

Final

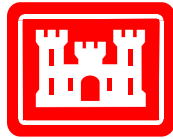
**Hazardous Waste Management Unit Progress Status Report, 2020
HWMU, Parcel 3**

**Fort Wingate Depot Activity
McKinley County, New Mexico**

June 11, 2021

Contract No. W912BV-16-C-0033

Prepared for:



U.S. Department of the Army
Corps of Engineers –

Tulsa District
2488 E. 81st Street
Tulsa, Oklahoma 74137

Prepared by:

AECOM

12120 Shamrock Plaza, Suite 100
Omaha, Nebraska 68154

60517380

Final

**Hazardous Waste Management Unit Progress Status Report, 2020
HWMU, Parcel 3**

**Fort Wingate Depot Activity
McKinley County, New Mexico**

June 11, 2021

Contract No. W912BV-16-C-0033

Prepared for:

U.S. Department of the Army
Corps of Engineers –

Tulsa District
2488 E. 81st Street
Tulsa, Oklahoma 74137

Prepared by:

AECOM Technical Services Inc.
12120 Shamrock Plaza, Suite 100
Omaha, Nebraska 68154

60517380

TABLE OF CONTENTS

1	Section 1	Introduction.....	1-1
2		1.1 Introduction.....	1-1
3		1.2 Project Purpose and Scope.....	1-1
4		1.3 Project Location.....	1-1
5		1.4 Site Description and Background.....	1-2
6		1.4.1 Open Burning and Detonation Areas.....	1-2
7		1.4.2 HWMU.....	1-3
8	Section 2	HWMU Removal Soil Sampling Activities.....	2-1
9		2.1 HWMU Removal Activites.....	2-1
10		2.1.1 Excavation Activities.....	2-1
11		2.1.2 Processing Activities.....	2-1
12		2.2 Soil Sample Activities and Analyses.....	2-2
13		2.2.1 Stockpile Soil Sampling.....	2-2
14		2.2.2 Confirmation Soil Sampling.....	2-3
15	Section 3	HWMU Removal Results.....	3-1
16		3.1 Soil Sampling Results.....	3-1
17		3.1.1 Stockpile Soil Sampling Results.....	3-2
18		3.1.2 Excavation Bottom/Sidewall Confirmation Soil Sampling	
19		Results.....	3-3
20		3.2 Risk Screening.....	3-4
21		3.2.1 Human Health.....	3-4
22		3.3 MEC Items and MD Recovered.....	3-7
23		3.3.1 MEC Recovery Results.....	3-7
24		3.3.2 MEC Disposal.....	3-8
25	Section 4	Summary.....	4-1
26	Section 5	References.....	5-1
27			

TABLE OF CONTENTS

1	List of Tables	
2	Table 1-1	Hazardous Waste Disposal Analyte List
3	Table 3-1	SSL Exceedances - Stockpile Soil Samples
4	Table 3-2	Laboratory Limits Greater Than SSLs
5	Table 3-3	Summary of Risk Screening Exceedances
6	Table 3-4	Summary of Intrusive Investigation Results
7	List of Figures	
8	Figure 1-1	FWDA Location Map
9	Figure 1-2	HWMU Location Map
10	Figure 1-3	HWMU Detail
11	Figure 2-1	Confirmation Sample Locations
12	Figure 3-1	Post-Excavation Recovered MEC and Detonation in Place Location
13	List of Appendices	
14	Appendix A	Soil Sampling Results
15	A.1	Stockpile Soil Sampling Results
16	A.2	Confirmation Soil Sampling Results
17	Appendix B	Cumulative Risk Tables
18	B.1	Stockpile Soil Sampling Risk Tables
19	B.2	Confirmation Soil Sampling Risk Tables
20	Appendix C	2020 Military Munitions and Explosives of Concern (MEC) Identified
21	Appendix D	NMED Correspondence
22	Appendix E	Stockpile Photographs
23		
24		
25		

TABLE OF CONTENTS

1 List of Acronyms

AECOM	AECOM Technical Services, Inc.
ALM	Adult Lead Exposure Model
APPL	Agriculture and Priority Pollutants Laboratories, Inc.
BIA	Bureau of Indian Affairs
BRAC	Base Realignment and Closure
CAMU	Corrective Action Management Unit
CDC	Current Detonation Crater
CFR	Code of Federal Regulations
CRP	Current Residue Pile
DGM	Digital Geophysical Mapping
DoD	Department of Defense
ECM	Earth Covered Magazine
EM	Engineer Manual
ft	foot/feet
FWDA	Fort Wingate Depot Activity
HWMU	Hazardous Waste Management Unit
ID	Identification number
IEUBK	Integrated Exposure Uptake Biokinetic
LOQ	Limits of Quantitation
MD	Munitions Debris
MDAS	Material Documented as Safe
MEC	Munitions and Explosives of Concern
mg/kg	milligrams per kilogram
MPPEH	Material Potentially Presenting an Explosive Hazard
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NMED	New Mexico Environment Department
OB/OD	Open Burning/Open Detonation
OBDA	Open Burning and Detonation Area
QA/QC	Quality Assurance/Quality Control
RC	Remote Controlled
RCRA	Resource Conservation Recovery Act
RSL	Regional Screening Level
SOP	Standard Operating Procedure
SSL	Soil Screening Level
SUXOS	Senior Unexploded Ordnance Supervisor
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TEAD	Tooele Army Depot

TABLE OF CONTENTS

USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound

1

1 1.1 INTRODUCTION

2 This Status Report has been prepared in response to a request made by the New Mexico
3 Environment Department (NMED) in a letter dated April 18, 2019 (NMED 2019a)
4 (**Appendix D**). The letter requires the Army to submit annual Status Reports describing the
5 work completed through the end of the previous calendar year at the Hazardous Waste
6 Management Unit (HWMU) (Open Burning/ Open Detonation [OB/OD] Unit) at Fort Wingate
7 Depot Activity (FWDA), McKinley County, New Mexico.

8 Removal activities have been conducted at the HWMU since 2012. This Status Report will
9 reflect data collected from soil analysis of stockpiled soils processed through the plant,
10 confirmation samples, and munitions and explosives of concern (MEC) recovery statistics from
11 operations by AECOM Technical Services, Inc. (AECOM) occurring in 2020.

12 1.2 PROJECT PURPOSE AND SCOPE

13 The objective of the HWMU removal action is to satisfy the closure performance standards
14 specified in the Resource Conservation Recovery Act (RCRA) Permit by removing hazardous
15 wastes and hazardous waste residues from the HWMU. Tasks in the removal action include:

- 16 • HWMU Boundary and Topographic Land Survey
- 17 • Construction and operation of a Corrective Action Management Unit (CAMU)
- 18 • Operate and Manage Earth Covered Magazines (ECMs)
- 19 • Debris and Soils Removal
- 20 • Debris and Soils Processing
- 21 • Soil Stockpile Management and Characterization Sampling
- 22 • Munitions Debris (MD) Flashing
- 23 • MEC and Material Documented as an Explosive Hazard Disposal
- 24 • Material Documented as Safe (MDAS) Disposal
- 25 • Post-excavation Digital Geophysical Mapping (DGM)
- 26 • Confirmation Soil Sampling (excavation base and sidewalls)
- 27 • Site Restoration

28 1.3 PROJECT LOCATION

29 FWDA is located in northwestern New Mexico in McKinley County, approximately 8 miles east
30 of Gallup, New Mexico (**Figure 1-1**). FWDA currently occupies approximately 24 square miles
31 (15,273 acres) of land with facilities formerly used to operate a reserve storage facility providing
32 for the care, preservation, minor maintenance, and disposal of assigned commodities– primarily
33 conventional military munitions.

1.4 SITE DESCRIPTION AND BACKGROUND

FWDA is an inactive United States Army Depot whose active mission was to store, ship, and receive material and dispose of obsolete or deteriorated explosives and military munitions. FWDA operated from the mid-1940s to 1993, at which time the active mission ceased, and the installation was then closed.

The installation was established as Fort Wingate in 1860. In 1941, Fort Wingate underwent major construction and expansion for the administration and ECM areas. In 1971, the depot was placed in reserve status and renamed Fort Wingate Depot Activity (MKM Engineers, Inc. 2008). In 1975, the installation was placed under the administrative command of Tooele Army Depot (TEAD), located near Salt Lake City, Utah. The active mission of FWDA ceased and the installation closed in January 1993 as a result of the Defense Authorization Amendments and Base Realignment and Closure (BRAC) Act of 1988. In 2002, the Army reassigned many functions at FWDA to the BRAC Division, including property disposal, caretaker duties, management of caretaker staff, and performance of environmental restoration and compliance activities. TEAD retained command and control responsibilities and continued to provide support services to FWDA until January 31, 2008. On January 31, 2008, command, control, and support functions were transferred to White Sands Missile Range; however, the BRAC office is conducting and administering the cleanup activities (TerranearPMC [TPMC] 2008). The cleanup activities are focused within Parcel 3, as illustrated in **Figure 1-2**.

FWDA is almost entirely surrounded by federally owned or administered lands, including both national forest and tribal lands. North and west of FWDA are Navajo tribal trust and allotted lands. The Bureau of Indian Affairs (BIA) administers the land east and south of Parcel 3 (Parcel 1). The land to the west is mostly undeveloped and is tribal trust and allotment land administered by the BIA, Navajo Nation, and individual Native American allottees (MKM Engineers, Inc. 2008).

1.4.1 Open Burning and Detonation Areas

The historic OB/OD activities at the FWDA were conducted primarily within a designated area of the installation; the Open Burning and Detonation Area (OBDA). The OBDA is located in the west-central portion of the installation and encompasses both the Current and Closed OB/OD Areas. The Closed OB/OD Area was used from 1948 to 1955. Beginning in the mid-1940s, burning and detonation operations at the installation were performed within the Current OB/OD Area which includes the HWMU. In 1980, these operations were permitted and regulated under RCRA Interim Status (Environmental Resource Management 1995). Operations within the HWMU are listed on the FWDA RCRA Part A Permit Application dated August 1980. In 2002, the pathway for environmental restoration of the HWMU was determined to be a RCRA Permit. The Permit was finalized in 2005. **Figure 1-2** shows the location of the HWMU relative to the OB/OD area.

1 1.4.2 HWMU

2 The HWMU, as identified in Attachment 12 of the FWDA RCRA Permit (NMED 2005) and
3 shown in **Figure 1-2**, is the focus of this project. The HWMU (32 acres) is within the Current
4 OB/OD Area (104 acres), which is within Parcel 3 (1805.8 acres). The HWMU consists of the
5 burning ground, 10 areas identified as Current Residue Piles (CRP) 1 through 10, and 12 open
6 detonation craters identified as Current Detonation Craters (CDC) 1 through 12. After OB/OD
7 operations were completed within the detonation craters, residual material and wastes were
8 placed around the HWMU, typically pushed onto or over the arroyo bank. A detailed map
9 illustrating the CRP and CDC areas within the HWMU is included in **Figure 1-3**.

10 Demilitarization of unserviceable, obsolete, or waste explosives, propellants, munitions, and
11 munitions components was accomplished at the HWMU. Propellants, small arms, and bulk
12 explosives were burned as a means of disposal. Explosive-filled munitions were disposed of by
13 detonation. Disposals by detonation were conducted within detonation craters that may have
14 been tamped with an earthen cover to minimize fragmentation dispersal.

15 OB/OD operations were conducted on the ground surface within the HWMU, and residual
16 materials appear to have been relocated throughout the HWMU via a variety of mechanisms,
17 including earthmoving (e.g., piles of residuals were pushed onto/over arroyo banks using
18 earthmoving equipment during FWDA operations), erosion (e.g., surface runoff has transported
19 residual materials from the initial piles down arroyo banks and into/along the arroyo bottoms),
20 and explosions (e.g., detonations have forced fragments and/or MEC beneath the ground surface)
21 (TPMC 2008).

22 Beginning in 2012, in accordance with the NMED approved workplan submitted by URS (URS
23 2013), cleanup activities included the mechanized removal of contaminated soils from the
24 HWMU area. The removed soils, which included MEC and other MD, were treated in a
25 processing plant which separated ferrous and non-ferrous materials from the soil contents
26 (**Section 2.1.2**). All MEC items discovered during processing were inspected by trained
27 unexploded ordnance (UXO) technicians and disposed of by burning or detonation. A discussion
28 of the 2020 MEC recovery is included in **Section 3.3**.

29 Soils leaving the treatment plant were placed into 250 cubic yard stockpiles. Soil samples were
30 collected from each stockpile and analyzed by Agricultural and Priority Pollutants Laboratories,
31 Inc. (APPL). Once laboratory results were received, a risk screening was completed for any
32 detections in excess of the soil cleanup criteria. If the stockpile soil sample results were below
33 the screening criteria, the soil was used as backfill in the HWMU excavation area. If the
34 stockpile soil sample results indicated that screening criteria were exceeded but were below
35 hazardous waste disposal criteria (see **Table 1-1** for list of analytes), the soil was classified as
36 non-hazardous waste and was hauled to the Northwest New Mexico Regional Solid Waste
37 Authority landfill. The soil was classified as non-hazardous waste. No hazardous waste was
38 generated in the HWMU during the 2020 removal activities.

- 1 The HWMU excavation area was divided into 100 feet (ft) by 100 ft grids as shown on
2 **Figure 1-3**. When a grid was thought to be cleared of all MEC and MD, the area was mapped
3 with DGM to identify and remove any remaining anomalies. Once cleared, confirmation soil
4 samples were collected from the extents of the excavation (base and sidewalls) and submitted for
5 laboratory analysis.
- 6 The NMED approval letter for the workplan submitted by URS is included in **Appendix D**. A
7 discussion of soil sampling procedures is provided in **Section 2**, and the results and discussion
8 are presented in **Section 3.1**.

**TABLE 1-1
HAZARDOUS WASTE DISPOSAL ANALYTE LIST
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO**

Analyte ^{1,2}	CAS Number	Source
Arsenic	7740-38-2	CFR
Barium	7740-39-3	CFR
Cadmium	7740-43-9	CFR
Chromium	7740-47-3	CFR
Lead	7439-92-1	CFR
Mercury	7439-97-6	CFR
Selenium	7782-49-2	CFR
Silver	7440-22-4	CFR
Benzene	71-43-2	CFR
Carbon Tetrachloride	56-23-5	CFR
Chlorobenzene	108-90-7	CFR
Chloroform	67-66-3	CFR
1,4-Dichlorobenzene	106-46-7	CFR
1,2-Dichloroethane	107-06-2	CFR
1,1-Dichloroethene	75-35-4	CFR
Methyl ethyl ketone (MEK)	78-93-3	CFR
Tetrachloroethylene (PCE)	127-18-4	CFR
Trichloroethylene (TCE)	79-01-6	CFR
Vinyl Chloride	75-01-4	CFR
2,4,5-TP (Silvex)	95-95-4	CFR
2-Methylphenol (o-Cresol)	95-48-7	CFR
p-Cresol	59-50-7	CFR
2,4-Dinitrotoluene	121-14-2	CFR
Hexachlorobenzene	118-74-1	CFR
Hexachlorobutadiene	87-68-3	CFR
Hexachloroethane	67-72-1	CFR
Nitrobenzene	98-95-3	CFR
Pentachlorophenol	87-86-5	CFR
2,4,5-Trichlorophenol	95-95-4	CFR
2,4,6-Trichlorophenol	88-06-2	CFR

Notes:

¹ Landfill disposal testing additionally includes the below physical testing.

Ignitability (in accordance with 40 CFR 261.21)

Corrosivity (in accordance with 40 CFR 261.22)

Reactivity (in accordance with 40 CFR 261.23)

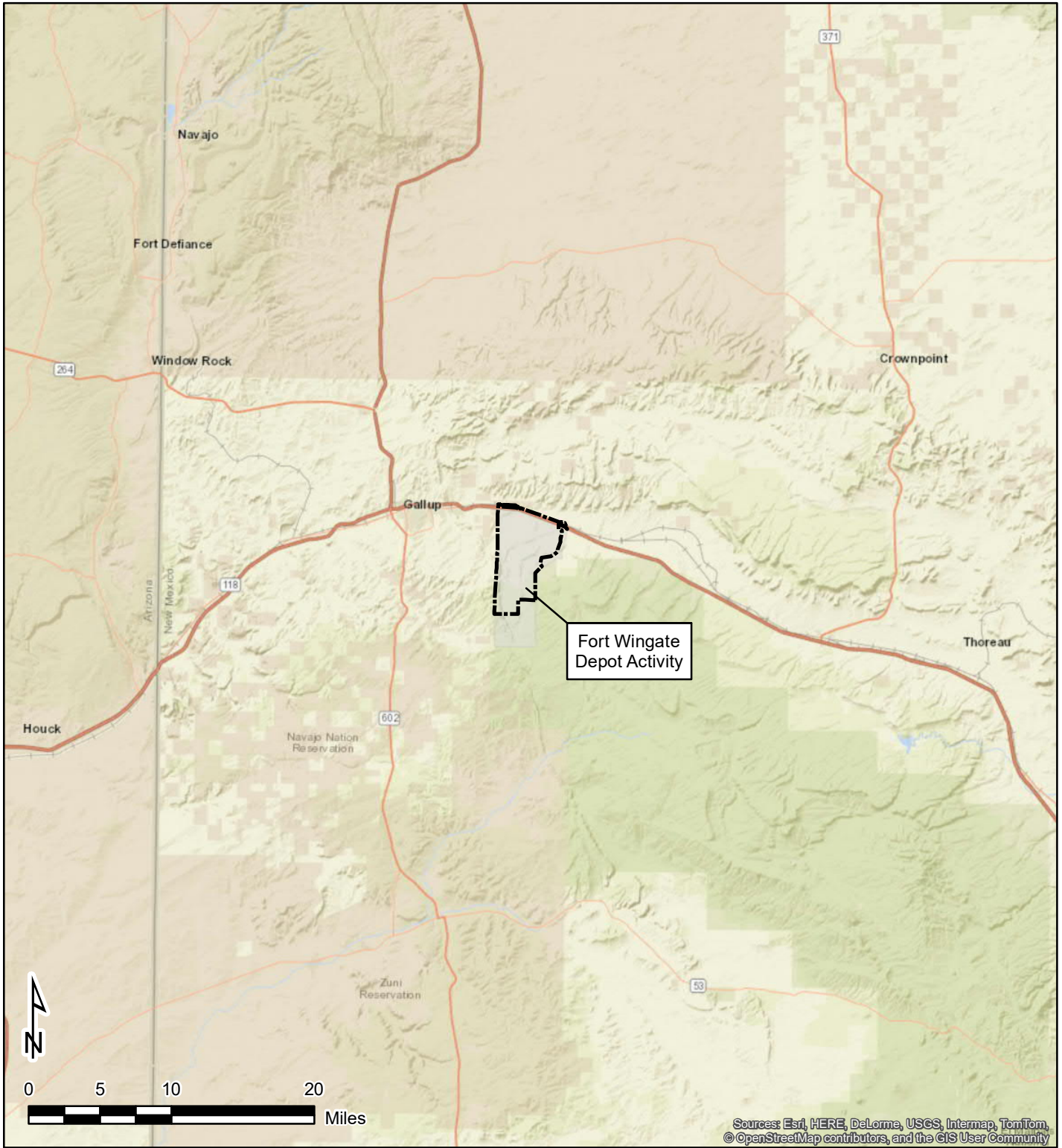
Paint Filter Liquid Test (in accordance with USEPA Test Method 9095)


² Toxicity Characteristic Regulatory Levels are available in 40 CFR Section 261.24

CAS - Chemical Abstract Service

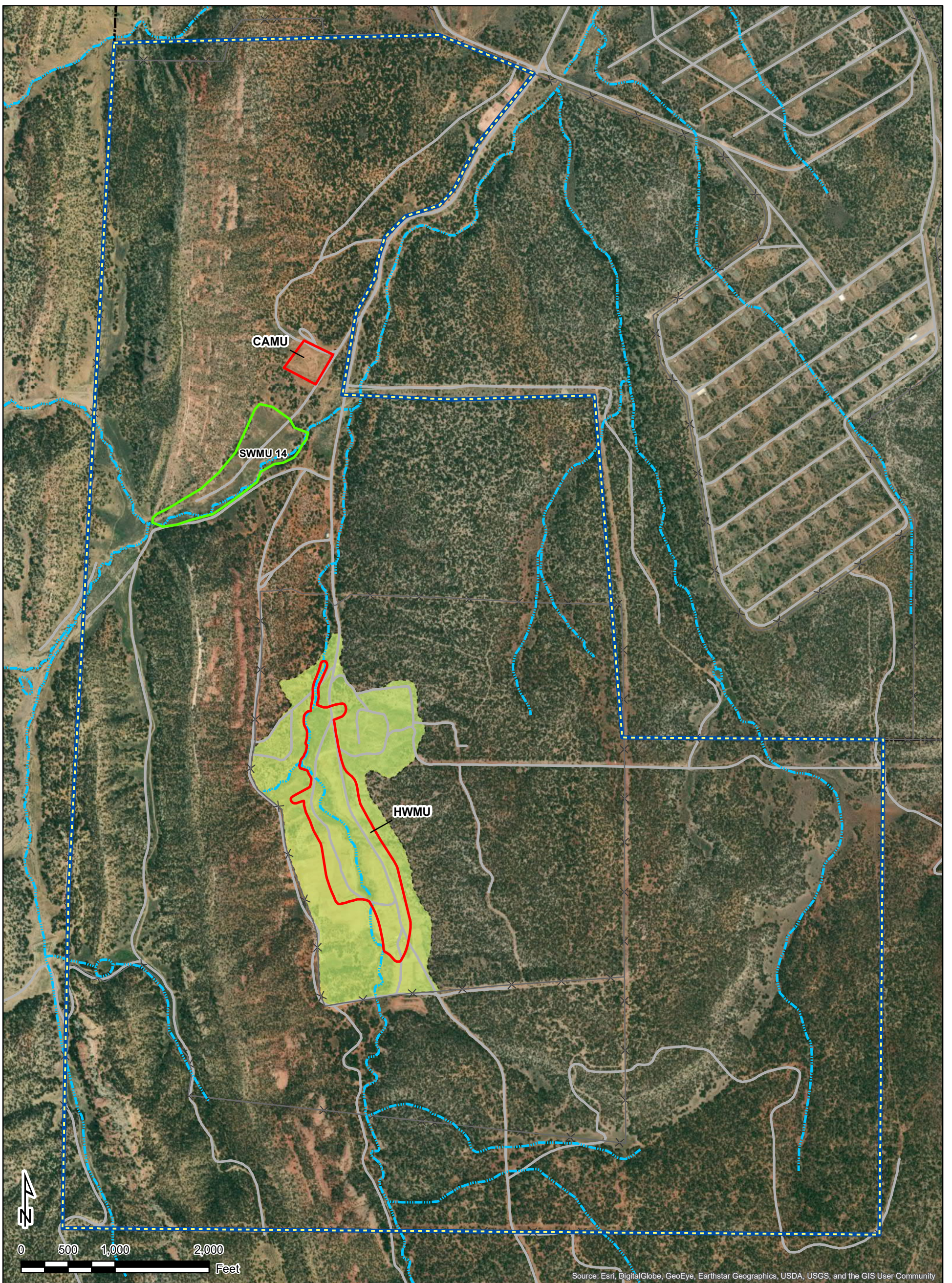
CFR - Code of Federal Regulations

USEPA - United States Environmental Protection Agency



Legend
 Installation Boundary

FWDA Location Map Fort Wingate Depot Activity McKinley County, New Mexico		
Drawn By: JZ	Date: 1/27/2021	Figure 1-1
Checked By: GB	Project No. 60517380	



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, USDA, USGS, and the GIS User Community

Locator Map



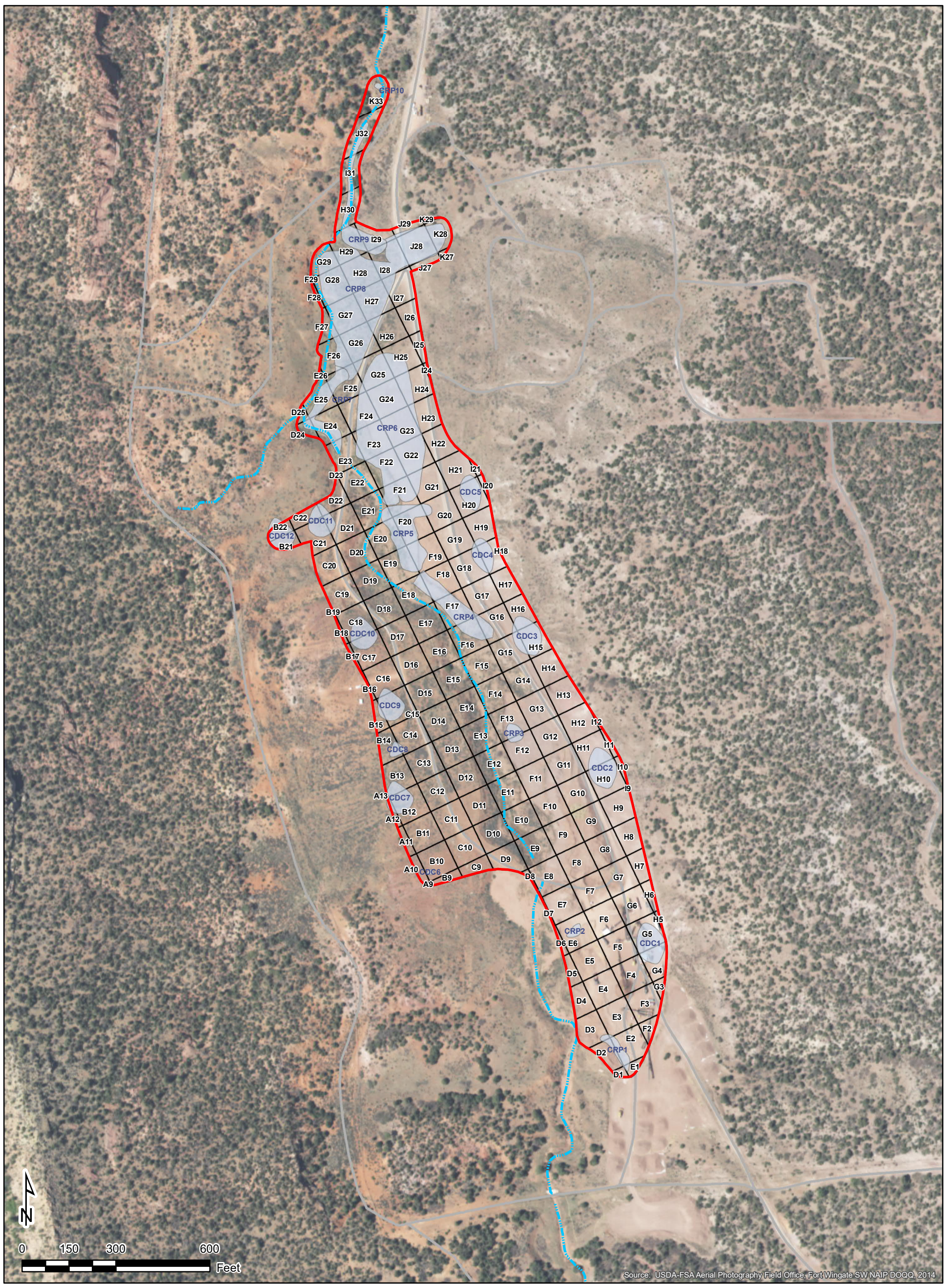
Sources: Esri, HERE, DeLorme, USCS, Intermap, TomTom, © OpenStreetMap contributors, and the GIS User Community

Legend

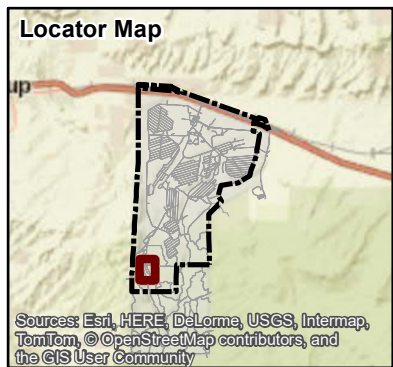
- Installation Boundary
- HWMU/CAMU Boundary
- SWMU 14 Boundary
- Parcel 3 Boundary
- OB/OD Area
- Road
- Fence
- Arroyo

HWMU Location Map Fort Wingate Depot Activity McKinley County, New Mexico	
Drawn By: JZ	Date: 1/27/2021
Checked By: GB	Project No. 60517380

Figure 1-2



Source: USDA-FSA Aerial Photography Field Office, FortWingate SW NAIIP DOQQ 2014



- Legend**
- Installation Boundary
 - HWMU Boundary
 - Arroyo
 - Road
 - HWMU Survey Grid
 - CRP/CDC Area

HWMU Detail		Figure 1-3
Fort Wingate Depot Activity		
McKinley County, New Mexico		
Drawn By:	Date:	
JZ	5/6/2021	
Checked By:	Project No.	
GB	60517380	

1 This section presents a summary of the HWMU removal activities, including a description of the
2 removal activities, removal areas, and soil sampling. For full descriptions of the soil processing
3 plant setup, soil processing procedures, and soil sample procedures, refer to the NMED approved
4 workplan (URS 2013). Reference to this document is included in **Section 5**.

5 **2.1 HWMU REMOVAL ACTIVITIES**

6 The overall goal for closure of the HWMU was to remove hazardous wastes and hazardous
7 waste residues (i.e., MEC and MD), and remove or decontaminate soils contaminated above
8 screening levels in accordance with Section III of the RCRA Permit (NMED 2005). The
9 objective was to remove MD and MEC from the HWMU to a size of 5/8 inch and identify and
10 remove any remaining contaminated soils.

11 **2.1.1 Excavation Activities**

12 Soils and debris were excavated from within the HWMU using remote controlled (RC)
13 equipment. The RC equipment (i.e., excavators and dozers) worked in tandem to excavate and
14 push material into piles, near the infeed, for conveyance to the processing plant. The soils and
15 debris were excavated in layers to minimize the volume of material removed and facilitate
16 periodic inspection of the excavation.

17 The RC equipment was also used to feed material to the processing plant. The infeed includes a
18 feeder with a six-inch screen opening. The screen prevented potential ordnance larger than six
19 inches from entering the plant to protect the equipment and plant operators.

20 **2.1.2 Processing Activities**

21 Excavated material was processed through a closed-loop processing plant which separated
22 material 5/8 inch or larger from soils. The processing plant utilized a series of electromagnets to
23 remove ferrous metal debris from soils, a trommel screen to separate material 5/8 inch and
24 smaller from all other material, a hammermill to decrease the size of material larger than 5/8
25 inch, and eddy currents to remove non-ferrous metal debris. Material continued to cycle through
26 this closed loop plant until it was either removed by the electromagnets or eddy currents, or it
27 passed through the 5/8-inch screen in the trommel.

28 All metallic debris removed from soils was deposited onto a conveyor that transferred the metal
29 to an inspection line, manned with UXO Technicians. All metal underwent a material potentially
30 presenting an explosive hazard (MPPEH) inspection, where MEC was identified and removed
31 from the debris. MEC items that were determined to be acceptable to move were transferred to
32 and stored in the ECMs until destruction at a later date. MEC items that were deemed
33 unacceptable to move, were destroyed in place within the HWMU.

1 2.2 SOIL SAMPLE ACTIVITIES AND ANALYSES

2 Soil sampling activities were completed at two separate sampling areas. Processed soils were
3 placed into 250 cubic yard stockpiles for characterization sampling. Confirmation soil sampling
4 was completed at the base and sidewalls of the remedial excavations to characterize the soils
5 remaining, prior to placing backfill. Samples were collected in accordance with the standard
6 operating procedures (SOPs) listed in the NMED approved workplan (URS 2013). The
7 workplan approval letter is included in **Appendix D**.

8 2.2.1 Stockpile Soil Sampling

9 The purpose of the characterization sampling was to identify and segregate soil stockpiles that
10 exhibited constituents less than the screening criteria in Attachment 7 of the RCRA Permit from
11 those that exceeded criteria. Each 250 cubic yard stockpile was placed on 6 mil poly and was
12 given a unique numeric identifier so that when analytical results were received and validated, the
13 results could be correlated with a specific stockpile. In total, 392 stockpiles were constructed
14 within the HWMU boundary. The base on each stockpile was approximately 1,900 square feet.
15 Following sample collection, stockpiles determined to be acceptable for re-use (i.e., based on
16 comparison to soil screening levels [SSLs] and cumulative risk calculations) were moved and
17 used as backfill.

18 Each processed stockpile consisted of one discrete soil sample for volatile organic compounds
19 (VOCs) (Method 8260B), and one composite sample collected and analyzed for target analyte
20 list metals (Method 6010B/6020A/741B), semi-volatile organic compounds (SVOCs) (Method
21 8270D), explosives (Method 8330B), polychlorinated biphenyl aroclors (Method 8082A), nitrate
22 (Method 9056A), cyanide (Method 9014), dioxins/furans (Method 8290), and perchlorate
23 (Method 6850) as stipulated in Section III of the FWDA RCRA Permit. In order to be
24 representative of the entire pile, the composite samples were composed of ten increments taken
25 from random locations throughout each pile. The samples were submitted to APPL for chemical
26 analyses.

27 2.2.1.1 Field Quality Assurance/Quality Control Procedures and Samples

28 Field quality assurance/quality control (QA/QC) samples were designed to help identify potential
29 sources of external sampling contamination and to evaluate potential error introduced by sample
30 collection and handling. All QA/QC identification numbers (IDs) were sent to the laboratory
31 with the other samples for analysis. Duplicate samples were collected at a frequency of 10
32 percent, and Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples were collected at a
33 frequency of 5 percent.

34 2.2.1.2 Duplicate Samples

35 Duplicate samples were collected to assess precision of sampling and analysis. For the stockpile
36 soil sampling, duplicate samples were collected at a frequency of 10 percent at the same time as
37 the initial corresponding samples and co-located to the field sample location. The duplicate

1 samples were packaged and handled identically to the initial samples, but were assigned a
2 dedicated QA/QC ID.

3 **2.2.1.3 Matrix Spikes and Matrix Spike Duplicates**

4 Matrix spike/matrix spike duplicates (MS/MSDs) were utilized to assess the potential for matrix
5 effects. Samples were designated for MS/MSD analysis on the chain of custody form and on
6 sampling containers. MS/MSD samples were collected at a frequency of 5 percent.

7 **2.2.2 Confirmation Soil Sampling**

8 In accordance with Section III.A.4 of the Class 3 Permit Modification and the NMED approved
9 work plan (URS 2013), soil samples were collected from the base and sidewalls of the remedial
10 excavations to characterize the remaining soils for future action(s). Confirmation samples were
11 collected from within detonation craters where craters were able to be identified. In all other
12 cases, confirmation samples were collected from within the 100 ft by 100 ft grid locations
13 presented on **Figure 2-1**, which encompassed the historical detonation craters. If the excavation
14 exceeded 20 ft in depth, a composite sample was taken for every 10 ft of depth per 100 feet of
15 sidewall. Samples were collected in accordance with the NMED approved workplan (URS
16 2013).

17 Sampling at Current Detonation Craters (CDCs) and Current Residue Piles (CRPs) consisted of
18 one discrete soil sample for VOCs (Method 8260B), and one composite sample collected and
19 analyzed for target analyte list metals (Method 6010B/6020A/741B), SVOCs (Method 8270D),
20 explosives (Method 8330B), polychlorinated biphenyl aroclors (Method 8082A), nitrate (Method
21 9056A), cyanide (Method 9014), dioxins/furans (Method 8290), and perchlorate (Method 6850)
22 as stipulated in Section III of the FWDA RCRA Permit. Each composite sample at CDCs/CRPs
23 (if identifiable) was composed of sixteen subsamples (each subsample approximately 50 to 60
24 grams) randomly collected from within each sampling area. Subsamples were combined into a
25 decontaminated or disposable bowl and thoroughly mixed with the sampling spoon. The
26 samples were submitted to APPL for chemical analysis. The purpose of the confirmation
27 sampling was to identify any areas where constituents exceeded the cleanup criteria stipulated in
28 Attachment 7 of the RCRA Permit (NMED 2005). NMED SSLs for a residential land use
29 scenario were used, or if an NMED residential SSL was not available for an analyte, the most
30 recent United States Environmental Protection Agency (USEPA) residential regional screening
31 level (RSL) was used. When site-specific background concentrations of a constituent exceeded
32 the NMED residential SSL/USEPA RSL (as appropriate), then the site-specific background
33 concentration for that constituent was used as the screening value. The USEPA RSL table was
34 updated during the 2020 removal activities. As a new update to the guidance table was released,
35 the screening levels were changed on the results tables in **Appendix A**, and the risk screening
36 tables in **Appendix B**. The NMED Risk Assessment Guidance for Site Investigations and
37 Remediation (NMED 2019b) was used to obtain SSLs. The USEPA Regional Screening Levels
38 (RSLs) - Generic Tables were used to obtain RSLs (USEPA 2020). The November 2019 RSL
39 table was used until the subsequent updates were released in May 2020 and November 2020.
40 Refer to **Section 3.1** for a discussion on site-specific background levels at FWDA.

1 The tables presented in **Appendix A** are based on NMED SSLs. The USEPA RSLs may be
2 listed next to a sample as a more current update, but decisions made corresponding to RSL
3 exceedances used the RSLs available at the time a sample was collected. **Table 3-1**, located
4 after **Section 3**, provides a summary of soil sample screening level exceedances during the 2020
5 removal activities.

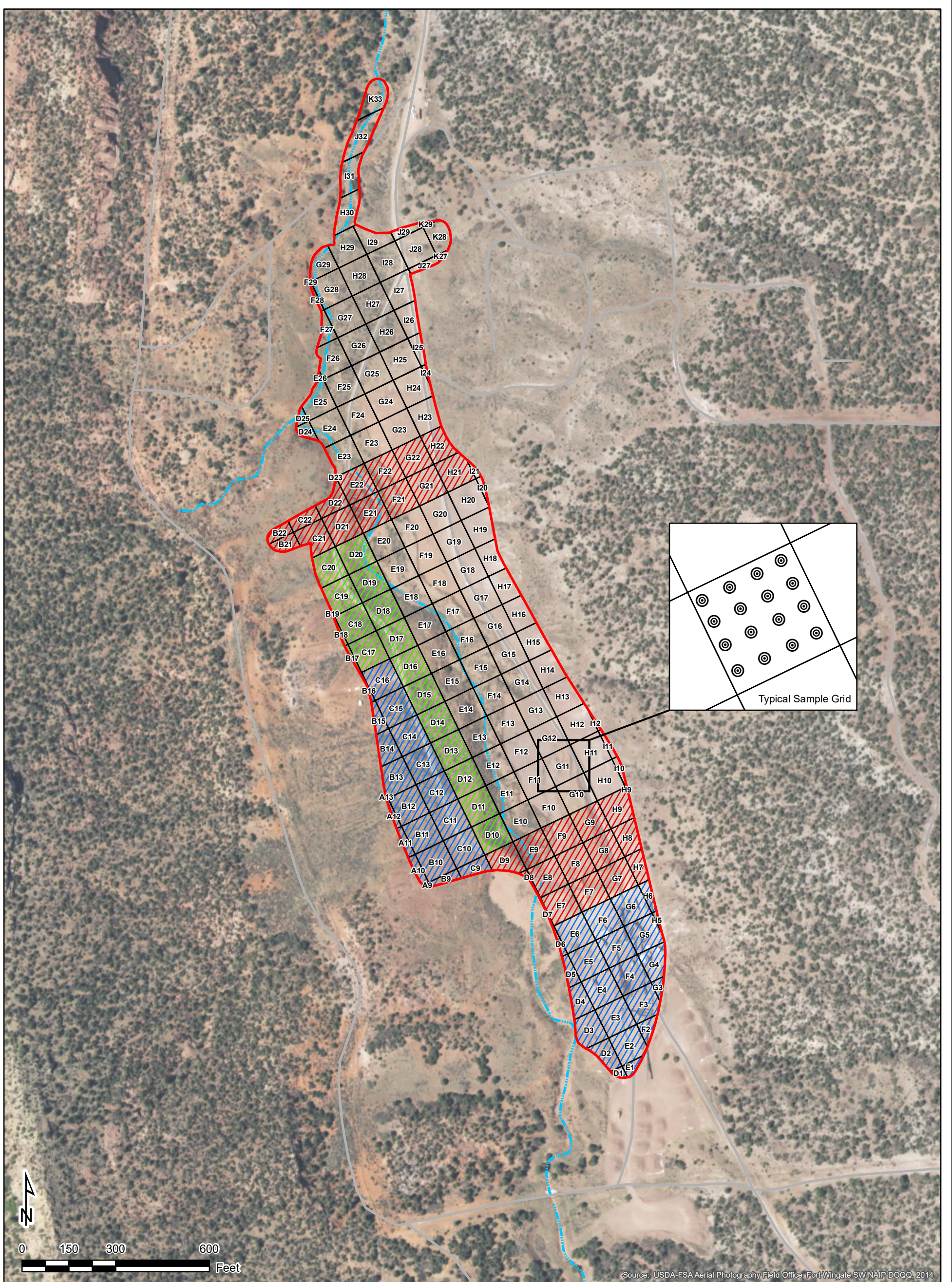
6 **2.2.2.1 Field Quality Assurance/Quality Control Procedures and Samples**

7 The field QA/QC procedures used during confirmation soil sampling match the procedures
8 described for the stockpile soil sampling which are described in **Section 2.2.1.1**.

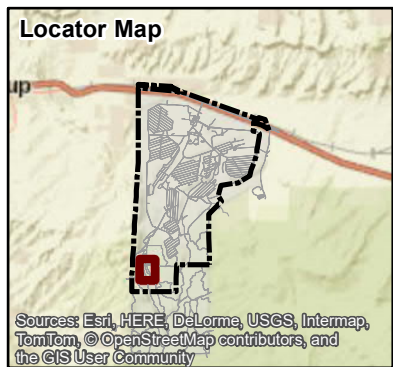
9 **2.3 SAMPLE IDENTIFICATION**

10 Samples collected during site activities were given discrete sample identification numbers. Each
11 sample was identified by a unique code that indicated the parcel number, site identifier, sample
12 location identifier, and sample number. The following list defines the acronyms used for the
13 sample identifications.

- 14 • P3HWMU = Parcel 3, Hazardous Waste Management Unit
- 15 • SKPL = Stockpile
- 16 • CDC = Current Detonation Crater
- 17 • CRP = Current Residue Pile
- 18 • EB = Excavation Bottom
- 19 • 001 = sample #



Source: USDA-FSA Aerial Photography Field Office, FortWingate SW NAIPO DOQQ 2014



Legend

- Installation Boundary
- HWMU Boundary
- Arroyo
- Road
- HWMU Survey Grid
- Sampled Grid (2012-2018)
- Sampled Grid (2019)
- Sampled Grid (2020)
- Composite Sub Sample Location

Note: Grids D7 and D23 were sampled in 2020.

**Confirmation Sample Locations
Fort Wingate Depot Activity
McKinley County, New Mexico**

Drawn By: JZ	Date: 2/1/2021
Checked By: JP	Project No. 60517380

Figure 2-1

3.1 SOIL SAMPLING RESULTS

All analyses were performed by APPL. APPL is a Department of Defense (DoD) Environmental Laboratory Accreditation Program certified laboratory. The stockpile soil samples that exceeded SSLs are summarized in **Table 3-1**. There were no confirmation samples that exceeded SSLs. The full stockpile soil sampling results are included in **Appendix A.1** and confirmation soil sampling results are included in **Appendix A.2**. Full laboratory reports were not required to be included with the yearly status reports, as stated in the Extension Request for the Parcel 3 Hazardous Waste Management Unit Investigation and Remediation Report letter from NMED on April 18, 2019. This letter is included in **Appendix D**.

The soil samples were submitted for analysis of VOCs (Method 8260B), target analyte list metals (Method 6010B/6020A/741B), SVOCs (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 (NMED 2005).

Table 3-2 summarizes chemicals with a detection limit greater than the NMED SSL. One chemical (N-Nitrosodimethylamine) exhibited this quality. There were no detections of N-Nitrosodimethylamine in any of the soil samples submitted for laboratory analysis. Until recently, laboratory instrumentation did not allow for the N-Nitrosodimethylamine detection limit to meet the screening level. The Army is aware of this issue and recognizes the NMED considers this a data quality issue. The Army is currently working with the NMED on resolution of this issue.

To allow performance of the risk-based screen, the tables in **Appendices A.1** and **A.2** present the residential screening value, the source of the screening value (NMED Residential SSL [NMED 2019b], USEPA RSL [USEPA 2020], or site-specific background [Shaw 2010] [USACE 2013]), the endpoint (cancer or noncancer), and the analytical result for each detected constituent. Limits of Quantitation (LOQs), Limits of Detection (LODs), and Detection Limits (DLs) were reviewed by the AECOM chemist to ensure that LOQs, LODs, and DLs were below the screening values. The sampling results were compared to the following:

- **Soil Background Levels:** Site-specific soil background levels at FWDA were established in two documents: Soil Background Study and Data Evaluation Report (Shaw Environmental, Inc. 2010) and Phase 2 Soil Background Report (United States Army Corp of Engineers [USACE] 2013). When the site-specific background concentration of a metal exceeds the screening value, the site-specific background concentration for that metal is used as the screening value.

The establishment of a UTL for antimony was an exception to the methodology used to establish soil background levels for other metals. The screening value for antimony was established to be 95 percent of the upper tolerance limit for soil unit 350 based on the 2012 soil background study conducted by the United States Army Corps of Engineers (USACE) (USACE 2013). The established background value for antimony was used in the same

manner as other metals background values during the risk screening (i.e., metals exceeding site-specific background values were included in the calculation of cumulative health risks).

- **NMED Residential SSLs:** The most current values were obtained at the time of sampling from the NMED Risk Assessment Guidance for Site Investigations and Remediation (<https://www.env.nm.gov/hazardous-waste/guidance-documents/>) (NMED 2019b). The lower of the values for the cancer and noncancer endpoints was selected. This guidance can be updated periodically throughout the duration of the removal activities, and updates to screening practices would be made as new residential SSLs became available. However, no updates occurred in 2020 (NMED 2019b).
- **USEPA Residential RSLs:** If an NMED SSL did not exist for a constituent, the USEPA RSL was utilized. Values were obtained from the most current RSL Residential Soil Table (TR=1E-06, HQ=1) on the USEPA RSLs- Generic Tables database (<https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>) that was available at the time a sample was collected. This table was updated periodically throughout the duration of the removal activities, and updates to screening practices were made as new RSLs became available (USEPA 2020). The November 2019 RSL table was used until the subsequent updates were released in May and November 2020. USEPA RSLs based on a carcinogenic endpoint were adjusted by a factor of 10 to achieve the target cancer risk of 1E-05 (per 2019 NMED guidance).

3.1.1 Stockpile Soil Sampling Results

Stockpile soil samples were collected from a total of 392 250-cubic yard stockpiles (1 sample per soil stockpile). Each stockpile soil sample consisted of one discrete soil sample for VOCs (Method 8260B), and one composite sample collected and analyzed for target analyte list metals (Method 6010B/6020A/741B), SVOCs (Method 8270D), explosives (Method 8330B), polychlorinated biphenyl aroclors (Method 8082A), nitrate (Method 9056A), cyanide (Method 9014), dioxins/furans (Method 8290), and perchlorate (Method 6850).

Organics were directly compared to the residential cancer and noncancer screening levels on a sample-by-sample basis. Inorganics were directly compared to established site-specific background levels and the residential cancer and noncancer screening levels on a sample-by-sample basis.

No VOCs, SVOCs, polychlorinated biphenyls, dioxins/furans, cyanide, nitrates, or perchlorate were detected at concentrations exceeding the residential cancer or noncancer screening levels in the 392 soil samples analyzed.

Two explosive compounds were detected at concentrations exceeding the residential cancer or noncancer screening levels in the 392 soil samples analyzed. 2,4,6-Trinitrotoluene was detected above the residential SSL noncancer endpoint of 36 milligrams per kilogram (mg/kg) in the following samples and at the following concentrations:

- P3HWMU-SKPL-1898: 560 mg/kg

- 1 • P3HWNUSKPL-1917: 140 mg/kg
- 2 • P3HWMUSKPL-1971: 59 mg/kg
- 3 • P3HWMUSKPL-1990: 58 mg/kg
- 4 • P3HWMUSKPL-1993: 13,000 mg/kg
- 5 • P3HWMUSKPL-1994: 110 mg/kg
- 6 • P3HWMUSKPL-1995: 220 mg/kg
- 7 • P3HWMUSKPL-1996: 160 mg/kg
- 8 • P3HWMUSKPL-1997: 140 mg/kg
- 9 • PWHWMUSKPL-1998: 300 mg/kg
- 10 • P3HWMUSKPL-1999: 160 mg/kg
- 11 • P3HWMUSKPL-2000: 140 mg/kg
- 12 • P3HWMUSKPL-2001: 63 mg/kg
- 13 4-Amino-2,6-dinitrotoluene was detected above the residential SSL noncancer endpoint of
- 14 7.7 mg/kg at P3HWMUSKPL-1993 at a concentration of 98 mg/kg.

- 15 Metals were detected above the residential SSL noncancer endpoint in one of the 392 stockpile
- 16 soil samples analyzed. Copper was detected above the residential SSL noncancer endpoint of
- 17 3,130 mg/kg in one sample (sample ID: P3HWMUSKPL-1988) at a concentration of 34,400
- 18 mg/kg. Lead was detected above the residential SSL noncancer endpoint of 400 mg/kg in the
- 19 same sample at a concentration of 1,500 mg/kg.

- 20 The stockpile soil samples that exceeded SSLs are summarized in **Table 3-1**.

- 21 **3.1.2 Excavation Bottom/Sidewall Confirmation Soil Sampling Results**

- 22 Confirmation soil samples were collected from 31 excavation bottom/sidewall locations. Each
- 23 confirmation sample consisted of one discrete soil sample for VOCs (Method 8260B), and one
- 24 composite sample collected and analyzed for target analyte list metals (Method
- 25 6010B/6020A/741B), SVOCs (Method 8270D), explosives (Method 8330B), polychlorinated
- 26 biphenyl aroclors (Method 8082A), nitrate (Method 9056A), cyanide (Method 9014),
- 27 dioxins/furans (Method 8290), and perchlorate (Method 6850).

- 28 Of the 31 confirmation soil samples collected and analyzed for VOCs, SVOCs, explosives,
- 29 polychlorinated biphenyls, dioxins/furans, metals, cyanide, nitrate, and perchlorate, there were
- 30 no laboratory detections that exceeded the residential cancer or noncancer screening levels.

1 3.2 RISK SCREENING**2 3.2.1 Human Health**

3 This section describes the general approach that was used to complete a risk screening for the
4 HWMU Removal of Parcel 3. Confirmation samples were collected from excavation sidewalls
5 and bottoms, or from individual soil stockpiles. Per NMED Guidance (NMED 2019b), all
6 detected organic compounds and metals exceeding site-specific background levels were
7 compared to the NMED Residential SSLs. The 2019 NMED guidance document and SSL tables
8 were used. Risk screening tables for each collected soil sample are located in **Appendix B**.

9 Groundwater sampling was not required per the NMED approved workplan (URS 2013). No
10 groundwater samples were collected as part of the HWMU removal activities; evaluation of
11 groundwater was not completed as part of this risk screening.

12 There are no permanent surface water bodies present within the HWMU area; therefore,
13 according to NMED guidance (NMED 2019b), the surface water exposure pathways were
14 considered incomplete, and a risk screening was not necessary.

15 The USEPA RSLs were updated during the 2020 removal activities. As a new update was
16 released, the risk screening tables (**Appendix B**) were updated to reflect the most current
17 screening levels available for future sampling. The risk screening levels for previously collected
18 samples were not changed, as these samples had already undergone the decision-making process
19 (based on the risk screening) to be used as backfill or to be properly disposed if laboratory
20 analysis indicated the sample exceeded SSLs.

21 3.2.1.1 Target Risk Levels

22 NMED SSLs are based on 1.0E-05 (1 in 100,000) target excess cancer risk or a target hazard
23 quotient of 1.0 for noncarcinogens (NMED 2019b). If an analyte exceeded NMED SSLs, then
24 additional evaluation as described in **Sections 3.2.1.5** and **3.2.1.6** was conducted.

25 3.2.1.2 Potentially Exposed Populations

26 NMED guidance provides screening criteria for three types of populations: residential,
27 commercial/industrial, and construction workers. The residential screening values are generally
28 the most conservative, especially for organic compounds; therefore, residential screening values
29 were used to evaluate potential risks in accordance with the NMED approved workplan (URS
30 2013).

31 Some metals, such as manganese, have screening values that are more conservative for
32 construction workers.

3.2.1.3 Preliminary Screening Exposure Concentrations

Concentrations were evaluated on a sample-by-sample basis. Therefore, the preliminary screening exposure concentration was the concentration of each chemical detected in a specific sample.

3.2.1.4 Comparison to Site-Specific Background Concentrations

For metals, sample concentrations were compared to established site-specific background values (Shaw 2010). The development of the screening value for antimony differed from the establishment of other background values. The antimony value is the 95th percent upper tolerance limit of soil unit 350 based on the 2012 background study conducted by USACE (USACE 2013). The site-specific background values are presented in the risk screening tables in **Appendix B**. Metals exceeding site-specific background values (including antimony) were included in the calculation of cumulative health risks (see **Section 3.2.1.5**).

3.2.1.5 Calculation of Cumulative Human Health Risk

NMED guidance (NMED 2019b) indicates that the potential cumulative risks and hazards should be considered in the screening evaluation to conclude whether further evaluation may be necessary. Therefore, consistent with the guidance, screening was performed by comparing maximum chemical concentrations detected at the site with NMED SSLs. NMED has published SSLs for the residential scenario. In the absence of NMED SSLs, USEPA RSLs were selected (carcinogenic RSLs were adjusted to a risk of 1.0E-05 per NMED guidance, consistent with NMED SSLs). USEPA RSL tables were updated during the 2020 removal activities. The specific NMED SSLs and USEPA RSLs used to evaluate a specific sample are identified in the footnotes of the risk screen tables in **Appendix B**.

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

- Cumulative Cancer Risk = $(C1/SSL1 + C2/SSL2 + \dots + Cn/SSLn) \times 1.0E-05$
- Cumulative Hazard Index = $(C1/SSL1 + C2/SSL2 + \dots + Cn/SSLn) \times 1$
- 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.

3.2.1.6 Risk Refinement

In accordance with NMED risk guidance current at the time a sample was evaluated (NMED 2019b), if the hazard index was greater than 1.0, concentrations at the site were further evaluated.

1 Site risks less than the NMED target level of 1.0E-05 and hazard indices less than the NMED
2 target level of 1.0 indicate that concentrations at the site are unlikely to result in adverse health
3 impacts. A target organ/system assessment was completed if the cumulative hazard index for a
4 sample exceeded 1.0 to determine if noncarcinogenic effects were additive. The process
5 involved calculating hazard indices for each target organ or system and assessed whether the
6 hazard index for an organ or organ system exceeded 1.0. Target organ/system assessments were
7 completed as necessary throughout the reporting period.

8 **3.2.1.7 Evaluation of Lead Concentrations**

9 Exposure to lead can result in neurotoxic and developmental effects. The primary receptors of
10 concern are children, whose nervous systems are still undergoing development and who also
11 exhibit behavioral tendencies that increase their likelihood of exposure (e.g., pica). These effects
12 may occur at exposures so low they may be considered to have no threshold and are evaluated
13 based on a blood lead level (rather than the external dose as reflected in the reference
14 dose/reference concentration methodology) (USEPA 1994, 1996, 1998, 2016). Therefore, the
15 risk evaluation and toxicological approach used by USEPA and other agencies for lead is unique
16 from other chemicals. For residential exposures, USEPA recommends the Integrated Exposure
17 Uptake Biokinetic (IEUBK) Model for Lead in Children for setting site-specific preliminary risk-
18 based remediation goals. NMED guidance (NMED 2019b) also recommends the use of the
19 IEUBK model for the evaluation of lead exposure for children. The Adult Lead Exposure Model
20 (ALM) is the model currently used by USEPA to evaluate adult exposures in the workplace and
21 is based on a pregnant mother's capacity to contribute to fetal blood lead levels. The models for
22 lead back-calculate to a soil concentration that would not exceed an estimated blood-lead
23 concentration of 10 micrograms per deciliter. NMED guidance (NMED 2019b) also
24 recommends the use of the ALM for the evaluation of adult exposures to lead. The NMED lead
25 SSL for residential exposure is 4.00E+02 mg/kg. Hazard Quotients are not calculated for lead
26 because there is no established threshold value. For screening, the maximum detected
27 concentration is presented simply as a comparison with the receptor-specific SSL. Based on the
28 screening comparison, one lead concentration exceeded site-specific background or the NMED
29 residential SSL; therefore, the IEUBK model was run and the results indicated that the
30 concentration would result in an unacceptable level of blood lead in children.

31 **3.2.1.8 Summary of Human Health Risk Screening**

32 A total of 392 stockpile samples and 31 confirmation soil samples were collected in 2020 during
33 the removal activities and were evaluated for human health risks. Three samples had cancer
34 risks in excess of 1.0E-05. Fourteen samples had a hazard index that exceeded 1.0 after
35 refinement. **Table 3-3** identifies the samples that exceeded the target cancer risk and target
36 hazard quotient values during the reporting period.

3.3 MEC ITEMS AND MD RECOVERED**3.3.1 MEC Recovery Results****3.3.1.1 MEC Recovered During Processing**

A total of 14,743 MEC items were recovered from the MPPEH inspection lines of the processing plant in 2020; 118 items were determined to be unacceptable to move and were destroyed by detonation in place in the HWMU at the end of each day. All other items were considered acceptable to move and were transferred to the ECMs for disposal at a later date. MEC items discovered during recovery operations were recorded each day on the MEC Log Table. This table tracks all MEC items identified and recovered from within the FWDA Parcel 3. Since most items were recovered from the inspection lines, the specific locations of these items could not reasonably be determined; therefore, the location of each item is listed as HWMU, without coordinates. For the purposes of the Status Report, the table has been reduced to only items removed from within the HWMU recovery area, as shown in **Appendix C**. MEC disposal of unacceptable to move items involved detonation in place within the HWMU (i.e., within a HWMU grid that still requires excavation and processing). Following consolidated disposal operations and detonation in place operations, the detonation crater and surrounding area was inspected by qualified UXO technicians to ensure no explosive hazards remain and recovered MD was removed. Detonation in place operations for items recovered in 2020 occurred in HWMU Grid H25 (shown on **Figure 2-1**), which will undergo excavation and sampling in the future. The detonation in place location is also shown on **Figure 3-1**.

3.3.1.2 MEC Recovered During DGM

In 2020, two MEC items and six MPPEH items (from two locations) were located during DGM clearance activities near Grids D11 and D12. Further excavation was completed to recover these five items, and DGM was reperformed for clearance following the excavations. The items detected during the DGM survey were located at four inches to six inches below ground surface and were removed (see **Table 3-4**). The item locations are illustrated in **Figure 3-1**.

3.3.1.3 MDAS Recovered

All metallic debris that was removed during the project was inspected and determined to be MDAS and flashed. Each batch of MDAS that was flashed was weighed prior to flashing to estimate the quantity of MDAS recovered during the work. In 2020, approximately 1.53 million pounds (765 tons) of MDAS were flashed and 1.56 million pounds (780 tons) of MDAS were removed from the site for disposal. The project total to date is 6.21 million pounds (3,105 tons) of MDAS flashed. All MDAS generated was secured in lockable roll-off containers and shipped offsite for recycling. Each shipment of MDAS was accompanied by a Form 1348-1, documenting the material as MDAS, and a bill of lading.

1 3.3.2 MEC Disposal

2 MEC disposal operations were supervised by the Senior Unexploded Ordnance Supervisor
3 (SUXOS) and coordinated with the on-site Ordnance and Explosives Safety Specialist. All
4 explosive operations followed the procedures outlined in Engineer Manual (EM) 385-1-97
5 (USACE 2008) and contractor SOPs. Transportation of donor explosives was conducted in
6 accordance with applicable sections of 49 Code of Federal Regulations (CFR) Part 397. All
7 appropriate notifications were made by the SUXOS prior to all MEC disposal operations.

8 Donor explosives were initiated by a radio-firing device, non-electric shock tube detonators, or
9 electric blasting caps. Donor explosives, consisting of jet perforators or boosters, were obtained
10 through an explosives vendor and were stored in two ECMs.

11 MEC disposal of acceptable to move items was conducted within the CAMU. The CAMU is
12 part of Solid Waste Management Unit (SWMU) 14, which is located approximately one-half
13 mile north of the HWMU. The CAMU/SWMU 14 locations relative to the HWMU are shown
14 on **Figure 1-2**. After MEC disposal operations were completed, the UXO team conducted an
15 inspection of the disposal area to confirm that explosives were consumed, and to conduct an
16 MPPEH inspection on any remaining materials.

17 MEC disposal of unacceptable to move items were detonated within the HWMU (i.e., within a
18 HWMU grid that still requires excavation and processing). Following disposal operations, the
19 detonation crater and surrounding area was inspected by qualified UXO technicians to ensure no
20 explosive hazards remain and recovered MD was removed. Detonation in place operations
21 occurred in HWMU Grid H25 (shown on **Figure 2-1**), which will undergo excavation and
22 sampling in the future. The detonation in place location is also shown on **Figure 3-1**.

**TABLE 3-1
SSL EXCEEDANCES - STOCKPILE SOIL SAMPLES
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO**

Stockpile Sample Location	Date Sampled	Chemical in Exceedance of SSL	Result (mg/kg)	Residential SSL Cancer Endpoint* (mg/kg)	Residential SSL Noncancer Endpoint* (mg/kg)	Background Value**	Source (Update year)
1898	8/24/2020	2,4,6-Trinitrotoluene	560	211	36	-	NMED (2019)
1917	9/3/2020	2,4,6-Trinitrotoluene	140	211	36	-	NMED (2019)
1971	10/5/2020	2,4,6-Trinitrotoluene	59	211	36	-	NMED (2019)
1990	10/14/2020	2,4,6-Trinitrotoluene	58	211	36	-	NMED (2019)
1993	10/14/2020	2,4,6-Trinitrotoluene	13,000	211	36	-	NMED (2019)
1994	10/14/2020	2,4,6-Trinitrotoluene	110	211	36	-	NMED (2019)
1995	10/14/2020	2,4,6-Trinitrotoluene	220	211	36	-	NMED (2019)
1996	10/16/2020	2,4,6-Trinitrotoluene	160	211	36	-	NMED (2019)
1997	10/16/2020	2,4,6-Trinitrotoluene	140	211	36	-	NMED (2019)
1998	10/16/2020	2,4,6-Trinitrotoluene	300	211	36	-	NMED (2019)
1999	10/20/2020	2,4,6-Trinitrotoluene	160	211	36	-	NMED (2019)
2000	10/20/2020	2,4,6-Trinitrotoluene	140	211	36	-	NMED (2019)
2001	10/20/2020	2,4,6-Trinitrotoluene	63	211	36	-	NMED (2019)
1993	10/14/2020	4-Amino-2,6-dinitrotoluene	98	-	7.7	-	NMED (2019)
1988	10/13/2020	Copper	34,400	-	3,130	18.4	NMED (2019)
1988	10/13/2020	Lead	1,500	-	400	12.4	NMED (2019)

Notes:

*Residential SSL Cancer and Noncancer Endpoints reflect the levels published in the NMED Risk Assessment Guidance for Site Investigations and Remediation document, or USEPA RSLs - Generic Tables that was current at the time a sample was collected. These levels have been updated several times throughout the life of this project, which explains why an SSL may change over time.

**Site-Specific background values are from the 2009 Background Study (Shaw 2010).

mg/kg- milligrams per kilogram

NMED- New Mexico Environment Department

SSL- Soil Screening Level

RSL- Regional Screening Level

USACE- United States Army Corps of Engineers

USEPA- United States Environmental Protection Agency

UTL-Upper Tolerance Limit

"-" - No available value

TABLE 3-2
LABORATORY LIMITS GREATER THAN SSLs
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO

Analyzed Chemical	CAS Number	Residential Value (Cancer Endpoint) (mg/kg)	Residential Value (Noncancer Endpoint) (mg/kg)	Limit of Quantitation* (mg/kg)	Limit of Detection* (mg/kg)	Detection Limit* (mg/kg)	Source (Update Year)
N-Nitrosodimethylamine	62-75-9	0.0234	0.493	0.36	0.036	0.025	NMED (2019)

Notes:

*Value may vary

CAS- Chemical Abstract Service

mg/kg- milligrams per kilogram

NMED- New Mexico Environment Department

**TABLE 3-3
SUMMARY OF RISK SCREENING EXCEEDANCES
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO**

Sample Location	Date Sampled	Chemical in Exceedance of SSL	Result (mg/kg)	Residential SSL Cancer Endpoint* (mg/kg)	Residential SSL Noncancer Endpoint* (mg/kg)	Background Value**	Target Cancer Risk	Estimated Cancer Risk***	Target Hazard Quotient	Estimated Hazard Quotient***	Target Organ
SKPL1898	8/24/2020	2,4,6-Trinitrotoluene	560	211	36	-	1.00E-05	2.65E-05	1.00E+00	1.56E+01	
SKPL1917	9/3/2020	2,4,6-Trinitrotoluene	140	211	36	-	1.00E-05	6.64E-06	1.00E+00	3.89E+00	
SKPL1971	10/5/2020	2,4,6-Trinitrotoluene	59	211	36	-	1.00E-05	2.80E-06	1.00E+00	1.64E+00	
SKPL1990	10/14/2020	2,4,6-Trinitrotoluene	58	211	36	-	1.00E-05	2.75E-06	1.00E+00	1.61E+00	
SKPL1993	10/14/2020	2,4,6-Trinitrotoluene	13,000	211	36	-	1.00E-05	6.16E-04	1.00E+00	3.61E+02	
SKPL1994	10/14/2020	2,4,6-Trinitrotoluene	110	211	36	-	1.00E-05	5.21E-06	1.00E+00	3.06E+00	
SKPL1995	10/14/2020	2,4,6-Trinitrotoluene	220	211	36	-	1.00E-05	1.04E-05	1.00E+00	6.11E+00	
SKPL1996	10/16/2020	2,4,6-Trinitrotoluene	160	211	36	-	1.00E-05	7.58E-06	1.00E+00	4.44E+00	
SKPL1997	10/16/2020	2,4,6-Trinitrotoluene	140	211	36	-	1.00E-05	6.64E-06	1.00E+00	3.89E+00	
SKPL1998	10/16/2020	2,4,6-Trinitrotoluene	300	211	36	-	1.00E-05	1.42E-05	1.00E+00	8.33E+00	
SKPL1999	10/20/2020	2,4,6-Trinitrotoluene	160	211	36	-	1.00E-05	7.58E-06	1.00E+00	4.44E+00	
SKPL2000	10/20/2020	2,4,6-Trinitrotoluene	140	211	36	-	1.00E-05	6.64E-06	1.00E+00	3.89E+00	
SKPL2001	10/20/2020	2,4,6-Trinitrotoluene	63	211	36	-	1.00E-05	2.99E-06	1.00E+00	1.75E+00	
SKPL1993	10/14/2020	4-Amino-2,6-dinitrotoluene	98	-	7.7	-	1.00E-05	NA	1.00E+00	1.27E+01	
SKPL1988	10/13/2020	Copper	34,400	-	3,130	18.4	1.00E-05	NA	1.00E+00	1.10E+01	GI Effects
SKPL1988	10/13/2020	Lead	1,500	-	400	12.4	1.00E-05	NA	1.00E+00	NA	High Blood Pb

Notes:

* Residential SSL Cancer and Noncancer Endpoints reflect the levels published in the NMED Risk Assessment Guidance for Site Investigations and Remediation document, or USEPA RSLs- Generic Tables that was current at the time a sample was collected. These levels have been updated several times throughout the life of this project, which explains why an SSL may change over time.

**Site-Specific background values are from the 2009 Background Study (Shaw 2010).

***Although only exceedances are listed, the formula used accounted for all detected analytes in the sample.

GI - Gastrointestinal

mg/kg - milligrams per kilogram

NMED - New Mexico Environment Department

Pb - lead

RSL - Regional Screening Level

SSL - Soil Screening Level

USACE - United States Army Corps of Engineers

USEPA - United States Environmental Protection Agency

UTL - Upper Tolerance Limit

"-" - No available value

TABLE 3-4
SUMMARY OF INTRUSIVE INVESTIGATION RESULTS
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO

Grid ID	Item Type	Description	Depth (in)	Weight (lbs)
C21	MPPEH	PD Fuze	6	2
E21	MPPEH	20mm/BLU-4	6	1
G9	MEC	M120 Fuze	4	1
H7	MEC	20mm	4	0.2

Notes:

BLU = bomb live unit

ID = identification

in = inch(es)

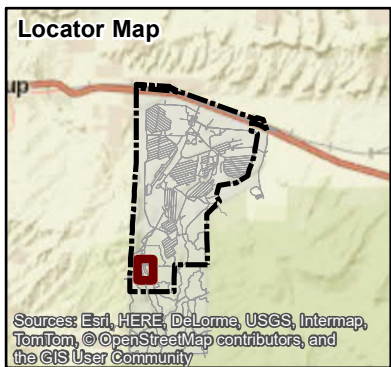
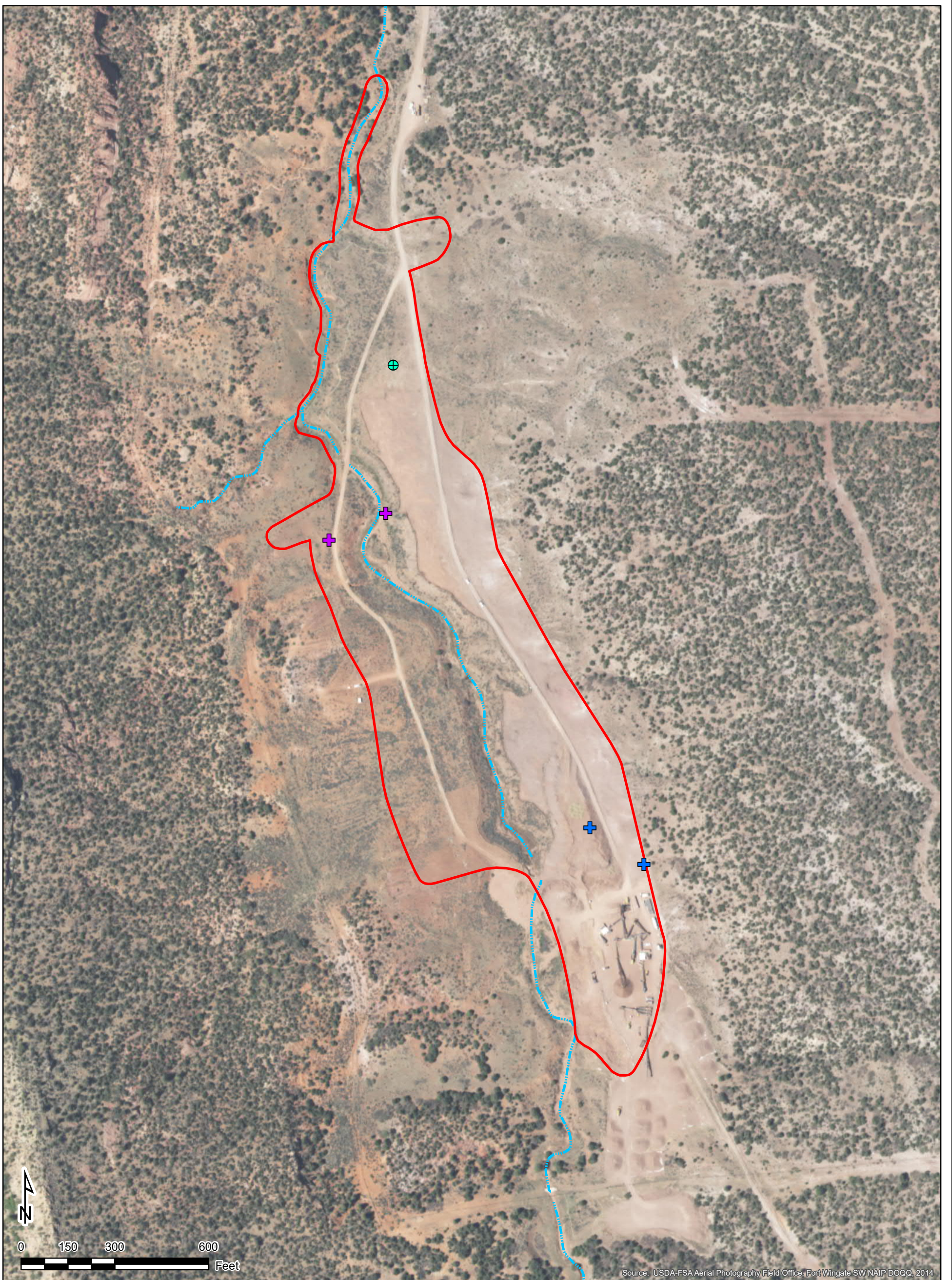
lbs = pounds

MEC = munitions and explosives of concern

mm = millimeter

MPPEH = material potentially presenting an explosive hazard

PD = point detonating



Legend

- Installation Boundary
- HWMU Boundary
- Arroyo
- MEC (Post-Excavation DGM Dig)
- MPPEH (Post-Excavation DGM Dig)
- Detonation in Place Location

Post-Excavation Recovered MEC and Detonation in Place Location
Fort Wingate Depot Activity
McKinley County, New Mexico

Drawn By:	Date:
JZ	2/1/2021
Checked By:	Project No.
GB	60517380

Figure 3-1

1 Removal activities at the FWDA Parcel 3 HWMU area have been conducted from 2012 to
2 current; however, operations ceased from late 2015 through the middle of 2017 as the initial
3 work contract ended and a new work contract was awarded to AECOM (formerly URS). As
4 such, there was no MEC recovery or soil sampling completed during the year 2016. This
5 HWMU Status Report discusses data collected during the 2020 recovery operations.

6 The USEPA RSLs were updated during the 2020 FWDA removal activity. The November 2019
7 USEPA RSL tables were used until the subsequent updates were released in May 2020 and
8 November 2020. There were no updates to the NMED SSLs in 2020 and the 2019 values were
9 used in the development of this report.

10 Approximately 123,000 cubic yards of soil was excavated and processed through the closed-loop
11 processing plant in 2020. A total of 392 stockpile soil samples and 31 confirmation soil samples
12 were collected in 2020. Of the 392 stockpile soil samples collected from the HWMU area,
13 fifteen samples exceeded residential screening levels. Fourteen stockpile soil samples exhibited
14 explosives concentrations of 560 mg/kg, 140 mg/kg, 59 mg/kg, 58 mg/kg, 13,000 mg/kg, 110
15 mg/kg, 220 mg/kg, 160 mg/kg, 140 mg/kg, 300 mg/kg, 160 mg/kg, 140 mg/kg, and 63 mg/kg for
16 2,4,6-Trinitrotoluene and 98 mg/kg for 4-Amino-2,6-dinitrotoluene, which exceeded the NMED
17 residential noncancer screening levels (36 mg/kg and 7.7 mg/kg, respectively). One stockpile
18 soil sample exceeded the NMED residential noncancer screening levels for copper
19 (34,000 mg/kg) and lead (1,500 mg/kg). Stockpiles that exceeded screening criteria were
20 segregated for later disposed at a licensed, off-site landfill. There were no other exceedances in
21 the stockpile soil samples and no exceedances of residential screening levels from the
22 confirmation soil samples. Stockpile soil samples that exceeded SSLs are summarized in
23 **Table 3-1**. Confirmation soil samples were collected and confirmed the absence of
24 contamination in the following 31 grids during 2020: B21, B22, C21, C22, D7 through D9, D21
25 through D23, E7 through E9, E21, E22, F7 through F9, F21, F22, G7 through G9, G21, G22, H7
26 through H9, H21, and H22 as shown on **Figure 2-1**. It is expected that the following grids will
27 be excavated, processed, and sampled in 2021: E10 through E20, F10 through F-20, G10 through
28 G22, and H10 through H22.

29 Risk screening was performed on all samples collected from the soil stockpiles and the
30 confirmation samples. Three stockpile samples exceeded the cancer risk of 1.0E-05. Fourteen
31 stockpile samples exhibited a hazard index that exceeded 1.0 for two target organs. A summary
32 of the stockpile soil samples that exceeded risk screening levels in included in **Table 3-3**.

33 MEC recovery operations effectively removed a total of 14,743 MEC items from the HWMU
34 area in 2020 (a total of 40,879 MEC items since the beginning of the removal activities in 2012).
35 Most items were properly disposed of within the CAMU area (which is adjacent to SWMU 14);
36 however, items that were designated unacceptable to move were detonated within the HWMU.
37 MEC recovery and disposal operations were conducted by authorized on-site UXO technicians.

38 Approximately 1.53 million pounds (765 tons) of metallic debris was removed, inspected,
39 designated as MDAS, flashed, and recycled in 2020, with a total of 6.21 million pounds
40 (3,105 tons) of MDAS flashed removed since the beginning of the removal activities in 2012.

- 1 Environmental Resource Management. 1995. Draft Final Fort Wingate Depot Activity, Gallup,
2 NM, Open Burning/Open Detonation Areas, Closure Field Program, Technical Plan,
3 ELIN A004. September.
- 4 MKM Engineers, Inc. 2008. Kickout Investigation Work Plan, Fort Wingate Army Depot
5 Activity, McKinley County, New Mexico. July.
- 6 New Mexico Environment Department (NMED). 2005. RCRA Permit Number
7 NM6213820974-1. Fort Wingate Depot Activity. 1 December.
- 8 NMED. 2019a. Extension Request for the Parcel 3 Hazardous Waste Management Unit
9 Investigation and Remediation Report, Fort Wingate Depot Activity, McKinley County,
10 New Mexico. April 18.
- 11 NMED. 2019b. Risk Assessment Guidance for Site Investigations and Remediation. February.
12 (URL: <https://www.env.nm.gov/hazardous-waste/guidance-documents/>).
- 13 Shaw Environmental, Inc. (Shaw). 2010. Soils Background Study and Data Evaluation Report.
14 Fort Wingate Depot Activity. October.
- 15 TerranearPMC (TPMC). 2008. Summary Report of Historical Information, OB/OD Unit
16 HWMU and Parcel 3 SWMUs and AOCs, Fort Wingate Depot Activity, McKinley
17 County, New Mexico. June.
- 18 United States Army Corps of Engineers (USACE). 2008. EM385-1-97. Explosives - Safety and
19 Health Requirements Manual. 15 September.
- 20 USACE. 2013. Phase 2 Soil Background Report, Fort Wingate Depot Activity. February.
- 21 United States Environmental Protection Agency (USEPA). 1994. Revised Interim Soil Lead
22 Guidance for CERCLA Sites and RCRA Corrective Action Facilities (EPA/540/F-
23 94/043). Office of Solid Waste and Emergency Response. Washington, D.C.
- 24 USEPA. 1996. Recommendations of the Technical Review Workgroup for Lead for an Interim
25 Approach to Assessing Associated with Adult to Lead in Soil. December.
- 26 USEPA. 1998. Clarification to the 1994 Revised Interim Soil Lead Guidance for CERCLA
27 Sites and RCRA Corrective Action Facilities. OWSER Directive 9200.4-27,
28 EPA/540/F 98/030. August.
- 29 USEPA. 2016. Memorandum: Updated Scientific Considerations for Lead in Soil Cleanups.
30 December 22, 2016.
- 31 USEPA. 2020. Regional Screening Levels (RSLs)- Generic Tables. November.
32 (<https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>). (Also includes
33 updates in May 2019 and November 2019).

- 1 URS Group, Inc. (URS). 2013. Approved Final – Removal Work Plan, HWMU, Parcel 3, Fort
- 2 Wingate Depot Activity, McKinley County, New Mexico. February.

1

A.1 – Stockpile Soil Sampling Results

1

A.2 – Confirmation Soil Sampling Results

1

B.1 – Stockpile Soil Sampling Risk Tables

1

B.2 – Confirmation Soil Sampling Risk Tables

