. He supervises all teams and personnel on a project including:

- Planning, coordinating, and supervising all on-site munitions activities.
- Supervise UXO field teams.
- Certify munitions, explosives, and dangerous articles and/or scrap as ready for turn-in or disposal IAW current policies.
- Provide MEC response support for explosives safety, MEC destruction, and blast designs.
- Provide technical input to H&S Design Analyses and emergency response requirements.
- Stop work if performance is not in compliance with WP or SSHP.
- Direct and oversee UXO-related corrective actions following communications with Site Manager and the PM.
- Coordinate with OESS on munitions field activities and schedules with notifications to the PM and Site Manager.

4.2.7 Site Safety and Health Officer/Unexploded Ordnance Safety Officer

The Site Safety and Health Officer for this project is the UXOSO who reports directly to the Program Munitions Response Safety Manager. The UXOSO will be responsible for:

- Analyzing operational risks, explosive hazards, and safety requirements.
- Developing and implementing approved explosives and UXO H&S program in compliance with applicable DoD policy and federal, state, and local H&S statutes, regulations and codes.
- Establishing and ensuring compliance with all site-specific explosive operations safety requirements.
- Enforce personnel limits and safety exclusion zones for explosives-related operations.

- Conduct, document, and report the results of safety inspections to ensure compliance with all applicable explosives safety policies, standards, regulations, and codes.
- Ensure all protective works and equipment used within the exclusion zone are operated in compliance with applicable DoD policy, DDESB approvals, and federal, state, and local statutes, regulations, and codes.
- Stop, amend, or curtail work for H&S deficiencies.
- Reports to Program Munitions Response Safety Manager and communicates with SUXOS, Site Manager, and field teams.

4.2.8 Unexploded Ordnance Quality Control Specialist

The UXOQCS has the responsibility and authority to enforce the site-specific QC plans and procedures and reports directly to the Program QA/QC Manager coordinating site activities with the SUXOS. The UXOQCS responsibilities include:

- Developing and implementing the MEC-specific sections of the work plan for all explosive related operations.
- Conduct and document QC audits and inspection of all explosive operations for compliance.
- Identify, document, report and ensure completion of corrective actions to ensure all explosive operations comply with requirements.
- Stop, amend, or curtail work for quality deficiencies.
- Reports to Program QA/QC Manager and communicates with SUXOS, Site Manager, and field teams.

4.3 MILESTONES

Project updates shall be made to USACE at the completion of each milestone listed in the baseline project schedule (**Figure 2-2**) or more often as appropriate.

4.4 EMPLOYEE QUALIFICATIONS

Prior to an employee's initial assignment or any change in duties/assignment, the employee's certifications, medical release form, and training records will be reviewed to make sure the employee is qualified and capable to perform the duties to which they are being assigned.

UXOQP will meet the standards required by DDESB TP-18 and DA PAM 385-63 for personnel working in the designated ICM areas. A Personnel Qualifications Certification Letter stating that the UXO personnel meet the qualifications of DDESB TP 18 will be submitted.

The UXOSO will maintain personnel files on each employee, including copies of licenses, training records, and certificates of qualifications that support the employee's placement and position. At a minimum the files will include:

- Naval School, Explosive Ordnance Disposal certification or certification IAW DDESB TP 18 approved schools (UXO personnel only).
- Current certificate of medical clearance/annual physical examination IAW 29 Code of Federal Regulations (CFR) 1910.120.
- 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) safety training certification.
- 8-hour HAZWOPER supervisor certification (required by position).
- Current 8-hour annual HAZWOPER refresher certificate.
- Current certificate for Cardiopulmonary Resuscitation training and First Aid (required by position).
- Current and Valid Driver's License (with restrictions identified) (if required).
- Current QC training certificates (as required by position)
- Documentation of previous experience and training in accordance with DDESB TP-18

4.5 PUBLICATIONS

A technical review of the PWS and all pertinent data has been completed, and a list of required publications to be maintained at the site has been compiled. In addition to this list, any additional manuals the project team may require will be provided. Prior to the start of operations and periodically throughout the project, the SUXOS will check to ensure site publications are present and in good repair. Results of this inspection will be recorded and reported to the PM. The currently identified publications include:

- FWDA RCRA Permit No. NM6213820974.
- Corporate Environmental Safety and Health Program.
- OSHA, 29 CFR 1910, Occupational Safety and Health Standards for General Industry.
- OSHA, 29 CFR 1926, Occupational Safety and Health Standards for the Construction Industry.
- EM 385-1-1, Safety and Health Requirements Manual.
- EM 385-1-97, Explosives Safety and Health Requirements Manual.
- DoD 4145.26-M, Contractor's Safety Manual for Ammunition and Explosives.
- DoD 6055.09-M, DoD Ammunition and Explosives Safety Standards.
- DA PAM 385-64, Ammunition and Explosives Safety Standards.

- Department of the Army Regulation (AR) 385-10, The Army Safety Program.
- DA PAM 385-63, Range Safety.
- AR 385-40 w/supplement, Accident Reporting and Records.
- Alcohol, Tobacco and Firearms (ATF) 27 CFR 555, Commerce in Explosives.
- ATF P 5400-7.
- Safety Data Sheets for hazardous substances used on-site.
- USACE "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions." HNC-ED-CS-S-98-7, HNC Safety Advisory and DDESB Memo dated 22 May 2014.
- USACE Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives Sites.
- DDESB TP 16 and the Buried Explosion Module.
- DA PAM 385-30, Risk Management.
- HNC-ED-CS-S-00-3, Use Of Water For Mitigation Of Fragmentation And Blast Effects Due To Intentional Detonation Of Munitions, Sept 2000.
- TM 60A-1-1-31, General Information on EOD Disposal Procedures.
- DDESB TP-18, Minimum Qualifications for Personnel Conducting Munitions and Explosives of Concern-Related Activities.
- USACE Engineer Regulation (ER) 385-1-99, USACE Accident Investigation and Reporting.
- USACE EM 200-1-15, Technical Guidance for Military Munitions Response Actions (30 Oct 2015).

4.6 MONITORING EQUIPMENT TESTING

Detection and other support equipment utilized on-site (e.g., sampling pumps, real-time monitors) will be checked for operational reliability IAW the manufacturer's specifications.

4.6.1 Maintenance Program

All tools, instruments, and equipment used on-site will be properly maintained and tested (as necessary) IAW the manufacturer's specifications or standard industry practices. Analog geophysical instruments will undergo daily function checks as described in **Table 4-1**. This applies to communications equipment, vehicles/machinery, environmental monitoring equipment, and PPE.

Equipment will be protected from dust and contamination and visually checked for damage prior to use. Preventative maintenance will be performed on a regular basis. Critical spare parts will be kept on-site to minimize downtime.

A maintenance program will be implemented as described below:

- Preventive Maintenance: The assigned operator of each piece of equipment will perform scheduled, and when necessary, unscheduled, preventative maintenance to ensure the equipment is maintained in a satisfactory operating condition. Preventive maintenance consists of before, during and after operational checks, and documentation of these activities, either in the operators log book or in the team leader's field log book.
- Routine Repair and Adjustment: Routine repair and adjustment is based on the manufacturer's schedule for adjustment, calibration, or replacement. All equipment used on-site will be maintained and submitted for routine repair and adjustment IAW the manufacturer's specifications.
- Emergency Repair: Emergency repair includes any unscheduled repair. This type of repair will be conducted using manufacturer required replacement parts and procedures to ensure the continued integrity of the equipment and viable performance.

4.6.2 Logs and Records

For all site work, bound log books with consecutively numbered pages will be used by field personnel. The field log books will be used to record the daily activities of the field team, provide sketch maps and other pertinent items, and to note any observations which might affect the quality of data. UXO team leaders will maintain a field log book per UXO field team. The field log books and site records will be utilized to record the data described below:

- The SUXOS logbook at a minimum will provide a summary of all operations conducted to include information on weather conditions, problem areas, WP modifications, injuries, start/stop times, tailgate safety briefs, equipment discrepancies, training conducted, visitors, and any additional items deemed appropriate.
- The UXOSO will maintain a safety logbook. The log will be used to record all safety related matters associated with the specific project such as: safety briefings/meetings, including items covered and attendees; safety audits; near-misses/accidents/incidents. It will include cause and corrective action taken; weather conditions; and any other matters encompassing safety.
- Training Records: The UXOSO will maintain training records for all site personnel. These records will contain training certificates, licenses, and other qualifying data for an individual's duty position.
- The UXOQCS will maintain a logbook and will record the performance and results of QC observations and inspections.
- Visitors Sign-in Sheet: The SUXOS and UXOSO will maintain this log for all personnel not directly involved in the project site activities. This log will identify visitors by name, company, date, time in/out, and a contact phone number.

- Photographic Record: The SUXOS will maintain a photographic record to log all photographs taken to document work and/or site conditions. Photographs will be maintained on file until the end of the project. Photographs will be forwarded to the corporate office for safekeeping.
- Site Status Maps: The SUXOS and UXOQCS will maintain working status maps of the operating areas provided by GIS. These maps will be used to document task progression and other pertinent activities and locations.

Log books and records will be inspected by the UXOQCS on a weekly basis. These inspections will focus on the completeness, accuracy, and legibility of the entries and records. Results of these inspections will be forwarded to the SUXOS. The log books are utilized to formulate the Final Report and serve as an "Official Document" in the event of any problem area identified after the completion of the project. All log books will be maintained on file (at the AECOM Office located at 12120 Shamrock Plaza, Suite 100, Omaha, Nebraska 68154) for a period of seven years after project completion. These logs may be digitally archived.

4.6.3 Quality Audits

An audit is an examination and evaluation performed to determine whether essential site-specific elements have been identified, performed, documented, and effectively implemented IAW specified requirements. Internal audits will be conducted to verify all procedures and protocols are implemented IAW with approved WP. Field audits will concentrate on products, procedures, proper documentation, and inspections of the database to verify performance metrics are being attained.

4.6.4 Quality Control Surveillance

Daily, random, and scheduled surveillance will be performed of all work areas and definable features of work identified in the WP.

4.6.5 Quality Control Inspections

Daily, random, scheduled, and final acceptance inspections will be performed of the definable features of work to verify compliance with WP requirements. To verify that quality work is conducted, QC inspections will be conducted according to the criteria specified in the following paragraphs. All inspections will be conducted by the responsible personnel and documented accordingly.

4.6.5.1 Geophysical Inspections

The performance requirements for removal action using analog methods is presented in **Table 4-1** and are IAW EM 200-1-15, Table 11-6.

4.6.5.2 Quality Control Requirements Using Analog Methods

QC inspections and/or surveillance will be accomplished using QC surveillance and checklists developed specifically for this process. Inspection, surveillance points, and sampling frequency for each selected definable feature of work are shown in **Table 4-1**. Sampling frequencies will be IAW EM 200-1-15, Table 6-6, Acceptance Sampling for Anomaly Resolution.

4.6.5.3 GPS Equipment Inspections

If GPS equipment is used for portions of the project, the functionality of the equipment relative to a known control point will be established prior to the start of each day of use, documented in a logbook and verified by the UXOQCS (vertical control or topography will not be confirmed).

4.6.6 Phase Inspection Process

The UXOQCS will ensure that the three-phase control process is implemented for each definable feature of work, regardless of who performs the task. Each control phase is important for obtaining a quality product. However, the preparatory and initial inspections will be particularly invaluable in preventing problems. Production work will not be performed on a definable feature of work until a successful preparatory phase inspection has been completed, and initial phase inspection criteria have been identified and prepared.

4.6.7 Preparatory Phase Inspection

A preparatory phase inspection will be performed prior to beginning each definable feature of work. The purpose of this inspection will be to review applicable specifications and to verify that the necessary resources, conditions, and controls are in place and compliant before the start of work activities. The UXOQCS will verify with the client that all prerequisite submittals have been submitted and approved, and lessons learned during previous similar work have been incorporated, as appropriate, into the project procedures to prevent recurrence of past problems. The UXOQCS will meet the staff responsible for the performance of a given task, including subcontractor personnel. The UXOQCS will document the Preparatory Phase Inspection in the DQCR.

WPs and operating procedures will be reviewed by the UXOQCS to ensure they describe pre-qualifying requirements or conditions, equipment and materials, appropriate sequence, methodology, and QC provisions. The UXOQCS will verify the following:

- Required plans and procedures have been prepared and approved and are available to the field staff.
- Field equipment is appropriate for its intended use, available, and functional.
- Responsibilities have been assigned and communicated; the field staff has the necessary knowledge, expertise, and information to perform their jobs.
- The arrangements for support services have been made.

- The prerequisite site work has been completed.

Discrepancies between existing conditions and approved plans/procedures will be resolved and corrective actions taken for unsatisfactory and nonconforming conditions identified during a preparatory phase inspection. This will be verified by the SUXOS, or their designee, prior to granting approval for work to begin. The UXOSO will discuss job hazards with site personnel and verify that the necessary safety measures are in place and ready for use. The UXOQCS will verify the completion of this task.

4.6.8 Initial Phase Inspection

An initial phase inspection will be performed the first time a definable feature of work is performed. The purpose of the inspection will be to:

- Check the preliminary work for compliance with procedures and contract specifications.
- Verify inspection, testing, and the established acceptable level of workmanship.
- Check safety compliance, review the minutes of the Preparatory Phase Inspection.

The UXOQCS will be responsible for ensuring all discrepancies between site practices and approved specifications are identified and resolved. Discrepancies between site practices and the approved plans/procedures will be resolved. Corrective actions for unsatisfactory conditions or practices will be verified by the SUXOS, or their designee, prior to granting approval to proceed. The results of the initial phase inspection results will be documented in the QC log book, on the Initial Inspection Checklist, and summarized in the DQCR.

4.6.9 Follow-up Phase Inspection

A follow up phase inspection is performed each day a definable feature of work is performed. The purpose of the inspection is to make sure a level of continuous compliance and workmanship is maintained. The UXOQCS is responsible for on-site monitoring of the operations taking place and verifying continued compliance with the requirements of the contract and approved project plans. If a work stoppage is required to correct some procedure, a Stop Work Order will be completed. The UXOQCS is also responsible for verifying that a daily health and safety inspection is performed and documented as prescribed in the SSHP.

The SUXOS will oversee and observe the same activities as under the initial inspection. Discrepancies between site practices and the approved plans/procedures will be resolved, and corrective actions for unsatisfactory and nonconforming conditions or practices will be verified by the SUXOS or his designee, prior to granting approval to continue work. Follow-up phase inspection results will be documented in the DQCR. Additional inspections performed on the same task may be required. Additional preparatory and initial inspections may be warranted under any of the following conditions:

- Unsatisfactory work.

- Changes in key personnel.
- Resumption of work after a substantial period of inactivity.
- Changes to the project PWS/specifications.

4.6.10 Lessons Learned

During the course of field activities, data or information may be discovered that could eliminate or reduce challenges and/or offer opportunities for quality and productivity improvements through value engineering. These lessons learned will be valuable tools in updating plans and procedures for follow-on field operations. Lessons learned will be documented during the entire project. In the event of safety-related events, the UXOSO will perform this function. If the lesson learned will affect the task or project by improving safety, quality, performance, or economics, then the PM/SUXOS/UXOQCS will gather this information and include it with the weekly status report.

- Topics for consideration for determining lessons learned include:
- Problems encountered.
- Solutions developed to solve the problems.
- Alternative procedures or processes that improved the operations.
- Quality/Productivity Improvements.
- Economic impacts.
- Resolving scheduling conflicts.

TABLE 4-1
PPERFORMANCE REQUIREMENTS FOR REMOVAL ACTIONS USING ANALOG METHODS
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO

Requirement	Limited Applicability (Specific to	Performance Standard	Frequency	Consequence of Failure
Repeatability (instrument functionality)[1]	All	All items in test strip detected (trains ear daily to items of interest)	Min 1 daily	Remedial training and additional remedial measures as described in this WP if due to operator error, or replacement of faulty equipment.
Detection and Recovery[2]	All	All blind detection seeds recovered	Per operator per lot: variable 1-2 large/deep and 1-3 small/shallow[5]	If a seed item is missed, the lot will be reworked[6]
Anomaly Resolution[3/4]	Verification inspections of grids compelted using an analog instrument[1]	QC final acceptance inspections of completed grids to verify proper target anomaly identification and resolution. Accept on zero.	A minimum of 10% of each grid turned over to QC by Operations will be inspected[4]	Redo affected work
GPS Equipment	All	Position offset of known/temporary control point within expected range as described in this WP.	Daily	Redo affected work

Notes:

[1] Function checks of analog geophysical instruments (e.g., Schonstedt 52Cx or equivalent) will be conducted daily at the ITS established for the project. If an instrument is found to be functioning improperly during the daily function test, it will be replaced and not used during field activities until it has been repaired and passes the function test.

[2] Blind seed items consisting of ISOs will be buried within a subset of the surveyed clearance grids along the Inner Fence areas as a QC check on the instruments functionality and the UXO technicians' ability to detect subsurface anomalies. Once buried, the locations of all seeded items will be recorded with a handheld GPS. The seed items will be photographed, and the depth and orientation recorded and documented. All of the seeded items will be painted the same color to clearly identify them as QC blind seeds. All seed items located by the UXO clearance teams will be recorded on the grid sheet

[3] Resolved is defined as 1) there is no geophysical signal remaining at the flagged/selected location, or 2) a signal remains but it is too low or too small to be associated with the target of interest, or 3) a signal remains but is associated with surface material which when moved results in low, or no signal at the interpreted location, or 4) a signal remains and a complete rationale for its presence exists.

[4] This performance metric includes the UXOQCS finding no MEC (regardless of size) or metallic debris 1.5 inches by 3 inches or larger in a grid turned over by Operations to QC for inspection. The UXOQCS will use the same instrument used by Operations to resolve target anomalies. The UXOQCS will notify the USACE OESS when grids have been QC accepted and are ready for Government OESS QA inspection. The UXOQCS will update the USACE OESS on a daily basis on the status of QC accepted grids awaiting OESS QA inspection.

[5] A variant number of ISO(s) will be seeded in each lot.

[6] Grids that have government acceptance within the lot will not require rework.

DoD. 2012. DoD Manual (DoDM) 6055.09-M, Ammunition and Explosives Safety Standards. 12 March.

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Interstate Technology and Regulatory Council (ITRC). 2012. Incremental Sampling Methodology (including January 2020 Clarifications). February. URL: https://www.itrcweb.org/GuidanceDocuments/ISM-1_2012_with_Clarifications.pdf

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PIKA. 2015b. Explosives Safety Submission, Munitions and Explosives of Concern, Non-Time Critical Removal Action, Kickout Area, SWMU 1, SWMU 10, SWMU 14, SWMU 15, SWMU 33, SMWU 74, AOC 79, AOC 89, AOC 90, AOC 91, and AOC 92 in Parcels 1, 2, 3,11, 20, and 21, Fort Wingate Depot Activity. February.

Program Management Corporation. 1999. Final Open Burning/Open Detonation Area RCRA Interim Status Closure Plan, Phase IA – Characterization and Assessment of Site Conditions for the Soils/Solid Matrix. Prepared for the U.S. Army Corps of Engineers (November 1999).

Robertson, A.J., Henry, D.W., and Langman, J.B. 2013. Geochemical evidence of groundwater flow paths and the fate and transport of constituents of concern in the alluvial aquifer at Fort Wingate Depot Activity, New Mexico, 2009: U.S. Geological Survey Scientific Investigations Report 2013–5098, 89 p., 13 http://pubs.usgs.gov/sir/2013/5098/

Shaw Environmental, Inc. (Shaw). 2010. Soils Background Study and Data Evaluation Report. Fort Wingate Depot Activity. October.

TM 60A-1-1-31, General Information on EOD Disposal Procedures.

URS Group, Inc. (URS). 2013. Approved Final Removal Work Plan. HWMU, Parcel 3. February.

U.S. Army. 1995. Final Environmental Assessment. Disposal of a Portion of Fort Wingate Depot Activity, New Mexico. United States Department of the Army (August 1995).

USACE. 1998a. Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites. United States Army Engineering and Support Center, Huntsville, August 1998. (Terminology Update March 2000).

USACE. 1998b. Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions, HNC-ED-CS-S-98-7. United States Army Corps of Engineers, August 1998 (Including Amendment 1, February 2011, Amendment 2, May 2014, and HNC Safety Advisory and DDESB Memo dated 22 May 2014).

USACE. 2000. HNC-ED-CS-S-00-3, Use of Water For Mitigation of Fragmentation and Blast Effects due to Intentional Detonation of Munitions.

USACE. 2008. Engineering Manual (EM) 385-1-97, Explosives Safety and Health Requirements Manual (including Errata 1 through 6 dated June and July 2009, April 2010, and May 2013, and Change 1, dated June 2013).

USACE. 2013. Phase 2 Soil Background Report, Fort Wingate Depot Activity. February.

USACE. 2014a. EM 385-1-1. Safety and Health Requirements Manual. 30 November.

USACE. 2014b. Engineering Regulation 385-1-95, Safety and Health Requirements for Munitions and Explosives of Concern Operations. United States Army Corps of Engineers, December 2014.

USACE. 2015. EM 200-1-15, Technical Guidance for Military Munitions Response Actions. United States Army Corps of Engineers. 30 October.

Sachin Saldanha

From: Paul Hanneman
Sent: Wednesday, January 14, 2015 12:36 PM
To: Myers, Dennis J SWF
Cc: Madl, Mike; Shahrukh Kanga; Sachin Saldanha
Subject: Re: FW: Kickout removal question (UNCLASSIFIED)

Thanks DJ;

Once we have USACE RTCs and red-line comments we will start finalize that WP and during that final process I'll make sure that criteria is included, however I'm confident we state the criteria of 1.5 inches x 3 inches, But I will look for text locations to insert, NMED approved criteria of metal 1.5 inches by 3 inches. If we amend the text of this document, I will talk with you before we go final and print to ensure you're ok with our un-reviewed changes.

In addition, we are currently conducting the review of the AOC/SWMU clearance and investigation WP; we will make sure that text and criteria is included in the second WP for the MEC clearance of the non-burial pit areas of the AOCs and SWMUs.

We currently have a WP Appendix A - Tribal Correspondences. I recommend we amend that title to: Appendix A - Correspondences

Please let me know if you're good with this verbiage and the change of the name of the Appendix and I will proceed to make it work.

Thanks

PWH

On Wed, Jan 14, 2015 at 11:15 AM, Myers, Dennis J SWF <Dennis.J.Myers@usace.army.mil> wrote:
Classification: UNCLASSIFIED
Caveats: NONE

Team,

In effort to keep things black and white, NMED agreement is below on the failure criteria of a grid. 1.5inches by 3inches. This email needs to be placed in the work plan. Not sure where you would like to place it, but as long it is there we should be good.

DJ

Dennis "DJ" Myers
Ordnance & Explosives Safety Specialist
FWDA Project Manager
U.S. Army Corp of Engineers
Fort Worth, TX 76102
817-609-5014 (Cell)
720-670-0493 (personal cell)

dennis.j.myers@usace.army.mil

-----Original Message-----
From: Smith, Steve W SWF
Sent: Wednesday, January 14, 2015 10:44 AM
To: Myers, Dennis J SWF; Christy Esler
Cc: Kirwan, Stephen E (Eric) SWF; Patterson, Mark C CIV (US)
Subject: FW: Kickout removal question (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

DJ,

Mark sure this email is in the KOA WP. It establishes the anomaly size in the Permit.

Christy,

Please file in the admin record.

-----Original Message-----
From: Kirwan, Stephen E (Eric) SWF
Sent: Monday, March 17, 2014 2:02 PM
To: Smith, Steve W SWF; Slavens, Michael SWF; Bohannon, Timothy P SWF; Smith, Jackie G SWF; Myers, Dennis J SWF
Subject: FW: Kickout removal question (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

FYI, see below.

Thank you,
Eric

-----Original Message-----
From: Wear, Benjamin, NMENV [mailto:Benjamin.Wear@state.nm.us]
Sent: Monday, March 17, 2014 1:00 PM
To: Kirwan, Stephen E (Eric) SWF; Cobrain, Dave, NMENV
Subject: [EXTERNAL] RE: Kickout removal question (UNCLASSIFIED)

Thanks, Eric,

Based on our discussion on Friday, we concur with your approach.

Thanks again,

Ben Wear
Environmental Scientist
Hazardous Waste Bureau

New Mexico Environment Department
2905 Rodeo Park Dr. East, Bldg. 1
Santa Fe, NM 87505
(505) 476-6041

-----Original Message-----
From: Kirwan, Stephen E (Eric) SWF [mailto:Stephen.E.Kirwan@usace.army.mil]
Sent: Monday, March 17, 2014 6:22 AM
To: Cobrain, Dave, NMENV; Wear, Benjamin, NMENV
Subject: Kickout removal question (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Gentlemen,
Per out call on Friday, I'm resending the email explaining our intent to use a specific size of metal for the cleanup requirement for the kickout area.

We are scoping the kickout removal project. We typically include in our scopes a failure criteria (usually the smallest expected item). We would like to set the failure criteria at any metal 1.5" x 3" in size. We know it is more conservative then the permit, which says remove all waste military munitions, but we don't want them digging up something and just leaving it because it isn't a munitions. If you're agreeable please just respond to this email. If you would like to discuss further, let me know.

Thank you,

Eric Kirwan
SWD Regional Planning and Environmental Center U.S. Army Engineer District, Fort Worth
(817) 366-2437

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

State of New Mexico
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6313
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov

SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

BUTCH TONGATE
Cabinet Secretary
J. C. BORREGO
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

November 2, 2017

Mark Patterson
BRAC Environmental Coordinator
Fort Wingate Depot Activity
13497 Elton Road
North Lima, OH 44452

Steve Smith
USACE
CESWF-PER-DD
819 Taylor Street, Room 3B06
Fort Worth, TX 76102

RE: CLARIFICATION REGARDING THE PARCEL 3 HAZARDOUS WASTE MANAGEMENT UNIT CLEANUP OF SOIL CONTAMINATION OUTSIDE OF THE UNIT BOUNDARY
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO
EPA ID# NM6213820974
HWB-FWDA-17-001

Dear Messrs. Patterson and Smith:

The New Mexico Environment Department (NMED) discussed soil sampling and cleanup during a phone conversation that took place on September 22, 2017 between Mark Patterson (BRAC Coordinator), Steve Smith (USACE), and NMED regarding Parcel 3 remediation activity. NMED understands that the Permittee's contractor responsible for removal of contaminated soils at the Hazardous Waste Management Unit (HWMU) may encounter contaminated soils near or beyond the boundary of the HWMU. In lieu of discontinuing excavation activities, backfilling the excavation, and then returning to the site at a later date to re-excavate these contaminated soils, the contractor may elect, in coordination with the Permittee, to remove contaminated soils that extend beyond the HWMU boundary.

NMED agrees that the conditions, sampling protocols, and cleanup criteria stated in the Permittee's NMED-approved December 19, 2012 Final Removal Work Plan, HWMU, Parcel 3,

Revision 1, including all modifications provided in NMED's January 24, 2013 Approval with Modifications letter, apply to the removal of contaminated soils within, below, and adjacent to the HWMU boundary within the inner fence area.

Should you have any questions, please contact Ben Wear of my staff at (505) 476-6041.

Sincerely,

John E. Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
B. Wear, NMED HWB
C. Hendrickson, U.S. EPA Region 6
L. Rodgers, Navajo Nation
S. Begay-Platero, Navajo Nation
M. Harrington, Pueblo of Zuni
C. Seoutewa, Southwest Region BIA
G. Padilla, Navajo BIA
J. Wilson, BIA
B. Howerton, BIA
R. White, BIA
C. Esler, Sundance Consulting, Inc.

File: FWDA 2017 and Reading, Parcel 3, FWDA-17-001

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6313
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

November 7, 2019

Mark Patterson
BRAC Environmental Coordinator
Fort Wingate Depot Activity
13497 Elton Road
North Lima, OH 44452

RE: DISAPPROVAL
FINAL WORK PLAN INNER FENCE REVISION 2.0, PARCEL 3
[SECOND] RESPONSE TO APPROVAL WITH MODIFICATIONS
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO
EPA ID# NM6213820974
HWB-FWDA-17-001

Dear Mr. Patterson

The New Mexico Environment Department (NMED) is in receipt of the Fort Wingate Depot Activity (Permittee) *Final Work Plan Inner Fence Revision 2.0, Parcel 3, [Second] Response to Approval with Modifications* (Response), dated October 15, 2019. NMED has reviewed the Response. The Permittee must address the following comments.

1. **Permittee's Responses to NMED's Comment 2, dated September 18, 2018 and Comments 2 and 3, dated July 15, 2019**

   Permittee Statement: "Please see replacement pages 3-14 (Line 24) through 3-23 (Line 7), and associated Figure 3-4, for a revision to the plan that includes a demonstration that

there is minimal potential contamination associated with low density areas and individual MEC items."

NMED Comment: The pertinent discussion is included in replacement pages 3-14 (Line 12) through 3-22 (Line 27) in the Work Plan. Ensure that references are accurate. No response required.

2. **Section 3.7.10, Soil Sampling of Low-Density MEC Areas, line 23, page 3-14**

Permittee Statement: "Discrete locations will be sampled for explosives."

NMED Comment: Explain why Incremental Sampling Methodology (ISM) was not proposed for sampling of explosives at low-density MEC areas. ISM is likely a more appropriate sampling method at low-density MEC areas, if properly implemented. Comment 3 in NMED's *Disapproval Final RCRA Facility Investigation Report Parcel 6 Revision 1.0,* dated June 4, 2019 states, "[t]he NMED does not accept the inappropriate use of the incremental sampling method. NMED will only accept multi-incremental or ISM samples for explosives and metals in large-area surface releases with detonation or airborne distribution as the contaminant release source." Evaluate whether ISM is a more appropriate sampling method at low-density MEC areas and provide an explanation in a response letter. If ISM is found to be more appropriate, provide replacement pages for all pertinent sections.

3. **Section 3.7.10.1, Soil Sampling Design, lines 36-38, page 3-14 and lines 3-7, page 3-15**

Permittee Statement: "The inputs to the module assumed 8,000 potential sampling locations (i.e., the estimated number of MEC items potentially present) within the Inner Fence."

NMED Comment: All input parameters and supporting data for the Visual Sample Plan (VSP) "Item Sampling" module must be provided in the response letter. If input values are assumed, provide justification for the assumptions.

4. **Section 3.7.10.1, Soil Sampling Design, lines 3-7, page 3-15**

Permittee Statement: "VSP output determined collecting 59 soil samples from the potential 8,000 sampling locations would yield the desired confidence level (i.e., 95 percent confident that 95 percent of the 8,000 sampling locations are below SSLs), assuming that all sample results were below screening levels and cancer risks are less than or equal to 1.0E-05 and hazard equal to or less than 1.0."

NMED Comment: Demonstrate how 59 soil samples from 8,000 potential sampling locations (approximately 0.7 percent) will produce the desired confidence level. The

number of samples does not appear to be sufficient. In addition, if 8,000 sampling locations are identified during the clearance activities, explain how 59 sampling locations are selected out of the 8,000 potential locations. Furthermore, discuss the actions that will be taken in a scenario where the sampling results exceed the screening levels. Provide replacement pages that include the demonstration and discussion.

5. **Section 3.7.10.1, Soil Sampling Design, lines 7-8, page 3-15**

Permittee Statement: "Note, the number of MEC items (i.e., 8,000) present within the Inner Fence is estimated and subject to be refined as more information is obtained."

NMED Comment: The number of MEC items in low-density MEC areas is presumably estimated and refined from the MEC clearance activities conducted with the grid system presented in Figure 3-1, *Inner Fence Area Grid Map*. However, Figure 3-1 does not indicate which grids are considered as high or low density MEC areas. The Permittee must define what constitutes high and low density MEC areas in the revised Work Plan (e.g., the number of detected MEC items per grid). Provide replacement pages that include the explanation.

6. **Section 3.7.10.2, Sampling Procedures, Soil Sample Analyses, lines 28-29, page 3-16**

Permittee Statement: "Each discrete soil sample will be analyzed for explosives (Method 8330B) and submitted to Agricultural Priority Pollutants Laboratory, Inc. for chemical analysis."

NMED Comment: In Section 3.12.5, *Confirmation Soil Sampling [of high-density MEC areas ("HWMU-like" areas)]*, lines 19-20, page 3-33, the Permittee states, "[e]ach excavation or grid will be sampled for the constituents listed in Section III.A.4 of the FWDA RCRA Permit." Section III.A.4 of the FWDA RCRA Permit requires chemical analysis of volatile organic compounds, semi-volatile organic compounds, metals, explosive compounds, perchlorate, nitrate, cyanide, PCBs, dioxins, furans, and any other hazardous constituents specified by NMED. The analytical suite for soil sampling of low-density MEC areas must be comparable to that of high-density MEC areas except an analysis for volatile organic compounds (VOCs). VOCs are unlikely to be present as a result of the activities associated with low-density MEC areas; therefore, VOC analysis is not required at low-density MEC areas. However, the Permittee must propose to collect samples for semi-volatile organic compounds, metals, explosive compounds, perchlorate, nitrate, cyanide, PCBs, dioxins, and furans or provide justification for a reduced analytical suite. Revise all pertinent sections of the Work Plan (e.g., Section 3.7.10.2) to include the provision and provide replacement pages.

7. Section 3.7.10.2, Sampling Procedures, Soil Sample Collection, lines 1-2, page 3-17

Permittee Statement: "Using a decontaminated spoon or trowel (or disposable tool), remove soil from a one square foot area at the discrete soil sample location until the sampling depth of 0.5 ft is reached.

NMED Comment: In Section 3.7.10.1, lines 16-19, page 3-15, the Permittee states, "[s]oil samples will be collected from the 6-inch interval directly below a MEC where the highest likelihood of residual contamination would be found (e.g., for a MEC items recovered at 6 inches below ground surface, the soil sample would be collected from 6-12 inches below ground surface)." The Permittee's statement regarding the sampling procedures does not follow the procedure described in Section 3.7.10.1. Revise the Work Plan for accuracy and provide replacement pages.

The Permittee must address all comments in this letter and submit a response letter with replacement pages no later than **February 28, 2020**. In addition, the Permittee must submit an electronic version of the revised Work Plan, as well as an electronic redline-strikeout version of the revised Work Plan showing all changes that have been made to the Work Plan. Two copies of all submittals must be provided.

Should you have any questions, please contact Michiya Suzuki of my staff at (505) 476-6059.

Sincerely,

Dave Cobrain
Program Manager
Hazardous Waste Bureau

cc: B. Wear, NMED HWB
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R. Duwyenie, Navajo BIA
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B. Howerton, BIA
R. White, BIA
C. Esler, Sundance Consulting, Inc.

File: FWDA 2019 and Reading

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
600 ARMY PENTAGON
WASHINGTON, DC 20310-0600

October 15, 2019

Base Realignment and Closure Division

Mr. John Kieling
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

RE: Final Work Plan Inner Fence Revision 2.0, Parcel 3, Response to Approval with Modifications, Fort Wingate Depot Activity, McKinley County New Mexico, EPA # NM6213820974, HWB-FWDA-17-001.

Dear Mr. Kieling,

This letter presents the Army's additional response to Comment #2 in the New Mexico Environment Department (NMED) Approval with Modifications letter dated September 18, 2018, under RCRA Permit USEPA ID NO. NM6213820974, and Comments #1- #3 in the subsequent NMED letter dated July 15, 2019. The following are the Army's responses to NMED comments detailing where each comment was addressed and cross-referencing the numbered NMED comments. Additional replacement pages, as required by NMED's modifications, are attached (pages 3-14 through 3-23). In addition, an electronic version of the revised Work Plan and the redline-strikeout version showing changes in response to the Approval with Modifications are provided on the attached discs.

2. Low Density Areas and Individual Items – NMED September 18, 2018 letter

NMED Comment: Confirmation samples are only proposed in high density areas where mechanized removals will be conducted. However, demonstration that there is minimal potential contamination associated with individual items and that contamination associated with lower density clusters of items will not impact overall risk has not been provided. Provide data collected from the historical investigations to show that soil contamination resulting from lower density clusters and individual items are insignificant with respect to risk. If no data are available, then a statistical number of low density areas must be sampled until it can be demonstrated that residual soil contamination from low density areas and individual items is insignificant and would not affect overall human health and ecological risk. Revise the Plan to include a demonstration that there is minimal potential contamination associated with low density areas and individual items by providing supporting data or proposing further sampling. Provide NMED with replacement pages detailing the demonstration.

Army Response: Please see replacement pages 3-14 (Line 24) through 3-23 (Line 7), and associated Figure 3-4, for a revision to the plan that includes a demonstration that there is minimal potential contamination associated with low density areas and individual MEC items.

1. Electronic Copy of the Response to Comment Letter – NMED July 15, 2019 letter

NMED Comment: An electronic copy of the response to comment letter was not included with the submittal. In all future submittals, provide an electronic copy of the response to comment letter. The

Permittee has been provided this direction in multiple correspondence. Continued failure to follow NMED direction constitutes noncompliance and may result in an enforcement action.

Army Response: Please see attached discs with electronic copies of the response to comment letter.

2. Permittee's Response to NMED's Approval with Modifications Comment 2 – NMED July 15, 2019 letter

Permittee Statement: "Of the 105 soil samples taken from these seven installations, no explosives were detected in any of the analyzed soil samples. Additionally, of the reports that evaluated risk, all determined that risks to human health and the environment were insignificant."

NMED Comment: The Permittee provided the test results collected from Formerly Used Defense Sites (FUDS) to demonstrate that residual soil contamination at FWDA is insignificant. However, the data collected from the FUDS sites only indicates that contamination was not present at those sites which have their own unique histories. Revise the Work Plan to include a demonstration that there is minimal potential residual soil contamination associated with low-density areas and individual munitions of explosive concern (MEC) by proposing further sampling at FWDA, as Comment 2 of NMED's September 18, 2018 Approval with Modifications letter directed. Provide replacement pages as necessary.

Army Response: Please see replacement pages 3-14 (Line 24) through 3-23 (Line 7), and associated Figure 3-4, for a revision to the plan that includes a demonstration that there is minimal potential contamination associated with low density areas and individual MEC items.

3. Permittee's Response to NMED's Approval with Modifications Comment 2 – NMED July 15, 2019 letter

Permittee Statement: "Given that the Permit does not require sampling for residual soil contamination in the Kickout Area, and that the approved Kickout Area Work Plan specifically stated such sampling would not be performed, the Army is unable to support requests for additional sampling in these areas."

NMED Comment: The overall Kickout Area and the Kickout Area within the Inner Fence are two very different sites. Basing the work proposed in a plan for one site based on the conditions present at the other site implies a basic misunderstanding of the differences between the two sites. The Permittee was allowed to forego soil sampling beneath MEC items in the larger Kickout Area based on the overall size of the area and the low density of the MEC items. The Inner Fence area is a much smaller area that contains a much higher density of anomalies based on proximity to the OB/OD area and geophysical surveys, thereby requiring more thorough investigation. Data from other FUDS is not applicable at Fort Wingate Depot Activity and the Permittee must demonstrate that no residual contamination exists below excavated MEC items with a defensible sampling approach and analytical laboratory data. Revise the Work Plan to include a demonstration that there is minimal potential residual soil contamination associated with low-density areas and individual munitions of explosive concern (MEC) by proposing further sampling at FWDA, as Comment 2 of NMED's September 18, 2018 Approval with Modifications letter directed. Provide replacement pages as necessary.

Army Response: Please see replacement pages 3-14 (Line 24) through 3-23 (Line 7), and associated Figure 3-4, for a revision to the plan that includes a demonstration that there is minimal potential contamination associated with low density areas and individual MEC items.

If you have questions or require further information, please call me at (505) 721-9770.

Sincerely,

Mark Patterson
BRAC Environmental Coordinator

Enclosures

CF:

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Oliver Whaley, Navajo EPA
Jennifer Turner, DOI
FWDA Admin Record, OH/NM

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
600 ARMY PENTAGON
WASHINGTON, DC 20310-0600

DAIM-ODB July 30, 2018

Mr. John Kieling
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

RE: Final Work Plan Inner Fence, Parcel 3 Revision 1.0, Response to February 7, 2018 Disapproval letter, Fort Wingate Depot Activity, McKinley County, New Mexico EPA #NM6213820974, HWB-FWDA-17-001.

Dear Mr. Kieling:

This letter is in reply to the New Mexico Environment Department (NMED) Letter of Disapproval dated February 7, 2018, reference number HWB-FWDA-17-001, Final Work Plan Inner Fence, Parcel 3, Revision 1.0, dated November 29, 2017. The following are the Army's responses to NMED comments detailing where each comment was addressed and cross-referencing the numbered NMED comments.

Comments:

1. **Table of Contents, Lists of Acronyms**

NMED Comment: Definitions for some acronyms (e.g., HTRW, HNC, NONEL, UXOQP) are not provided in the Work Plan. Each acronym must be defined in the text or the document, *List of Acronyms.* Revise the Work Plan to provide definitions for these acronyms.

Army Response: Concur. The Work Plan was reviewed and revised to include all acronyms.

2. **Section 1.2.1.4, Section IV.D Kickout Area Clearance Report, lines 2-4, page 1-3**

Permittee Statement: "Within 180 days of the completion of the KOA investigation, clearance, and removal of WMM and WMM scrap from the KOA, the Army will provide the NMED a report summarizing the results of this work."

NMED Comment: Field work will be completed on November 20, 2019 and report preparation will start on January 27, 2022 according to Figure 2-2, *Project Schedule.* No activities are scheduled in 2020 and 2021 according to Figure 2-2. As the Permittee intends to provide NMED a report within 180 days of field work completion, the report pertaining to the investigation and removal activities in the Inner Fence Area must be submitted by May 20, 2020. Correct the discrepancy or explain why no activities are proposed in the 2020 and 2021 schedule in the revised Work Plan.

Army Response: Concur. The completion date for Inner Fence fieldwork is dependent upon varying densities of MEC and debris. Based on the approved project schedule, the end of fieldwork could extend to 9/8/21. Therefore, the schedule was revised to change the fieldwork end date to 9/8/21. Additionally, the schedule was updated to show the Army review of the removal report from 9/9/21 to 1/26/22. The planned NMED review will start on 1/27/22.

3. Section 1.3, Investigation & Clearance Summary, lines 30-32, Page 1-3

Permittee Statement: "MPPEH and MD inspection, handling, and final disposition as MDAS will be conducted IAW USACE EM 385-1-97, Change 1, DoD 4140.62, and DoD 6055.09-M."

NMED Comment: NMED does not review the referenced engineering manuals. The Permittee must describe the process for how materials documented as an explosive hazard (MDEH) and safe (MDAS) are inspected and separated from material potentially presenting an explosive hazard (MPPEH) in the revised Work Plan.

Army Response: Concur. The MPPEH inspection process is presented in Section 3.7.9.2 of the Inner Fence Work Plan. The second paragraph of Section 1.3 was revised as follows: "MPPEH and MD inspection, handling, and final disposition as MDAS will be conducted IAW USACE EM 385-1-97, Change 1, DoD 4140.62, and DoD 6055.09-M as detailed in **Section 3.7.9.2**. All MDEH will be destroyed using authorized disposal procedures. All MDAS recovered at the KOA will be delivered to a metal recycler to be smelted following completion of the RA."

4. Section 3.1, Overall Approach to Munitions Response Activities, lines 7-8, page 3-1

Permittee Statement: "The removal will not occur in areas too steep to safely work as shown on Figure 1-2."

NMED Comment: If inaccessible areas are encountered during the investigation of the Inner Fence Area, use Figure 3-1, *Inner Fence Area Grid Map,* to depict areas where field investigation and removal of debris are not conducted. Present the map in future reports.

Army Response: Concur. The first paragraph of Section 3.1 was revised as follows: "The removal will not occur in areas too steep to safely work as shown on **Figure 1-2**. Areas with a slope of approximately 35 percent or more are considered too steep to safely work. If unsafe areas are encountered during the investigation and removal is not conducted, those areas will be documented in the field and depicted on maps presented in future reports."

5. Section 3.4, Instruments Test Strip, lines 23-25, page 3-4

Permittee Statement: "The purpose of the ITS is a QC measure demonstrating the functionality of the detection equipment being used during the RA operations and the ability of the equipment operator to detect items that may be encountered in the field."

NMED Comment: The results of the detection and recovery test must be presented in the Kickout Area Clearance Report (KOA Report). Indicate each test result with depths, soil types, orientation and size of the object. In addition, the Permittee must determine the maximum depths that the instrument is capable of detecting each object listed in Table 3-2, *Equivalent ISO Simulant Items* under typical subsurface conditions in the Inner Fence Area. In Section 3.1, *Overall Approach to Munitions Response Activities,* lines 34-35, page 3-1, the Permittee states, "[i]n general, the depth of detection utilizing hand-held detectors is 11 times the diameter of the item." The statement may or may not be accurate under certain subsurface conditions; thus, it must be verified by an actual instrument at the site. No revisions to the Work Plan are necessary.

Army Response: Concur. The ITS results are recorded by the field team leaders, and the UXOQCS documents ITS completion in the Daily QC Report. The Daily QC Reports will be presented in the KOA Clearance Report. As indicated in the NMED comment, no change to the Work Plan is necessary.

6. Section 3.5, Location Surveys & Mapping Plan, lines 14-16, page 3-5

Permittee Statement: “All grid corner stakes will be painted orange, yellow stakes will be used for line of sight, white stakes will be used for MRS boundaries, and red stakes (or pin flags, flagging, or marking paint) will be used to mark areas to be avoided due to hazardous conditions."

NMED Comment: The paint must not contain constituents that may interfere with confirmation sample analysis. No revisions to the Work Plan are necessary.

Army Response: Concur. Field staff will not use paint that contains constituents that may interfere with confirmation sample analysis. As indicated in the NMED comment, no change to Work Plan is necessary.

7. Section 3.12.5.1, Confirmation Soil Sampling Method, lines 24-26 and lines 36-37, page 3-25 and lines 10-11, page 3-26

Permittee Statement: “Samples will be collected from the bottom and sidewalls of each excavation. Each excavation will likely vary significantly in shape and size; therefore, a composite sample will be collected from at least every 100 linear feet of sidewall."
"A composite sample will be collected from the bottom of each excavation that is less than 100 feet by 100 feet (10,000 square feet)."
"Each sample will be comprised of nine subsamples randomly collected from within each sampling area."

NMED Comment: The analytical suite for confirmation soil sampling must include target analyte list (TAL) metals, semi-volatile organic compounds (SVOC), explosives, polychlorinated biphenyl (PCB), nitrate, cyanide, dioxins/furans and perchlorate. For areas where excavation exceeds two feet in depth, the sampling protocols used for the HWMU removal must be followed. For areas where the excavation is less than two feet in depth, nine subsamples to make up a composite sample are sufficient to characterize decision units of less than 1,000 square feet. For shallow excavations greater than 1,000 square feet, each composite sample must be comprised of a minimum of *50* subsamples and exceed a mass of one kilogram in accordance with Section 6.1 of Attachment 9 of the Permit and *BP*A Method 8330B, respectively. For both composite and incremental samples, the initial screening must compare the detected concentration multiplied by the number of subsamples to the compound-specific screening level. Revise the Work Plan accordingly.

Army Response: Concur. The analytical suite for confirmation soil sampling will include the list referenced in the NMED comment, and will additionally include VOCs. Section 3.12.5.1 lists each of the requested analyte groups.

Based on follow-up correspondence and a conference call with NMED held June 13, 2018, the Army understands that excavations greater than 2 feet in depth must be sampled in accordance with the HWMU removal sampling protocols per the NMED comment.

It is also understood that excavations less than 2 feet in depth will require a different sampling protocol than what is being used for the HWMU. For excavations less than 2 feet in depth, the Army has decided to switch from composite soil sampling to discrete soil sampling. Therefore, the Inner Fence Work Plan was revised to include a discrete soil sampling approach that the contractor believes the NMED will find adequate to meet the project objectives. Section 3.12.5 was revised to include discrete soil sampling protocols and frequencies that have been acceptable to the NMED at other sites in New Mexico. The proposed sampling frequencies are as follows: 1) one excavation bottom sample for every 400 square feet, and 2) one sidewall sample for every 20 feet of sidewall.

8. Section 3.12.5.1, Confirmation Soil Sampling Method, lines 24-26, lines 36-37, page 3-25 and lines 5-6, page 3-26.

Permittee Statement: "Samples will be collected from the bottom and sidewalls of each excavation. Each excavation will likely vary significantly in shape and size; therefore, a composite sample will be collected from at least every 100 linear feet of sidewall."
"A composite sample will be collected from the bottom of each excavation that is less than 100 feet by 100 feet (10,000 square feet)."
"Each sample area will consist of one discrete soil sample for volatile organic compounds (VOCs) (Method 8260B) and..."

NMED Comment: The Permittee proposes to collect a discrete sample at least every 100 linear feet of the sidewalls and 10,000 square feet of the bottom; however, the number of discrete sample is not sufficient to characterize either bottom or sidewalls of each decision unit. For VOC analysis, a discrete sidewall sample must be collected every twenty linear feet of the sidewalls and a discrete base sample must be collected every 400 square feet of the bottom. Revise the Work Plan accordingly.

Army Response: Concur. For excavations less than 2 feet in depth, discrete VOC samples will be collected at a rate of one per each 20 linear feet of sidewall and one per each 400 square feet of excavation bottom.

9. Section 3.13, Backfilling Excavations, lines 7-8, page 3-29

Permittee Statement: "All excavations created from excavation of anomalies, detonations, and access will be backfilled and restored to original grade."

NMED Comment: Clarify the source of the backfill (e.g., soil generated from the shifting operation that has been determined to be acceptable for use as backfill).

Army Response: Concur. Section 3.13 was revised as follows: "All excavations created from excavation of anomalies, detonations, and access will be backfilled with soil generated during the excavation that has been determined to be acceptable for reuse. Areas will be restored and graded to promote positive drainage."

10. Table 3-1, Type & Depth of MEC Removed

NMED Comment: The variety of recovered MEC items, from 20mm to a 2000-lb bomb, are listed in Table 3-1. The recovered MEC items may exhibit a large range of detection depths; however, Table 3-1 lists only one detection depth. In addition, the listed depths of "~< 2 feet" and "~< 4 feet" are confusing because they may mean anything less than 2 feet and 4 feet, respectively. Further, the Permittee must clarify whether the table includes or excludes recovery depths from the HWMU remediation area. Divide Table 3-1 into several groups by munition detection depth ranges in the revised Work Plan.

Army Response: Concur. Table 3-1 was revised to include a footnote that indicates the table excludes recovery depths from the HWMU remediation area.

Table 3-1 was separated into several groups by munition detection depth ranges.

11. Figure 3-1, Inner Fence Area

NMED Comment: If "HWMU-like" surface and subsurface conditions are identified at the outermost decision unit along the fence line depicted in Figure 3-1, the adjacent soils outside of the decision unit along the fence line must be investigated in the same manner, where practicable. Although the scope only focuses on the investigation and removal activities within the Inner Fence Area, the Permittee must

include a measure to address contaminated soils outside of the fenced area where contamination is detected. The same grid system (e.g., 100 feet by 100 feet) may be established along the fence line, adjacent to the outermost decision unit. Revise the Work Plan to address potential soil contamination outside of the Inner Fence Area.

Army Response: Concur. Section 3.12 was revised to indicate that if "HWMU-like" conditions are identified at the outermost decision unit along the fence line of the Inner Fence Area, then adjacent soils outside of the fence line will also undergo confirmation soil sampling.

12. Permittee' s Response to Comment 2 of the Disapproval

Permittee Statement: "Appendix F of the WP was removed as indicated in the response above."

NMED Comment: The Permittee' s statement was removed; however, this Work Plan may be developed based on the inappropriate direction stating that soil sampling should not be unnecessarily completed if receptor pathways are incomplete. The Work Plan must be revised to address all potential exposure pathways that were not previously addressed. It should be noted that simply removing an inappropriate statement from the text may not entirely comply with the NMED's directions. Revise the Work Plan as necessary.

Army Response: Concur. For areas of the Inner Fence, soil sampling results will be used to address all potential exposure pathways. The new Section 3.12.6 includes details of the exposure pathways that will be addressed.

13. Permittee' s Response to Comment 7 of the Disapproval

Permittee Statement: "The schedule in Appendix C was revised to only include tasks related to the Inner Fence work. Also, the project schedule was moved into the main body of the work plan."

NMED Comment: Figure 2-2, Project Schedule, includes columns for "Task" and "CLIN"; however, they are not defined. The Permittee must either remove these columns from the figure or provide definitions in the revised Work Plan.

Army Response: Concur. The task and CLIN columns were deleted from the project schedule.

If you have questions or require further information, please call me at (505) 721-9770.

Sincerely,

Mark Patterson
BRAC Environmental Coordinator

Enclosures

CF:
D Cobrain, NMED HWB
B Wear, NMED HWB
M Suzuki, NMED HWB
S Khan, USACE SWT

Media

DEPARTMENT OF THE ARMY
FORT WINGATE DEPOT ACTIVITY
P.O. BOX 268
FORT WINGATE, NM 87316

November 27, 2017

Mr. John Kieling
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

RE: Army's Response to Comments, New Mexico Environmental Department Disapproval Letter dated August 30, 2017, Parcel 3 Final Work Plan Inner Fence.

Dear Mr. Kieling:

This letter is in response to the New Mexico Environmental Department (NMED) Letter of Disapproval dated August 30, 2017, reference number HWB-FWDA-17-001, Final Work Plan Inner Fence, Parcel 3, dated August 30, 2017. The following are the Army's responses to NMED comments detailing where each comment was addressed and cross-referencing the numbered NMED comments.

Comments:

GENERAL COMMENTS

1. Work Plan Organization

NMED Comment: The Permittee has provided a document that is difficult to review. The organization of the document is inconsistent. For example Table 2-1 and Figure 2-1 are located at the end of Section 2, whereas Table 4-1 is embedded in the text of Section 4 and all site maps are located in an appendix. For all tables, either locate the tables at the end of their section or, preferably, in a "Tables" section at end of report, but before the appendices. For all figures, which includes site maps, either locate the figures at end of their respective sections or, preferably, in a "Figures" section at the end of the report, but before the appendices. The tables and figures located at the end of the sections either contain page numbers that are out of sequence with the rest of the section or do not contain page numbers at all. Include appropriate page numbering on all tables and figures.

Also, the Work Plan includes sections and appendices that are not needed or required. Inclusion of these sections and appendices requires NMED to review and provide comments on each of them, thereby significantly slowing the review process. Removal of these types of sections and appendices will allow NMED to provide more rapid review of documents. The extraneous sections and appendices include:

Section	Suggestion
Section 5: Explosives Management Plan	NMED does not review or approve explosive management plans. Remove from Plan. Specific procedures to be used at

	Parcel 3 must be summarized in the text of the Work Plan.
Section 6: Environmental Protection Plan	NMED does not review or approve environmental protection plans. Remove from Plan. Procedures to be used at Parcel 3, such as those for Investigation Derived Waste management, must be described in the document text.
Section 7: Property Management Plan	If not required for site, remove from Plan.
Section 8: Interim Holding Facility Siting Plan for Chemical Warfare Materiel	If not required for site, remove from Plan.
Section 9: Physical Security Plan for Recovered Chemical Warfare Materiel	If not required for site, remove from Plan.
Appendix D: Accident Prevention Plan	If submitted under separate cover, remove from Plan.
Appendix F: Uniform Federal Policy - Quality Assurance Project Plan	QAPPs are not typically project specific and NMED does not review QAPPs**.** Detailed methods and procedures to be used at Parcel 3 must be provided in the "Field Investigation Plan" or "Quality Control Plan" sections of the text.
Appendix G: Explosives Safety Submission	If submitted under separate cover, remove from Plan.

Revise the Plan to remove unnecessary sections and appendices, as well as to include detailed descriptions within the text of all methods and procedures to be used during the investigation. Also, organize the tables and figures in the revised document in a consistent manner as detailed above.

Army Response: Table 4-1 was moved to the end of Section 4 to maintain consistency throughout the document. The maps in Appendix B were moved to the end of the section when first introduced. Appendix B was deleted. All tables/figures were moved to the end of the appropriate section and contain a unique table or figure number. Moving the tables/figures to end of sections has added consistency and alleviates possible confusion as to where tables/figures can be found. Based on the NMED suggestions regarding WP sections and appendices, the following sections/appendices were removed from the WP: Section 5: Explosives Management Plan, Section 6: Environmental Protection Plan, Section 7: Property Management Plan, Section 8: Interim Holding Facility Plan Siting Plan, Appendix D: APP, Appendix F: UFP-QAPP, and Appendix G: Explosives Safety Submission.

2. Nature and Extent of Contamination, Appendix F, UFP-QAPP, Attachment 1, Meeting Notes, p 2

Permittee Statement: “Mark Patterson noted that soil sampling should not be unnecessarily completed if receptor pathways are incomplete (i.e., the residential exposure horizon does not extend below 10 feet).”

NMED Comment: This direction is not appropriate. An integral part of all site investigations is the requirement to define the nature and extent of contamination at the

site. Section VII.H.l.b, RCRA Facility Investigation Work Plan Requirements, of the FWDA RCRA Permit states, "[t]he RFI Work Plan shall include schedules of implementation and completion of specific actions necessary to determine the nature and extent of contamination and the potential pathways of contaminant releases to the air, soil, surface water, and ground water." Whether receptor pathways are complete or not, the nature and extent of contamination at the site must be defined and all potential exposure pathways must be addressed.

Army Response: Appendix F of the WP was removed as indicated in the response above.

SPECIFIC COMMENTS

3. Section 3.1, Overall Approach to Munitions Response Activities, p 3-2

Permittee Statement: "MEC (regardless of size) and metallic debris measuring 1.5 inches by 3 inches or larger will be removed from the surface and subsurface by manual digging of anomalies IAW EM 385-1-97 to depth of detection."

NMED Comment: Depth of detection is not defined. Provide the effective depth of detection for various sized objects (e.g., 1.5"x3" objects, 40mm mortars, 75mm mortars, etc.) in the revised Plan.

Army Response: Section 3.1 was revised as follows: "…to depth of detection. *Depth of detection varies depending on the size and orientation of the subsurface anomaly. In general, the depth of detection utilizing handheld detectors is 11 times the diameter of that item. Expected MEC types and approximate geophysical detection depths are shown in* ***Table 3-1***. UXO teams will survey…"

The following table was added to present the type of MEC expected, maximum depth of MEC recovered during investigations, and approximate geophysical detection depths.

MRS	MEC Recovered	Maximum Depth of MEC Recovered During Previous Site Investigations (bgs)	Approximate Geophysical Detection Depth (bgs)
KOA Inner Fence Area	20mm, 37/40mm, 50mm, 57mm, 60mm, 75/76mm, 81mm, 90mm, 102mm, 105mm, 120mm, 155mm, 3.5", M83, Fuses, bomb live unit (BLU) 3 & 4, 5-inch rockets, 2.75-inch rockets and 3-inch rockets and AN-	~ < 2 feet	~ < 4 feet

	M66A2, 2000-lb HE Bombs		

Notes:
bgs = below ground surface
KOA = Kickout Area
MEC = munitions and explosives of concern
mm = millimeter
MRS = munitions response site

4. Section 3.1, Overall Approach to Munitions Response Activities, p 3-2

Permittee Statement: "Based on previous activities and geophysical surveys, it is likely that some portions of the Inner Fence Area adjacent to the HWMU boundary will exhibit subsurface conditions that are "HWMU-like" (i.e., high concentration of WMM at depths exceeding the limit of detection for analog geophysical instruments). Such areas will require mechanized MEC procedures in accordance with EM 385-1-97 instead of the analog survey and removal procedures. Any "HWMU-like" areas will be identified in coordination with the Army, and subsurface clearance of these areas will proceed as directed in the Approved Final HWMU Work Plan, Revision 1 (AECOM 2017). Sampling and analysis requirements for any "HWMU-like" areas are presented in the Uniform Federal Policy - Quality Assurance Project Plan (UFP-QAPP) (Appendix F) for the HWMU Removal Work Plan Amendment."

NMED Comment: The Plan provides no details on how "HWMU-like" areas will be identified if the WMM are at depths exceeding the limit of detection for analog geophysical instruments. The Plan also provides no details on clearance of "HWMU-like" areas. Reference to another work plan or a QAPP is not appropriate. Provide detailed descriptions of all work to be performed in the Inner Fence Area in the text of the Plan. Revise the Plan to include detailed descriptions of how "HWMU-like" areas within the Inner Fence Area will be cleared.

Army Response: Subsequent to the NMED review of the Inner Fence WP, the NMED and the Fort Wingate project team have had additional discussions regarding contaminated areas beyond the HWMU boundary within the Inner Fence Area (i.e., HWMU-like areas). As stated in a letter dated 2 November 2017 from NMED to BRAC/USACE outlining these additional discussions, NMED agreed that the conditions, sampling protocols, and cleanup criteria stated in the NMED-approved HWMU WP apply to the removal of contaminated soils beyond the HWMU boundary within the Inner Fence Area. Therefore, Section 3.12 of the Inner Fence WP has been revised to include details from the NMED-approved HWMU WP to describe how the clearance of "HWMU-like" areas will be conducted.

The WP was revised to remove text indicating that "HWMU-like" areas contain high concentrations of WMM at depths exceeding the limits of detection for analog geophysical instruments. The presence of "HWMU-like" material below depths of detection is not anticipated because these areas will likely exhibit strong subsurface signatures and/or be visibly identifiable. Section 3.1 was revised to clarify the description of "HWMU-like" as follows: "…it is likely that some portions of the Inner Fence Area adjacent to the HWMU boundary will exhibit subsurface conditions that are "HWMU-like" (i.e., contaminated areas that contain a sufficient number of anomalies such that excavation and processing the

material through a processing plant would be more efficient and safer than manual excavation). Such areas will require mechanized MEC procedures in accordance with EM 385-1-97 instead of analog survey and manual excavation removal procedures."

Section 3.1 was also revised to introduce the NMED clarification letter as follows: "In a letter dated November 2, 2017, the NMED agreed that the conditions, sampling protocols, and cleanup criteria specified in NMED-approved Final HWMU Work Plan (URS 2013) apply to the removal of contaminated soils that extend beyond the HWMU boundary (i.e., HWMU-like areas) within the Inner Fence Area. Contaminated areas requiring mechanical excavation (e.g., HWMU-like areas) as described above will be cleared in accordance with the NMED letter addressing contaminated soils beyond the HWMU boundary within the Inner Fence Area (**Appendix A**). In accordance with the NMED-provided letter, subsurface clearance of these areas will proceed as directed in the Approved Final HWMU Work Plan (URS 2013). Details of how "HWMU-like" areas within the Inner Fence Area will be cleared and sampled are provided in **Section 3.12**."

5. Section 3.10.1, Munitions and Explosives of Concern Disposal, p 3-16

Permittee Statement: "Detailed MEC disposal procedures are found in the MEC Disposal SOP."

NMED Comment: Descriptions of all methods and procedures must be included in the Report text. References to an SOP is not acceptable. Provide detailed descriptions of all work to be performed in the Inner Fence Area in the text of the Plan. Revise the Plan to include detailed descriptions of MEC disposal procedures that will be used within the Inner Fence Area.

Army Response: Section 3.10.1 was revised as follows: "Detailed MEC demolition procedures are detailed in **Section 3.10.5**."

A description of MEC demolition was added to Section 3.10.5.

6. Section 3.12, Soil Sampling for Munitions Constituents, p 3-18

Permittee Statement: "Munitions constituents (MC) sampling will not be conducted under the WP for this task. Therefore, no UFP-QAPP outlining MC sampling requirement is required for this work. However, if "HWMU-Iike" areas are identified and approved for removal by mechanized MEC procedures, then confirmation soil sampling will be completed IA W the HWMU Work Plan Amendment. A copy of the UFP-QAPP for the HWMU removal is included in Appendix F."

NMED Comment: The Plan provides no details on clearance of "HWMU-Iike" areas. Reference to another work plan or a QAPP is not appropriate. The Permittee must provide detailed descriptions of all work to be performed in the Inner Fence Area in the text of the Plan. Revise the Plan to include detailed descriptions of how "HWMU-Iike" areas within the Inner Fence Area will be cleared, as well as how confirmation samples for munition-related contamination will be collected and analyzed.

Army Response: As discussed above, the clearance of contaminated soils that extend beyond the HWMU boundary within the Inner Fence Area (i.e., "HWMU-like" material) will proceed as described in the NMED clarification letter dated 2 November 2017. Therefore, the Inner Fence WP has been revised to include details from the NMED-approved HWMU WP to describe how the clearance of "HWMU-like" areas will be conducted, including how confirmation samples will be collected and analyzed. Details for the clearance of "HWMU-like" areas were included in Section 3.12.

7. Appendix C, Project Schedule.

NMED Comment: The provided schedule is overly complicated and difficult to interpret. In the revised Plan, provide a simplified project schedule indicating when the field work will begin and end, as well as when report documenting the field work and results will be provided to NMED.

Army Response: The schedule in Appendix C was revised to only include tasks related to the Inner Fence work. Also, the project schedule was moved into the main body of the work plan.

If you have questions or require further information, please call me at (505) 721-9770.

Sincerely,

Mark Patterson
BRAC Environmental Coordinator

Enclosures

CF: Media

D Cobrain, NMED HWB
B Wear, NMED HWB
M Suzuki, NMED HWB
M Patterson, FWDA BEC
S Khan, USACE SWT