

**SUMMARY REPORT OF HISTORICAL
INFORMATION
PARCEL 22
FINAL**

**FORT WINGATE DEPOT ACTIVITY
McKinley County, New Mexico**

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Prepared for:

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LIST OF ACRONYMS

1	ACM	Asbestos-Containing Material
2	AOC	Area of Concern
3	ATSDR	Agency for Toxic Substance and Disease Registry
4	bgs	below ground surface
5	BLM	Bureau of Land Management
6	BRAC	Base Realignment and Closure
7	BRACD	BRAC Office
8	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
9		
10	CY	cubic yard
11	DOI	Department of the Interior
12	EI	Environmental Investigation
13	ESA	Environmental Site Assessment
14	FWDA	Fort Wingate Depot Activity
15	HWB	Hazardous Waste Bureau
16	HTWE	High Temperature Water Extraction
17	lb	pound
18	LBP	Lead-Based Paint
19	mg/kg	Milligram per Kilogram
20	MIDAS	Munition Items Disposition Action System
21	NARA	National Archives and Records Administration
22	NEW	Net Explosive Weight
23	NMED	New Mexico Environmental Department
24	OB/OD	Open Burning/Open Detonation
25	OVM	Organic Vapor Monitor
26	PCB	Polychlorinated Biphenyl
27	ppm	part per million
28	QA	Quality Assurance
29	RCRA	Resource Conservation and Recovery Act
30	RDX	Cyclotrimethylenetrinitramine
31	RFI	RCRA Facility Investigation
32	SOP	Standard Operating Procedure
33	SRHI	Summary Report of Historical Information
34	SVOC	Semi-volatile Organic Compound
35	SWMU	Solid Waste Management Unit
36	TAL	Target Analyte List
37	TCL	Target Compound List
38	TEAD	Tooele Army Depot
39	TM	Technical Manual
40	TPL	TPL, Inc.
41	TNT	Trinitrotoluene
42	TPH	Total Petroleum Hydrocarbon
43	USACE	U.S. Army Corps of Engineers
44	USEPA	U.S. Environmental Protection Agency
45	UST	Underground Storage Tank
46	VOC	Volatile Organic Compound
47	WSMR	White Sands Missile Range
48		

1 **1.0 INTRODUCTION**

2 This Summary Report of Historical Information (SRHI) for Parcel 22 at Fort
3 Wingate Depot Activity (FWDA) summarizes previous investigations and
4 historical records for Parcel 22. This report summarizes historical information for
5 the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs)
6 located in Parcel 22.

7 This document was prepared by TerranearPMC, LLC of Exton, Pennsylvania, in
8 partial fulfillment of the requirements of Task Order No. 0010 under Contract
9 W9126G-06-D-0016. Contracting Officer's Representative and technical
10 oversight responsibilities for the tasks described in this document were provided
11 by the U.S. Army Corps of Engineers (USACE), Fort Worth District.

12 This document has been prepared for submission to the New Mexico
13 Environment Department (NMED) Hazardous Waste Bureau (HWB), as outlined
14 in Section VIII.A.1.a of the Resource Conservation and Recovery Act (RCRA)
15 Permit (hereinafter referred to as "the Permit") for FWDA. The Permit (NM
16 6213820974) was finalized in December 2005 and became effective 31
17 December 2005.

18 This document has been prepared as a companion report to both the RCRA
19 Facility Investigation (RFI) Work Plan and Release Assessment Report for Parcel
20 22.

21 **1.1 PURPOSE/OBJECTIVE**

22 The purpose of this SHRI is to summarize historical information and previous
23 environmental investigation and restoration activities for all Parcel 22 SWMUs
24 and AOCs.

2.0 BACKGROUND

2.1 DESCRIPTION OF THE FACILITY

FWDA is a closed U.S. Army depot whose former mission was to receive, store, maintain, and ship assigned materials (primarily explosives and military munitions), and to dispose of obsolete or deteriorated explosives and military munitions. Since 1975, the installation has been 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 (BRACD), 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 and control and support functions were transferred to White Sands Missile Range (WSMR).

FWDA currently occupies approximately 24 square miles (approximately 15,277 acres) of land in northwestern New Mexico, in McKinley County. The installation is located 8 miles east of Gallup on U.S. Route 66 and approximately 130 miles west of Albuquerque on Interstate 40 (Figure 2-1). FWDA contains facilities formerly used to operate a reserve storage activity providing for the care, preservation, and maintenance of assigned commodities, primarily conventional military munitions. The installation mission included the disassembly and demilitarization of unserviceable and obsolete military munitions.

The installation is divided into areas based upon location and historical land use (Figure 2-2). These major land-use areas include the Administration Area, the Workshop Area, the Magazine (Igloo) Area (former munitions storage areas including Igloo Blocks A through H, J and K), protection and buffer areas, and the Open Burning/Open Detonation (OB/OD) areas. The northern portion of lands identified as Parcel 22 are a portion of the former FWDA Workshop Area, and the southern portion is a portion of the Magazine (Igloo) Area.

FWDA operations in Parcel 22 ended with the closure of FWDA in January 1993. Tenant operations within Parcel 22 were conducted by TPL, Inc. (TPL), under various contracts. TPL performed demilitarization of military munitions with an emphasis on resource recovery and reuse. Demilitarization operations ranged from simple mechanical separation of munitions into their components to chemical processes to further extract reusable materials.

TPL's original facilities use contract was issued in 1994, and TPL began to occupy FWDA facilities in late 1994. The original contract consisted of the use five buildings (Building 527, Building 528, Buildings 528A and 528B, and Building 529), plus 19 igloos in Igloo Block B. TPL also installed a modular office trailer adjacent to Building 527.

Later contracts/modifications added additional buildings/facilities, including: Buildings 550 and 551; Buildings 535 and 536 (plus surrounding area); Buildings

1 518 and 519 (plus surrounding area); Buildings 301, 302, and 312; and 53 igloos
2 in Igloo Block D. The 53 igloos in Igloo Block D were returned to Army control in
3 2005. The remaining facilities used by TPL in Parcel 22 were returned to Army
4 control in 2007.

5 FWDA has been undergoing final environmental restoration prior to property
6 transfer/reuse. As part of the planned property transfer to the Department of the
7 Interior (DOI), the installation has been divided into reuse parcels (Figure 2-2).
8 Parcels transferred to date consist of Parcels 1, 15, and 17. According to the
9 most recent reuse planning document (DOI, 2005), the planned reuse for Parcel
10 22 is as a Commercial Holding Zone.

11 The Permit lists a total of three SWMUs within Parcel 22, as follows (Figure 2-3):

- 12 • SWMU 12 Building 536 (Inspectors Workshop and Ammunition
13 Renovation Depot);
- 14 • SWMU 27 Building 528 Complex (Includes Building 528 [Ammunition
15 Normal Maintenance Building], Building 528A [temporary
16 storage igloo], AOC 121 [Building 528B, temporary storage
17 igloo], AOC 122 [Building 529], AOC 125 [Building 550,
18 vacuum collector barricade], and AOC 126 [Building 551,
19 service magazine]); and
- 20 • SWMU 70 Disassembly Plant and TPL Quality Assurance (QA) Test
21 Area (includes Building 517, Structure 518, Building 519,
22 Structure 520, Structure 521, and Structure 547).

23 In addition to the SWMUs listed above, Parcel 22 contains five AOCs, as follows
24 (Figure 2-3):

- 25 • AOC 30 Igloo Block D;
- 26 • AOC 69 Buildings 301, 302, and 312 (Standard Magazines), and
27 Building 316 (Field Lunch Room);
- 28 • AOC 71 Former rectangular structure near TMW-5 and north of
29 Building 528;
- 30 • AOC 75 Former or existing electrical transformer locations within
31 Parcel 22; and
- 32 • AOC 88 Former buildings or structures and disposal areas
33 southwest, south, and southeast of Building 528.

34 **2.2 SUMMARY OF GENERAL HISTORICAL INFORMATION**

35 A number of record searches and document reviews relating to FWDA
36 operations in general as well as the Parcel 22 SWMUs and AOCs in particular
37 have been performed since the environmental restoration program began in
38 1980.

Available records pertaining to operations at the Parcel 22 SWMUs and AOCs were reviewed in preparation of past documents and this SRHI.

Records reviewed included:

- A historical aerial photograph analysis for FWDA (ERI, 2006);
- Historical maps, drawings, and records located at FWDA;
- Historical records and documents, obtained from the National Archives and Records Administration (NARA), stored in multiple locations;
- Historical records and documents obtained from the NARA College Park, Maryland, location;
- Historical records obtained from Army Field Support Command/Joint Munitions Command History Office's archives and document collection; and
- Other historical documents contained in the FWDA Information Repository.
- Historical information regarding operations and environmental characterization has been incorporated into the summaries for individual SWMUs and AOCs.

2.3 INTERVIEWS

Interviews of former FWDA personnel familiar with FWDA operations were conducted in 1994 and 1995 as part of the archives search, and were documented in the document entitled *Archive Search Report, Fort Wingate*, dated July 1995 (USACE, 1995, pages 4-7 and 4-8, and Appendix H). Additional interviews were conducted by USACE in 2006-2007 and were documented in a document entitled *Summary of Interviews, Fort Wingate Depot Activity* (USACE, 2007, Section 3.0).

There was no specific information regarding FWDA activities within Parcel 22 contained in interview documentation.

2.4 AERIAL PHOTOGRAPH ANALYSIS

Historical aerial photographs were analyzed as presented in a document entitled *Aerial Photographic Analysis, Fort Wingate Depot Activity* (ERI, 2006); information for Parcel 22 is included in Appendix B of this SRHI. Analysis findings been incorporated into the summaries for individual SWMUs and AOCs.

2.5 ENVIRONMENTAL INVESTIGATION AND RESTORATION ACTIVITIES

The environmental restoration process at FWDA had been underway for 25 years prior to Permit issuance. With the exception of the OB/OD Area, environmental restoration activities at FWDA began in 1980 under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) guidelines, with the U.S. Environmental Protection Agency (USEPA) Region 6 as the lead regulatory agency.

1 Since that time, NMED has become the lead regulatory agency, and the pathway
2 for environmental restoration has been evolving for a number of years. In 2002,
3 NMED determined that the pathway would be a RCRA permit for post-closure
4 care of the OB/OD Area, with a RCRA corrective action module attached to
5 address requirements for other sites. The Permit (NM 6213820974) was
6 finalized in December 2005 and became effective 31 December 2005 (NMED,
7 2005).

8 Previous investigations at each SWMU and AOC are summarized in the following
9 sections.

10

3.0 SWMU 12 – BUILDING 536

3.1 LOCATION, DESCRIPTION, AND OPERATIONAL HISTORY

SWMU 12 is Building 536, Inspectors Workshop. SWMU 12 is shown in Figure 3-1. Representative photographs are included in the companion RFI Work Plan for Parcel 22. Historical drawings and information are included in Appendix C.

Building 536 (originally known as Building 39) was constructed in 1943, and contained areas for inspection and testing of various munitions. Facilities included an ammunition storage room, an inspection room, a gauge room, a test fixture for rocket motors, a pull apart machine and barricade, and a repair room. More recent FWDA building lists identify Building 536 as an ammunition renovation building. The date FWDA operations in Building 536 ceased prior to installation closure in January 1993 is not known.

A nearby building (Building 535) houses a boiler to provide steam heat to Building 536. Building 535 constructed in 1943, and was converted from a coal-fired to dual-fuel-fired boiler when FWDA was converted to natural gas circa 1969.

According to historic installation drawings, Building 536 had, at various times during its operation, a discharge to a cesspool (with an outfall to the arroyo), a septic tank and leach field, and a connection to the FWDA sanitary sewer system.

With the exception of characterization related to releases from a pole-mounted electrical transformer east of the building, no environmental baseline data were collected at Building 536 prior to the start of TPL operations. The former pole-mounted transformer location is discussed as part of AOC 75.

TPL operations in Building 536 began circa 1996, and included demilitarization of munitions and processing of propellant into smokeless powder for commercial resale. Detailed information or records regarding exact operations and disposition of various removed/recovered components was not found.

Reports from TEAD “staff assistance” inspection visits note multiple issues with housekeeping inside and outside Building 536 over time

3.2 PREVIOUS INVESTIGATIONS

3.2.1 Historical Aerial Photograph Analysis

As noted in the aerial photo analysis report (ERI, 2006, findings included in Appendix B of this SRHI), the only findings for SWMU 12 in historical aerial photographs spanning the years 1948 through 1997 were the construction of Building 536 in 1952.

The aerial photo analysis also noted disturbed ground and probable debris in the 1948 aerial and disturbed ground in the 1952 aerial, north of Building 536. It is not known if this site was associated with operations in SWMU 12. This site was

1 included in the Release Assessment Report for Parcel 22 (Section 9.1.3), and
2 appeared to have been used for placement of large rocks (Photo 9-6, Appendix A
3 of the companion Release Assessment Report for Parcel 22), most likely those
4 removed during the construction of Building 536. No other significant findings
5 were observed during the site reconnaissance.

6 Additionally, the analysis noted open storage of probable crates east of Building
7 536 in the 1997 aerial. These features were not present during the site
8 reconnaissance and are suspected to have been materials stored by TPL during
9 their operations within Building 536.

10 **3.2.2 Historical Records Review**

11 A review of FWDA historical drawings was completed for the Building 536 area.
12 Historical drawings are provided in Appendix C.

13 Drawing A-5-10 is a floor plan of Building 536 that shows a trap pit in the south
14 end of the building interior.

15 Drawing A-5-31 is an overlay that shows equipment located in Building 536. This
16 equipment included a wax pot table, rocket test table and vise, grinder, and two
17 pull apart machines.

18 Drawing A-5-35 shows the plumbing system for Building 536; the trap pit shown
19 in A-5-10 is shown to be part of the steam heating system, and the restroom
20 facilities are connected to the building sanitary drain line. There are no floor
21 drains or other discharge locations.

22 Drawing C-3-59 shows the sanitary sewer connection for Building 536 as well as
23 the abandoned cesspool and septic tank and drain field.

24 Drawing A-5-37 is a floor plan of Building 535 (the heating plant for Building 536)
25 that shows several features. An area drain in the exterior stair well drains to a
26 sump pit in the northeast corner of the building. The sump pit discharged via a
27 drain line to the south exterior of the building. A floor drain in the southwest
28 corner of the building also discharged to the south exterior of the building. In
29 addition to the sump pit, a condensate pit is also present in Building 535.

30 Drawing A-5-209 is a floor plan of Building 536 that indicates the presence of a
31 "paint storage structure" 81.5 feet southeast of the southeast corner of the
32 building. In addition, notes on the drawing indicate Building B534 (also known as
33 Structure 40 and Structure 56 on other drawings) as an abandoned 10,000-
34 gallon, concrete water-storage tank. The water tank, approximately 500 feet
35 south of Building 536, is shown in detail on Drawing C-2-54.

36 According to Real Property Records reviewed, Building 534 was completed in
37 June 1963 and was reported as a 10,000-gallon concrete tank. Structure 534
38 was reported demolished in April 1967. The location of this structure was
39 evaluated as part of the Parcel 22 Release Assessment Report (Section 9.1.3).

3.2.3 *Underground Storage Tank Removal*

Fuels used for heating at FWDA have changed several times. Initially, most FWDA administration and workshop buildings were heated via steam from coal-fired boilers. Later, coal-fired boilers were converted to natural gas-fired boilers, with a several heating units converted to dual-fuel (both fuel oil- and natural gas-fired) boilers. Building 535 houses the heating unit for Building 536. Building 535 was converted from a coal-fired to dual-fuel-fired boiler when FWDA was converted to natural gas.

A 2,000-gallon fuel oil underground storage tank (UST) was removed from the Building 536 area in 1992 (Envirotech, 1993, copies of relevant materials included in Appendix C). The tank was constructed of fiberglass, empty of contents when removed, and was noted as having no pitting or corrosion (Envirotech, 1993).

An organic vapor monitor (OVM), used to field screen the open excavation, was used to detect organic vapors from the headspace sample collected within the excavation. Two post-removal soil samples were collected from the tank excavation and analyzed for total petroleum hydrocarbons (TPH). Vapors were not detected during field screening. TPH was detected at a concentration of 46.2 milligrams per kilogram (mg/kg) in the soil sample collected from the northern end of the excavation (Figure 3-1). The New Mexico UST Bureau limit for TPH was 100 mg/kg at the time the sample was collected, and the site investigation was considered complete.

The excavation was backfilled with clean fill obtained onsite and no further action/closure was recommended.

3.2.4 *Phase I Environmental Site Assessment*

From 1998 to 2000, a DOI Bureau of Land Management (BLM) environmental contractor documented conditions within Parcel 22 as part of a Phase I Environmental Site Assessment (ESA) of Parcels 6 and 22; this effort was documented in a report entitled *Phase I Environmental Site Assessment, Final Report, Fort Wingate (Parcels 6 and 22)* (TTNUS, 2000, pages 5-1, 5-2, and inspection forms in Appendix B of the report; copies included in Appendix C). No environmental samples were collected as part of the investigation.

During the ESA, asbestos-containing material (ACM) (in the form of pipe insulation inside Building 535) was reported in good condition. A small sump containing water was reported in the northeast corner of the building.

A 10,000-gallon AST was reported east of Building 535; however, TPL indicated the AST was used for fire suppression and contained water. No secondary containment was observed for the AST.

Building 536 reportedly contained a drum of ethylene glycol and bags of calcium nitrate, sodium acetate, and sodium nitrate. The containers were reported in good condition.

3.2.5 Cesspool and Septic Tank Investigation

In 2000, samples were collected from a cesspool, cesspool outfall, septic tank, and septic drain field that received sanitary discharge from Building 536 prior to installation of sanitary sewer lines to the FWDA Sewage Treatment Plant (SWMU 10, Parcel 11). as summarized in the document entitled *Final Release Assessments Report* (Tetra Tech, 2000, Section 6.13, pages 6-10 and 6-11; sampling methodologies were summarized in Section 3.2, pages 3-1 through 3-3 and Section 3.3, pages 3-3 and 3-4). Sample locations are shown in Figure 3-1.

One sediment sample (B536-001) was collected from the bottom of the septic tank. One sediment sample (B536-002) was collected from the bottom of the cesspool. One surface soil sample (B536-004) was collected at the cesspool outfall. One soil boring (B536-003) was completed adjacent to the cesspool, to a depth of 25 feet bgs (sample collected at 25 feet bgs). Four soil borings (B536-005 through B536-008) were completed within the septic tank drain field to a depth of 10 feet bgs (samples collected at surface, 5 feet bgs, and in one boring, 8 feet bgs).

Samples were analyzed for target compound list (TCL) volatile organic compounds (VOCs), TCL semi-volatile organic compounds (SVOCs), target analyte list (TAL) metals, TCL pesticides, and TCL polychlorinated biphenyls (PCBs).

These data are included in summary tables showing detected soil constituents and a comparison to current Permit cleanup levels, included as Table 3-1 (VOCs), Table 3-2 (SVOCs), and Table 3-3 (inorganics) in the companion RFI Work Plan for Parcel 22. No pesticides or PCBs were detected.

4.0 SWMU 27 - BUILDING 528 COMPLEX

4.1 LOCATION, DESCRIPTION, AND OPERATIONAL HISTORY

SWMU 27, the Building 528 Complex, contains six structures: Building 528, Building 527, Building 550, Building 551, Buildings 528A and 528B, and Building 529. SWMU 27 is shown in Figure 4-1. Representative photographs are included in the companion RFI Work Plan for Parcel 22. Historical drawings and information are included in Appendix D.

Building 528, Ammunition Normal Maintenance Building, was constructed in 1955, and contained areas/operations for receiving and unpacking, disassembly, defuzing, cleaning/derusting, painting, reassembly, container repair and painting, and an abrasive blasting operation.

Building 527, Heating Plant, was constructed in 1955 and contained a boiler to provide steam to heat Building 528, and also contained a chlorinator and water softener.

Building 550, Vacuum Collector Building, was constructed circa 1966 to house separators and a vacuum producer pump for an overhead vacuum recovery system for smokeless powder propellant debagged in Building 528.

Building 551, Service Magazine, is an earth-covered magazine constructed circa 1969 to store smokeless powder propellant collected in Building 550.

Buildings 528A and 528B are also earth-covered magazines, constructed sometime between 1973 and 1985 (first visible in a 1985 aerial photo). They are not shown on any historical FWDA drawings.

Building 529, Flammable Materials Storehouse, was constructed in 1955 and was used to store flammable materials (e.g., paints, solvents) used in Building 528 operations.

The exact date FWDA operations in these buildings ceased prior to installation closure in January 1993 is not known.

TPL began using the Building 528 Complex in 1994 to demilitarize munitions. Detailed information or records regarding exact operations and disposition of various removed/recovered components was not found, but enough information was available to generally describe TPL operations in the Building 528 Complex.

Building 528 was used for disassembly of munitions, including removal of smokeless and black powder. Recovered components were re-containerized within the building (the overhead vacuum recovery system discharging in Building 550 was not utilized by TPL) and either moved to another location for storage (awaiting disposal or reuse), or; in the case of recovered propellant, incorporated in other operations in Building 528 to produce blasting gel or other products.

TPL operated a propane-fired thermal treatment unit (popping furnace) northeast of Building 528 for an unknown length of time in the late 1990s.

Building 551 was initially used by TPL for the disassembly of photoflash cartridges under contract DAAA09-94-C-0386; the items disassembled were M112 and M112A1 photoflash cartridges. From the Army's Munition Items Disposition Action System (MIDAS) database, the photoflash charge in these cartridges (7 ounces of charge per cartridge) was, by weight, 40% aluminum, 30% potassium perchlorate, and 30% barium nitrate, with trace amounts of iron, zinc, and silicon. A curbed concrete pad, approximately 40 feet wide by 75 feet long was constructed to support photo flash processing equipment, including High Temperature Water Extraction (HTWE) process equipment and tanks. The purpose of the HTWE processing step was to solubilize and separate barium nitrate and potassium perchlorate from recyclable metals. The date disassembly operations began is unknown; a TPL letter dated 18 March 1996 notes that Building 551 "will be used" to house photoflash disassembly, so it is presumed that operations began sometime after that date. No process design information (e.g., process flow diagrams, piping and instrumentation drawings, design volumes/capacities) was found during preparation of this document. The wet separation steps were discontinued in 1997; characterization, removal, and disposal of residual materials including liquids, solids, tanks, and other process equipment took place from 1997 until sometime in 2002. These activities were not well documented.

Raw materials used in TPL operations were stored in and around Building 551. An ammonium nitrate feed hopper and a storage shed used to store blasting gel ingredients were located approximately 60 feet north northwest of Building 551.

Following the end of photo flash cartridge disassembly operations, Building 551 was used as a less than 90-day storage area for non-explosive hazardous wastes. Drums and containers were stored in the building and under an exterior open-sided storage area.

TPL used Building 529 for storage of flammables and other materials, and used Building 550 for storage of ethylene glycol antifreeze.

4.2 PREVIOUS INVESTIGATIONS

4.2.1 Historical Aerial Photograph Analysis

As noted in the aerial photo analysis report (ERI, 2006, Parcel 22 findings included in Appendix B), the only finding for SWMU 27 in historical aerial photographs spanning the years 1948 through 1997 was the appearance of the Building 528 Complex in the 1958 photograph.

The analysis noted numerous crates present on the east and west sides of Building 528 in the 1997 photograph. Two trailers were also present north of Building 528. These features were not present during the site reconnaissance and were associated with TPL operations at SWMU 27.

4.2.2 Historical Records Review

A review of FWDA historical drawings was completed for the Building 528 Complex. Historical drawings are provided in Appendix D.

1 Drawing A-9-33 is a floor plan of Building 528 that shows the different operations
2 that were conducted as part of ammunition maintenance. The flow of operations
3 was in a counter clockwise direction, starting in the southwest corner. These
4 operations included: unpacking, disassembly, resizing, painting, abrasive
5 blasting, stenciling, reassembly, gauging, and repacking. As noted in the
6 drawing, Building 528 also contained an office and restrooms as well as loading
7 docks.

8 Drawings A-5-159 and A-5-160 show the plumbing system for Building 528;
9 these drawings show that a service sink in the work area and the restroom
10 facilities are connected to the building sanitary sewer line. There are no floor
11 drains or other discharge locations.

12 Drawing B-9-77 is the abrasive blast machine used at Building 528. Drawing B-
13 9-57 is the dust collection unit associated with the abrasive blast machine.
14 Drawing D-4-8d is thought to have been the ammunition-marking machine used
15 in Building 528.

16 Drawing B-11-36 shows locations of all utilities used at SWMU 27. As noted in
17 the drawing, three electrical transformers were present at Building 527 and three
18 transformers were present at Building 528. Sanitary sewer, treated water, and
19 untreated water were provided to both Building 528 and Building 527. The
20 electrical transformers are part of AOC 75, and further discussed in the Parcel 22
21 Release Assessment Report (TPMC, 2007).

22 Drawing A-5-171 shows "existing building foundation to be removed" near the
23 current Flammable Storage Building. This foundation appears to have been one
24 of the pre-1940s magazine locations. A "drip pit" is shown on the south side of
25 Building 527. In addition, this drawing has elevation contour lines to show
26 topography in the area of SWMU 27.

27 Drawing B-9-144 shows "cannon shell steel containers to be removed by others"
28 just east of Building 527. No additional information regarding the containers was
29 reviewed.

30 Drawing D-2-36e shows geologic borings completed in the SWMU 27 area.

31 Drawing A-10-18 is a floor plan of Building 527 showing a condensate pump.

32 Drawing A-5-99 is construction plans for Building 550.

33 Drawing A-5-103 provides equipment placement within Building 550. The
34 drawing also shows the exhaust for the vacuum collection unit.

35 Drawing A-5-106 is a floor plan of Building 551 showing a drainage "gutter" and
36 associated through-wall weep hole.

37 Drawing A-10-24 is a floor plan of the Flammable Storage Structure showing a
38 slope to the doorway for drainage.

1 According to Real Property Records reviewed, Building 551 was completed in
2 June 1968. Building 527, Building 528, and Building 529 were completed in
3 March 1955.

4 The addition of a reinforced concrete “drip pit”, completed in March 1955, is
5 reported as 5-feet wide, 5-feet long, and 6-feet deep. Additionally, the
6 conversion of Building 527 from coal-fired to natural gas-fired boilers was
7 completed in April 1969.

8 **4.2.3 Environmental Investigation**

9 Potential contamination around SWMU 27 was evaluated as part of a facility-wide
10 environmental investigation (EI) following FWDA closure. Samples were
11 collected around Building 528 in 1992 and 1993 to evaluate potential releases
12 from FWDA operations. Soil samples were collected from five surface locations
13 and two soil borings as summarized in the document entitled *Final Remedial*
14 *Investigation/Feasibility Study Report & RCRA Corrective Action Program*
15 *Document* (ERM PMC, 1997, (ERM PMC, 1997, Section 7.4.5, pages 7-99
16 through 7-103; sampling methodologies were summarized in Sections 3.1.2.4
17 and 3.1.2.5, pages 3-6 through 3-8). These samples were analyzed for TCL
18 VOCs, TCL SVOCs, explosives, PCBs, TAL metals, nitrate/nitrite, and total
19 phosphorus. Sample locations are shown in Figure 4-1.

20 Five surface soil samples (FAMSO001 through FAMSO005) were collected
21 around the perimeter of Building 528.

22 One soil boring (FAM01) was completed adjacent to Building 528. One soil
23 boring (FAM02) was completed downgradient of Building 551. Each boring was
24 completed to a depth of 10 feet bgs, and samples were collected from the depth
25 intervals of 0 to 1 foot bgs, 3 to 5 feet bgs, and 8 to 10 feet bgs.

26 Summary tables showing detected soil constituents and a comparison to current
27 Permit cleanup levels are included as Table 4-1 (VOCs), Table 4-2 (SVOCs), and
28 Table 4-3 (explosives, PCBs, and inorganics) in the companion RFI Work Plan
29 for Parcel 22.

30 **4.2.4 Baseline Characterization**

31 Immediately prior to the start of TPL operations, samples were collected inside
32 Building 528, on the concrete slabs outside Buildings 550 and 551, and inside the
33 “S.E. Magazine” (believed to be either Building 528A or 528B) by a contractor
34 working for TPL in November 1994, prior to the start of TPL operations (IT,
35 1995).

36 With the exception of one sample of paint chips and one wipe sample that were
37 analyzed for lead, the samples were either discrete or composite wipe samples
38 and were analyzed for either explosives or TPH. Nine three-part composite wipe
39 samples were analyzed for explosives, and two discrete and one three-part
40 composite samples were analyzed for TPH.

4.2.5 Phase I Environmental Site Assessment

From 1998 to 2000, a DOI BLM environmental contractor documented conditions within Parcel 22 as part of a Phase I ESA of Parcels 6 and 22; this effort was documented in a report entitled *Phase I Environmental Site Assessment, Final Report, Fort Wingate (Parcels 6 and 22)* (TTNUS, 2000, pages 5-1, 5-2, and inspection forms in Appendix B of the report; copies included in Appendix D). No environmental samples were collected as part of the investigation.

A 550-gallon AST containing gasoline was reported north of Building 527. The AST had secondary containment and no leaks associated with the AST were reported.

No potential environmental concerns were reported at Building 528; however, cracks in the floor were noted.

Building 529 was reported to have containers of paint, spray paint, and epoxy being stored. The containers were noted in good condition.

No potential environmental concerns were noted at Building 550 or Building 551.

Two 10,000-gallon ASTs, marked barium solution, were reported east of Building 551. The ASTs were empty; however, neither AST had secondary containment. A water bath, leaking onto bare soil, was noted northeast of Building 551. TPL indicated the liquid was water.

4.2.6 NMED Inspections/Investigations

In April 2002, an NMED contractor collected samples of water from the outdoor sump and soil samples adjacent and downgradient from surface runoff from sump overflow. The water sample was analyzed for explosives, RCRA metals, SVOCs, and nitroglycerin. Two soil samples were collected from an area downgradient of the catch basin and analyzed for explosives, perchlorate, RCRA metals, nitroglycerin, and nitrocellulose. Results were documented in a report entitled *Analysis Report for the Ft. Wingate Explosives Inspections* (EDOT, 2002; a copy is included in Appendix D).

NMED HWB referenced photoflash cartridge disassembly and component recovery operations performed in and adjacent to Building 551, including spills of process liquids onto the curbed concrete containment pad surrounding the HTWE process, in their basis for listing Building 551 as a SWMU. One such spill was reported by TPL in a letter dated 19 June 1997. The spill event was estimated to be 6,000 gallons, and was reportedly contained "within existing containment" (believed to refer to the curbed concrete pad) and pumped back into the tank from which it was released.

NMED HWB performed surface soil sampling for perchlorate analysis around Building 528, Building 550, and Building 551 in July and September 2000. Two samples were collected near Building 528, one sample was collected near Building 550, and three samples were collected near Building 551. Results were documented in a fax from NMED dated 12 June 2002 (NMED, 2002). Perchlorate was detected in five of the six samples. As part of the same

1 investigation, NMED HWB collected ground water samples from existing
2 monitoring wells TMW02, TMW03, TMW04, TMW05, TMW06, TMW07, and
3 TMW10 in July 2000. Perchlorate was detected only in TMW05 (Figure 4-2).

4 **4.2.7 Perchlorate Investigation**

5 Because perchlorate was detected in samples collected by NMED, a perchlorate
6 characterization study was conducted for soil and ground water in several areas
7 in 2002. This investigation was documented in a letter report entitled *Draft*
8 *Perchlorate Characterization Letter Report for the Workshop Area, Fort Wingate*
9 *Depot Activity* (PMC, 2003).

10 A total of 29 surface soil samples were collected from the Building 528 Complex,
11 focusing on Building 550 and Building 551. The soil sample locations were
12 biased near building entrances, breaches in the containment curbing around the
13 concrete pad, and in areas directly downgradient of the buildings and associated
14 infrastructure that would receive surface water flow during precipitation events.

15 As shown in Figure 4-2, ground water monitoring wells are present north and
16 northwest of the Building 528 Complex. Ground water flow directions (Section
17 3.1.2) typically follow the bedrock surface, which generally dips gently to the
18 northwest.

19 Ground water samples were collected from all northern FWDA wells, including
20 TMW05, for two consecutive sampling events. During these sampling events,
21 perchlorate was detected in monitoring wells northwest of SWMU 27. Because
22 no historical FWDA operations at SWMU 27 are known to have involved
23 perchlorate and TPL conducted operations at SWMU 27 using an aqueous
24 process to separate munitions constituents including perchlorate from which
25 there were documented spills, it is assumed the source for the perchlorate in
26 ground water northwest of SWMU 27 is TPL operations conducted at SWMU 27.

27

5.0 SWMU 70 – DISASSEMBLY PLANT AND TPL QA TEST AREA

5.1 LOCATION, DESCRIPTION, AND OPERATIONAL HISTORY

The Disassembly Plant was constructed in the mid- to late 1940s and consists of an equipment storage building (Building 517), a remote control shelter (Building 518), a motor generator building (Building 519), a work mount pier (Building 520), a timber revetted barricade (Structure 521) and an earthen barricade (Structure 547). SWMU 70 is shown in Figure 5-1. Representative photographs are included in the companion RFI Work Plan for Parcel 22. Historical drawings and information are included in Appendix E.

The Disassembly Plant was used for disassembly of munitions that could not safely be disassembled in other FWDA operations. Disassembled components were then returned to other operations at FWDA for further demilitarization or storage.

Historical standard operating procedures (SOPs) (example AM-O-102) reference the use of “suitable containers” placed under munitions being disassembled to collect any explosive filler that may be dislodged during operations.

The date FWDA operations at the Disassembly Plant ceased is not known. The Disassembly Plant was not identified as a potential AOC in the 1980 Installation Assessment; and is therefore, presumed to have been inactive for some time prior to 1980. There are no environmental baseline data for SWMU 70.

TPL operations at the Disassembly Plant have included testing (by detonation) of samples of blasting gel, testing of explosive safety shielding used on process equipment, and detonations/burns conducted as part of employee training.

TPL site plans show safety arcs for overpressure and fragment distance for detonations up to 100 pounds (lb) Net Explosive Weight (NEW) with a 4-foot burial depth.

5.2 PREVIOUS INVESTIGATIONS

5.2.1 Historical Aerial Photograph Analysis

As noted in the aerial photo analysis report (ERI, 2006, Parcel 22 findings included in Appendix B), the buildings and barricades are first visible in the 1948 photo.

The analysis noted light-tone material present on the west side of SWMU 70 in the 1973 photo.

No other significant findings were noted in any of the other aerial photographs.

5.2.2 Historical Records Review

A review of FWDA historical drawings was completed for the SWMU 70. Historical drawings and other documents are provided in Appendix E.

1 Drawing A-5-88 is a site plan showing elevations and structure arrangement. As
2 noted on the drawing, a fuel tank is shown near the motor generator platform.

3 Drawing B-11-99 is a site plan showing structure arrangement. As noted on the
4 drawing, a fuel tank and “dry-type” transformer are shown near the motor
5 generator platform. Additionally, utilities are shown for SWMU 70.

6 Drawing A-12-17 is another site plan, however; an “armor plate powder collector”
7 is shown slightly south of the “work mounting pier” (Structure 520).

8 Drawing A-12-21 is another site plan that also includes the standard operating
9 procedures for the disassembly plant. Additionally, the motor generator and fuel
10 tank noted in the previous drawings are not included in this drawing. Additional
11 utilities are shown that are not included in Drawing B-1-99.

12 Drawing A-5-81 shows the safety barricade and work-mounting pier.

13 Drawing A-5-93 shows the equipment storage building plans, which also note
14 “asbestos slater’s felt” and asbestos shingles.

15 Drawing A-5-91 are the remote control building plans.

16 Drawing A-5-90 shows Building 519, the motor generator building.

17 Drawing A-5-89 is another site plan showing transformers. Although current
18 facility electrical plans show a dedicated electrical service from Building 528 to
19 the disassembly plant, the disassembly plant was in operation before Building
20 528 was built; and therefore, the disassembly plant most likely had an electrical
21 generator prior to having a dedicated electrical service. The transformers are
22 part of AOC 75 and will be discussed in the Parcel 22 Release Assessment
23 Report (TPMC, 2008).

24 According to Real Property Records reviewed, Building 518, Building 520, and
25 Building 521 were first documented in the records in October 1948. Structure
26 517 is documented as completed 15 June 1948. It is assumed that all the
27 buildings/structures associated with SWMU 70 were constructed/completed
28 around the same time, since those buildings and structures were needed to
29 operate the Disassembly Plant. These buildings were later deemed “inactive
30 status” in August 1971. As previously noted, it is assumed that all the
31 buildings/structures associated with SWMU 70 were considered inactive around
32 the same time because all are needed to operate the Disassembly Plant.

33 Additionally, the property records show Building 519 as the motor generator
34 platform and motor generator building. The property record is dated October
35 1948.

36 The property records also show overhead electric service being connected to
37 Building 519 in 1958, and later converted to underground service in 1961. It is
38 assumed the use of the motor generator previously referenced was discontinued
39 around that same timeframe, since it would have no long been needed to supply
40 power to SWMU 70.

1 An SOP dated 14 June 1954 details demilitarization of 250-pound bombs at
2 SWMU 70. As shown in this SOP, bombs would have been transported from a
3 storage area to Building 521 and staged on dunnage. Individual bombs would be
4 loaded onto a wooden skid, and both the bomb and the skid placed onto the
5 roller conveyor. The bomb would be placed in a holding vise and engaged to the
6 base plate-removal machine at Building 520. At this point, the base plate would
7 be removed by remote control from Building 518. A container would be placed
8 under the tail section of the bomb to collect dislodged explosive filler. Once the
9 base plate was removed, the bomb would be rotated. The nose plug removed by
10 remote control similar to the base plate. Both the base plate and nose plug
11 would be loosely re-installed so they would not fall out during transport, and the
12 bomb transported to Building 503 or Building 515. If the booster casing (with
13 tetryl pellet) became disassembled from the base plate and remained in the filler,
14 an attempt to remove it would be made using vacuum or suction cup. If the
15 removal attempt failed, the opening would be sealed and the bomb transported to
16 the demolition area to be destroyed.

17 According to Caretaker log books, TPL operations at their “QA Test Area” began
18 circa 1996. “Testing” activities prior to 2002 are not well documented, but
19 historical documents show that the area has been used for activities including
20 ballistic testing of smokeless powder products, small-scale explosive testing
21 supporting various research programs, QA testing of blasting gel products,
22 testing (explosive and burning) of safety shielding proposed/designed for use in
23 TPL demilitarization operations, detonation/treatment of unsafe items (per 16
24 June 2000 letter from TPL to Army contracting and NMED basis document),
25 testing of military munitions (e.g., photo flash cartridges) to determine explosive
26 force and evaluate resale opportunities (per Defense Contract Management
27 Agency [DCMA] audit dated March 29, 2001), thermal treatment of dismantled
28 process equipment (e.g., use of file destroyers to decontaminate photoflash
29 process equipment, per DCMA audit dated March 29, 2001), thermal treatment of
30 fuze components and other metal parts (per TPL letter dated September 18,
31 2002), cleaning and separating (thermal treatment) of metal fuze components
32 prior to recycling (per TPL Test Range use report dated October 2002), safety
33 training for TPL personnel, and burning of recovered propellant, fuzes, and other
34 materials, reportedly after normal working hours (per NMED interview dated
35 January 2002).

36 **5.2.3 Phase I Environmental Site Assessment**

37 From 1998 to 2000, a DOI BLM environmental contractor documented conditions
38 within Parcel 22 as part of a Phase I ESA of Parcels 6 and 22; this effort was
39 documented in a report entitled *Phase I Environmental Site Assessment, Final*
40 *Report, Fort Wingate (Parcels 6 and 22)* (TTNUS, 2000, pages 5-1, 5-2, and
41 inspection forms in Appendix B of the report; copies included in Appendix E). No
42 environmental samples were collected as part of the investigation.

43 **5.2.4 NMED Inspections**

44 In April 2002 (as part of a RCRA audit), an NMED contractor collected one soil
45 sample from the “test range” to evaluate the presence of residual energetic
46 materials (EODT, 2002). This sample was analyzed in the field using

1 immunoassay test kits for Trinitrotoluene (TNT) and Cyclotrimethylenetrinitramine
2 (RDX). Results were documented in a report entitled *Analysis Report for the Ft.*
3 *Wingate Explosives Inspections* (EDOT, 2002; a copy is included in Appendix E).
4 RDX was detected in the soil sample. The report did not provide a sample
5 location map.

6

6.0 AOC 30 – IGLOO BLOCK D

6.1 LOCATION, DESCRIPTION, AND OPERATIONAL HISTORY

AOC 30 is Igloo Block D. Igloo Block D consists of 103 earth-covered magazines (igloos) and 17 open storage sites (earthen revetments, also known as “Y-Sites”) constructed in 1941 and used for storage of munitions. The Parcel 22 portion of AOC 30 contains 53 igloos and 13 open storage sites; the remaining 50 igloos and four open storage sites are located in Parcel 19. All buildings and structures within AOC 30 will be discussed in this section, regardless of the parcel they may occupy. The location of AOC 30 is shown in Figure 6-1. Representative photographs are included in the companion RFI Work Plan for Parcel 22. Historical drawings and information are included in Appendix F.

Each igloo is a reinforced concrete arch, approximately 20 feet wide by 42 feet long by 12 feet high, with concrete ends and a concrete floor (see FWDA Drawing Nos. A-15-62, A-15-63, and A-15-8, included in Appendix F), has an earth covering over the sides and top. Some igloos have a ground level floor and entrance door; others have an elevated floor and entrance with an attached loading dock. As shown in the design drawings, each igloo was waterproofed to prevent precipitation from entering the igloo, and each igloo has drain gutters at the base of the interior walls which were designed to collect any moisture which might accumulate on the walls, and drain to the front (exposed) side of the igloo. Each igloo is ventilated via a roof vent, and has a lightning protection system.

The open storage Y-sites range in size from approximately 25 feet wide by 50 feet long to approximately 50 feet wide by 75 feet long. Y-sites consist of a flat area surrounded by earthen berms ranging in height from 4 to 6 feet in height with a single open entrance on the north side.

As shown in Figure 6-1, two small concrete safety shelters (Buildings 404 and 405) are located within AOC 30 (see FWDA Drawing Nos. C-9-15, A-4-13, and A-7-45, included in Appendix F). These structures consisted of a single small reinforced concrete room, approximately 10 feet wide and 25 feet long, with two small entrances. These safety shelters were intended to provide safe refuge for personnel in the event of an emergency during operations in Igloo Block D.

There are no electrical, sanitary sewer, natural gas or water utilities serving Igloo Block D. Surface runoff is conveyed via open ditches and culverts generally to the north-northwest, with a portion of Igloo Block D draining to the arroyo located to the west and the majority of Igloo Block D draining toward the north-northeast (FWDA Drawing A-2-15, included in Appendix F).

FWDA utilized Igloo Block D from 1942 through base closure in 1993. In order to ensure safety and maintain the usability of stored munitions, storage operations in FWDA igloo blocks/magazine areas were conducted in accordance with established procedures and standards as outlined in documents such as Technical Manual (TM) 9-1900 (Ammunition, General) and TM 9-1300-200 (Ammunition – General). Relevant portions of these TMs are included in Appendix A. As shown in the TMs, boxes, cases, and other containers of munitions stored in a magazine were:

- 1 • to be clean and dry before being stored;
- 2 • not to be opened in a magazine;
- 3 • not to be stored after having been opened unless they had been securely re-
- 4 closed; and
- 5 • not to be repaired in a magazine.

6 The TMs also detail magazine inspection requirements, including:

- 7 • Magazines should be inspected once a month, or more frequently as
- 8 required, to see that all conditions are normal, that neither humidity nor
- 9 temperature has been too high within the magazine, and that containers are
- 10 in satisfactory condition;
- 11 • The magazines should be in good repair, dry, and well ventilated;
- 12 • Interiors of magazines should be clean and neat with stores arranged in
- 13 orderly fashion;
- 14 • Outer containers should be securely closed;
- 15 • Loose munitions, damaged containers, empty containers, paint, oil, gasoline,
- 16 waste, rags, tools and other prohibited articles should not be present in
- 17 magazines; and
- 18 • Exudate (leakage) should be removed from magazines promptly.

19 The TMs specifically prohibit other operations, such as munitions
20 maintenance/renovation, within magazine areas. As noted above, physically
21 damaged munitions or munitions exuding (leaking) explosive fillers would be
22 removed from storage, and materials used to clean up any exudate/leakage
23 would likewise not remain in a storage area; these items would have been
24 transported to the OB/OD Area for further treatment. Simply stated,
25 accumulation or releases of hazardous materials inside or around an igloo was
26 not permitted because the resulting safety hazard would endanger other
27 munitions in storage, and by extension the associated facilities and personnel.

28 Outside storage in the Y-sites generally followed the same requirements. As
29 noted in the TMs, outside storage was only to be used temporarily and only as an
30 emergency expedient (e.g., before, during, or following a war, when munitions
31 were received faster than they could be safely placed in storage within an igloo
32 or when igloos were filled to capacity). When outdoor storage was used, the
33 TMs state that bombs and separate-loading shells were to be given preference
34 over packaged munitions, and that frequent inspections for signs of deterioration
35 or loose components were to be performed.

36 Following FWDA closure in 1993, the 53 igloos in Parcel 22 were used by an
37 FWDA tenant, TPL, Inc., for storage of munitions and munitions components.
38 TPL's original facilities use contract was issued in 1994, and TPL began to
39 occupy FWDA facilities in late 1994. TPL's storage operations in the igloos

1 differed from that of the Army; TPL stored propellant removed from munitions in
2 TPL demilitarization operations in SWMU 27. Rather than being present inside
3 munitions and their shipping containers, the removed propellant was stored in
4 bags and other containers, and was stored awaiting reuse or recycling.
5 Inspection and housekeeping practices utilized by TPL were not documented.
6 The 53 igloos in Igloo Block D used by TPL were emptied of stored propellant
7 and returned to Army control in 2005.

8 **6.2 PREVIOUS INVESTIGATIONS**

9 **6.2.1 Historical Aerial Photograph Analysis**

10 As noted in the aerial photo analysis report (ERI, 2006; Parcel 22 findings
11 included in Appendix B), there were no significant findings for AOC 30 on any of
12 the photos reviewed, spanning the years 1935 through 1997.

13 **6.2.2 Historical Records Review**

14 No detailed records of munitions stored over the period of Army use (1942 to
15 1993) were found. Although records (in the form of magazine data cards
16 detailing type and lot information for stored munitions, as well as dates of storage
17 and inspections) were maintained during FWDA operations as required by the
18 TMs, none of these records were archived following FWDA closure. One historic
19 document (USATHAMA, 1980; Page 26) reported storage of bulk TNT and M15
20 mines in Igloo Block D. A more general list of types of munitions that could have
21 been stored is included in Appendix A.

22 Several historical drawings were reviewed that provided general details about
23 AOC 30. Historical drawings are provided in Appendix F. FWDA Drawing A-14-
24 3, dated September 1945, shows AOC 30 and provides details of the number of
25 igloos (103 total) and open storage sites (17 total). FWDA Drawings A-15-62, A-
26 15-63, and A-15-8 provide general construction details for the earth-covered
27 igloos. Additionally, FWDA Drawings A-15-62 and A-15-8 show the internal
28 gutter and outside drains of the igloos. FWDA Drawing A-15-1 provides general
29 information for the open storage Y-sites. Review of records associated with TPL
30 confirmed that TPL used some or all of the 53 igloos in the Parcel 22 portion of
31 Igloo Block D to store munitions and munitions components under their facilities
32 use contract from sometime after 1994 until 2005.

33 TPL performed an open burn of unstable propellant on the road in front of Igloo
34 D-1147 (reported as D-1144 in Caretaker log books) in December 2001. Both
35 reported locations are shown in Figure 4-1. The propellant became unstable
36 after TPL personnel applied a chlorine solution to disinfect rodent droppings
37 present in the propellant bags. As described in a 19 December 2001 letter from
38 TPL (included in Appendix F), the amount burned was reported as approximately
39 300 lbs, poured in a pile 6 inches wide by 1 inch high by 100 feet long down the
40 center of the asphalt paved road. In a November 2004 response to an NMED
41 HWB Request for Information (dated 29 July 2004, included in Appendix F), TPL
42 listed the amount burned as 5,000 lbs and the burn date in 2002. It is unclear if
43 more than one burning event took place and exactly how much was burned.
44 There was no documented post-burn cleanup or sampling.

6.2.3 Environmental Investigation

Potential contamination within FWDA igloo blocks was evaluated as part of a facility-wide EI following FWDA closure. Igloos and open storage sites within Igloo Block D where samples were collected are highlighted in Figure 6-1. Interior surface wipe samples and surface soil samples were collected from Igloos D-1153, D-1163, D-1179 (all located in Parcel 22) and Igloos D-1188, D-1216, D-1220, D-1221, and D-1229 (all located in Parcel 19). Surface soil samples were collected from open storage sites Y-D1146 and Y-D1158 (both located in Parcel 22). Typical sample location schematics and sample results are presented in a document entitled *Final Remedial Investigation/Feasibility Study Report & RCRA Corrective Action Program Document* (ERM PMC, 1997, Section 7.2; ; sampling methodologies were summarized in Sections 3.1.2.4 and 3.1.2.5, pages 3-6 through 3-8).

A total of 24 interior surface wipe samples (three per igloo) were collected and analyzed for explosives. Three of the eight igloos sampled had detectable concentrations of explosives on interior surfaces; however; no Permit cleanup level exists for interior surfaces of a building.

A total of 30 surface soil samples (four per igloo and three per Y-site) were collected and analyzed for explosives and total phosphorus. No explosives were detected in any of the surface soil samples. As shown in Table 1, phosphorus was detected in all 30 samples.

6.2.4 Igloo Pilot Wash Program

In 1997, USACE conducted an igloo pilot wash program to evaluate the effectiveness and estimate costs of washing interior surfaces of igloos to remove any residual constituents from FWDA storage operations. This effort was reported in a document entitled *Fort Wingate Igloo Pilot Wash Final Report* (SAIC, 1997). As noted in the report (SAIC, 1997, pages 3-2 and 3-5) explosives and metals (primarily lead) were detected in the collected wash water. No soil samples for lead analysis were collected to confirm that lead impacts were limited to the igloo interiors, and the wash water was discharged to the ground surface outside the igloo being washed, with approval from the NMED Ground Water Quality Bureau (SAIC, 1997, page 3-5).

6.2.5 Health Consultation

The detection of explosives and lead on interior igloo surfaces led the Army (in consultation with other stakeholders) to request a health consultation from the U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR). This health consultation was documented in a report entitled *Health Consultation, Public Health Implications for Reuse of Munitions Storage Magazines (Igloos), Fort Wingate Depot Activity* (ATSDR, 2000). A copy of this document is included in Appendix F. The presence of lead on the igloo interior surfaces was attributed to a number of possible sources, including lead bullets, lead foil on munitions, and/or fork lift exhaust. ATSDR recommended additional sampling, using vacuum sampling

1 methodology (rather than wipes or rinses) to further evaluate risks associated
2 with reuse of the igloos.

3 **6.2.6 Phase I Environmental Site Assessment**

4 From 1998 to 2000, a DOI BLM environmental contractor documented conditions
5 within Parcel 22 as part of a Phase I ESA of Parcels 6 and 22; this effort was
6 documented in a report entitled *Phase I Environmental Site Assessment, Final*
7 *Report, Fort Wingate (Parcels 6 and 22)* (TTNUS, 2000). The contractor
8 performed a visual inspection of the interior and exterior of 11 igloos in Igloo
9 Block D; six of the igloos contained propellant stored by TPL, while the other five
10 were empty (TTNUS, 2000, pages 4-4 and 4-5). The Phase I ESA did not note
11 any concerns with the exterior of the igloos.

12 **6.2.7 Explosives Safety Inspections**

13 In 2000, TEAD personnel conducted final inspections of all FWDA igloos not
14 included in TPL's facilities use contract. The 50 igloos in Igloo Block D that are
15 located in Parcel 19 were inspected in October and December 2000. Other than
16 floor cracks in three igloos (D-1190, D-1211, and D-1229) which did not have any
17 visible evidence of contamination (e.g., staining), there were no significant
18 findings during the inspections. Following completion of the interior inspection,
19 TEAD personnel locked each igloo access door with a cable lock.

20 The 53 igloos in the Parcel 22 portion of Igloo Block D were returned to Army
21 control in 2005. In June 2005, TEAD personnel conducted final inspections of
22 these igloos. Other than floor cracks in approximately 14 igloos which did not
23 have any visible evidence of contamination (e.g., staining), there were no
24 significant findings during the inspections. Following completion of the interior
25 inspection, TEAD personnel locked each igloo access door with a cable lock.

26

7.0 AOC 69 – BUILDINGS 301, 302, AND 312 AND BUILDING 316

7.1 LOCATION, DESCRIPTION, AND OPERATIONAL HISTORY

AOC 69 includes Buildings 301, 302, and 312 (Standard Magazines), and Building 316 (Field Lunch Room) north of and adjacent to Igloo Block D (AOC 30). AOC 69 is shown in Figure 7-1. Representative photographs are included in the companion Release Assessment Report for Parcel 22. Historical drawings and information are included in Appendix G.

Buildings 301, 302, and 312 are large single-story warehouse style buildings, approximately 218 feet long by 52 feet wide, constructed in 1941. The buildings have reinforced concrete floors, clay-tile block walls and, as shown in FWDA Drawing No. A-15-53 (included in Appendix G), corrugated asbestos roofing. The buildings are adjacent to a railroad siding and have loading docks along the south side of the structures. These buildings are standard above ground magazines used for storage of munitions. Each magazine is ventilated and has a lightning protection system. There are no electrical, sanitary sewer, natural gas or water utilities serving the magazines.

Building 316 is a single-story building, approximately 64 feet long by 40 feet wide, constructed in 1944. The building has a concrete floor, stone and mortar walls, and a wood-framed, asphaltic-shingle roof. This building was initially a field lunch room, where personnel from the magazine area could gather and eat. Later uses may have included storage of inert materials. There are no electrical, sanitary sewer, natural gas or water utilities serving the Building 316. Access to Building 316 is via three single doors, one on the center of the north side of the building, and two on the ends of the south side.

The Army utilized the Standard Magazines (Buildings 301, 302, and 312) from 1942 through base closure in 1993. The same standards and procedures for munitions storage described in detail in detail for AOC 30, Igloo Block D (Section 6.1) were employed during Army storage operations at the Standard Magazines.

Buildings 301, 302, and 312 were used by an FWDA tenant, TPL, Inc., for storage. TPL's original facilities use contract was issued in 1994, and TPL began to occupy FWDA facilities in late 1994, and TPL continued operations at FWDA until late 2006. Materials stored by TPL in the Standard Magazines were not documented. TPL did not use Building 316.

7.2 PREVIOUS INVESTIGATIONS

7.2.1 Historical Aerial Photograph Analysis

As noted in the aerial photo analysis report (ERI, 2006; Parcel 22 findings included in Appendix B), findings for AOC 69 included an area of disturbed ground in the 1935 aerial photo, south of where the magazines were constructed in 1941. In the 1952 aerial photo, the magazines are first noted. Dark-toned material or staining is noted south of the magazines in the 1973, 1978, 1985, 1991, 1993, and 1997 aerial photos. No significant findings were noted in the other aerial photos reviewed.

7.2.2 Historical Records Review

None of the historical documents reviewed suggested that releases of hazardous wastes or hazardous constituents occurred from AOC 69.

No detailed records of munitions stored over the period of Army use (1942 to 1993) were found. Although records (in the form of magazine data cards detailing type and lot information for stored munitions, as well as dates of storage and inspections) were maintained during FWDA operations as required by the TMs, none of these records were archived following FWDA closure.. A review of TM 9-1904 (War Department, 1944, page 780; a copy is included in Appendix A) indicated standard above ground magazines were used for storage of less explosive munitions, such as fixed cartridge-type and small arms munitions in shipping containers. There were no significant findings for AOC 69 in any of the historical records reviewed.

Several historical drawings were reviewed that provided general details about AOC 69. Historical drawings are provided in Appendix G. FWDA Drawing B-11-16, dated October 1970, provides locations of the standard magazines. FWDA Drawings B-11-89, A-15-49, A-15-50, A-15-53, and A-15-55 provide general construction details for the standard magazines. FWDA Drawing A-5-199 shows details for magazine area lunch rooms, including Building 316. FWDA Drawing C-6-30 shows details for addition of electric lighting, water and sanitary sewer service, and natural gas for heating to Building 316.

No information regarding TPL operations in Buildings 301, 302, and 312 was found for review.

7.2.3 Phase I Environmental Site Assessment

From 1998 to 2000, a DOI BLM environmental contractor documented conditions within Parcel 22 as part of a Phase I ESA of Parcels 6 and 22; this effort was documented in a report entitled *Phase I Environmental Site Assessment, Final Report, Fort Wingate (Parcels 6 and 22)* (TTNUS, 2000, pages 5-1, 5-2, and inspection forms in Appendix B of the report; copies included in Appendix G). The contractor performed a visual inspection of the interior and exterior of Buildings 301, 302, 312, and 316. Other than the presence of ACM and potential lead-based paint (LBP), the Phase I ESA did not note any concerns with the buildings.

1 **8.0 AOC 71 – FORMER RECTANGULAR STRUCTURE**

2 **8.1 LOCATION, DESCRIPTION, AND OPERATIONAL HISTORY**

3 AOC 71 is listed in the Permit as a “Former rectangular structure near TMW-5
4 and north of Building 528.” Because the Permit description and the map location
5 for AOC 71 differed and two possible locations existed, AOC 71 was divided into
6 AOC 71A and AOC 71B. For purposes of the release assessment, the location
7 near TMW05, north of Building 528 was designated 71A. The location south of
8 Arterial Road No. 6 and west of Normal Maintenance Avenue was designated
9 71B. AOC 71 is shown in Figure 8-1. A single historical drawing is included in
10 Appendix H.

11 Because part of AOC 71 is located within Parcel 21, both AOC 71A and AOC
12 71B were evaluated as part of the Parcel 21 release assessment, as reported in
13 a document entitled *Release Assessment Report, Parcel 21, Fort Wingate Depot*
14 *Activity* (TPMC, 2008, Section 10.0).

15

9.0 AOC 75 – ELECTRICAL TRANSFORMER LOCATIONS

9.1 LOCATION, DESCRIPTION, AND OPERATIONAL HISTORY

AOC 75 is listed in the Permit as “Electrical Transformers (at least 65 former or existing transformers)”. FWDA records (included in Appendix I) show 65 transformers in 29 locations throughout FWDA. As shown in Figure 9-1, a number of these locations are within Parcel 22. Representative photographs are included in the companion Release Assessment Report for Parcel 22. Historical drawings and information are included in Appendix I.

9.2 PREVIOUS INVESTIGATIONS

9.2.1 Historical Records Review

According to FWDA records (included in Appendix I), three pole-mounted electrical transformers were located at Building 536 (SWMU 12, Figure 9-1). Two of the transformers were classified as PCB-contaminated transformers, with PCB concentrations of 180 parts per million (ppm) and 270 ppm, respectively. The third transformer was classified as a PCB transformer, with a PCB concentration of 770 ppm. These transformers were removed and manifested for disposal in January 1993.

According to FWDA records (included in Appendix I), three pole-mounted electrical transformers were located at Building 527 (Figure 9-1). These transformers were considered non-PCB (PCB concentrations less than 10 ppm). These transformers were relocated to Vault A near Building 15 in 1992.

According to FWDA records (included in Appendix I), three pole-mounted electrical transformers were located at Building 528 (Figure 9-1). These transformers were considered non-PCB (PCB concentrations less than 10 ppm). These transformers were removed and manifested for disposal in January 1993.

According to FWDA records (included in Appendix I), two electrical transformers were located inside Building 519 (Figure 9-1). These transformers were considered PCB transformers, with PCB concentrations of 770,000 ppm and 990,000 ppm. Based on professional knowledge of PCB concentrations in electrical transformers, it is believed the PCB results from these transformers are either reported incorrectly (i.e. laboratory error) or in the wrong units (i.e. parts per billion [ppb]). These transformers were reported as leaking in 1990 and as being stored in Building 15 prior to disposal in 1992. These transformers were manifested for disposal in January 1993.

9.2.2 Building 536 Soil Removal

Soil was removed at Building 536 as part of a soil remediation effort in 1996 (CCC Group, 1996). Approximately 7 cubic yards (CY) of soil were removed near the pole-mounted transformers associated with Building 536. The soil was manifested and transported to the US Ecology Landfill near Beatty, Nevada for disposal. Three post-removal samples collected from the excavation exceeded

1 the conservative 1 mg/kg cleanup standard. Copies of documentation are
2 included in Appendix I.

3 Additional PCB-impacted soil exceeding 1 mg/kg was removed in 1998 (CCC
4 Group, 1998). Soil was removed from depths between 2 feet and 4 feet below
5 ground surface (bgs) under the former pole-mounted transformers at Building
6 536. The soil was manifested and transported to the U.S. Ecology Landfill near
7 Beatty, Nevada for disposal. Eight post-removal samples collected from the
8 excavation were below the 1 mg/kg cleanup standard. The excavation was
9 backfilled with clean soil obtained off-site. Copies of documentation are included
10 in Appendix I.
11

10.0 AOC 88 – FORMER BUILDINGS OR STRUCTURES AND DISPOSAL AREAS SOUTHWEST, SOUTH, AND SOUTHEAST OF BUILDING 528

10.1 LOCATION, DESCRIPTION, AND OPERATIONAL HISTORY

AOC 88 is listed in the Permit as “Former Buildings or Structures and Disposal Areas Southwest, South, and Southeast of Building 528”. The “former buildings or structures” portion of AOC 88 consists of two former open storage areas (also known as “X-sites”). The “disposal areas” portion of AOC 88 refers to an area south of Building 528 where debris including ACM were disposed on the ground surface.

For simplicity, the former X-sites will be called AOC 88A (the eastern location) and AOC 88B (the western location), and the ACM debris area will be called AOC 88C. AOC 88 locations are shown in Figure 10-1. Representative photographs are included in the companion Release Assessment Report for Parcel 22. Historical drawings and information are included in Appendix J.

As described below, the X-site at AOC 88A appears to have been used periodically between 1945 and the late 1960s/early 1970s, while the X-site at AOC 88B appears to have been used periodically between 1945 and the late 1950s/early 1960s. The same standards and procedures for munitions storage described in detail in detail for AOC 30, Igloo Block D (Section 6.1) were employed during Army storage operations at the X-sites.

It is not known when the ACM debris was placed at AOC 88C. As noted below, the ACM debris was removed in 2001.

10.2 PREVIOUS INVESTIGATIONS

10.2.1 Historical Aerial Photograph Analysis

As noted in the aerial photo analysis report (ERI, 2006; Parcel 22 findings are included in Appendix B), a low building or building foundation was present at AOC 88A in the 1948 photo. The 1952 photo showed a graded area with probable disposal area at AOC 88A. In the 1966 photo, an access road leads to an area of light-toned material and disturbed ground at AOC 88A. In analysis of the 1973, 1978, 1985, and 1991 photos found that scarred and disturbed areas with probable debris present at AOC 88A. There were no significant findings for the remaining photos analyzed and no coverage in the 1991 photo.

10.2.2 Historical Records Review

A historical map from 1945 (FWDA Drawing No. A-7-70, included in Appendix J) shows the AOC 88 locations as temporary storage areas T-325 (AOC 88A) and T-326 (AOC 88B).

A historical map from 1955 (FWDA Drawing No. A-3-4, included in Appendix J) shows AOC 88B as T-32 (X-15) and is noted as an X-Site with a 3,000 ton capacity. No feature is present in the AOC 88A location on historical map A-3-4.

1 Historical maps from 1963 (FWDA Drawing No. C-9-13, included in Appendix J)
2 and 1966 (FWDA Drawing Nos. C-10-4 and A-14-4, included in Appendix J)
3 show the AOC 88A location (T-325) as temporary open storage area Z-551. No
4 AOC 88B location is present on either historical map.

5 A historical map from 1966 (FWDA Drawing No. A-14-4, included in Appendix J),
6 appears to have been used by FWDA personnel to track status of each open
7 storage site shown, with push pins used to identify a given site's status. The
8 handwritten legend included the classification "leakers awaiting disposition", and
9 it is possible that open storage site Z-551 (AOC 88A) was one of the sites used
10 to store "leakers." The AOC 88B location is not shown on the historical map.

11 A review of the *Installation Assessment of Fort Wingate Army Depot Activity*
12 (USATHAMA, 1980, Page 27, Section d) found a statement regarding "large
13 quantities of Napalm bombs stored at FWDA during the SEA conflict. Any rejects
14 or leakers among these fire bombs were destroyed by burning in the demolition
15 area." SEA was an abbreviation of Southeast Asia, and the "SEA conflict" was
16 also known as the Vietnam War or Vietnam Conflict. The time period of the
17 Vietnam War corresponds to the approximate date (1966) of the map described
18 above.

19 Based on this information, it is possible that damaged munitions containing
20 napalm were stored at AOC 88A. Information on Vietnam-era napalm weapons
21 is included in Appendix J. There is no record of the exact types of munitions
22 containing napalm stored at FWDA. However, only two types of the eight
23 weapons were pre-filled at the factory, with Napalm-B filler. Napalm-B was a
24 mixture of polystyrene thickener, benzene, and gasoline. The remaining six
25 types of weapons were shipped empty and filled in the field.

26 ACM debris were removed from AOC 88C in 2001, as documented in a report
27 entitled *Report of Asbestos Abatement and Asbestos Inspection at Selected*
28 *Buildings, Fort Wingate Depot Activity* (USACE, 2002). Asbestos was not
29 detected in five confirmatory soil samples following removal.

30

1 **11.0 *PARCEL 22 ASBESTOS EVALUATION***

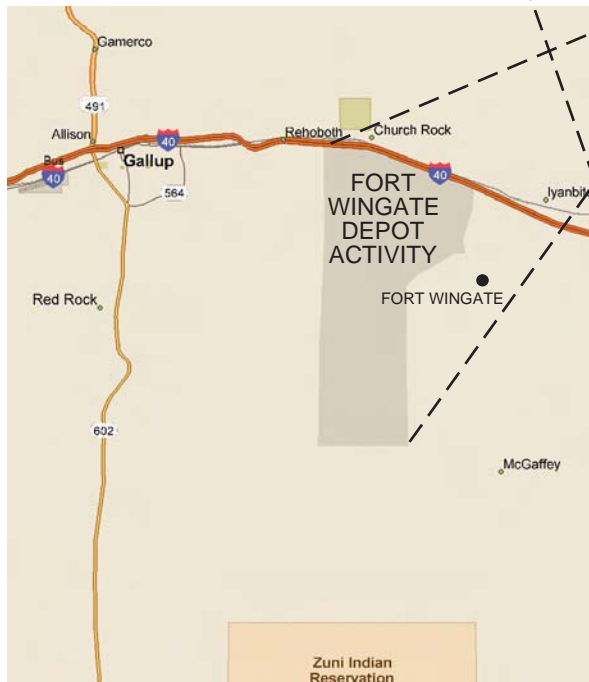
2 An evaluation of ACM associated with Parcel 22 buildings was completed by
3 USACE. A copy of the report is included in Appendix K.

12.0 REFERENCES

- ATSDR, 2000. Health Consultation, Public Health Implications for Reuse of Munitions Storage Magazines (Igloos), Fort Wingate Depot Activity. U.S. Department of Health and Human Services, Public Health Services, Agency for Toxic Substances and Disease Registry, September 29, 2000.
- DOI, 2005. Reuse Plan for Fort Wingate Depot Activity. U.S. Department of the Interior, August 31, 2005.
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- ERM PMC, 1997. Final Remedial Investigation/Feasibility Study Report & RCRA Corrective Action Program Document, Fort Wingate Depot Activity. ERM Program Management Company, 15 November 1997. FWDA Information Repository Document Number FW 97-12.
- NMED, 2005. Resource Conservation and Recovery Act permit, EPA ID No. NM 6213820974. New Mexico Environment Department Hazardous Waste Bureau, December 1, 2005.
- SAIC, 1997. Fort Wingate Igloo Pilot Wash Final Report.
- TPMC, 2008. Release Assessment Report, Parcel 21, Fort Wingate Depot Activity. TerranearPMC, 7 February 2008.
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- TTNUS, 2000. Phase I Environmental Site Assessment, Final Report, Fort Wingate (Parcels 6 and 22).
- U.S. Army, 1961. Fort Wingate Ordnance Depot, Facilities Data Report. U.S. Army, May 1961. FWDA Information Repository Document Number FW 61-1.
- USACE, 1995. Archive Search Report, Fort Wingate.
- USACE, 2002. Report of Asbestos Abatement and Asbestos Inspection at Selected Buildings, Fort Wingate Depot Activity.
- USACE, 2007. Summary of Interviews, Fort Wingate Depot Activity.
- USATHAMA, 1980. Installation Assessment of Fort Wingate Army Depot Activity, Report No. 136. U.S. Army Toxic and Hazardous Materials Agency, January 1980. FWDA Information Repository Document Number FW 80-1.
- USEPA, 2006. Region 6 Human Health Medium Specific Screening Levels. U.S. Environmental Protection Agency, Region 6, 2006.

FIGURES

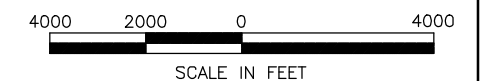
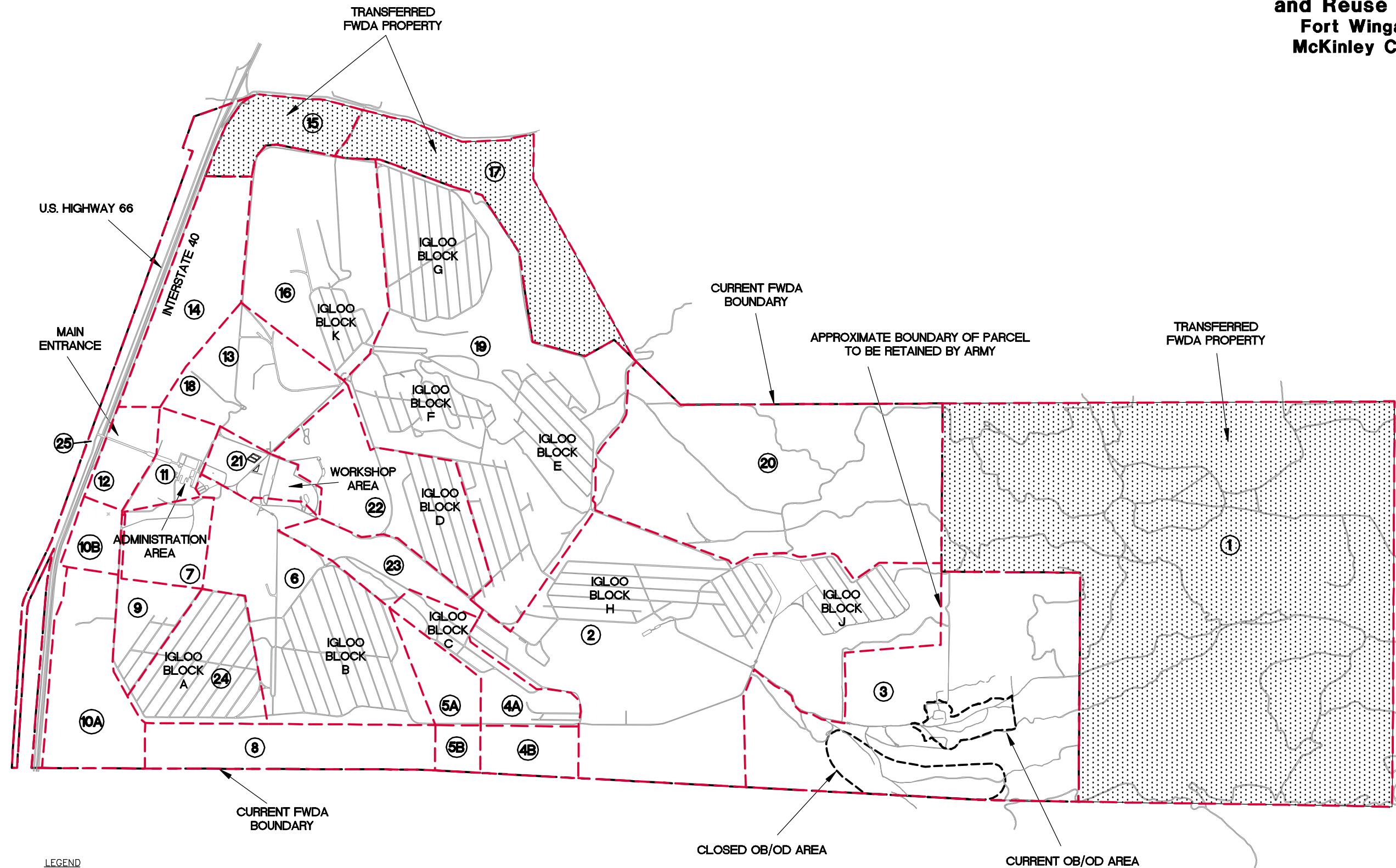
Figure 2-1
Installation Location
Fort Wingate Depot Activity
McKinley County, New Mexico



NOT TO SCALE

SOURCE: MICROSOFT STREETS & TRIPS, 2006.

Figure 2-2
Historical Land Use
and Reuse Parcel Boundaries
Fort Wingate Depot Activity
McKinley County, New Mexico



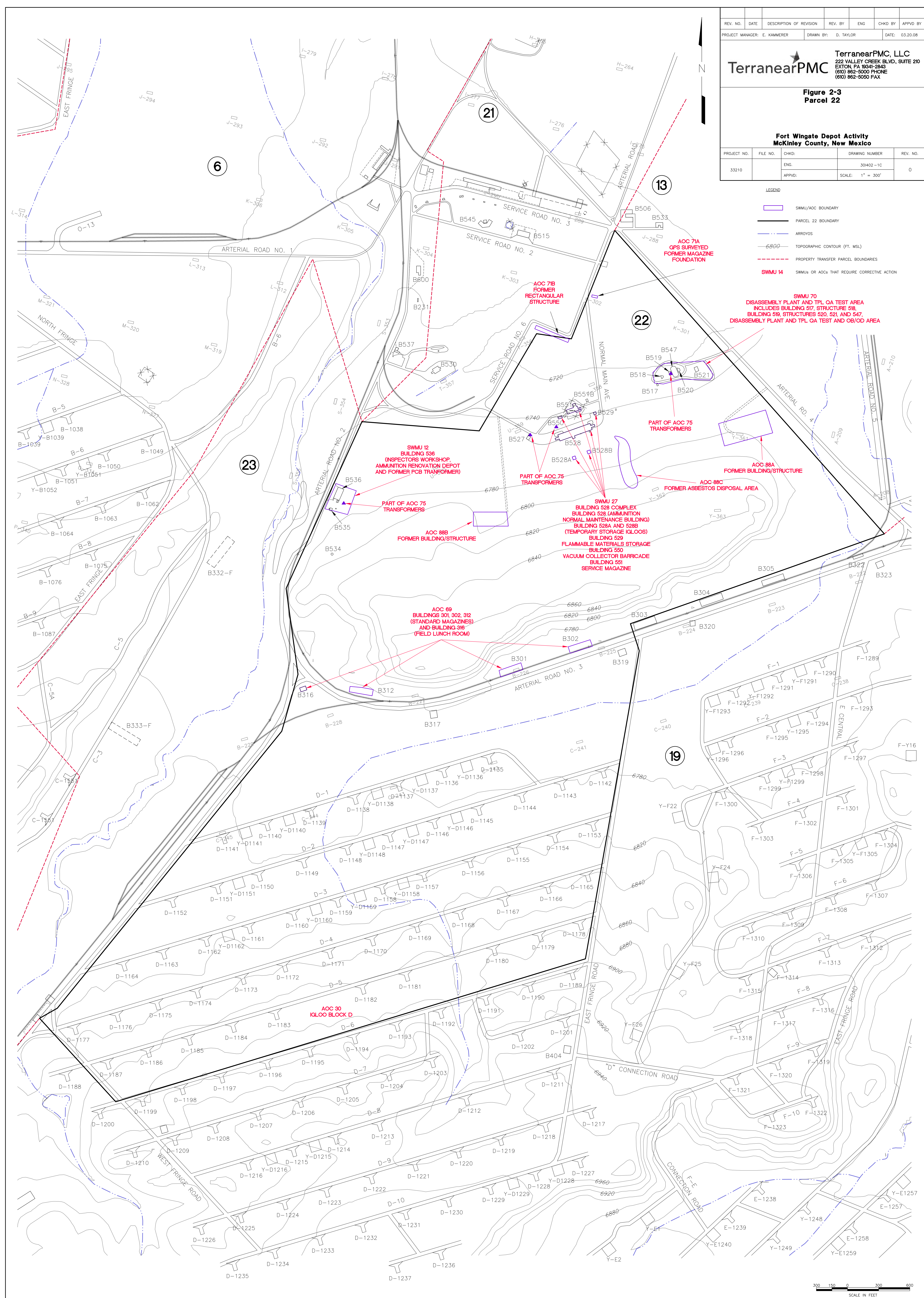
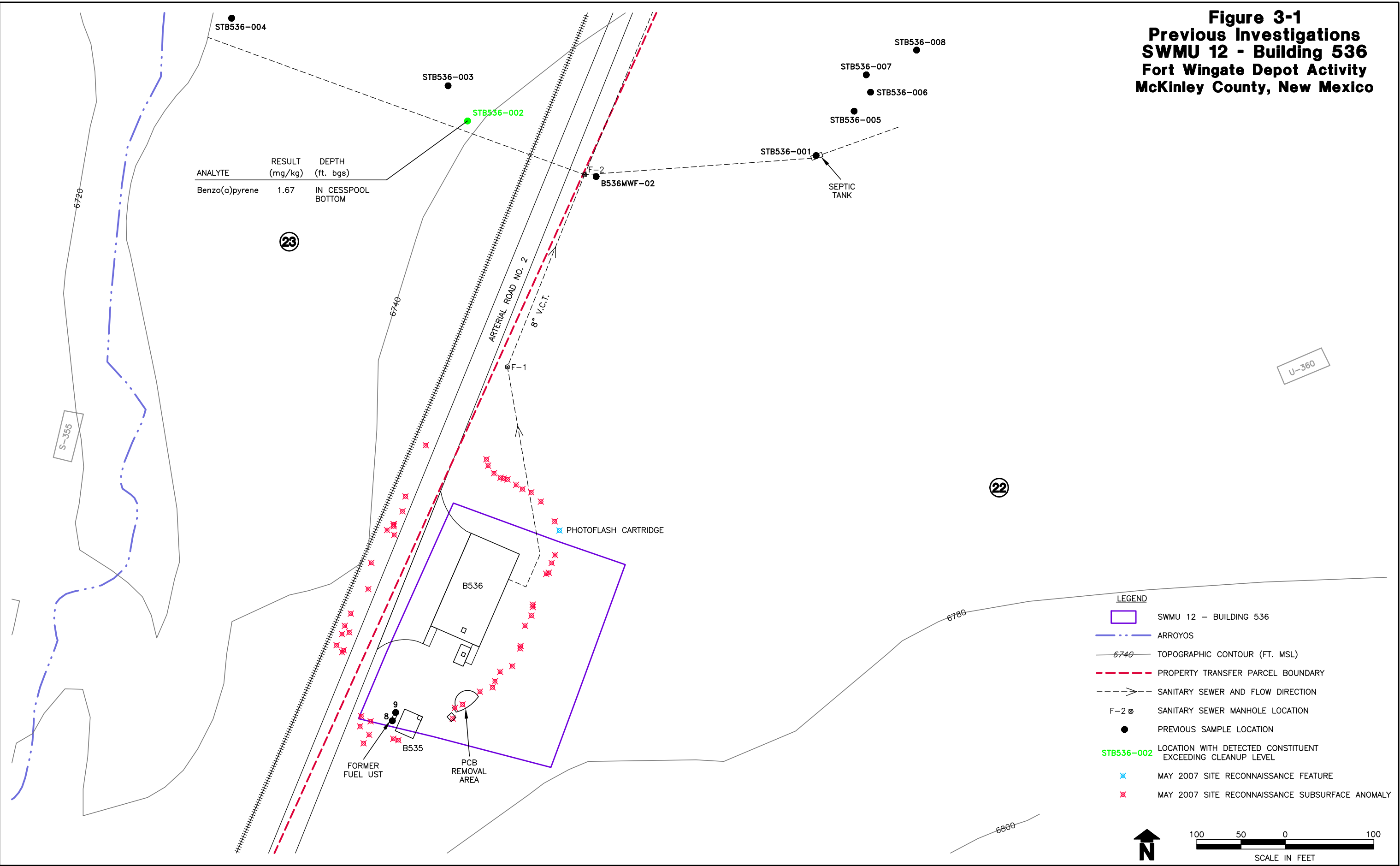
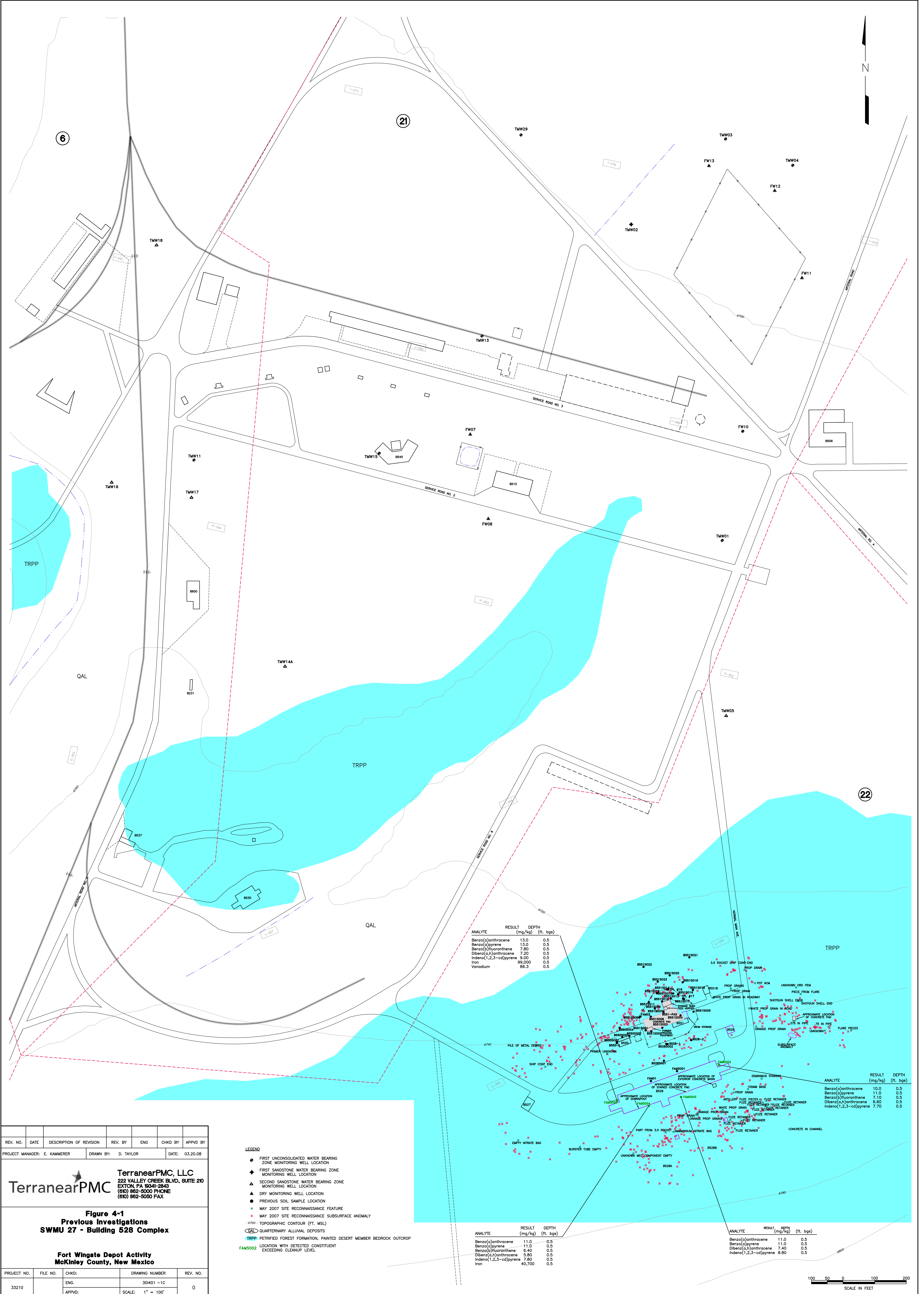
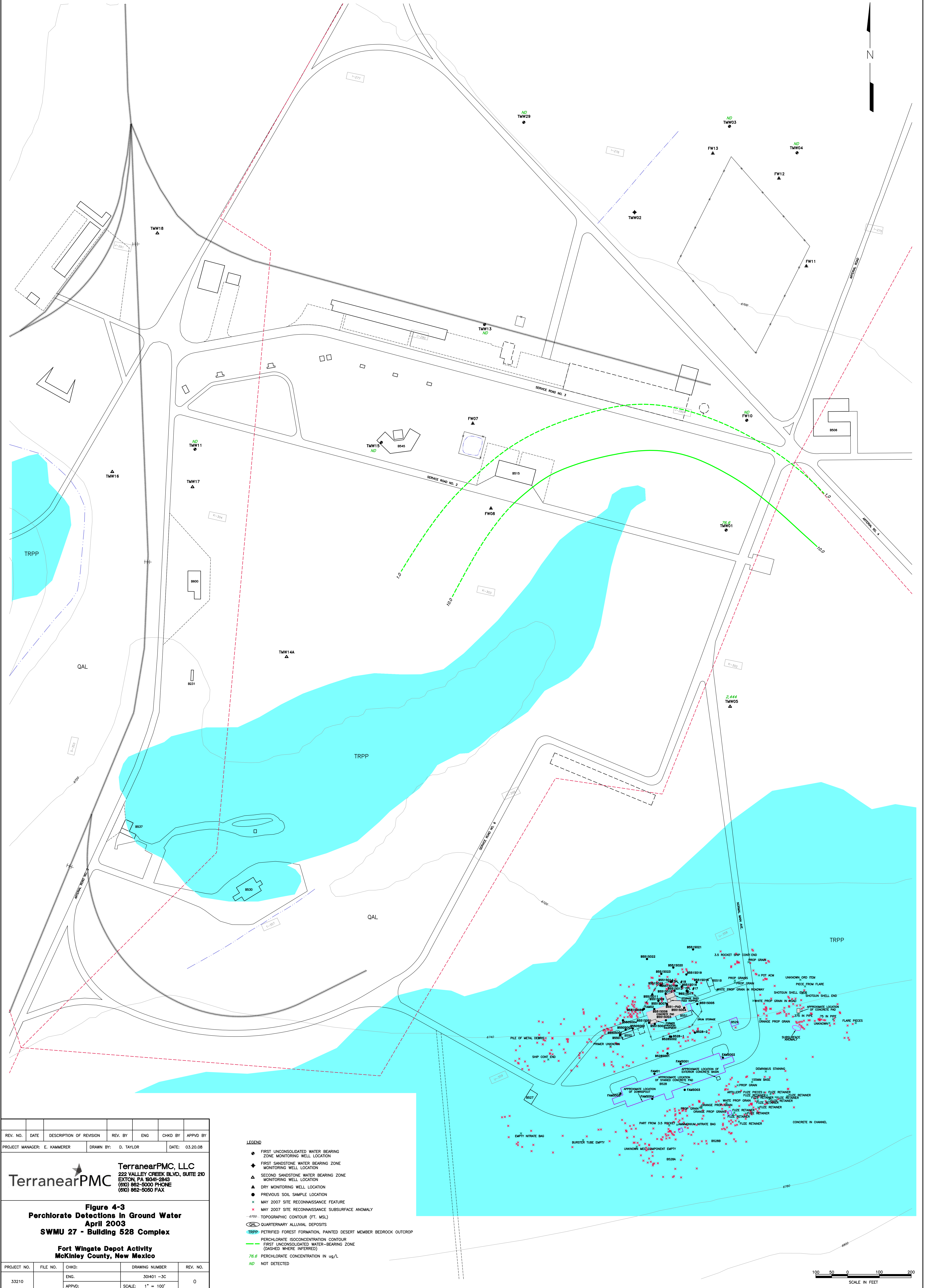


Figure 3-1
Previous Investigations
SWMU 12 - Building 536
Fort Wingate Depot Activity
McKinley County, New Mexico









[illegible]

APPROXIMATE REPORTED
LOCATION OF TPL
PROPELLANT BURN

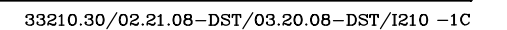
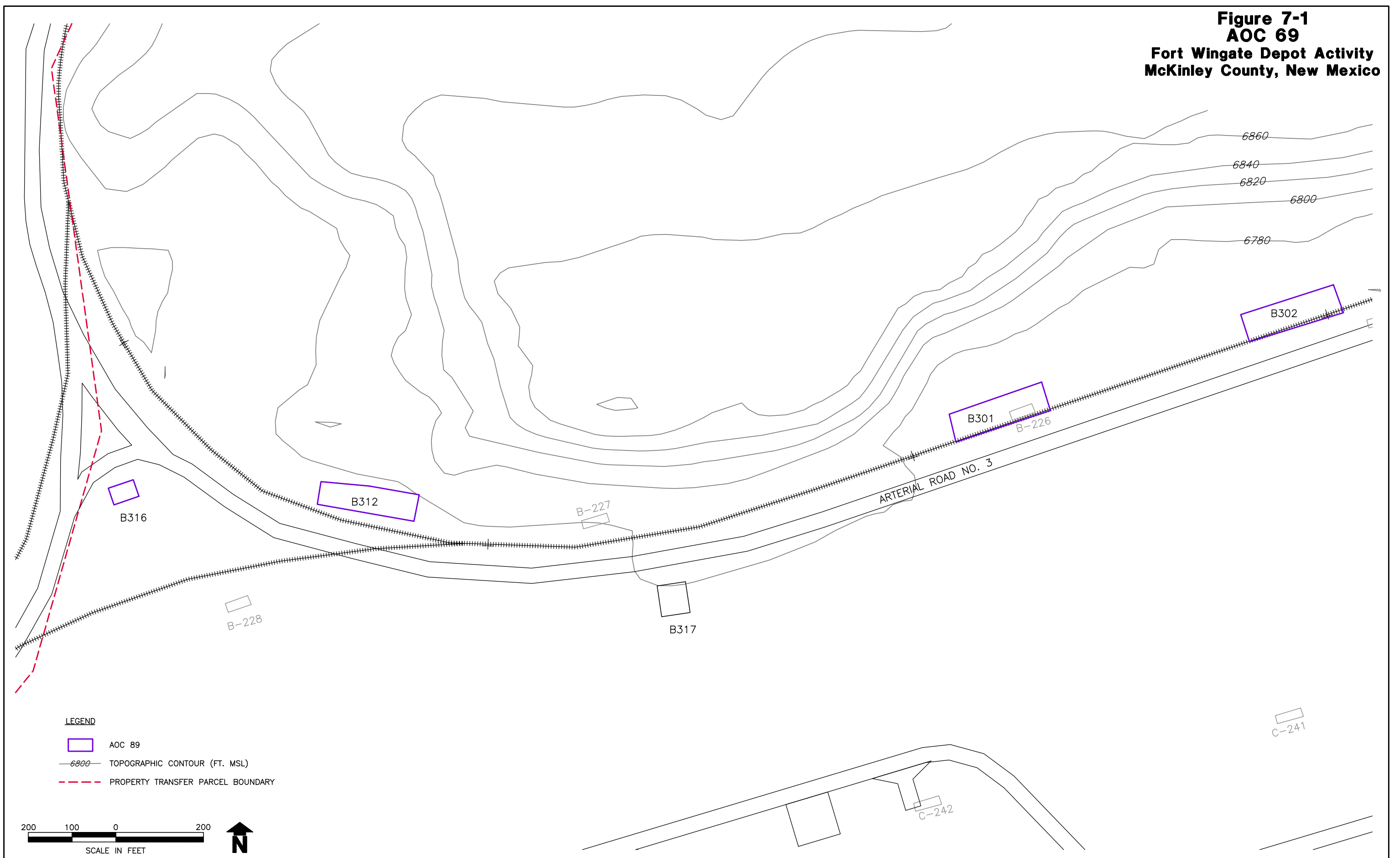


Figure 7-1
AOC 69
Fort Wingate Depot Activity
McKinley County, New Mexico



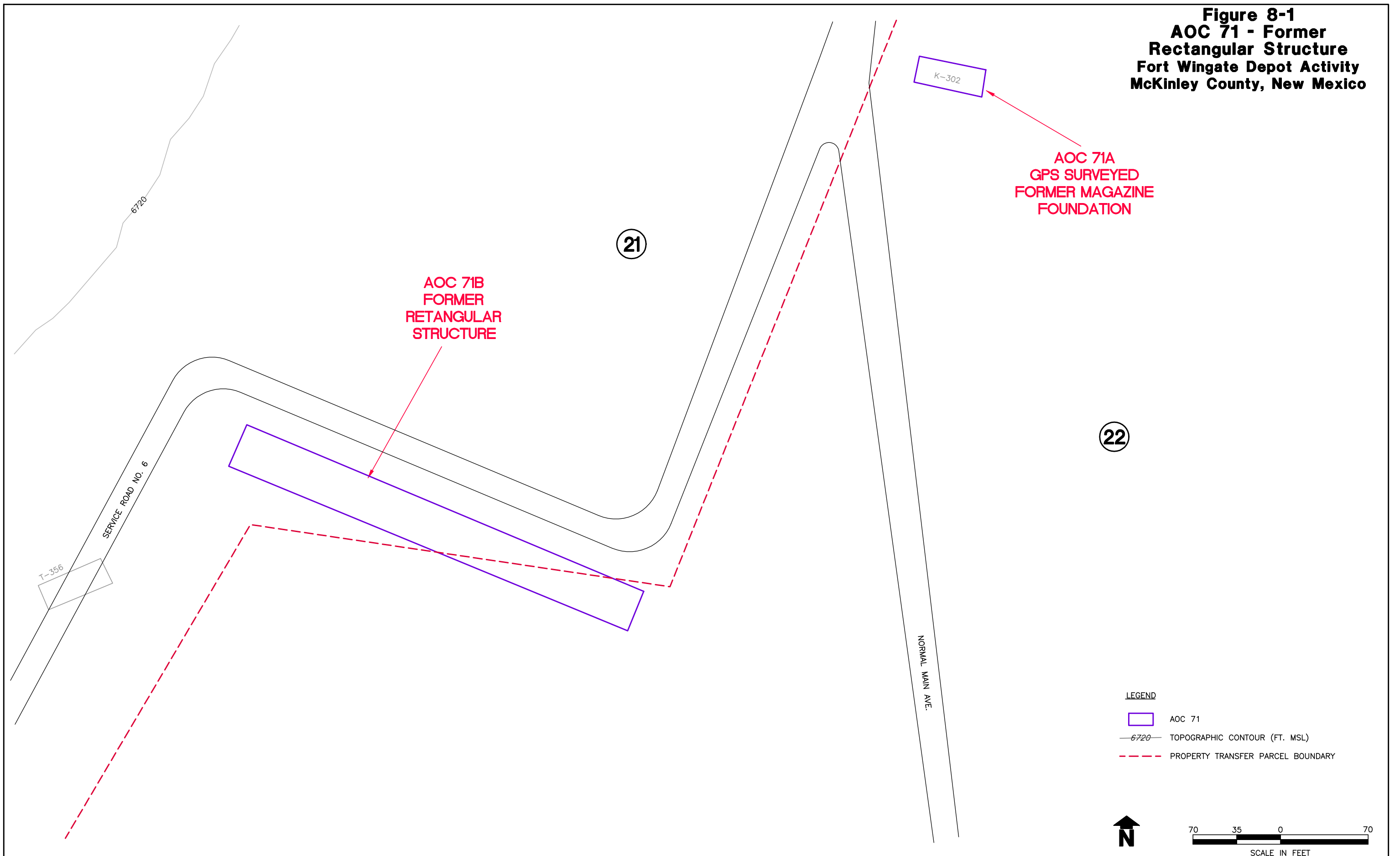
LEGEND

- AOC 89
- TOPOGRAPHIC CONTOUR (FT. MSL)
- PROPERTY TRANSFER PARCEL BOUNDARY

200 100 0 200
 SCALE IN FEET



Figure 8-1
AOC 71 - Former
Rectangular Structure
Fort Wingate Depot Activity
McKinley County, New Mexico



LEGEND

- AOC 71
- 6720 TOPOGRAPHIC CONTOUR (FT. MSL)
- PROPERTY TRANSFER PARCEL BOUNDARY



Figure 9-1
AOC 75
Fort Wingate Depot Activity
McKinley County, New Mexico

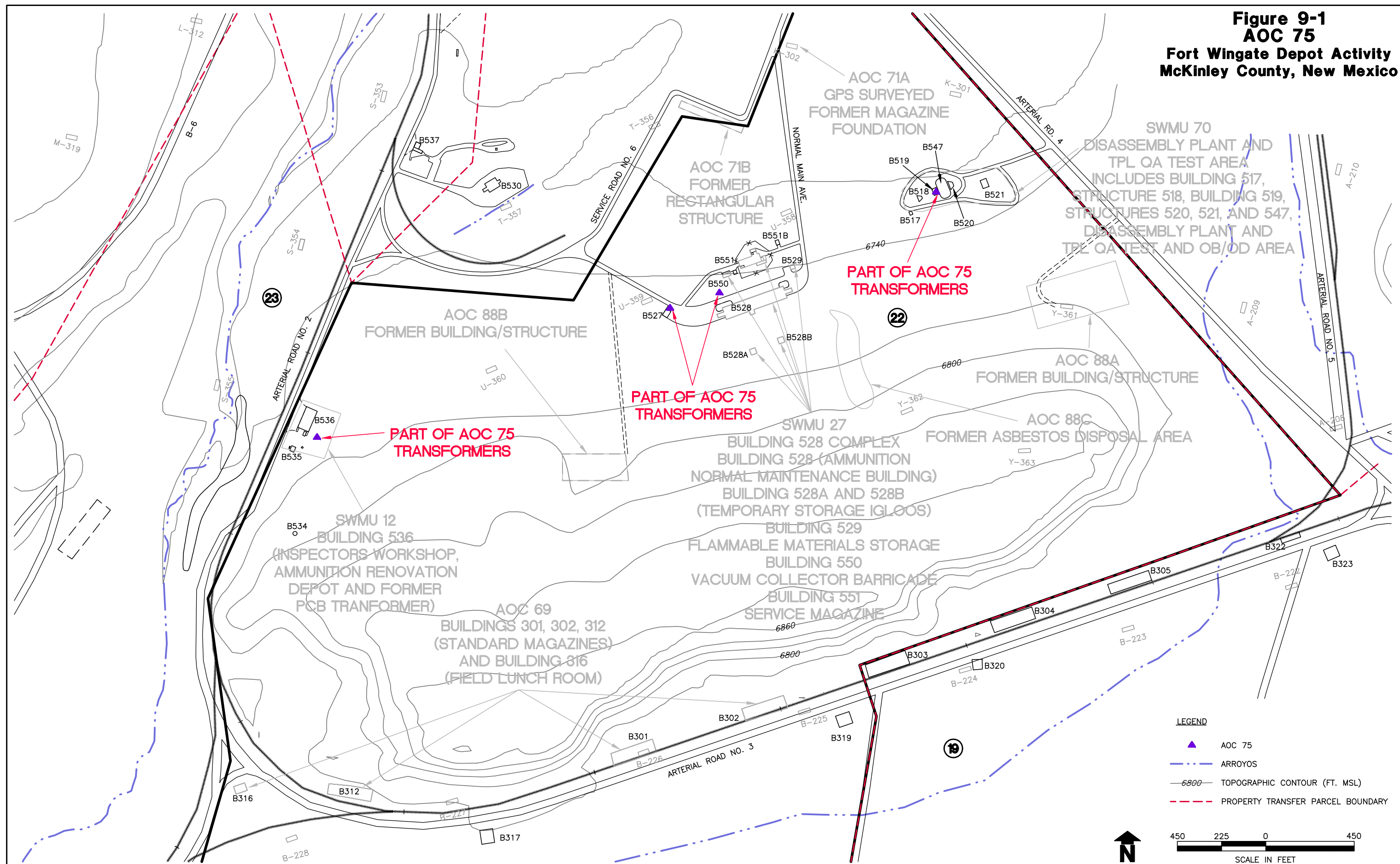


Figure 10-1
AOC 88
Fort Wingate Depot Activity
McKinley County, New Mexico

