

Draft

Remedial Investigation

**Site-Specific Field Sampling Plan,
Site-Specific Safety and Health Plan, and Site-Specific
Unexploded Ordnance Safety Plan Attachments
Training Area T-6 (Naylor Field), Parcel 183(6)**

**Fort McClellan
Calhoun County, Alabama**

**Task Order CK19
Contract No. DACA21-96-D-0018
IT Project No. 838936**

October 2002

Revision 0

**Draft
Remedial Investigation
Site-Specific Field Sampling Plan Attachment
Training Area T-6 (Naylor Field), Parcel 183(6)**

**Fort McClellan
Calhoun County, Alabama**

Prepared for:

**U.S. Army Corps of Engineers, Mobile District
109 St. Joseph Street,
Mobile, Alabama 36602**

Prepared by:

**IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923**

**Task Order CK19
Contract No. DACA21-96-D-0018
IT Project No. 838936**

October 2002

Revision 0

Table of Contents

	Page
List of Tables	iv
List of Figures	v
List of Acronyms	vi
Executive Summary	ES-1
1.0 Project Description	1-1
1.1 Introduction	1-1
1.2 FTMC Site Description and History	1-1
1.3 Training Area T-6 (Naylor Field), Parcel 183(6): Site Description and History	1-2
1.4 Regional and Site-Specific Geology	1-4
1.4.1 Regional Geology	1-4
1.4.2 Site-Specific Geology	1-8
1.5 Regional and Site-Specific Hydrogeology	1-9
1.5.1 Regional Hydrogeology	1-9
1.5.2 Site-Specific Hydrogeology	1-10
1.6 Scope of Work	1-11
2.0 Summary of Existing Environmental Studies	2-1
2.1 Previous Investigations	2-2
2.2 Site Investigation	2-4
2.2.1 Summary of Field Activities	2-4
2.2.2 Summary of Analytical Results	2-5
2.2.2.1 Surface and Depositional Analytical Results	2-6
2.2.2.2 Subsurface Soil Analytical Results	2-7
2.2.2.3 Groundwater Analytical Results	2-8
2.2.2.4 Surface Water Analytical Results	2-9
2.2.2.5 Sediment Analytical Results	2-10
2.2.3 SI Summary and Conclusions	2-10
3.0 Site-Specific Data Quality Objectives	3-1
3.1 Overview	3-1
3.2 Data Users and Available Data	3-1
3.3 Conceptual Site Exposure Model	3-2

Table of Contents (Continued)

	Page
3.4 Decision-Making Process, Data Uses, and Needs.....	3-3
3.4.1 Risk Evaluation	3-3
3.4.2 Data Types and Quality	3-3
3.4.3 Precision, Accuracy, and Completeness.....	3-4
4.0 Field Investigations	4-1
4.1 UXO Survey Requirements and Utility Clearances	4-1
4.1.1 Surface UXO Survey	4-1
4.1.2 Downhole UXO Survey	4-1
4.1.3 Utility Clearances	4-1
4.2 Environmental Sampling	4-1
4.2.1 Surface Soil Sampling	4-2
4.2.1.1 Sample Locations and Rationale.....	4-2
4.2.1.2 Sample Collection.....	4-2
4.2.2 Subsurface Soil Sampling.....	4-2
4.2.2.1 Sample Locations and Rationale.....	4-3
4.2.2.2 Sample Collection.....	4-3
4.2.3 Monitoring Well Installation	4-3
4.2.3.1 Monitoring Well Locations and Rationale.....	4-4
4.2.3.2 Residuum Monitoring Wells.....	4-4
4.2.3.3 Bedrock Monitoring Wells	4-5
4.2.4 Groundwater Sampling.....	4-7
4.2.4.1 Sample Locations and Rationale.....	4-7
4.2.4.2 Sample Collection.....	4-7
4.2.5 Depositional Sampling	4-7
4.2.5.1 Sample Locations and Rationale.....	4-7
4.2.5.2 Sample Collection.....	4-8
4.2.6 Surface Water Sampling.....	4-8
4.2.6.1 Sample Locations and Rationale.....	4-8
4.2.6.2 Sample Collection.....	4-8
4.2.7 Sediment Sampling.....	4-8
4.2.7.1 Sample Locations and Rationale.....	4-9
4.2.7.2 Sample Collection.....	4-9
4.2.8 Slug Tests	4-9
4.3 Decontamination Requirements	4-9

Table of Contents (Continued)

	Page
4.4 Survey of Sample Locations.....	4-9
4.5 Analytical Program.....	4-10
4.6 Sample Preservation, Packaging, and Shipping	4-11
4.7 Investigation-Derived Waste Management	4-11
4.8 Site-Specific Safety and Health.....	4-12
5.0 Project Schedule.....	5-1
6.0 References	6-1
Attachment 1 - List of Abbreviations and Acronyms	
Attachment 2 - Memorandum for Release of Property to Conduct HTRW Investigations	
Appendix A - Boring Logs and Well Construction Logs	
Appendix B - Sample Collection Logs and Analysis Request/Chain-of-Custody Records	
Appendix C - Well Development Logs	
Appendix D - Survey Data	
Appendix E - Variances	
Appendix F - Summary Statistics for Background Media, Fort McClellan, Alabama	
Appendix G - Summary of Validated Analytical Data	

List of Tables

Table	Title	Follows Page
1-1	Groundwater Elevations, Training Area T-6, Parcel 183(6)	1-10
1-2	Horizontal Hydraulic Gradient, Training Area T-6, Parcel 183(6)	1-11
2-1	Sampling Locations and Rationale, Training Area T-6, Parcel 183(6)	2-5
2-2	Monitoring Well Construction Summary, Training Area T-6, Parcel 183(6)	2-5
2-3	Groundwater and Surface Water Field Parameters, Training Area T-6, Parcel 183(6)	2-5
2-4	Variances to the Final Site-Specific Field Sampling Plan, Training Area T-6, Parcel 183(6)	2-5
2-5	Surface and Depositional Soil Sample Analytical Results, Training Area T-6, Parcel 183(6)	2-6
2-6	Subsurface Soil Sample Analytical Results, Training Area T-6, Parcel 183(6)	2-6
2-7	Groundwater Sample Analytical Results, Training Area T-6, Parcel 183(6)	2-6
2-8	Surface Water Sample Analytical Results, Training Area T-6, Parcel 183(6)	2-6
2-9	Sediment Sample Analytical Results, Training Area T-6, Parcel 183(6)	2-6
3-1	Summary of Data Quality Objectives, Training Area T-6, Parcel 183(6), Remedial Investigation	3-1
4-1	Sampling Locations and Rationale, Remedial Investigation at Training Area T-6, Parcel 183(6)	4-2
4-2	Surface and Subsurface Soil Sample Designations and Analytical Parameters, Remedial Investigation at Training Area T-6, Parcel 183(6)	4-2
4-3	Groundwater Sample Designations and Analytical Parameters, Remedial Investigation, Training Area T-6, Parcel 183(6)	4-7
4-4	Surface Water and Sediment Sample Designations and Analytical Parameters	4-8
4-5	Analytical Samples, Remedial Investigation, Training Area T-6, Parcel 183(6)	4-10

1 **Executive Summary**

2
3 In accordance with Contract Number DACA21-96-D-0018, Task Order CK19, IT Corporation
4 (IT) will conduct a remedial investigation (RI) at Training Area T-6 (Naylor Field), Parcel
5 183(6), at Fort McClellan, Calhoun County, Alabama. The RI will determine the nature and
6 extent of contamination resulting from U.S. Army training activities that occurred at the site.
7 The purpose of this site-specific RI field sampling plan is to provide technical guidance for the
8 sampling activities proposed at Training Area T-6 (Naylor Field), Parcel 183(6).
9

10 Training Area T-6 (Naylor Field), Parcel 183(6), is a heavily wooded area located at the base of
11 the eastern slope of Howitzer Hill, about 300 feet southwest of the intersection of Derby Street
12 and Town Center Drive, and west of South Branch of Cane Creek. Training Area T-6 was used
13 from an unknown date prior to 1954 until 1973. The site encompasses about 10 acres. The area
14 contained eight training sites that consisted of concrete pads on which equipment was parked and
15 a network of drainage ditches that may have drained to a shallow pond. The training activities
16 conducted reportedly involved the decontamination of training aids contaminated with chemical
17 warfare materials (CWM), including distilled mustard (HD), lewisite, and Sarin. The training
18 aids consisted of surplus vehicles that had been taken out of service and dedicated to these
19 decontamination training exercises. After being intentionally contaminated with chemical
20 warfare agent, the training aid was decontaminated using volumes of decontaminant
21 (supertropical bleach, Decontamination Solution Number 2, or decontamination agent,
22 noncorrosive) well in excess of the volume actually required to effectively complete
23 decontamination. Reportedly, personnel decontamination was also conducted here before
24 trainees left the site; expended protective mask canisters were collected and sent to the on-site
25 landfill, presumably to Landfill No. 3.
26

27 Previous investigations have been carried out at Training Area T-6. In 1973, the Army collected
28 and analyzed surface soil samples for CWM. CWM was not detected. In 1993, Science
29 Applications International Corporation completed a site investigation, which included the
30 screening and sampling of six soil locations. These locations were screened for HD using
31 Miniature Continuous Air Monitoring Systems and were sampled for CWM breakdown
32 products; nothing was detected above background readings during screening or above reporting
33 limits from sample analysis. In 2001, a CWM engineering evaluation/cost analysis (EE/CA) was
34 completed by Parsons Engineering Science, Inc. (Parsons) to address the potential presence of
35 CWM or other subsurface disposal using geophysical surveys, excavation of suspect anomalies,
36 continuous air monitoring, soil sampling, and laboratory analysis of soils for chemical agents and
37 chemical agent breakdown products. The CWM EE/CA investigation did not find any evidence

1 of soil contamination by chemical agents. Based on the results of soil sampling and analysis, it
2 can be inferred there are no sources of CWM in the environment at Training Area T-6; therefore,
3 the likelihood of current or future human health risks due to exposure to chemical agents is very
4 small. As a result of the CWM investigation by Parsons, U.S. Army Corps of Engineers
5 (USACE)-Huntsville Center issued a release of CWM sites on the Main Post to conduct
6 hazardous, toxic, and radiological waste investigations. A copy of this memorandum is attached
7 to this RI field sampling plan. Site investigation field activities were carried out by IT in 2001
8 and 2002. Sample analysis results showed that metals, volatile organic compounds (VOC), and
9 semivolatile organic compounds (SVOC) were detected in site media.

10
11 IT will collect 24 groundwater samples (14 proposed and 10 pre-existing locations), 11 surface
12 soil samples, 11 subsurface soil samples, 2 surface water samples, 2 sediment samples, and 6
13 depositional soil samples at this site. Potential contaminant sources at Training Area T-6, Parcel
14 183(6), include VOCs, SVOCs, and metals. Chemical analyses of the samples collected during
15 the field program will include VOCs, SVOCs, total metals, and chemical agent breakdown
16 products. If any standing water serving as collection ponds for site drainage is found, sediment
17 samples may be collected at the discretion of the sampler; they will be analyzed for total organic
18 carbon and grain size. Results from these analyses will be compared with site-specific screening
19 levels, ecological screening values, and background values to determine if potential site-specific
20 chemicals are present at the site at concentrations that pose an unacceptable risk to human health
21 or the environment.

22
23 This RI field sampling plan will be used in conjunction with the installation-wide sampling and
24 analysis plan (SAP), the site-specific safety and health plan, and the site-specific unexploded
25 ordnance (UXO) safety plan. The SAP includes the installation-wide safety and health plan,
26 monitoring well installation and maintenance plan, investigation-derived waste management
27 plan, ordnance and explosives management plan, and quality assurance plan. Site-specific
28 hazard analyses are included in the site-specific safety and health plan and the site-specific UXO
29 safety plan attachments.

30
31 The USACE-Huntsville requires that work conducted at potential CWM sites use UXO anomaly
32 avoidance techniques. Therefore, prior to initiating field activities at Training Area T-6, Parcel
33 183(6), IT will conduct UXO avoidance activities as outlined in Appendix E of the installation-
34 wide SAP and the attached site-specific UXO safety plan. Surface sweeps and downhole
35 surveys will be conducted to identify anomalies for the purpose of UXO avoidance.

1 At the completion of the RI field work, a feasibility study (FS) will be conducted. The FS will
2 identify, develop, screen, and evaluate remedial alternatives for contaminated media at the site as
3 required under the Comprehensive Environmental Response, Compensation, and Liability Act
4 (CERCLA). The FS report will be prepared in accordance with the guidelines, criteria, and
5 considerations set forth in the 1988 U.S. Environmental Protection Agency guidance document
6 entitled *Guidance for Conducting Remedial Investigation and Feasibility Studies Under*
7 *CERCLA, Interim Final*. The FS will provide the Base Realignment and Closure Cleanup Team
8 sufficient data to select a feasible and cost-effective remedial alternative that will protect human
9 health and the environment.
10

1.0 Project Description

1.1 Introduction

The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the remedial investigation (RI) at Training Area T-6 (Naylor Field), Parcel 183(6), under Task Order CK19, Contract Number DACA21-96-D-0018.

This RI site-specific field sampling plan (SFSP) has been prepared to provide technical guidance and rationale for sample collection and analysis at Training Area T-6, Parcel 183(6). The objective of this investigation is to further characterize the potential contamination resulting from training activities that occurred at the site and to better define the extent of groundwater contamination observed during previous investigations. IT will collect samples to characterize the source, nature, and extent of contamination. The data collected will also be used to evaluate the level of risk to human health and the environment posed by releases of chemicals. This RI SFSP will be used in conjunction with the site-specific safety and health plan (SSHP), the site-specific unexploded ordnance (UXO) safety plan, the installation-wide sampling and analysis plan (SAP) (IT, 2002a), and the installation-wide work plan (IT, 2002b). The SAP includes the installation-wide safety and health plan, well installation and maintenance plan, investigation-derived waste (IDW) management plan, ordnance and explosives management plan, and quality assurance plan (QAP). Site-specific hazard analysis is included in the SSHP and the site-specific UXO safety plan attachments.

1.2 FTMC Site Description and History

FTMC is located in the foothills of the Appalachian Mountains of northeastern Alabama near the cities of Anniston and Weaver in Calhoun County. FTMC is approximately 60 miles northeast of Birmingham, 75 miles northwest of Auburn, and 95 miles west of Atlanta, Georgia. FTMC consists of three main areas of government-owned and leased properties: the Main Post, Pelham Range, and Choccolocco Corridor (the lease for Choccolocco Corridor terminated in May 1998). The size of each property is presented below:

- Main Post 18,929 acres
- Pelham Range 22,245 acres
- Choccolocco Corridor 4,488 acres.

The Main Post is bounded on the east by the Choccolocco Corridor, which connects the Main Post with the Talladega National Forest. Pelham Range is located approximately five miles west

1 of the Main Post and adjoins the Anniston Army Depot on the southwest. Pelham Range is
2 located to the west of U.S. Highway 431, approximately five miles from the Main Post.

3
4 FTMC is under the jurisdiction of the U.S. Army Training and Doctrine Command. Until
5 September 1999, the installation housed three major organizations, the U.S. Army Military
6 Police School, the U.S. Army Chemical School, and the Training Center (under the direction of
7 the training brigade), in addition to other major support units and tenants.

8
9 In 1917 the U.S. government purchased 18,929 acres of land near Anniston for use as an artillery
10 range and a training camp due to the outbreak of World War I. The site was named Camp
11 McClellan in honor of Major General George B. McClellan, a leader of the Union Army during
12 the Civil War. Camp McClellan was used to train troops for World War I from 1917 until the
13 armistice. It was then designated as a demobilization center. Between 1919 and 1929, Camp
14 McClellan served as a training area for active army units and other civilian elements. Camp
15 McClellan was redesignated as Fort McClellan in 1929 and continued to serve as a training area.

16
17 In 1940, the government acquired an additional 22,245 acres west of FTMC. This tract of land
18 was named Pelham Range. In 1941, the Alabama legislature leased approximately 4,488 acres to
19 the U.S. government to provide an access corridor from the Main Post to Talladega National
20 Forest. This corridor provided access to additional woodlands for training.

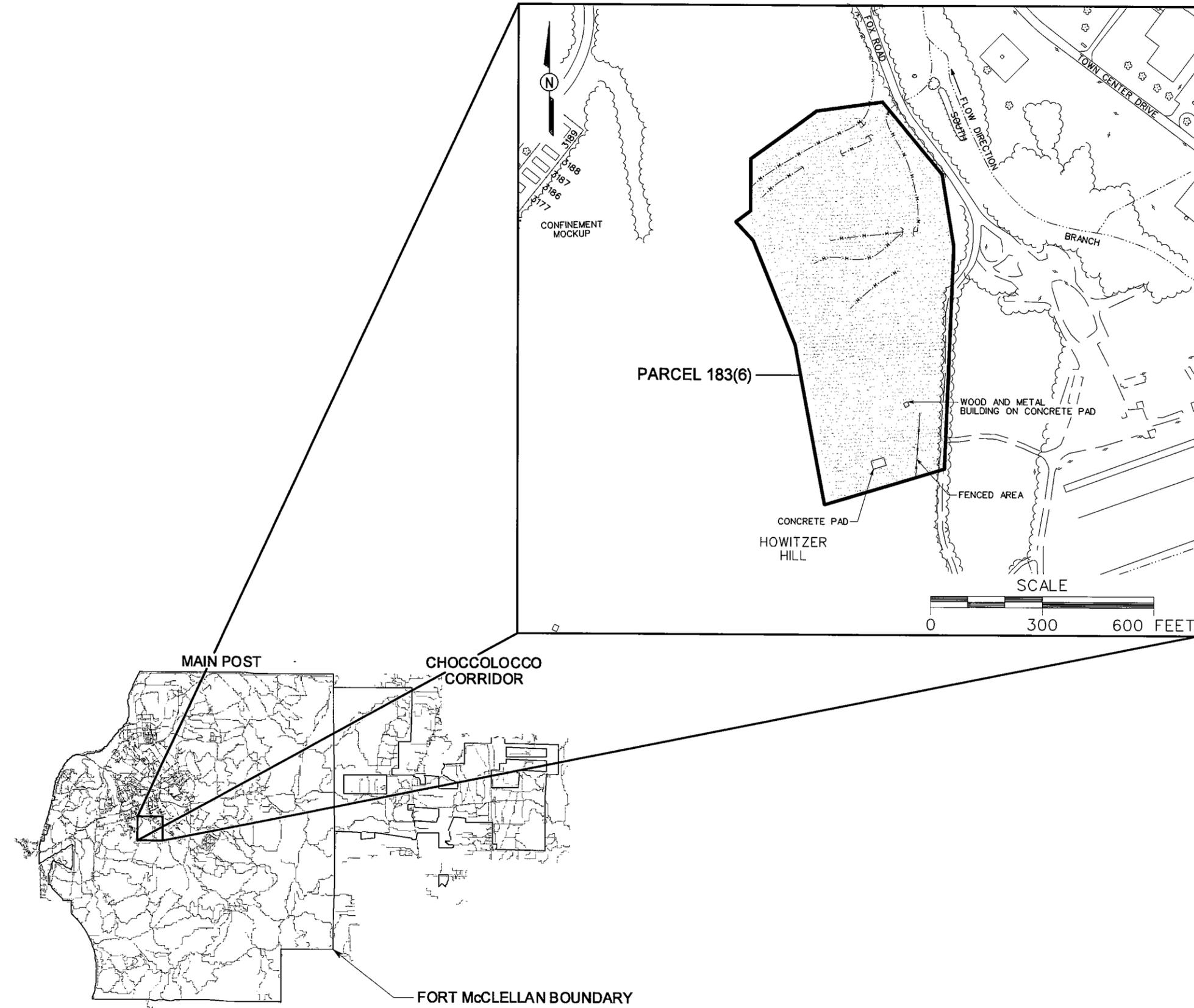
21
22 The U.S. Army operated the Chemical Corps School at FTMC from 1951 until the school was
23 deactivated in 1973. The Chemical Corps School offered advanced training in all phases of
24 chemical, biological, and radiological warfare to students from all branches of the military
25 service.

26
27 Until closure in September 1999, activities at FTMC could be divided into support activities,
28 academic training, and practical training. Support activities included housing, feeding, and
29 moving individuals during training. Academic training included classroom, laboratory, and field
30 instruction. Practical training included weapons, artillery and explosives, vehicle operation and
31 maintenance, and physical and tactical training activities.

32 33 **1.3 Training Area T-6 (Naylor Field), Parcel 183(6): Site Description and** 34 **History**

35 Training Area T-6 (Naylor Field), Parcel 183(6), is a heavily wooded area located at the base of
36 the eastern slope of Howitzer Hill, about 300 feet southwest of the intersection of Derby Street
37 and Town Center Drive, and west of South Branch of Cane Creek (Figures 1-1 and 1-2)
38 (Parsons Engineering Science, Inc. [Parsons], 2002). Training Area T-6 was used from an

DWG. NO.: ...838936es.033
 PROJ. NO.: 838936
 INITIATOR: D. ALLAN
 PROJ. MGR.: J. YACOUB
 DRAFT. CHCK. BY:
 ENGR. CHCK. BY: S. MORAN
 DATE LAST REV.:
 DRAWN BY:
 STARTING DATE: 09/27/02
 DRAWN BY: D. BOMAR
 09/27/02
 11:26:00 AM
 c:\cadd\design\838936es.033



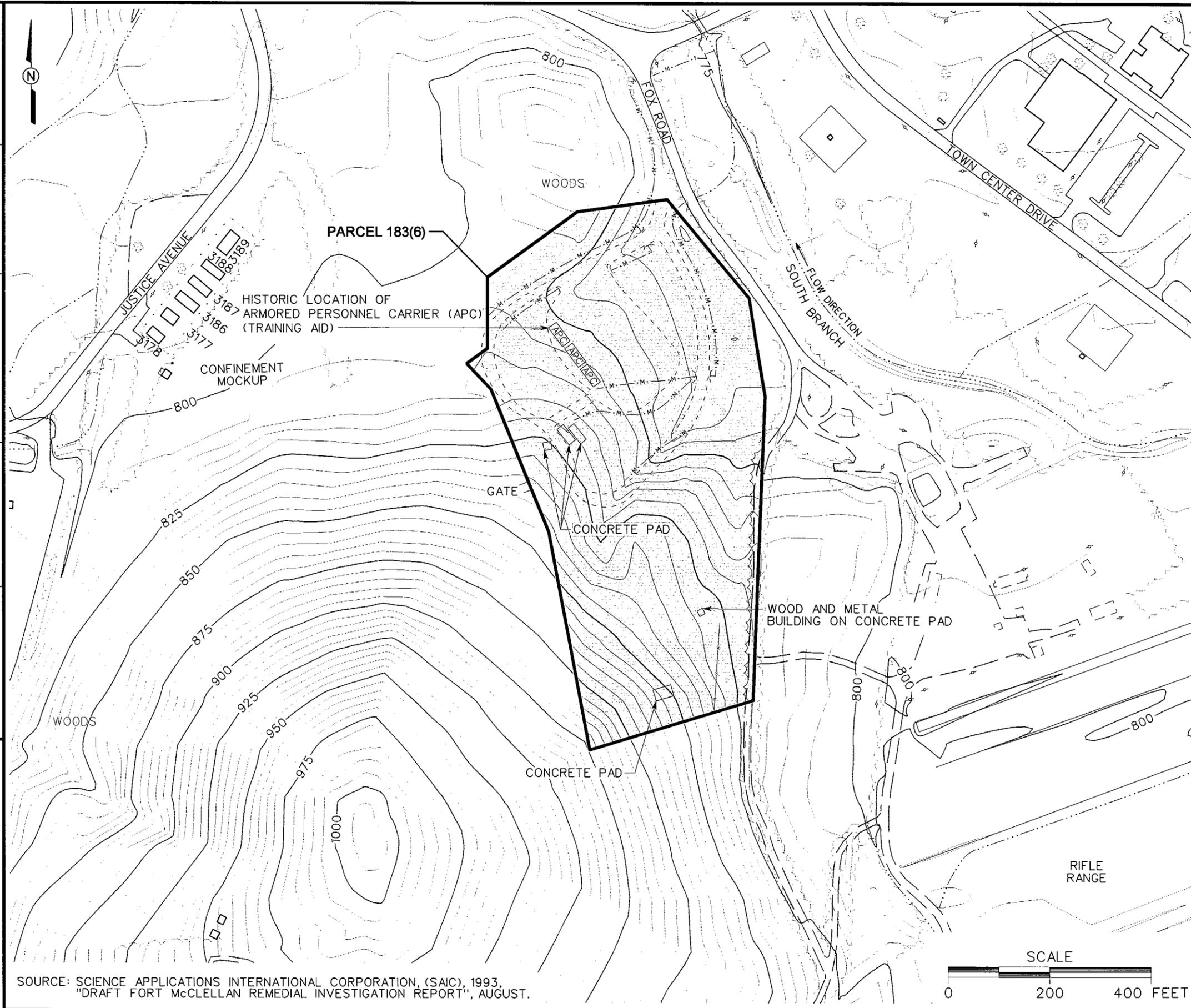
- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - BUILDING
 - FORMER BUILDING
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - CULVERT WITH HEADWALL
 - SURFACE DRAINAGE / CREEK
 - MANMADE SURFACE DRAINAGE FEATURE
 - FENCE
 - UTILITY POLE
 - MOUND
 - DEPRESSION

FIGURE 1-1
SITE LOCATION MAP
TRAINING AREA T-6 (NAYLOR FIELD)
PARCEL 183(6)

U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



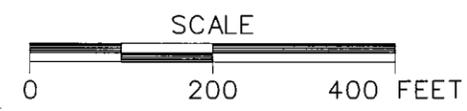
DWG. NO.: ... \838936es.034
 PROJ. NO.: 838936
 INITIATOR: J. REMO
 PROJ. MGR.: J. YACOBUB
 DRAFT. CHK. BY: S. MORAN
 ENGR. CHK. BY: S. MORAN
 DRAFT. CHK. BY: S. MORAN
 ENGR. CHK. BY: S. MORAN
 STARTING DATE: 09/25/02
 DATE LAST REV.:
 DRAWN BY:
 DRAWN BY: D. BOWAR
 09/27/02
 04:28:32 PM
 c:\cadd\design\838936es.034
 dbomar



- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - BUILDING
 - FORMER BUILDING
 - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - CULVERT WITH HEADWALL
 - SURFACE DRAINAGE / CREEK
 - MANMADE SURFACE DRAINAGE FEATURE
 - FENCE
 - UTILITY POLE
 - MOUND
 - DEPRESSION
 - HISTORICAL FEATURES, (SAIC, 1993)

FIGURE 1-2
SITE MAP
TRAINING AREA T-6 (NAYLOR FIELD)
PARCEL 183(6)

U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



SOURCE: SCIENCE APPLICATIONS INTERNATIONAL CORPORATION, (SAIC), 1993.
 "DRAFT FORT McCLELLAN REMEDIAL INVESTIGATION REPORT", AUGUST.

1 unknown date prior to 1954 until 1973. Historically, it was called the Howitzer Hill
2 Decontamination Area, or the Former Agent Decontamination Training Area. The site
3 encompasses about 10 acres. The area was fenced and posted; however, the site is accessible
4 due to breaks in the fence because of age and lack of maintenance. The area contained eight
5 training sites that consisted of concrete pads on which equipment was parked and a network of
6 drainage ditches that may have drained to a shallow pond (Parsons, 2002). Only four concrete
7 pads were located during a February 1999 site visit by Parsons. Numerous drainage ditches also
8 located in the area surrounding the pads were believed to have been used to drain liquids from
9 the pads to a shallow open pond. The pond area was not visible during Parsons' site visit.
10 There was no evidence of burial sites at the time of Parsons' site visit (Parsons, 2002). A site
11 visit by IT in August 2000 also did not reveal any evidence of burial sites or ponds.

12
13 The training activities conducted reportedly involved the decontamination of various chemical
14 warfare material (CWM), including distilled mustard (HD), lewisite (L), and Sarin (GB), with
15 the decontamination solutions supertropical bleach (STB), decontamination agent, noncorrosive
16 (DANC), and Decontamination Solution Number 2 (DS2) (Roy F. Weston, Inc. [Weston], 1990;
17 Science Applications International Corporation [SAIC], 1993; Environmental Science and
18 Engineering, Inc. [ESE], 1998). Not more than 40 milliliters of HD was typically reported to be
19 used during each exercise (Weston, 1990). However, personnel interviewed during the
20 environmental baseline survey (EBS) site visit stated that training aids were intentionally
21 contaminated with up to 2 gallons of HD during each exercise (ESE, 1998). The training aids
22 consisted of surplus vehicles that had been taken out of service and dedicated to these
23 decontamination training exercises. After being intentionally contaminated with chemical
24 warfare agent, the training aid was decontaminated using volumes of decontaminant (STB, DS2,
25 or DANC) well in excess of the volume actually required to effectively complete
26 decontamination. One report indicated that both mustard and HD agents were used and that most
27 training occurred in the northern half of the area (ESE, 1998). Reportedly, personnel
28 decontamination was also conducted here before trainees left the site; expended protective mask
29 canisters were collected and sent to the on-site landfill, presumably to Landfill No. 3 (ESE,
30 1998).

31
32 Vehicles used as training aids are clearly visible at Training Area T-6 on aerial photographs
33 (December 9, 1954, and March 10, 1973). The training aids were located in the northern portion
34 of the site and were aligned northeast-southwest in 1954. The training aids were located in the
35 same area in 1973, but were realigned to a northwest-southeast orientation (ESE, 1998).

36
37 An analysis of historical aerial photographs by Parsons indicated open areas and objects possibly
38 used for decontamination training. Nearly all of the activity occurred on the northern half of the

1 site. One cleared area at the end of a north/south trail near the center of the fenced area appears
2 in the 1954 aerial photograph and is suspected to be a possible burial site (Parsons, 2002).
3 However, a site visit by IT in August 2000 did not reveal any burial sites. Activity at the site
4 ceased or diminished dramatically sometime after 1969, since the area becomes largely
5 revegetated in the subsequent photograph taken in 1982. This timeframe coincides with the
6 reported dates of use for the area, with activities stopping in 1973 when the Chemical School left
7 FTMC (Parsons, 2002).

8 9 **1.4 Regional and Site-Specific Geology**

10 11 **1.4.1 Regional Geology**

12 Calhoun County includes parts of two physiographic provinces, the Piedmont Upland Province
13 and the Valley and Ridge Province. The Piedmont Upland Province occupies the extreme
14 eastern and southeastern portions of the county and is characterized by metamorphosed
15 sedimentary rocks. The generally accepted range in age of these metamorphics is Cambrian to
16 Devonian.

17
18 The majority of Calhoun County, including the Main Post of FTMC, lies within the Appalachian
19 fold-and-thrust structural belt (Valley and Ridge Province), where southeastward-dipping thrust
20 faults with associated minor folding are the predominant structural features. The fold-and-thrust
21 belt consists of Paleozoic sedimentary rocks that have been asymmetrically folded and thrust-
22 faulted, with major structures and faults striking in a northeast-southwest direction.

23
24 Northwestward transport of the Paleozoic rock sequence along the thrust faults has resulted in
25 the imbricate stacking of large slabs of rock, referred to as thrust sheets. Within an individual
26 thrust sheet, smaller faults may splay off the larger thrust fault, resulting in imbricate stacking of
27 rock units within the individual thrust sheet (Osborne and Szabo, 1984). Geologic contacts in
28 this region generally strike parallel to the faults, and repetition of lithologic units is common in
29 vertical sequences. Geologic formations within the Valley and Ridge Province portion of
30 Calhoun County have been mapped by Warman and Causey (1962), Osborne and Szabo (1984),
31 and Moser and DeJarnette (1992) and vary in age from Lower Cambrian to Pennsylvanian.

32
33 The basal unit of the sedimentary sequence in Calhoun County is the Cambrian Chilhowee
34 Group. The Chilhowee Group consists of the Cochran, Nichols, Wilson Ridge, and Weisner
35 Formations (Osborne and Szabo, 1984) but in Calhoun County is either undifferentiated or
36 divided into the Cochran and Nichols Formations and an upper, undifferentiated Wilson Ridge
37 and Weisner Formation. The Cochran is composed of poorly sorted arkosic sandstone and

1 conglomerate with interbeds of greenish gray siltstone and mudstone. Massive to laminated
2 greenish gray and black mudstone makes up the Nichols Formation, with thin interbeds of
3 siltstone and very fine-grained sandstone (Osborne et al., 1988). These two formations are
4 mapped only in the eastern part of the county.

5
6 The Wilson Ridge and Weisner Formations are undifferentiated in Calhoun County and consist
7 of both coarse-grained and fine-grained clastics. The coarse-grained facies appears to dominate
8 the unit and consists primarily of coarse-grained, vitreous quartzite and friable, fine- to coarse-
9 grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained
10 facies consists of sandy and micaceous shale and silty, micaceous mudstone, which are locally
11 interbedded with the coarse clastic rocks. The abundance of orthoquartzitic sandstone and
12 quartzite suggests that most of the Chilhowee Group bedrock in the vicinity of FTMC belongs to
13 the Weisner Formation (Osborne and Szabo, 1984).

14
15 The Cambrian Shady Dolomite overlies the Weisner Formation northeast, east, and southwest of
16 the Main Post and consists of interlayered bluish gray or pale yellowish gray sandy dolomitic
17 limestone and siliceous dolomite with coarsely crystalline, porous chert (Osborne et al., 1989).
18 A variegated shale and clayey silt have been included within the lower part of the Shady
19 Dolomite (Cloud, 1966). Material similar to this lower shale unit was noted in core holes drilled
20 by the Alabama Geologic Survey on FTMC (Osborne and Szabo, 1984). The character of the
21 Shady Dolomite in the FTMC vicinity and the true assignment of the shale at this stratigraphic
22 interval are still uncertain (Osborne, 1999).

23
24 The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and
25 southeast of the Main Post, as mapped by Warman and Causey (1962) and Osborne and Szabo
26 (1984), and immediately to the west of Reilly Airfield (Osborne and Szabo, 1984). The Rome
27 Formation consists of variegated, thinly interbedded grayish red-purple mudstone, shale,
28 siltstone, and greenish red and light gray sandstone, with locally occurring limestone and
29 dolomite. Weaver Cave, located approximately one mile west of the northwest boundary of the
30 Main Post, is situated in gray dolomite and limestone mapped as the Rome Formation (Osborne
31 et al., 1997). The Conasauga Formation overlies the Rome Formation and occurs along
32 anticlinal axes in the northeastern portion of Pelham Range (Warman and Causey, 1962;
33 Osborne and Szabo, 1984) and the northern portion of the Main Post (Osborne et al., 1997). The
34 Conasauga Formation is composed of dark gray, finely to coarsely crystalline, medium- to thick-
35 bedded dolomite with minor shale and chert (Osborne et al., 1989).

1 Overlying the Conasauga Formation is the Knox Group, which is composed of the Copper Ridge
2 and Chepultepec dolomites of Cambro-Ordovician age. The Knox Group is undifferentiated in
3 Calhoun County and consists of light medium gray, fine to medium crystalline, variably bedded
4 to laminated, siliceous dolomite and dolomitic limestone that weather to a chert residuum
5 (Osborne and Szabo, 1984). The Knox Group underlies a large portion of the Pelham Range
6 area.

7
8 The Ordovician Newala and Little Oak Limestones overlie the Knox Group. The Newala
9 Limestone consists of light to dark gray, micritic, thick-bedded limestone with minor dolomite.
10 The Little Oak Limestone consists of dark gray, medium- to thick-bedded, fossiliferous,
11 argillaceous to silty limestone with chert nodules. These limestone units are mapped as
12 undifferentiated at FTMC and in other parts of Calhoun County. The Athens Shale overlies the
13 Ordovician limestone units. The Athens Shale consists of dark gray to black shale and
14 graptolitic shale with localized interbedded dark gray limestone (Osborne et al., 1989). These
15 units occur within an eroded “window” in the uppermost structural thrust sheet at FTMC and
16 underlie much of the developed area of the Main Post.

17
18 Other Ordovician-aged bedrock units mapped in Calhoun County include the Greensport
19 Formation, Colvin Mountain Sandstone, and Sequatchie Formation. These units consist of
20 various siltstones, sandstones, shales, dolomites, and limestones and are mapped as one,
21 undifferentiated unit in some areas of Calhoun County. The only Silurian-age sedimentary
22 formation mapped in Calhoun County is the Red Mountain Formation. This unit consists of
23 interbedded red sandstone, siltstone, and shale with greenish gray to red silty and sandy
24 limestone.

25
26 The Devonian Frog Mountain Sandstone consists of sandstone and quartzitic sandstone with
27 shale interbeds, dolomudstone, and glauconitic limestone (Osborne et al., 1988). This unit
28 locally occurs in the western portion of Pelham Range.

29
30 The Mississippian Fort Payne Chert and the Maury Formation overlie the Frog Mountain
31 Sandstone and are composed of dark to light gray limestone with abundant chert nodules and
32 greenish gray to grayish red phosphatic shale, with increasing amounts of calcareous chert
33 toward the upper portion of the formation (Osborne and Szabo, 1984). These units occur in the
34 northwestern portion of Pelham Range. Overlying the Fort Payne Chert is the Floyd Shale, also
35 of Mississippian age, which consists of thin-bedded, fissile, brown to black shale with thin
36 intercalated limestone layers and interbedded sandstone. Osborne and Szabo (1984) reassigned

1 the Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC,
2 to the Ordovician Athens Shale based on fossil data.

3
4 The Pennsylvanian Parkwood Formation overlies the Floyd Shale and consists of a medium to
5 dark gray, silty, clay shale and mudstone with interbedded light to medium gray, very fine to fine
6 grained, argillaceous, micaceous sandstone. Locally the Parkwood Formation also contains beds
7 of medium to dark gray argillaceous, bioclastic to cherty limestone and beds of clayey coal up to
8 a few inches thick (Raymond et al., 1988). In Calhoun County, the Parkwood Formation is
9 generally found within a structurally complex area known as the Coosa deformed belt. In the
10 deformed belt, the Parkwood Formation and Floyd Shale are mapped as undifferentiated because
11 their lithologic similarity and significant deformation make it impractical to map the contact
12 (Thomas and Drahovzal, 1974; Osborne et al., 1988). The undifferentiated Parkwood Formation
13 and Floyd Shale are found throughout the western quarter of Pelham Range.

14
15 The Jacksonville thrust fault is the most significant structural geologic feature in the vicinity of
16 the Main Post of FTMC, both for its role in determining the stratigraphic relationships in the area
17 and for its contribution to regional water supplies. The trace of the fault extends northeastward
18 for approximately 39 miles between Bynum, Alabama, and Piedmont, Alabama. The fault is
19 interpreted as a major splay of the Pell City fault (Osborne and Szabo, 1984). The Ordovician
20 sequence that makes up the Eden thrust sheet is exposed at FTMC through an eroded window, or
21 "fenster," in the overlying thrust sheet. Rocks within the window display complex folding, with
22 the folds being overturned and tight to isoclinal. The carbonates and shales locally exhibit well-
23 developed cleavage (Osborne and Szabo, 1984). The FTMC window is framed on the northwest
24 by the Rome Formation; north by the Conasauga Formation; northeast, east, and southwest by
25 the Shady Dolomite; and southeast and southwest by the Chilhowee Group (Osborne et al.,
26 1997). Two small klippen of the Shady Dolomite, bounded by the Jacksonville fault, have been
27 recognized adjacent to the Pell City fault at the FTMC window (Osborne et al., 1997).

28
29 The Pell City fault serves as a fault contact between the bedrock within the FTMC window and
30 the Rome and Conasauga Formations. The trace of the Pell City fault is also exposed
31 approximately nine miles west of the FTMC window on Pelham Range, where it traverses
32 northeast to southwest across the western quarter of Pelham Range. The trace of the Pell City
33 fault marks the boundary between the Pell City thrust sheet and the Coosa deformed belt.

34
35 The eastern three-quarters of Pelham Range is located within the Pell City thrust sheet, while the
36 remaining western quarter of Pelham is located within the Coosa deformed belt. The Pell City
37 thrust sheet is a large-scale thrust sheet containing Cambrian and Ordovician rocks. It is

1 relatively less structurally complex than the Coosa deformed belt (Thomas and Neathery, 1982).
2 The Pell City thrust sheet is exposed between the traces of the Jacksonville and Pell City faults
3 along the western boundary of the FTMC window and along the trace of the Pell City fault on
4 Pelham Range (Thomas and Neathery, 1982; Osborne et al., 1988). The Coosa deformed belt is
5 a narrow northeast-to-southwest-trending linear zone of complex structure (approximately 5 to
6 20 miles wide and approximately 90 miles in length) consisting mainly of thin imbricate thrust
7 slices. The structure within these imbricate thrust slices is often internally complicated by small-
8 scale folding and additional thrust faults (Thomas and Drahovzal, 1974).

9 10 **1.4.2 Site Specific Geology**

11 The Anniston and Allen gravelly loam and the Montevallo shaly silt clay loam are mapped
12 underlying Parcel 183(6). The Anniston Allen gravelly loam underlies the eastern portion, and
13 the Montevallo shaly silty clay loam underlies the western portion of site. The Anniston and
14 Allen gravelly loam is typically developed in old alluvium found along the foot slopes and
15 alluvial fans of the larger hills in the region. The color of the surface soil ranges from dark to
16 reddish brown. The subsurface soil is generally reddish brown in color and consists of a gravelly
17 clay loam to clay or silty clay loam. The Montevallo shaly silty clay loam is developed from the
18 residuum of interbedded shale and fine-grained sandstone or limestone. The surface soil is very
19 dark grayish brown to very dark brown in color. The subsoil consists of a yellowish brown shaly
20 silt loam (U.S. Department of Agriculture [USDA], 1961).

21
22 Figure 1-3 shows that Training Area T-6, Parcel 183(6), is located along the southwestern
23 boundary of the FTMC geologic window discussed in Section 1.4.1. The Jacksonville Fault is
24 mapped across the north-central portion of Parcel 183(6), marking the fault contact between the
25 undifferentiated Cambrian Chilhowee Group and the undifferentiated Mississippian/Ordovician
26 Floyd and Athens Shale. The undifferentiated Floyd and Athens Shale is mapped underlying the
27 northern portion, and the undifferentiated Chilhowee Group is mapped underling the southern
28 portion of the parcel (Osborne et al., 1997).

29
30 The soil encountered during direct-push and drilling activities at Parcel 183(6) consisted
31 predominantly of a light brown to dark brown to reddish to yellowish orange clay with varying
32 amounts of gravel, silt, and sand. The description of the soils encountered at the site are
33 consistent with the mapped Anniston and Allen gravelly loam and the Montevallo shaly silt clay
34 loam. Lithologic logs for the direct-push borings are presented in Appendix A.

35
36 Based on split-spoon and hollow-stem auger refusal, bedrock was encountered between 12 and
37 30 feet below ground surface (bgs) at ten monitoring well locations. Intensely to slightly

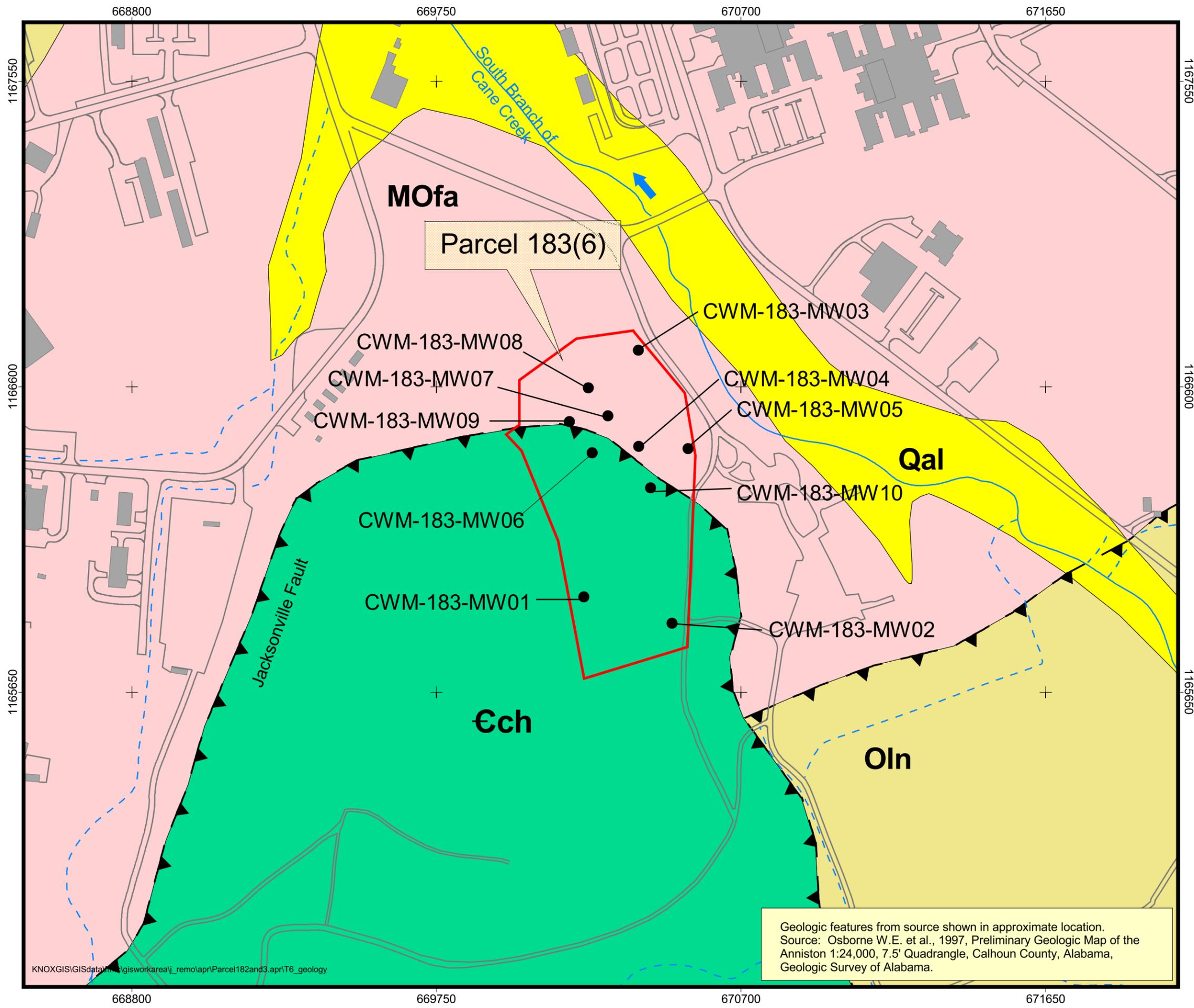


Figure 1-3
Site Geologic Map
Training Area T-6, Parcel 183(6)
 Fort McClellan
 Calhoun County, Alabama

Legend

- Surface Drainage Feature w/flow direction (dashed where intermittent)
- Roads
- Buildings
- Parcel Boundary
- Monitoring Well Location

Geology

- Qal** Quaternary - Alluvium
- MOfa** Mississippian/Ordovician - Floyd & Athens Shale, undifferentiated
- Oln** Ordovician - Little Oak and Newala Limestones, undifferentiated
- ECh** Cambrian - Chilhowee Group, undifferentiated
- Thrust Fault (dashed where inferred; bars on upper sheet)



N




U.S. Army Corps of Engineers
Mobile District

IT CORPORATION
A Member of The IT Group

Geologic features from source shown in approximate location.
 Source: Osborne W.E. et al., 1997, Preliminary Geologic Map of the Anniston 1:24,000, 7.5' Quadrangle, Calhoun County, Alabama, Geologic Survey of Alabama.

KNOXGISIGISdata\m\gisworkarea\j_remo\apr\Parcel182and3.apr\T6_geology

1 weathered, dark gray to black shale was encountered at three monitoring wells located in the
2 southern portion of the parcel (CWM-183-MW01, CWM-183-MW02, and CWM-183-MW06).
3 Intensely to slightly weathered, medium to dark gray limestone was encountered at the remaining
4 seven monitoring well locations in the northern portion of the parcel. The bedrock encountered
5 at monitoring well locations does not appear consistent with units mapped by Osborne et al.
6 (1997), however, proposed drilling and sampling during this RI (Chapter 4) will provide
7 additional lithological and structural information at Parcel 183(6). The lithologic logs for the
8 monitoring well borings are included in Appendix A.

9 10 **1.5 Regional and Site-Specific Hydrogeology**

11 12 **1.5.1 Regional Hydrogeology**

13 The hydrogeology of Calhoun County has been investigated by the Geologic Survey of Alabama
14 (Moser and DeJarnette, 1992) and the U.S. Geological Survey in cooperation with the General
15 Services Administration (Warman and Causey, 1962) and Alabama Department of
16 Environmental Management (ADEM) (Planert and Pritchette, 1989). Groundwater in the
17 vicinity of FTMC occurs in residuum derived from bedrock decomposition, within fractured
18 bedrock along fault zones, and from the development of karst frameworks. Groundwater flow
19 may be estimated to be toward major surface water features. Areas with well-developed
20 residuum horizons may subtly reflect the surface topography, but the groundwater flow direction
21 also may exhibit the influence of pre-existing structural fabrics or the presence of perched water
22 horizons on unweathered ledges or impermeable clay lenses.

23
24 Precipitation and subsequent infiltration provide recharge to the groundwater flow system in the
25 region. The main recharge areas for the aquifers in Calhoun County are located in the valleys.
26 The ridges generally consist of sandstone, quartzite, and slate which are resistant to weathering,
27 relatively unaffected by faulting, and, therefore, relatively impermeable. The ridges have steep
28 slopes and thin to no soil cover, which enhances runoff to the edges of the valleys (Planert and
29 Pritchette 1989).

30
31 The thrust fault zones typical of the county form large storage reservoirs for groundwater. Points
32 of discharge occur as springs, effluent streams, and lakes. Coldwater Spring is one of the largest
33 springs in the State of Alabama, with a discharge of approximately 32 million gallons per day.
34 This spring is the main source of water for the Anniston Water Department, from which FTMC
35 buys its water. The spring is located approximately five miles southwest of Anniston and
36 discharges from the brecciated zone of the Jacksonville Fault (Warman and Causey, 1962).

1 Shallow groundwater on FTMC occurs principally in the residuum developed from Cambrian
2 sedimentary and carbonate bedrock units of the Weisner Formation, Shady Dolomite, and locally
3 in lower Ordovician carbonates. The residuum may yield adequate groundwater for domestic
4 and livestock needs but may go dry during prolonged dry weather. Bedrock permeability is
5 locally enhanced by fracture zones associated with thrust faults and by the development of
6 solution (karst) features.

7
8 Two major aquifers were identified by Planert and Pritchette (1989): the Knox-Shady and
9 Tusculumbia-Fort Payne aquifers. The continuity of the aquifers has been disrupted by the
10 complex geologic structure of the region, such that each major aquifer occurs repeatedly in
11 different areas. The Knox-Shady aquifer group occurs over most of Calhoun County and is the
12 main source of groundwater in the county. It consists of the Cambrian- and Ordovician-aged
13 quartzite and carbonates. The Conasauga Dolomite is the most utilized unit of the Knox-Shady
14 aquifer, with twice as many wells drilled as any other unit (Moser and DeJarnette, 1992).

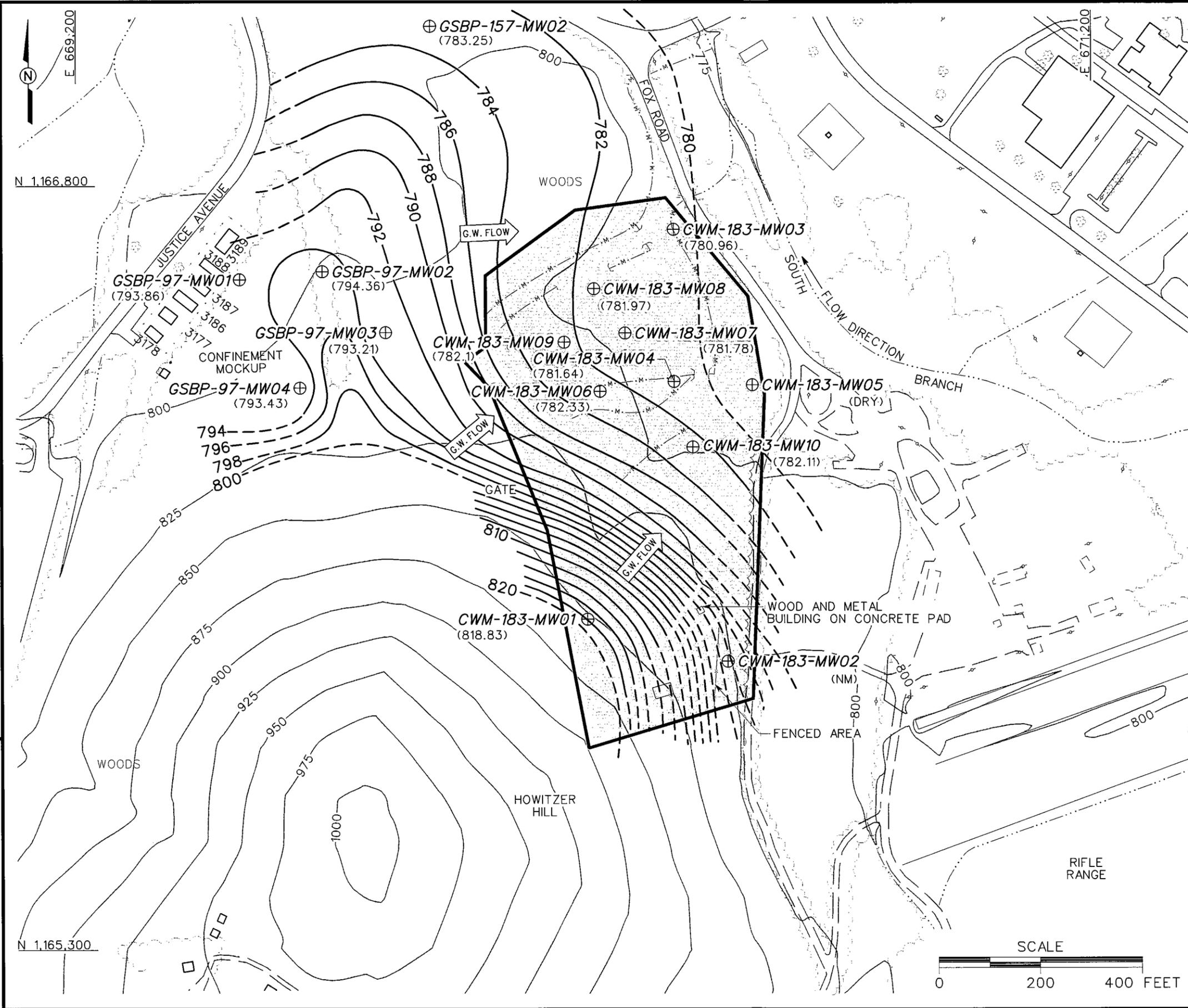
15
16 Regional groundwater flow in the bedrock was approximated for the FTMC vicinity by the U.S.
17 Geological Survey (Scott et al., 1987). Regional groundwater elevation ranged from 800 feet
18 above mean sea level on the main base to about 600 feet above mean sea level to the west on
19 Pelham Range, based on water depths in wells completed across multiple formations.
20 Groundwater elevation contours suggest that regional groundwater flow is from the Main Post to
21 the northwest.

22
23 Scott et al. (1987) concluded that the groundwater surface broadly coincides with the surface
24 topography and that the regional aquifers are hydraulically connected. Groundwater flow on a
25 local scale may be more complex and may be affected by geologic structures such as the shallow
26 thrust faults, rock fracture systems, and karst development in soluble formations.

27 28 **1.5.2 Site-Specific Hydrogeology**

29 Static groundwater levels were measured in the permanent residuum monitoring wells at Parcel
30 183(6) and adjacent Parcels 97(7) and 157(7) on January 7 and 8, 2002 (Table 1-1). Depth to
31 groundwater measurements were taken from the top of casing following procedures outlined in
32 the SAP (IT, 2000a). A potentiometric surface map (Figure 1-4) was constructed for the
33 residuum water-bearing zone at Parcels 183(6), 97(7), and 157(7). As shown on Figure 1-4,
34 groundwater flow is southwest to northeast across this area. The hydraulic gradient decreases
35 from southwest to northeast across the area and, based on the January 2002 data, the horizontal
36 hydraulic gradient ranges from less than 0.01 foot per foot (ft/ft) to 0.1 ft/ft, with an arithmetic

DWG. NO.: ...838936es.032
 PROJ. NO.: 838936
 INITIATOR: D. ALLAN
 PROJ. MGR.: J. YACOB
 DRAFT. CHK. BY: S. MORAN
 ENGR. CHK. BY: S. MORAN
 STARTING DATE: 09/27/02 DATE LAST REV.:
 DRAWN BY: D. BONAR
 09/27/02 02:12:29 PM
 dbomar
 c:\cadd\design\838936es.032



- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - BUILDING
 - FORMER BUILDING
 - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
 - GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
 - GROUNDWATER ELEVATION (FT MSL) (JANUARY 2002)
 - GROUNDWATER FLOW DIRECTION
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - CULVERT WITH HEADWALL
 - SURFACE DRAINAGE / CREEK
 - MANMADE SURFACE DRAINAGE FEATURE
 - FENCE
 - UTILITY POLE
 - MOUND
 - DEPRESSION
 - EXISTING RESIDUUM MONITORING WELL LOCATION
 - NOT MEASURED

FIGURE 1-4
GROUNDWATER ELEVATION MAP
TRAINING AREA T-6 (NAYLOR FIELD)
PARCEL 183(6)

U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018

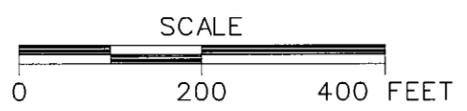


Table 1-1

**Groundwater Elevations
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

Well Location	Date	Depth to Water (ft BTOC)	Top of Casing Elevation (ft amsl)	Ground Elevation (ft amsl)	Groundwater Elevation (ft amsl)
CWM-183-MW01	8-Jan-02	37.08	855.91	853.77	818.83
CWM-183-MW02	8-Jan-02	NM	829.79	827.94	NM
CWM-183-MW03	8-Jan-02	9.85	790.81	788.81	780.96
CWM-183-MW04	8-Jan-02	18.87	800.51	798.34	781.64
CWM-183-MW05	8-Jan-02	Dry	798.55	796.48	Dry
CWM-183-MW06	8-Jan-02	28.59	810.92	808.91	782.33
CWM-183-MW07	8-Jan-02	19.15	800.93	798.83	781.78
CWM-183-MW08	8-Jan-02	16.79	798.76	796.74	781.97
CWM-183-MW09	8-Jan-02	27.08	809.18	806.95	782.10
CWM-183-MW10	8-Jan-02	19.90	802.01	799.96	782.11
GSBP-97-MW01	8-Jan-02	4.13	797.99	795.24	793.86
GSBP-97-MW02	8-Jan-02	10.38	804.74	802.1	794.36
GSBP-97-MW03	8-Jan-02	14.11	807.32	804.81	793.21
GSBP-97-MW04	8-Jan-02	18.40	811.83	809.23	793.43
GSBP-157-MW02	7-Jan-02	9.78	793.03	790.475	783.25

Elevations referenced to the North American Vertical Datum of 1988 (NAVD88).

BTOC - Below top of casing

ft - Feet

amsl - Above mean sea level

NM - Not Measured

1 mean of approximately 0.03 ft/ft (Table 1-2). The proposed drilling and collection of water
2 levels during this RI will provide additional hydrogeological information for Parcel 183(6).

4 **1.6 Scope of Work**

5 The scope of work for activities associated with the RI for Training Area T-6, as specified by the
6 statement of work (USACE, 2002), includes the following tasks:

- 7 • Develop the RI SFSP attachment.
- 8
- 9 • Develop the RI SSHP attachment.
- 10
- 11 • Develop the UXO safety plan attachment.
- 12
- 13 • Conduct a surface and near surface UXO survey over all areas to be included in the
- 14 sampling effort.
- 15
- 16 • Provide downhole UXO support for all intrusive direct-push and drilling activities to
- 17 determine the presence of potential downhole hazards.
- 18
- 19 • Install 14 groundwater monitoring wells (seven residuum and seven bedrock wells).
- 20
- 21 • Collect 24 groundwater samples (14 proposed and 10 pre-existing locations), 11
- 22 surface soil samples, 11 subsurface soil samples, 2 surface water samples, 2 sediment
- 23 samples, and 6 depositional soil samples.
- 24
- 25 • Analyze samples for the parameters listed in Section 4.6.
- 26
- 27 • Conduct slug tests on selected monitoring wells (three residuum and three bedrock
- 28 wells).
- 29
- 30 • Conduct a feasibility study (FS) in accordance with the guidelines, criteria, and
- 31 considerations set forth in the U.S. Environmental Protection Agency (EPA) 1988
- 32 guidance document entitled *Guidance for Conducting Remedial Investigations and*
- 33 *Feasibility Studies Under CERCLA, Interim Final.*
- 34
- 35

36 The USACE-Huntsville requires that work conducted at potential CWM sites use UXO anomaly
37 avoidance techniques. Therefore, prior to initiating field activities at Training Area T-6, Parcel
38 183(6), IT will conduct UXO avoidance activities as outlined in Appendix E of the installation-
39 wide SAP and the attached site-specific UXO safety plan. Surface sweeps and downhole
40 surveys will be conducted to identify anomalies for the purpose of UXO avoidance.

41
42 At the completion of the field activities and sample analyses, draft, draft final, and final RI
43 summary reports will be prepared. Reports will be prepared in accordance with current EPA
44 Region 4 and ADEM requirements.

1
2 Subsequent to completion of the RI field work, an FS will be conducted for Training Area T-6,
3 Parcel 183(6), to identify, develop, screen, and evaluate remedial alternatives for contaminated
4 media at the site, as required under the Comprehensive Environmental Response, Compensation,
5 and Liability Act (CERCLA), as amended, and as specified in the National Oil and Hazardous
6 Substances Contingency Plan (40 *Code of Federal Regulations*, Part 300). An FS report will be
7 prepared in accordance with the guidelines, criteria, and considerations set forth in the EPA
8 guidance document entitled *Guidance for Conducting Remedial Investigations and Feasibility*
9 *Studies Under CERCLA* (EPA, 1988). The report will provide the Base Realignment and
10 Closure (BRAC) Cleanup Team sufficient data to select a feasible and cost-effective remedial
11 alternative that will protect human health and the environment.

12
13 The sections in the FS report will provide the following:

- 14
- 15 • An introduction detailing site background information and a summary of the RI,
16 including the nature and extent of contamination, contaminant fate and transport, and
17 the results of the human health and ecological risk assessments
- 18
- 19 • Identification and screening of remedial technologies
- 20
- 21 • Development and screening of remedial alternatives
- 22
- 23 • A detailed analysis of remedial alternatives.
- 24

25 The Identification and Screening of Technologies section of the report will present objectives for
26 remedial action(s), a summary of applicable health and environmental protection criteria and
27 standards, and identification of volumes or areas of media to which remedial actions may be
28 applied. It will also identify general response actions for each medium of interest, defining
29 containment, treatment, excavation, or other actions, singly or in combination, that may be taken
30 to satisfy the remedial action objectives. Potentially feasible technologies will be presented for
31 each of the general response actions, along with the technical criteria and the site-specific
32 requirements used in the technology screening process and the results of the remedial technology
33 screening.

34
35 The Development and Screening of Remedial Alternatives section of the report will present the
36 remedial alternatives developed by combining the technologies carried forward from the initial
37 screening. Each of the identified alternatives will be screened against three evaluation criteria:
38 1) effectiveness, 2) implementability, and 3) cost.

1 The Detailed Analysis of Remedial Alternatives section will present a description and evaluation
2 of each of the alternatives retained from the alternative screening process. Each alternative will
3 be evaluated individually, and a comparative analysis among alternatives will be presented. The
4 remedial action alternatives selected for evaluation will be individually evaluated against the
5 following seven criteria:

- 6
- 7 • Overall protection of human health and the environment
- 8 • Compliance with applicable or relevant and appropriate requirements
- 9 • Long-term effectiveness and permanence
- 10 • Reduction of toxicity, mobility, and volume
- 11 • Short-term effectiveness
- 12 • Implementability
- 13 • Cost.
- 14

15 Although CERCLA requires the evaluation of alternatives against nine evaluation criteria, the
16 state acceptance and community acceptance criteria will be evaluated in the record of decision
17 after comments have been received on the FS report from the regulatory agencies and the public.

2.0 Summary of Existing Environmental Studies

An EBS was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with U.S. Department of Defense guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria.

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas)
2. Areas where only release or disposal of petroleum products has occurred
3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response
4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken
5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken
6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented
7. Areas that are not evaluated or require additional evaluation.

The EBS was conducted in accordance with the Community Environmental Response Facilitation Act (CERFA) protocols (CERFA-Public Law 102-426) and U.S. Department of Defense policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, EPA Region 4, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

1 Training Area T-6 (Naylor Field), Parcel 183(6), was classified as a Category 6 site in the EBS.
2 Category 6 CERFA parcels are areas of known contamination where required response actions
3 have not been taken.
4

5 The following sections summarize previous investigations conducted at Parcel 183(6), including
6 the SI performed by IT during 2001 and 2002. Section 2.1 provides a synopsis of the
7 investigations conducted prior to the IT SI. The scope of the IT SI was outlined in the document
8 *Chemical Warfare Material Sites – Agent ID Area (Parcel 509), Training Area T-6 (Naylor*
9 *Field) (Parcel 183), Blacktop Training Area (Parcel 511), Fenced Yard in Blacktop Area*
10 *(Parcel 512), Dog Training Area (Parcel 513), Dog Kennel Area (Parcel 516), Training Area T-*
11 *5 (Parcel 182), Former Detection and Identification Area (Parcel 180), Old Burn Pit (Parcel*
12 *514), CBR Proficiency Area (Parcel 517), and Old Toxic Training Area (Parcel 188), Fort*
13 *McClellan, Calhoun County, Alabama (IT, 2000b). The results of the SI conducted by IT are*
14 *discussed in Section 2.2.*
15

16 **2.1 Previous Investigations**

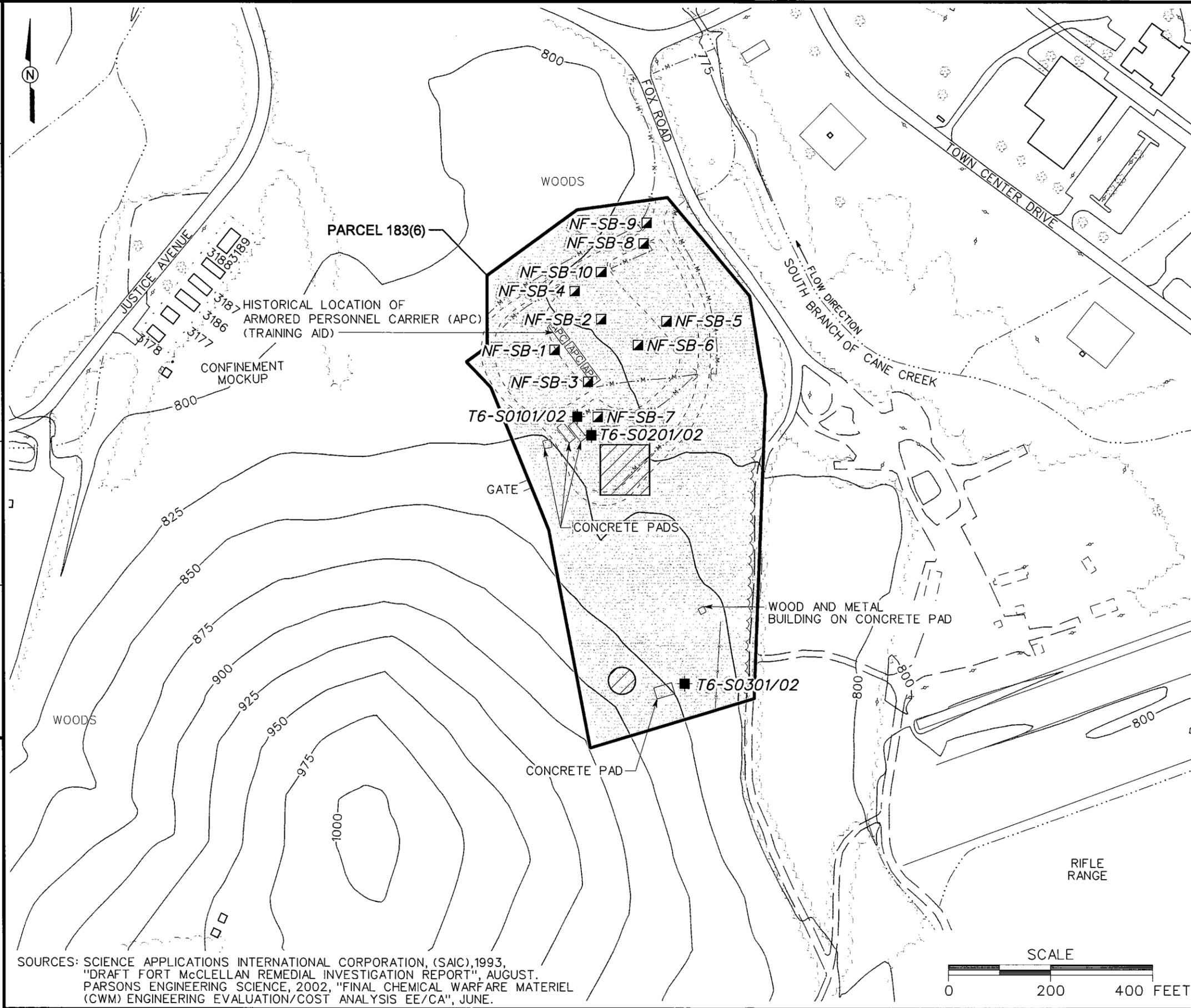
17 Training Area T-6 (Naylor Field), Parcel 183(6), was decontaminated when it was closed early
18 in 1973. Random surface soil samples collected and analyzed by the Army in March 1973
19 revealed no CWM. Based on these results, the Army cleared the area for surface activity (SAIC,
20 1993).
21

22 In 1992, the U.S. Army Technical Escort Unit collected six soil samples from three locations at
23 Parcel 183(6) (Figure 2-1). The soil samples were field screened for HD using miniature
24 continuous air monitoring system (MINICAMS[®]) prior to releasing soil samples for laboratory
25 analysis. The screening results did not indicate the presence of HD in the samples. Laboratory
26 analysis of the soil samples for HD breakdown products did not indicate the presence of these
27 compounds.
28

29 Parsons conducted an EE/CA at 33 FTMC sites, including Training Area T-6 (Naylor Field),
30 Parcel 183(6), to evaluate potential CWM contamination (Parsons, 2002). The investigation
31 consisted of a geophysical survey, intrusive activities, soil sampling, and a qualitative risk
32 evaluation.
33

34 The geophysical survey was performed over a 100-by-100-foot grid in the central portion of the
35 parcel using an EM61 to evaluate a cleared area observed on a 1954 aerial photograph (Figure 2-
36 1). The geophysical survey identified 27 anomalies. Most of the anomalies were located along
37 the axis of a man-made surface drainage feature (ditch) that ran from the southwestern corner to
38 the middle of the east side of the grid. In addition, Schonstedt magnetometers were used to

10/07/02 02:49:18 PM
 STARTING DATE: 09/25/02 DATE LAST REV.:
 DRAWN BY: D. BOMAR
 DRAFT. CHCK. BY: S. MORAN
 ENGR. CHCK. BY: J. YACOBUB
 INITIATOR: J. REMO
 PROJ. MGR.: J. YACOBUB
 DWG. NO.: ...838936es.029
 PROJ. NO.: 838936



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- FORMER BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE
- MOUND
- DEPRESSION
- HISTORICAL FEATURES (SAIC, 1993)
- USATEU (SAIC) SUBSURFACE SOIL SAMPLE LOCATION
- PARSONS SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- APPROXIMATE LOCATION OF GEOPHYSICAL SURVEYS (PARSONS, 2002)
- APPROXIMATE LOCATION OF HORSESHOE-SHAPED MOUND INVESTIGATED BY PARSONS USING MAGNETOMETERS

SOURCES: SCIENCE APPLICATIONS INTERNATIONAL CORPORATION, (SAIC), 1993, "DRAFT FORT McCLELLAN REMEDIAL INVESTIGATION REPORT", AUGUST.
 PARSONS ENGINEERING SCIENCE, 2002, "FINAL CHEMICAL WARFARE MATERIEL (CWM) ENGINEERING EVALUATION/COST ANALYSIS EE/CA", JUNE.

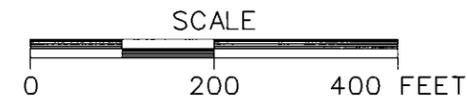


FIGURE 2-1
SAMPLE LOCATION MAP
PREVIOUS INVESTIGATIONS
TRAINING AREA T-6 (NAYLOR FIELD)
PARCEL 183(6)
 U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018
IT CORPORATION
 A Member of The IT Group

1 identify seven additional small anomalies within and near a horseshoe-shaped mound located in
2 southern portion of the parcel (Figure 2-1) (Parsons, 2002).

3
4 Intrusive investigations performed at Parcel 183(6) by Parsons in May 2001 used hand tools to
5 excavate the magnetic anomalies identified during the geophysical investigation. Continuous air
6 monitoring was performed during intrusive activities using MINICAMS, open-path Fourier
7 transform infrared spectroscopy, and photoionization detector (PID). Twenty-nine of the 34
8 anomalies detected at the site were determined to be metallic scrap. The remaining five
9 anomalies were caused by rust flake or iron-rich soil and rocks. A majority of the metallic scrap
10 found in the 100-by-100-foot area in the central portion of the parcel consisted of 8-gallon STB
11 drums or associated drum parts (Parsons, 2002).

12
13 Ten soil borings were advanced at the site to evaluate the presence of chemical agents or
14 breakdown products (Figure 2-1). The soil samples were collected within man-made surface
15 drainage features that had a high probability of collecting runoff (e.g., drainage ditches and
16 shallow depressions). Soil samples were collected from each boring at 0.5 to 1 foot and 3.5 to 4
17 feet bgs. The samples were field screened for HD, GB, and L agents by Edgewood Chemical
18 and Biological Center personnel prior to shipping the samples to the laboratory. The samples
19 were analyzed for GB, HD, L, and breakdown products (1,4-thioxane and 1,4-dithiane). All
20 screening results were below background, and the analytical results did not indicate the presence
21 of analyzed compounds above the reporting limits (Parsons, 2002).

22
23 Two excavated 8-gallon drums contained soil and a white residue that was suspected to be STB.
24 A soil sample collected from each drum was submitted for analysis for GB, HD, L, and
25 breakdown products (1,4-thioxane and 1,4-dithiane). None of the analyzed compounds were
26 detected above the reporting limits (Parsons, 2002).

27
28 No CWM-related items were identified during the EE/CA performed by Parsons. Drums of the
29 type historically associated with decontamination chemicals, such as STB, were encountered by
30 Parsons; however, these items are not considered CWM. Generally, only small quantities of
31 agent were used during training activities, although some exercises reportedly used up to two
32 gallons of agent. Historical evidence indicates only agents and decontamination chemicals were
33 used; ordnance-type items were not used. The soil analytical results indicated no residual agent
34 or degradation products in the vicinity of the drums or at any other area of the site. In addition,
35 concrete “bombs” found on the surface were not considered CWM, because they were used as
36 training aids and not to deliver agent (Parsons, 2002).

1 Based on a historical review and sampling and analysis activities performed during a CWM
2 engineering evaluation and cost analysis (EE/CA) investigation, along with other types of
3 investigations, Parsons concluded that no residual chemical agents or degradation products exist
4 in the sampled media. Therefore, the probability of current or future human health risk due to
5 exposure to chemical agents is very small. Parsons recommended a “no further action”
6 alternative for Parcel 183(6). As a result of the CWM EE/CA investigation by Parsons, USACE-
7 Huntsville Center issued a release of CWM sites on the Main Post to conduct hazardous, toxic,
8 and radioactive waste (HTRW) investigations (Attachment 2).

10 **2.2 Site Investigation**

11 IT conducted SI activities at 11 CWM sites at FTMC, including Training Area T-6 (Naylor
12 Field), Parcel 183(6). The purpose of the SI was to determine the presence or absence of
13 potential site-specific chemicals (PSSC) and to recommend further actions, if appropriate. The
14 following sections summarize the SI activities conducted by IT at Parcel 183(6).

16 **2.2.1 Summary of Field Activities**

17 The SI activities conducted by IT at Training Area T-6 (Naylor Field), Parcel 183(7), consisted
18 of collection and analysis of 15 surface and depositional soil samples, 13 subsurface soil
19 samples, 7 groundwater samples, and 1 surface water and sediment sample. Ten monitoring
20 wells were installed to facilitate collection of the groundwater samples and to provide site-
21 specific geological and hydrogeological characterization information. However, only seven
22 monitoring wells produced sufficient groundwater for sampling.

24 Samples collected during the SI at Parcel 183(6) were analyzed for the following parameters:

- 26 • Target analyte list metals – EPA Methods 6010B/7471A
- 28 • Target compound list (TCL) volatile organic compounds (VOC) – EPA Method
29 8260B
- 31 • TCL semivolatile organic compound (SVOC) – EPA Method 8270C
- 33 • CWM breakdown products (including orthosulfur compounds) EPA Methods 8321
34 and 8270M.

36 The sediment sample was analyzed for the following additional parameters:

- 38 • Total organic carbon (TOC) – EPA Method 9060
- 40 • Grain size – American Society for Testing and Materials (ASTM) Method
41 D421/D422.

1
2 The samples were analyzed using EPA SW-846 methods, including Update III methods where
3 applicable, as presented in the SAP (IT, 2000a). Sample locations are shown on Figure 2-2.
4 Sample locations, media, and rationale are summarized in Table 2-1. Sample collection logs are
5 included in Appendix B.

6
7 Environmental sampling at Parcel 183(6) was performed following procedures outlined in the SI
8 SFSP (IT, 2000b) and in conjunction with the SSHP as attachments to the WP (IT, 1998) and
9 SAP (IT, 2000a). The monitoring wells were installed and developed as described in the SAP
10 (IT, 2000a). Table 2-2 summarizes construction details of the monitoring wells installed at the
11 site. The lithological logs and well construction logs are included in Appendix A. Well
12 development logs are included in Appendix C. Table 2-3 summarizes the groundwater and
13 surface water field parameters.

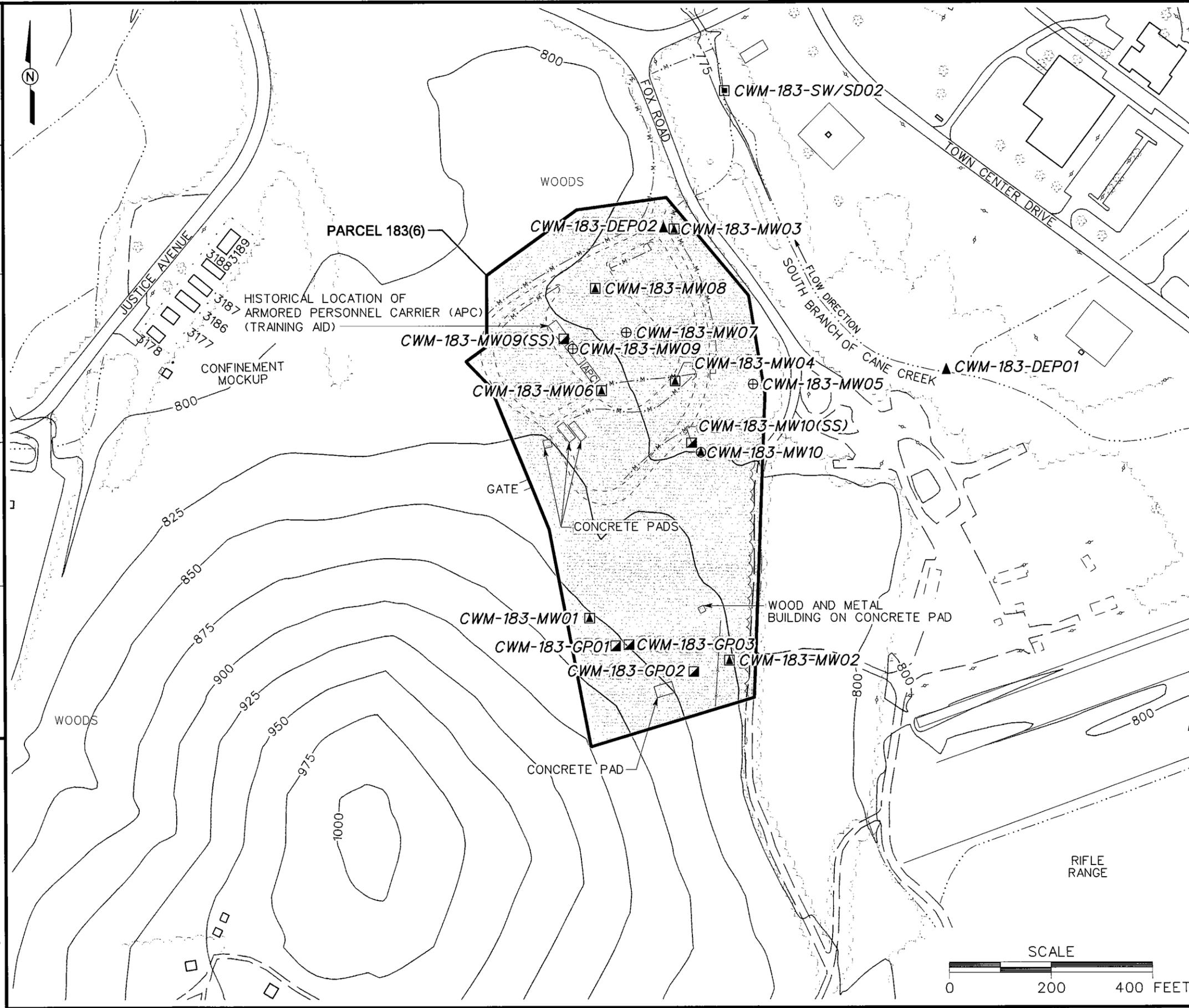
14
15 Sample locations were surveyed using global positioning system (GPS) and conventional civil
16 survey techniques described in the SAP (IT, 2000a). Horizontal coordinates were referenced to
17 the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983.
18 Elevations were referenced to the North American Vertical Datum of 1988. Horizontal
19 coordinates and elevations are included in Appendix D.

20
21 Four variances to the SFSP were recorded during the completion of the SI at Training Area T-6,
22 Parcel 183(6). These variances did not alter the intent of the investigation or the sampling
23 rationale presented in the SFSP (IT, 2000b). The variances to the SFSP are summarized in Table
24 2-4, and the variance reports are included in Appendix E.

25 26 **2.2.2 Summary of Analytical Results**

27 The results of the chemical analyses of samples collected at Training Area T-6 (Naylor Field),
28 Parcel 183(6), indicate that metals, VOCs, and one SVOC were detected in the various site
29 media. To evaluate the nature and extent of contamination at the site, the analytical results were
30 compared to human health site-specific screening levels (SSSL), ecological screening values
31 (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed by
32 IT as part of the human health and ecological risk evaluations associated with SIs being
33 performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs and
34 ESVs are presented in the *Final Human Health and Ecological Screening Values and PAH*
35 *Background Summary Report* (IT, 2000c). Background metals screening values are presented in
36 the *Final Background Metals Survey Report, Fort McClellan, Alabama* (SAIC, 1998). Summary
37 statistics for background metals samples collected at FTMC are included in Appendix F.

10/07/02
 STARTING DATE: 09/25/02 DATE LAST REV.:
 DRAWN BY: D. BOWAR
 DRAFT. CHK. BY: ENGR. CHK. BY: S. MORAN
 INITIATOR: J. REMO
 PROJ. MGR.: J. YACOUB
 DWG. NO.: ... 838936es.030
 PROJ. NO.: 838936



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- FORMER BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE
- MOUND
- DEPRESSION
- HISTORICAL FEATURES (SAIC, 1993)
- SURFACE WATER/SEDIMENT SAMPLE LOCATION
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- RESIDUUM MONITORING WELL LOCATION (DRY WELL)

FIGURE 2-2
 SAMPLE LOCATION MAP
 IT SITE INVESTIGATION
 TRAINING AREA T-6 (NAYLOR FIELD)
 PARCEL 183(6)

U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018

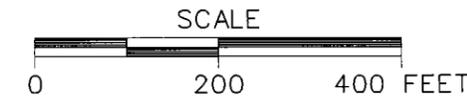


Table 2-1

**Sampling Locations and Rationale
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

Sample Location	Media	Rationale
CWM-183-DEP01	Depositional Soil	A depositional soil sample was collected from the dry creek bed of the South Branch of Cane Creek upstream of the parcel to determine if potential site-specific chemicals (PSSC) are present.
CWM-183-DEP02	Depositional Soil	A depositional soil sample was collected from a drainage ditch in the northern portion of the parcel to determine if PSSC are present.
CWM-183-GP01	Surface soil Subsurface soil	Surface and subsurface soil samples were collected just north of a concrete pad used for decontamination training activities located in the southern portion of the parcel to determine if PSSC are present.
CWM-183-GP02	Surface soil Subsurface soil	Surface and subsurface soil samples were collected downslope of a concrete pad used for decontamination training activities to determine if PSSC are present.
CWM-183-GP03	Surface soil Subsurface soil	Surface and subsurface soil samples were collected just north of a concrete pad used for decontamination training activities located in the southern portion of the parcel to determine if PSSC are present.
CWM-183-MW01	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the southwestern area of the parcel to determine if PSSC are present.
CWM-183-MW02	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected downgradient of the concrete pad used for decontamination training activities located in the southern portion of the parcel to determine if PSSC are present.
CWM-183-MW03	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the northeast corner of parcel to determine if PSSC are present.
CWM-183-MW04	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected downgradient of concrete pads used for decontamination training activities located in the west-central portion of the parcel to determine if PSSC are present.
CWM-183-MW05	Surface soil Subsurface soil	Surface and subsurface soil samples were collected near the eastern boundary of the parcel to determine if PSSC are present.
CWM-183-MW06	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected downgradient of the concrete pads used for decontamination training activities located near the center of the parcel to determine if PSSC are present.
CWM-183-MW07	Surface soil Subsurface soil	Surface and subsurface soil samples were collected downslope of the historical location of the armored personnel carriers (APC) used for decontamination training activities to determine if PSSC are present.
CWM-183-MW08	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the north-central portion of the parcel, downgradient of the historical location of the APCs used for decontamination training activities to determine if PSSC are present.

Table 2-1

**Sampling Locations and Rationale
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

Sample Location	Media	Rationale
CWM-183-MW09	Surface soil Subsurface soil	Surface and subsurface soil samples were collected in a series of trenches in the northwest corner of the parcel to determine if PSSC are present.
CWM-183-MW10	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected downgradient of an area where pieces of buried supertropical bleach drums were found to determine if PSSC are present.
CWM-183-SW/SD02	Surface water Sediment	Surface water and sediment samples were collected from the South Branch of Cane Creek downstream of the site to determine if PSSC are present.

PSSC - Potential site-specific chemicals.

APC - Armored personnel carrier.

Table 2-4

**Variations to the Final Site-Specific Field Sampling Plan
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 2)

Variance to the SFSP	Justification for Variance	Impact to Site Investigation
<p>The Final Site-Specific Field Sampling Plan proposed the collection of surface water and sediment samples at sample locations CWM-183-SWSD01 and CWM-183-SWSD03. Surface water and sediment samples were not collected from these locations. Depositional soil samples CWM-186-DEP01 and CWM-186-DEP02 were collected at these locations.</p>	<p>Surface water and sediment were not collected from these two locations because surface water and sediment were not present in the creek and drainage ditch at the time of sample collection. Several attempts were made to collect the samples but all attempts were unsuccessful.</p>	<p>None. Depositional soil samples collected from these locations are representative samples.</p>
<p>The Final Site-Specific Field Sampling Plan proposed the collection of ten surface soil samples and ten subsurface soil samples in order to determine if potential site-specific chemicals (PSSC) are present. Thirteen surface soil samples and thirteen subsurface soil samples were collected for chemical analysis to determine if PSSC are present.</p>	<p>The IT Site Manager made a decision to collect three additional surface and subsurface soil samples at sample locations CWM-183-GP03, CWM-183-MW09 and CWM-183-MW10. These three additional surface and subsurface soil samples were collected to better determine if PSSC are present.</p>	<p>None. The samples provided additional data to determine if PSSC are present.</p>
<p>The Final Site-Specific Field Sampling Plan proposed the installation of eight residuum monitoring wells. Two additional residuum monitoring wells CWM-183-MW09 and CWM-183-MW10 were installed.</p>	<p>The IT Site Manager made a decision to install two additional residuum monitoring wells CWM-183-MW09 and CWM-183-MW10 based on information attained from the Parsons (2002) CWM investigation and site features observed during SI activities at Parcel 183(6).</p>	<p>None. The wells provided additional data to determine if PSSC are present.</p>

Table 2-4

**Variations to the Final Site-Specific Field Sampling Plan
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

Variance to the SFSP	Justification for Variance	Impact to Site Investigation
<p>The Final Site-Specific Field Sampling Plan proposed the installation of eight residuum monitoring wells for the collection of eight groundwater samples. Two additional wells CWM-183-MW09 and CWM-183-MW10 were also installed for the collection of groundwater samples. Of the ten residuum monitoring wells installed at Parcel 183(6), only seven wells were sampled. Groundwater samples were not collected from monitoring wells CWM-183-MW05, CWM-183-MW07 and CWM-183-MW09.</p>	<p>Competent bedrock was encountered at monitoring wells CWM-183-MW05, CWM-183-MW07, and CWM-183-MW09 prior to reaching groundwater. Based on previous investigations at FTMC, groundwater tends to migrate along the soil/ bedrock interface. Therefore, a decision was made to install the wells on top of competent bedrock with the intention of having groundwater enter the well when the water table was higher. To date, groundwater has been present at times in the wells but not enough was present to acquire a sample. These wells will be sampled if an adequate amount of water is present in the well.</p>	<p>None. The wells that were sampled provided sufficient data to determine the presence of site-related contaminants.</p>

1 The following sections and Tables 2-5 through 2-9 summarize the results of the comparison of
2 the detected constituents to the SSSLs, ESVs, and background screening values. Complete
3 analytical data are presented in Appendix G.
4

5 **2.2.2.1 Surface and Depositional Analytical Results**

6 Thirteen surface soil samples and two depositional soil samples were collected at Training Area
7 T-6, Parcel 183(6). Surface and depositional soil samples were collected from the uppermost
8 foot of soil at the locations shown on Figure 2-2. Analytical results were compared to residential
9 human health SSSLs, ESVs, and metals background screening values, as presented in Table 2-5.
10

11 **Metals.** Twenty-one metals were detected in the surface and depositional soil at Training Area
12 T-6. The concentrations of seven metals (aluminum, antimony, arsenic, chromium, iron,
13 manganese, and vanadium) exceeded SSSLs. Of these metals, aluminum (nine sample
14 locations), antimony (CWM-183-DEP01), chromium (CWM-183-MW10), iron (CWM-183-
15 GP01 and CWM-183-MW09), and vanadium (CWM-183-MW07) exceeded their respective
16 background concentrations. With the exception of the antimony results, the aforementioned
17 metals were within their upper background ranges (Appendix F). The antimony result at CWM-
18 183-DEP01 (5.59 milligrams per kilogram [mg/kg]) only minimally exceeded its SSSL (3.11
19 mg/kg) and upper background range (2.6 mg/kg). The result was flagged with a “J” data
20 qualifier, indicating that the metal was positively identified but the concentration was estimated
21 below the reporting limit.
22

23 Thirteen metals were detected at concentrations exceeding ESVs. Of these metals, eleven had
24 results also exceeding their respective background concentrations in one or more samples:
25 aluminum, antimony, beryllium, chromium, cobalt, copper, iron, nickel, selenium, vanadium,
26 and zinc. However, only antimony (CWM-183-DEP01), beryllium (four sample locations),
27 copper (three sample locations), nickel (CWM-183-MW06), and selenium (four sample
28 locations) exceeded their respective ESVs and upper background ranges (Appendix F). Figure 2-
29 3 shows the sample locations with metals results exceeding SSSLs\ESVs and upper background
30 range.
31

32 **Volatile Organic Compounds.** Fourteen VOCs were detected in surface and depositional
33 soil samples collected at Parcel 183(6). The trichlorofluoromethane results, four methylene
34 chloride results, and one acetone result were flagged with a “B” data qualifier, signifying that
35 these compounds were also detected in an associated laboratory or field blank sample. The
36 majority of the remaining VOC results were flagged with a “J” data qualifier, indicating that
37 concentrations were estimated. VOC concentrations in the surface and depositional soil samples
38 ranged from 0.001 to 0.71 mg/kg.

Table 2-5

Surface and Depositional Soil Sample Analytical Results
 Training Area T-6 (Naylor Field), Parcel 183(6)
 Fort McClellan, Calhoun County, Alabama

(Page 1 of 6)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)						CWM-183 CWM-183-DEP01 TG0023 7-Nov-01 0- 0.5						CWM-183 CWM-183-DEP02 TG0024 7-Nov-01 0- 0.5						CWM-183 CWM-183-GP01 TG0001 17-Oct-01 0- 1						
Parameter	Units	UBR ^a	BKG ^b	SSSL ^c	ESV ^c	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	
METALS																								
Aluminum	mg/kg	3.99E+04	1.63E+04	7.80E+03	5.00E+01	7.45E+03					YES	3.42E+03						YES	2.00E+04			YES	YES	YES
Antimony	mg/kg	2.60E+00	1.99E+00	3.11E+00	3.50E+00	5.59E+00	J	YES	YES	YES	YES	ND							ND					
Arsenic	mg/kg	4.90E+01	1.37E+01	4.26E-01	1.00E+01	6.69E+00				YES		1.54E+00					YES		8.22E+00				YES	
Barium	mg/kg	2.88E+02	1.24E+02	5.47E+02	1.65E+02	8.44E+01						3.33E+01							1.10E+02					
Beryllium	mg/kg	8.70E-01	8.00E-01	9.60E+00	1.10E+00	1.37E+00		YES	YES		YES	ND							1.44E+00		YES	YES		YES
Calcium	mg/kg	1.79E+04	1.72E+03	NA	NA	9.05E+02						4.37E+03			YES				3.46E+02					
Chromium	mg/kg	1.34E+02	3.70E+01	2.32E+01	4.00E-01	1.88E+01					YES	6.41E+00					YES		2.83E+01				YES	YES
Cobalt	mg/kg	7.10E+01	1.52E+01	4.68E+02	2.00E+01	7.01E+00						1.81E+00	J						2.74E+01			YES		YES
Copper	mg/kg	2.40E+01	1.27E+01	3.13E+02	4.00E+01	9.14E+00						6.85E+00							4.15E+01		YES	YES		YES
Iron	mg/kg	5.63E+04	3.42E+04	2.34E+03	2.00E+02	3.27E+04				YES	YES	5.97E+03					YES	YES	3.47E+04			YES	YES	YES
Lead	mg/kg	8.30E+01	4.01E+01	4.00E+02	5.00E+01	1.31E+01						1.18E+01							2.33E+01					
Magnesium	mg/kg	9.60E+03	1.03E+03	NA	4.40E+05	8.66E+02						5.28E+02							7.95E+02					
Manganese	mg/kg	6.85E+03	1.58E+03	3.63E+02	1.00E+02	4.48E+02				YES	YES	2.10E+02					YES		6.19E+02				YES	YES
Mercury	mg/kg	3.20E-01	8.00E-02	2.33E+00	1.00E-01	ND						ND							3.40E-02	J				
Nickel	mg/kg	2.20E+01	1.03E+01	1.54E+02	3.00E+01	1.03E+01						2.43E+00	J						8.69E+00					
Potassium	mg/kg	6.01E+03	8.00E+02	NA	NA	1.96E+03				YES		5.33E+02	J						2.05E+03			YES		
Selenium	mg/kg	1.30E+00	4.80E-01	3.91E+01	8.10E-01	6.11E-01	B			YES		ND							1.84E+00		YES	YES		YES
Silver	mg/kg	1.90E+00	3.60E-01	3.91E+01	2.00E+00	ND						ND							ND					
Sodium	mg/kg	5.63E+02	6.34E+02	NA	NA	4.84E+01	B					6.57E+01	B						5.87E+01	J				
Vanadium	mg/kg	1.58E+02	5.88E+01	5.31E+01	2.00E+00	2.15E+01					YES	1.07E+01					YES		5.33E+01				YES	YES
Zinc	mg/kg	2.09E+02	4.06E+01	2.34E+03	5.00E+01	6.33E+01			YES		YES	2.76E+01							6.13E+01	J		YES		YES
VOLATILE ORGANIC COMPOUNDS																								
1,1,2,2-Tetrachloroethane	mg/kg	NA	NA	3.13E+00	1.00E-01	ND						ND							ND					
2-Butanone	mg/kg	NA	NA	4.66E+03	8.96E+01	1.60E-02	J					6.60E-02	J						1.10E-02	J				
Acetone	mg/kg	NA	NA	7.76E+02	2.50E+00	1.60E-01	J					7.10E-01	J						1.30E-01	J				
Bromodichloromethane	mg/kg	NA	NA	1.02E+01	1.00E-01	ND						ND							ND					
Carbon tetrachloride	mg/kg	NA	NA	4.83E+00	1.00E+03	ND						ND							ND					
Chloroform	mg/kg	NA	NA	1.03E+02	1.00E-03	ND						ND							ND					
Cis-1,2-Dichloroethene	mg/kg	NA	NA	7.77E+01	1.00E-01	ND						ND							ND					
Methylene chloride	mg/kg	NA	NA	8.41E+01	2.00E+00	2.10E-03	B					2.60E-03	B						ND					
Styrene	mg/kg	NA	NA	1.55E+03	1.00E-01	ND						1.50E-01					YES		ND					
Tetrachloroethene	mg/kg	NA	NA	1.21E+01	1.00E-02	ND						ND							ND					
Toluene	mg/kg	NA	NA	1.55E+03	5.00E-02	ND						1.40E-02							ND					
Trichloroethene	mg/kg	NA	NA	5.72E+01	1.00E-03	ND						ND							ND					
Trichlorofluoromethane	mg/kg	NA	NA	2.33E+03	1.00E-01	ND						ND							2.20E-03	B				
p-Cymene	mg/kg	NA	NA	1.55E+03	NA	ND						7.40E-03	J						ND					

Table 2-5

**Surface and Depositional Soil Sample Analytical Results
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 6)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)						CWM-183 CWM-183-GP02 TG0003 17-Oct-01 0-1					CWM-183 CWM-183-GP03 TG0025 26-Nov-01 0-1					CWM-183 CWM-183-MW01 TG0005 17-Oct-01 0-1								
Parameter	Units	UBR ^a	BKG ^b	SSSL ^c	ESV ^e	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	
METALS																								
Aluminum	mg/kg	3.99E+04	1.63E+04	7.80E+03	5.00E+01	1.76E+04			YES	YES	YES	1.92E+04			YES	YES	YES	1.80E+04			YES	YES	YES	
Antimony	mg/kg	2.60E+00	1.99E+00	3.11E+00	3.50E+00	ND						ND						ND						
Arsenic	mg/kg	4.90E+01	1.37E+01	4.26E-01	1.00E+01	7.12E+00			YES			8.76E+00	J			YES		5.86E+00				YES		
Barium	mg/kg	2.88E+02	1.24E+02	5.47E+02	1.65E+02	6.45E+01						8.79E+01	J					1.30E+02			YES			
Beryllium	mg/kg	8.70E-01	8.00E-01	9.60E+00	1.10E+00	5.24E-01	J					9.25E-01	J	YES	YES			7.46E-01	J					
Calcium	mg/kg	1.79E+04	1.72E+03	NA	NA	6.57E+03			YES			1.93E+02						2.38E+02						
Chromium	mg/kg	1.34E+02	3.70E+01	2.32E+01	4.00E-01	1.64E+01				YES		1.43E+01					YES	1.70E+01						YES
Cobalt	mg/kg	7.10E+01	1.52E+01	4.68E+02	2.00E+01	4.46E+00						ND						1.44E+01						
Copper	mg/kg	2.40E+01	1.27E+01	3.13E+02	4.00E+01	2.80E+01		YES	YES			7.01E+01		YES	YES		YES	2.22E+01			YES			
Iron	mg/kg	5.63E+04	3.42E+04	2.34E+03	2.00E+02	2.39E+04				YES	YES	2.65E+04				YES	YES	1.76E+04				YES	YES	
Lead	mg/kg	8.30E+01	4.01E+01	4.00E+02	5.00E+01	1.61E+01						2.40E+01	J					2.10E+01						
Magnesium	mg/kg	9.60E+03	1.03E+03	NA	4.40E+05	8.56E+02						4.56E+02						7.81E+02						
Manganese	mg/kg	6.85E+03	1.58E+03	3.63E+02	1.00E+02	2.35E+02				YES		1.38E+01	J					7.20E+02				YES	YES	
Mercury	mg/kg	3.20E-01	8.00E-02	2.33E+00	1.00E-01	ND						4.70E-02	B					ND						
Nickel	mg/kg	2.20E+01	1.03E+01	1.54E+02	3.00E+01	1.09E+01			YES			4.56E+00						8.00E+00						
Potassium	mg/kg	6.01E+03	8.00E+02	NA	NA	1.23E+03			YES			2.24E+03			YES			1.11E+03			YES			
Selenium	mg/kg	1.30E+00	4.80E-01	3.91E+01	8.10E-01	9.87E-01	J		YES	YES		2.02E+00	B	YES	YES		YES	9.98E-01	J		YES		YES	
Silver	mg/kg	1.90E+00	3.60E-01	3.91E+01	2.00E+00	1.37E+00	J		YES			ND						ND						
Sodium	mg/kg	5.63E+02	6.34E+02	NA	NA	5.76E+01	J					5.45E+01	J					5.40E+01	J					
Vanadium	mg/kg	1.58E+02	5.88E+01	5.31E+01	2.00E+00	4.18E+01					YES	3.94E+01					YES	3.89E+01						YES
Zinc	mg/kg	2.09E+02	4.06E+01	2.34E+03	5.00E+01	4.42E+01	J		YES			4.20E+01			YES			3.64E+01	J					
VOLATILE ORGANIC COMPOUNDS																								
1,1,2,2-Tetrachloroethane	mg/kg	NA	NA	3.13E+00	1.00E-01	5.30E-03						ND						ND						
2-Butanone	mg/kg	NA	NA	4.66E+03	8.96E+01	ND						ND						7.70E-03	J					
Acetone	mg/kg	NA	NA	7.76E+02	2.50E+00	2.80E-02	J					ND						1.20E-01	J					
Bromodichloromethane	mg/kg	NA	NA	1.02E+01	1.00E-01	ND						ND						ND						
Carbon tetrachloride	mg/kg	NA	NA	4.83E+00	1.00E+03	1.30E-02						ND						ND						
Chloroform	mg/kg	NA	NA	1.03E+02	1.00E-03	1.20E-01					YES	ND						ND						
Cis-1,2-Dichloroethene	mg/kg	NA	NA	7.77E+01	1.00E-01	ND						ND						ND						
Methylene chloride	mg/kg	NA	NA	8.41E+01	2.00E+00	2.80E-03	B					ND						ND						
Styrene	mg/kg	NA	NA	1.55E+03	1.00E-01	ND						ND						ND						
Tetrachloroethene	mg/kg	NA	NA	1.21E+01	1.00E-02	ND						ND						ND						
Toluene	mg/kg	NA	NA	1.55E+03	5.00E-02	ND						ND						ND						
Trichloroethene	mg/kg	NA	NA	5.72E+01	1.00E-03	1.80E-03	J				YES	ND						ND						
Trichlorofluoromethane	mg/kg	NA	NA	2.33E+03	1.00E-01	ND						ND						1.60E-03	B					
p-Cymene	mg/kg	NA	NA	1.55E+03	NA	ND						ND						ND						

Table 2-5

Surface and Depositional Soil Sample Analytical Results
 Training Area T-6 (Naylor Field), Parcel 183(6)
 Fort McClellan, Calhoun County, Alabama

(Page 3 of 6)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)						CWM-183 CWM-183-MW02 TG0007 17-Oct-01 0- 1						CWM-183 CWM-183-MW03 TG0009 17-Oct-01 0- 1						CWM-183 CWM-183-MW04 TG0011 17-Oct-01 0- 1						
Parameter	Units	UBR ^a	BKG ^b	SSSL ^c	ESV ^c	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	
METALS																								
Aluminum	mg/kg	3.99E+04	1.63E+04	7.80E+03	5.00E+01	2.38E+04			YES	YES	YES	1.54E+04					YES	YES	1.76E+04			YES	YES	YES
Antimony	mg/kg	2.60E+00	1.99E+00	3.11E+00	3.50E+00	ND						ND							ND					
Arsenic	mg/kg	4.90E+01	1.37E+01	4.26E-01	1.00E+01	8.58E+00				YES		6.13E+00					YES		7.21E+00				YES	
Barium	mg/kg	2.88E+02	1.24E+02	5.47E+02	1.65E+02	9.77E+01						8.39E+01							1.05E+02					
Beryllium	mg/kg	8.70E-01	8.00E-01	9.60E+00	1.10E+00	1.36E+00		YES	YES		YES	5.95E-01	J						6.17E-01	J				
Calcium	mg/kg	1.79E+04	1.72E+03	NA	NA	1.37E+02						1.62E+03							1.05E+03					
Chromium	mg/kg	1.34E+02	3.70E+01	2.32E+01	4.00E-01	1.64E+01					YES	1.83E+01					YES		2.23E+01					YES
Cobalt	mg/kg	7.10E+01	1.52E+01	4.68E+02	2.00E+01	3.55E+00	B					8.65E+00							4.38E+00					
Copper	mg/kg	2.40E+01	1.27E+01	3.13E+02	4.00E+01	6.10E+01		YES	YES		YES	2.41E+01		YES	YES				3.19E+01		YES	YES		
Iron	mg/kg	5.63E+04	3.42E+04	2.34E+03	2.00E+02	3.32E+04				YES	YES	2.14E+04					YES	YES	2.49E+04				YES	YES
Lead	mg/kg	8.30E+01	4.01E+01	4.00E+02	5.00E+01	2.72E+01						2.84E+01							1.54E+01					
Magnesium	mg/kg	9.60E+03	1.03E+03	NA	4.40E+05	6.90E+02						8.00E+02							1.09E+03		YES			
Manganese	mg/kg	6.85E+03	1.58E+03	3.63E+02	1.00E+02	1.50E+01						3.73E+02					YES	YES	1.69E+02					YES
Mercury	mg/kg	3.20E-01	8.00E-02	2.33E+00	1.00E-01	ND						ND							ND					
Nickel	mg/kg	2.20E+01	1.03E+01	1.54E+02	3.00E+01	7.39E+00						7.69E+00							6.00E+00					
Potassium	mg/kg	6.01E+03	8.00E+02	NA	NA	2.53E+03			YES			1.13E+03							2.25E+03			YES		
Selenium	mg/kg	1.30E+00	4.80E-01	3.91E+01	8.10E-01	1.99E+00		YES	YES		YES	7.28E-01	J		YES				1.51E+00		YES	YES		YES
Silver	mg/kg	1.90E+00	3.60E-01	3.91E+01	2.00E+00	1.54E+00	J		YES			ND							ND					
Sodium	mg/kg	5.63E+02	6.34E+02	NA	NA	6.88E+01	J					5.71E+01	J						5.91E+01	J				
Vanadium	mg/kg	1.58E+02	5.88E+01	5.31E+01	2.00E+00	5.42E+01				YES	YES	3.85E+01					YES		4.55E+01					YES
Zinc	mg/kg	2.09E+02	4.06E+01	2.34E+03	5.00E+01	4.82E+01	J		YES			4.68E+01	J		YES				3.66E+01	J				
VOLATILE ORGANIC COMPOUNDS																								
1,1,2,2-Tetrachloroethane	mg/kg	NA	NA	3.13E+00	1.00E-01	ND						8.70E-03							4.80E-03					
2-Butanone	mg/kg	NA	NA	4.66E+03	8.96E+01	ND						1.40E-02	J						7.80E-03	J				
Acetone	mg/kg	NA	NA	7.76E+02	2.50E+00	ND						1.60E-01	J						1.40E-01	J				
Bromodichloromethane	mg/kg	NA	NA	1.02E+01	1.00E-01	ND						ND							ND					
Carbon tetrachloride	mg/kg	NA	NA	4.83E+00	1.00E+03	ND						ND							ND					
Chloroform	mg/kg	NA	NA	1.03E+02	1.00E-03	ND						ND							ND					
Cis-1,2-Dichloroethene	mg/kg	NA	NA	7.77E+01	1.00E-01	ND						ND							1.90E-03	J				
Methylene chloride	mg/kg	NA	NA	8.41E+01	2.00E+00	ND						ND							ND					
Styrene	mg/kg	NA	NA	1.55E+03	1.00E-01	ND						ND							ND					
Tetrachloroethene	mg/kg	NA	NA	1.21E+01	1.00E-02	ND						ND							1.00E-03	J				
Toluene	mg/kg	NA	NA	1.55E+03	5.00E-02	ND						1.30E-03	J						ND					
Trichloroethene	mg/kg	NA	NA	5.72E+01	1.00E-03	ND						2.00E-02					YES		2.40E-03	J				YES
Trichlorofluoromethane	mg/kg	NA	NA	2.33E+03	1.00E-01	ND						ND							ND					
p-Cymene	mg/kg	NA	NA	1.55E+03	NA	ND						ND							ND					

Table 2-5

Surface and Depositional Soil Sample Analytical Results
 Training Area T-6 (Naylor Field), Parcel 183(6)
 Fort McClellan, Calhoun County, Alabama

(Page 4 of 6)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)						CWM-183 CWM-183-MW05 TG0013 18-Oct-01 0- 1						CWM-183 CWM-183-MW06 TG0015 17-Oct-01 0- 1						CWM-183 CWM-183-MW07 TG0017 17-Oct-01 0- 1						
Parameter	Units	UBR ^a	BKG ^b	SSSL ^c	ESV ^e	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	
METALS																								
Aluminum	mg/kg	3.99E+04	1.63E+04	7.80E+03	5.00E+01	1.57E+04				YES	YES	2.12E+04			YES	YES	YES	2.00E+04			YES	YES	YES	YES
Antimony	mg/kg	2.60E+00	1.99E+00	3.11E+00	3.50E+00	ND						ND						ND						
Arsenic	mg/kg	4.90E+01	1.37E+01	4.26E-01	1.00E+01	8.26E+00				YES		7.14E+00				YES		8.46E+00					YES	
Barium	mg/kg	2.88E+02	1.24E+02	5.47E+02	1.65E+02	9.06E+01						1.16E+02						8.45E+01						
Beryllium	mg/kg	8.70E-01	8.00E-01	9.60E+00	1.10E+00	9.08E-01	B	YES	YES			1.15E+00		YES	YES		YES	6.26E-01	J					
Calcium	mg/kg	1.79E+04	1.72E+03	NA	NA	5.06E+02						4.42E+02						5.08E+02						
Chromium	mg/kg	1.34E+02	3.70E+01	2.32E+01	4.00E-01	2.35E+01				YES	YES	2.06E+01					YES	2.40E+01					YES	YES
Cobalt	mg/kg	7.10E+01	1.52E+01	4.68E+02	2.00E+01	1.40E+01						3.02E+01			YES		YES	4.48E+01						
Copper	mg/kg	2.40E+01	1.27E+01	3.13E+02	4.00E+01	2.53E+01		YES	YES			2.33E+01			YES			3.56E+01		YES	YES			
Iron	mg/kg	5.63E+04	3.42E+04	2.34E+03	2.00E+02	2.93E+04				YES	YES	3.05E+04				YES	YES	3.09E+04					YES	YES
Lead	mg/kg	8.30E+01	4.01E+01	4.00E+02	5.00E+01	2.40E+01	J					2.14E+01						1.30E+01						
Magnesium	mg/kg	9.60E+03	1.03E+03	NA	4.40E+05	8.05E+02						1.06E+03			YES			9.92E+02						
Manganese	mg/kg	6.85E+03	1.58E+03	3.63E+02	1.00E+02	7.99E+02				YES	YES	1.12E+03				YES	YES	1.49E+02						YES
Mercury	mg/kg	3.20E-01	8.00E-02	2.33E+00	1.00E-01	3.50E-02	J					ND						ND						
Nickel	mg/kg	2.20E+01	1.03E+01	1.54E+02	3.00E+01	1.18E+01				YES		4.07E+01		YES	YES		YES	9.01E+00						
Potassium	mg/kg	6.01E+03	8.00E+02	NA	NA	1.21E+03				YES		1.22E+03			YES			2.02E+03				YES		
Selenium	mg/kg	1.30E+00	4.80E-01	3.91E+01	8.10E-01	9.37E-01	J			YES	YES	ND						1.29E+00				YES		YES
Silver	mg/kg	1.90E+00	3.60E-01	3.91E+01	2.00E+00	ND						ND						1.40E+00	J			YES		
Sodium	mg/kg	5.63E+02	6.34E+02	NA	NA	5.53E+01	J					5.45E+01	J					5.53E+01	J					
Vanadium	mg/kg	1.58E+02	5.88E+01	5.31E+01	2.00E+00	4.65E+01					YES	4.23E+01					YES	5.92E+01				YES	YES	YES
Zinc	mg/kg	2.09E+02	4.06E+01	2.34E+03	5.00E+01	3.99E+01	J					8.99E+01	J		YES		YES	4.17E+01	J			YES		
VOLATILE ORGANIC COMPOUNDS																								
1,1,2,2-Tetrachloroethane	mg/kg	NA	NA	3.13E+00	1.00E-01	ND						4.20E-03	J					9.40E-03						
2-Butanone	mg/kg	NA	NA	4.66E+03	8.96E+01	1.50E-02	J					1.20E-02	J					ND						
Acetone	mg/kg	NA	NA	7.76E+02	2.50E+00	3.50E-01	J					1.10E-01	J					1.40E-01	J					
Bromodichloromethane	mg/kg	NA	NA	1.02E+01	1.00E-01	ND						ND						ND						
Carbon tetrachloride	mg/kg	NA	NA	4.83E+00	1.00E+03	ND						ND						ND						
Chloroform	mg/kg	NA	NA	1.03E+02	1.00E-03	ND						ND						ND						
Cis-1,2-Dichloroethene	mg/kg	NA	NA	7.77E+01	1.00E-01	ND						ND						ND						
Methylene chloride	mg/kg	NA	NA	8.41E+01	2.00E+00	ND						ND						ND						
Styrene	mg/kg	NA	NA	1.55E+03	1.00E-01	ND						ND						ND						
Tetrachloroethene	mg/kg	NA	NA	1.21E+01	1.00E-02	ND						ND						ND						
Toluene	mg/kg	NA	NA	1.55E+03	5.00E-02	7.00E-03						ND						ND						
Trichloroethene	mg/kg	NA	NA	5.72E+01	1.00E-03	ND						ND						5.30E-03						YES
Trichlorofluoromethane	mg/kg	NA	NA	2.33E+03	1.00E-01	ND						ND						ND						
p-Cymene	mg/kg	NA	NA	1.55E+03	NA	ND						ND						ND						

Table 2-5

Surface and Depositional Soil Sample Analytical Results
 Training Area T-6 (Naylor Field), Parcel 183(6)
 Fort McClellan, Calhoun County, Alabama

(Page 5 of 6)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)						CWM-183 CWM-183-MW08 TG0019 17-Oct-01 0- 1						CWM-183 CWM-183-MW09 TG0031 26-Nov-01 0- 1						CWM-183 CWM-183-MW10 TG0033 28-Nov-01 0- 1					
Parameter	Units	UBR ^a	BKG ^b	SSSL ^c	ESV ^c	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS																							
Aluminum	mg/kg	3.99E+04	1.63E+04	7.80E+03	5.00E+01	1.10E+04				YES	YES	1.72E+04			YES	YES	YES	1.30E+04				YES	YES
Antimony	mg/kg	2.60E+00	1.99E+00	3.11E+00	3.50E+00	ND						ND						ND					
Arsenic	mg/kg	4.90E+01	1.37E+01	4.26E-01	1.00E+01	5.47E+00				YES		1.23E+01	J				YES	7.06E+00	J				YES
Barium	mg/kg	2.88E+02	1.24E+02	5.47E+02	1.65E+02	9.26E+01						6.66E+01	J					1.00E+02	J				
Beryllium	mg/kg	8.70E-01	8.00E-01	9.60E+00	1.10E+00	7.00E-01	J					5.16E-01	J					7.24E-01	J				
Calcium	mg/kg	1.79E+04	1.72E+03	NA	NA	5.16E+03			YES			8.96E+02						5.46E+02					
Chromium	mg/kg	1.34E+02	3.70E+01	2.32E+01	4.00E-01	3.64E+01				YES	YES	2.96E+01					YES	4.41E+01			YES	YES	YES
Cobalt	mg/kg	7.10E+01	1.52E+01	4.68E+02	2.00E+01	6.95E+00						4.81E+00						1.29E+01					
Copper	mg/kg	2.40E+01	1.27E+01	3.13E+02	4.00E+01	1.91E+01			YES			2.71E+01		YES	YES			1.97E+01			YES		
Iron	mg/kg	5.63E+04	3.42E+04	2.34E+03	2.00E+02	2.06E+04				YES	YES	3.79E+04			YES	YES	YES	2.50E+04				YES	YES
Lead	mg/kg	8.30E+01	4.01E+01	4.00E+02	5.00E+01	3.04E+01						2.05E+01	J					1.92E+01	J				
Magnesium	mg/kg	9.60E+03	1.03E+03	NA	4.40E+05	4.86E+02						6.94E+02						5.80E+02					
Manganese	mg/kg	6.85E+03	1.58E+03	3.63E+02	1.00E+02	7.78E+02				YES	YES	2.32E+02	J				YES	8.49E+02	J			YES	YES
Mercury	mg/kg	3.20E-01	8.00E-02	2.33E+00	1.00E-01	ND						4.40E-02	B					ND					
Nickel	mg/kg	2.20E+01	1.03E+01	1.54E+02	3.00E+01	8.43E+00						1.33E+01			YES			1.02E+01					
Potassium	mg/kg	6.01E+03	8.00E+02	NA	NA	6.07E+02						9.59E+02			YES			8.68E+02			YES		
Selenium	mg/kg	1.30E+00	4.80E-01	3.91E+01	8.10E-01	ND						8.04E-01	B		YES			7.73E-01	B		YES		
Silver	mg/kg	1.90E+00	3.60E-01	3.91E+01	2.00E+00	ND						1.62E+00	J		YES			ND					
Sodium	mg/kg	5.63E+02	6.34E+02	NA	NA	5.59E+01	J					4.62E+01	J					4.07E+01	J				
Vanadium	mg/kg	1.58E+02	5.88E+01	5.31E+01	2.00E+00	3.19E+01	J				YES	5.04E+01					YES	4.22E+01					YES
Zinc	mg/kg	2.09E+02	4.06E+01	2.34E+03	5.00E+01	4.94E+01	J		YES			4.65E+01			YES			3.15E+01					
VOLATILE ORGANIC COMPOUNDS																							
1,1,2,2-Tetrachloroethane	mg/kg	NA	NA	3.13E+00	1.00E-01	4.80E-02	J					ND						ND					
2-Butanone	mg/kg	NA	NA	4.66E+03	8.96E+01	1.20E-02	J					ND						ND					
Acetone	mg/kg	NA	NA	7.76E+02	2.50E+00	1.00E-01	J					6.40E-03	B					6.30E-02	J				
Bromodichloromethane	mg/kg	NA	NA	1.02E+01	1.00E-01	ND						ND						ND					
Carbon tetrachloride	mg/kg	NA	NA	4.83E+00	1.00E+03	8.70E-03						ND						ND					
Chloroform	mg/kg	NA	NA	1.03E+02	1.00E-03	2.00E-01	J				YES	ND						ND					
Cis-1,2-Dichloroethene	mg/kg	NA	NA	7.77E+01	1.00E-01	ND						ND						ND					
Methylene chloride	mg/kg	NA	NA	8.41E+01	2.00E+00	5.30E-03	J					ND						1.40E-03	B				
Styrene	mg/kg	NA	NA	1.55E+03	1.00E-01	ND						ND						ND					
Tetrachloroethene	mg/kg	NA	NA	1.21E+01	1.00E-02	1.20E-03	J					ND						ND					
Toluene	mg/kg	NA	NA	1.55E+03	5.00E-02	ND						ND						ND					
Trichloroethene	mg/kg	NA	NA	5.72E+01	1.00E-03	2.40E-02	J				YES	ND						ND					
Trichlorofluoromethane	mg/kg	NA	NA	2.33E+03	1.00E-01	ND						ND						ND					
p-Cymene	mg/kg	NA	NA	1.55E+03	NA	ND						ND						ND					

Table 2-5

**Surface and Depositional Soil Sample Analytical Results
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 6 of 6)

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

^a UBR - Upper background range as given in Science Applications International Corporation (SAIC), 1998.

Final Background Metals Survey Report, Fort McClellan, Alabama, July.

^b BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998.

^c Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT, 2000.

Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 2-6

**Subsurface Soil Sample Analytical Results
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 6)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					CWM-183 CWM-183-GP01 TG0002 17-Oct-01 2 - 3					CWM-183 CWM-183-GP02 TG0004 17-Oct-01 9 - 10					CWM-183 CWM-183-GP03 TG0026 26-Nov-01 2 - 3				
Parameter	Units	UBR ^a	BKG ^b	SSSL ^c	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	2.46E+04	1.36E+04	7.80E+03	2.12E+04			YES	YES	3.74E+04		YES	YES	YES	1.55E+04			YES	YES
Arsenic	mg/kg	3.80E+01	1.83E+01	4.26E-01	7.33E+00				YES	1.23E+01				YES	8.34E+00	J			YES
Barium	mg/kg	4.50E+03	2.34E+02	5.47E+02	9.14E+01					1.15E+02					5.24E+01	J			
Beryllium	mg/kg	2.00E+00	8.60E-01	9.60E+00	1.15E+00	J		YES		1.07E+00	J		YES		9.02E-01	J		YES	
Calcium	mg/kg	3.65E+03	6.37E+02	NA	5.09E+01	B				1.47E+03			YES		4.30E+01	J			
Chromium	mg/kg	5.50E+01	3.83E+01	2.32E+01	2.12E+01					2.60E+01				YES	1.31E+01				
Cobalt	mg/kg	9.60E+01	1.75E+01	4.68E+02	1.20E+01					6.99E+00					1.50E+00	J			
Copper	mg/kg	6.10E+01	1.94E+01	3.13E+02	5.18E+01			YES		3.49E+01			YES		5.94E+01			YES	
Iron	mg/kg	4.80E+04	4.48E+04	2.34E+03	3.67E+04			YES	YES	4.56E+04			YES	YES	3.31E+04				YES
Lead	mg/kg	5.00E+02	3.85E+01	4.00E+02	2.19E+01					1.61E+01					2.24E+01	J			
Magnesium	mg/kg	5.94E+03	7.66E+02	NA	7.17E+02					1.61E+03			YES		2.55E+02				
Manganese	mg/kg	1.90E+04	1.36E+03	3.63E+02	1.46E+02					1.23E+02					1.84E+01	J			
Mercury	mg/kg	1.20E-01	7.00E-02	2.33E+00	ND					ND					5.70E-02	B			
Nickel	mg/kg	3.80E+01	1.29E+01	1.54E+02	1.00E+01					3.74E+01			YES		4.48E+00				
Potassium	mg/kg	6.15E+03	7.11E+02	NA	2.02E+03			YES		2.76E+03			YES		1.39E+03			YES	
Selenium	mg/kg	5.50E-01	4.70E-01	3.91E+01	1.56E+00		YES	YES		ND					1.55E+00	B	YES	YES	
Silver	mg/kg	6.60E-01	2.40E-01	3.91E+01	ND					1.63E+00	J	YES	YES		1.37E+00	J	YES	YES	
Sodium	mg/kg	6.43E+02	7.02E+02	NA	5.64E+01	J				6.22E+01	J				4.41E+01	J			
Vanadium	mg/kg	9.90E+01	6.49E+01	5.31E+01	4.51E+01					6.04E+01				YES	3.92E+01				
Zinc	mg/kg	8.90E+01	3.49E+01	2.34E+03	4.22E+01	J		YES		9.72E+01	J	YES	YES		3.57E+01			YES	
VOLATILE ORGANIC COMPOUNDS																			
1,1,2,2-Tetrachloroethane	mg/kg	NA	NA	3.13E+00	ND					1.80E-01					ND				
2-Butanone	mg/kg	NA	NA	4.66E+03	ND					ND					ND				
Acetone	mg/kg	NA	NA	7.76E+02	5.40E-02	J				7.70E-03	J				6.40E-03	B			
Methylene chloride	mg/kg	NA	NA	8.41E+01	ND					ND					ND				
Tetrachloroethene	mg/kg	NA	NA	1.21E+01	ND					6.10E-03					ND				
Toluene	mg/kg	NA	NA	1.55E+03	ND					ND					ND				
Trichloroethene	mg/kg	NA	NA	5.72E+01	ND					4.20E-02					ND				
Trichlorofluoromethane	mg/kg	NA	NA	2.33E+03	1.10E-03	B				ND					ND				
p-Cymene	mg/kg	NA	NA	1.55E+03	ND					ND					ND				

Table 2-6

**Subsurface Soil Sample Analytical Results
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 6)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					CWM-183 CWM-183-MW01 TG0006 17-Oct-01 1 - 2					CWM-183 CWM-183-MW02 TG0008 17-Oct-01 1 - 2					CWM-183 CWM-183-MW03 TG0010 17-Oct-01 3 - 4				
Parameter	Units	UBR ^a	BKG ^b	SSSL ^c	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	2.46E+04	1.36E+04	7.80E+03	1.85E+04			YES	YES	2.14E+04			YES	YES	1.70E+04			YES	YES
Arsenic	mg/kg	3.80E+01	1.83E+01	4.26E-01	7.25E+00				YES	8.08E+00				YES	8.13E+00				YES
Barium	mg/kg	4.50E+03	2.34E+02	5.47E+02	1.40E+02					9.21E+01					8.76E+01				
Beryllium	mg/kg	2.00E+00	8.60E-01	9.60E+00	8.71E-01	J		YES		1.36E+00			YES		6.66E-01	J			
Calcium	mg/kg	3.65E+03	6.37E+02	NA	3.29E+02					2.18E+02					1.44E+03			YES	
Chromium	mg/kg	5.50E+01	3.83E+01	2.32E+01	1.86E+01					1.86E+01					2.21E+01				
Cobalt	mg/kg	9.60E+01	1.75E+01	4.68E+02	1.33E+01					2.81E+00	B				1.11E+01				
Copper	mg/kg	6.10E+01	1.94E+01	3.13E+02	2.55E+01			YES		6.31E+01		YES	YES		2.90E+01			YES	
Iron	mg/kg	4.80E+04	4.48E+04	2.34E+03	1.88E+04				YES	3.77E+04				YES	3.20E+04				YES
Lead	mg/kg	5.00E+02	3.85E+01	4.00E+02	1.97E+01					1.98E+01					2.45E+01				
Magnesium	mg/kg	5.94E+03	7.66E+02	NA	7.91E+02			YES		7.34E+02					7.82E+02			YES	
Manganese	mg/kg	1.90E+04	1.36E+03	3.63E+02	8.54E+02				YES	2.58E+01					4.41E+02				YES
Mercury	mg/kg	1.20E-01	7.00E-02	2.33E+00	ND					4.50E-02	J				ND				
Nickel	mg/kg	3.80E+01	1.29E+01	1.54E+02	1.04E+01					7.90E+00					6.07E+00				
Potassium	mg/kg	6.15E+03	7.11E+02	NA	1.25E+03			YES		2.56E+03			YES		1.35E+03			YES	
Selenium	mg/kg	5.50E-01	4.70E-01	3.91E+01	1.27E+00		YES	YES		1.55E+00		YES	YES		1.07E+00	J	YES	YES	
Silver	mg/kg	6.60E-01	2.40E-01	3.91E+01	ND					ND					ND				
Sodium	mg/kg	6.43E+02	7.02E+02	NA	5.66E+01	J				8.58E+01	J				5.49E+01	J			
Vanadium	mg/kg	9.90E+01	6.49E+01	5.31E+01	3.98E+01					5.06E+01					4.61E+01				
Zinc	mg/kg	8.90E+01	3.49E+01	2.34E+03	4.02E+01	J		YES		5.04E+01	J		YES		3.36E+01	J			
VOLATILE ORGANIC COMPOUNDS																			
1,1,2,2-Tetrachloroethane	mg/kg	NA	NA	3.13E+00	ND					ND					4.10E-03	J			
2-Butanone	mg/kg	NA	NA	4.66E+03	1.30E-02	J				ND					ND				
Acetone	mg/kg	NA	NA	7.76E+02	4.00E-01	J				4.90E-02	J				9.80E-02	J			
Methylene chloride	mg/kg	NA	NA	8.41E+01	ND					ND					ND				
Tetrachloroethene	mg/kg	NA	NA	1.21E+01	ND					ND					ND				
Toluene	mg/kg	NA	NA	1.55E+03	2.40E-03	J				ND					ND				
Trichloroethene	mg/kg	NA	NA	5.72E+01	ND					ND					2.00E-03	J			
Trichlorofluoromethane	mg/kg	NA	NA	2.33E+03	3.50E-03	B				ND					ND				
p-Cymene	mg/kg	NA	NA	1.55E+03	ND					ND					ND				

Table 2-6

**Subsurface Soil Sample Analytical Results
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 6)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					CWM-183 CWM-183-MW04 TG0012 17-Oct-01 5 - 6					CWM-183 CWM-183-MW05 TG0014 18-Oct-01 2 - 3					CWM-183 CWM-183-MW06 TG0016 17-Oct-01 5 - 6				
Parameter	Units	UBR ^a	BKG ^b	SSSL ^c	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	2.46E+04	1.36E+04	7.80E+03	2.03E+04			YES	YES	1.68E+04			YES	YES	3.08E+04		YES	YES	YES
Arsenic	mg/kg	3.80E+01	1.83E+01	4.26E-01	8.82E+00				YES	9.06E+00				YES	1.37E+01				YES
Barium	mg/kg	4.50E+03	2.34E+02	5.47E+02	9.32E+01					6.42E+01					1.08E+02				
Beryllium	mg/kg	2.00E+00	8.60E-01	9.60E+00	7.34E-01	J				6.10E-01	B				1.11E+00	J		YES	
Calcium	mg/kg	3.65E+03	6.37E+02	NA	1.04E+02	J				3.66E+02					2.58E+02				
Chromium	mg/kg	5.50E+01	3.83E+01	2.32E+01	2.54E+01				YES	2.39E+01				YES	2.46E+01				YES
Cobalt	mg/kg	9.60E+01	1.75E+01	4.68E+02	2.51E+00	B				7.96E+00					7.11E+00				
Copper	mg/kg	6.10E+01	1.94E+01	3.13E+02	4.46E+01			YES		3.11E+01			YES		5.09E+01			YES	
Iron	mg/kg	4.80E+04	4.48E+04	2.34E+03	3.42E+04				YES	3.39E+04				YES	4.73E+04			YES	YES
Lead	mg/kg	5.00E+02	3.85E+01	4.00E+02	1.81E+01					1.77E+01	J				1.51E+01				
Magnesium	mg/kg	5.94E+03	7.66E+02	NA	8.07E+02			YES		7.40E+02					1.24E+03			YES	
Manganese	mg/kg	1.90E+04	1.36E+03	3.63E+02	7.95E+01					3.40E+02					1.58E+02				
Mercury	mg/kg	1.20E-01	7.00E-02	2.33E+00	ND					ND					6.00E-02	J			
Nickel	mg/kg	3.80E+01	1.29E+01	1.54E+02	5.90E+00					6.48E+00					5.42E+01		YES	YES	
Potassium	mg/kg	6.15E+03	7.11E+02	NA	2.35E+03			YES		1.44E+03			YES		2.59E+03			YES	
Selenium	mg/kg	5.50E-01	4.70E-01	3.91E+01	2.00E+00		YES	YES		7.18E-01	J	YES	YES		1.07E+00	J	YES	YES	
Silver	mg/kg	6.60E-01	2.40E-01	3.91E+01	ND					ND					ND				
Sodium	mg/kg	6.43E+02	7.02E+02	NA	5.71E+01	J				4.93E+01	J				6.03E+01	J			
Vanadium	mg/kg	9.90E+01	6.49E+01	5.31E+01	6.63E+01			YES	YES	5.53E+01				YES	6.36E+01				YES
Zinc	mg/kg	8.90E+01	3.49E+01	2.34E+03	3.92E+01	J		YES		3.59E+01	J		YES		1.72E+02	J	YES	YES	
VOLATILE ORGANIC COMPOUNDS																			
1,1,2,2-Tetrachloroethane	mg/kg	NA	NA	3.13E+00	6.20E-02					ND					5.20E-03	J			
2-Butanone	mg/kg	NA	NA	4.66E+03	ND					ND					ND				
Acetone	mg/kg	NA	NA	7.76E+02	1.50E-02	J				4.00E-02	J				3.40E-02	J			
Methylene chloride	mg/kg	NA	NA	8.41E+01	ND					ND					ND				
Tetrachloroethene	mg/kg	NA	NA	1.21E+01	ND					ND					ND				
Toluene	mg/kg	NA	NA	1.55E+03	ND					1.40E-03	J				ND				
Trichloroethene	mg/kg	NA	NA	5.72E+01	3.40E-03	J				ND					1.40E-03	J			
Trichlorofluoromethane	mg/kg	NA	NA	2.33E+03	ND					ND					ND				
p-Cymene	mg/kg	NA	NA	1.55E+03	ND					1.40E-03	J				ND				

Table 2-6

**Subsurface Soil Sample Analytical Results
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 4 of 6)

Parcel Sample Location Sample Number Sample Date Sample Depth (Feet)					CWM-183 CWM-183-MW07 TG0018 17-Oct-01 2.3- 3.3					CWM-183 CWM-183-MW08 TG0022 17-Oct-01 9 - 10					CWM-183 CWM-183-MW09 TG0032 26-Nov-01 11 - 12				
Parameter	Units	UBR ^a	BKG ^b	SSSL ^c	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	2.46E+04	1.36E+04	7.80E+03	1.32E+04				YES	2.83E+04		YES	YES	YES	2.49E+04		YES	YES	YES
Arsenic	mg/kg	3.80E+01	1.83E+01	4.26E-01	9.80E+00				YES	8.98E+00				YES	1.35E+01	J			YES
Barium	mg/kg	4.50E+03	2.34E+02	5.47E+02	6.70E+01					1.53E+02					1.00E+02	J			
Beryllium	mg/kg	2.00E+00	8.60E-01	9.60E+00	8.56E-01	J				1.10E+00	J		YES		1.07E+00	J		YES	
Calcium	mg/kg	3.65E+03	6.37E+02	NA	2.25E+02					1.14E+03			YES		1.74E+02				
Chromium	mg/kg	5.50E+01	3.83E+01	2.32E+01	2.32E+01				YES	2.38E+01				YES	2.37E+01				YES
Cobalt	mg/kg	9.60E+01	1.75E+01	4.68E+02	5.44E+00					7.97E+00					2.85E+01			YES	
Copper	mg/kg	6.10E+01	1.94E+01	3.13E+02	4.71E+01			YES		2.65E+01			YES		3.55E+01			YES	
Iron	mg/kg	4.80E+04	4.48E+04	2.34E+03	4.00E+04				YES	4.08E+04				YES	4.30E+04				YES
Lead	mg/kg	5.00E+02	3.85E+01	4.00E+02	1.84E+01					1.57E+01					2.26E+01	J			
Magnesium	mg/kg	5.94E+03	7.66E+02	NA	4.29E+02					1.33E+03			YES		7.15E+02				
Manganese	mg/kg	1.90E+04	1.36E+03	3.63E+02	1.60E+02					1.97E+02					1.55E+03	J		YES	YES
Mercury	mg/kg	1.20E-01	7.00E-02	2.33E+00	ND					ND					6.80E-02	B			
Nickel	mg/kg	3.80E+01	1.29E+01	1.54E+02	9.14E+00					1.30E+01			YES		4.13E+01		YES	YES	
Potassium	mg/kg	6.15E+03	7.11E+02	NA	1.28E+03			YES		1.98E+03			YES		1.13E+03			YES	
Selenium	mg/kg	5.50E-01	4.70E-01	3.91E+01	1.36E+00		YES	YES		ND					1.14E+00	B	YES	YES	
Silver	mg/kg	6.60E-01	2.40E-01	3.91E+01	1.52E+00	J	YES	YES		1.45E+00	J	YES	YES		1.63E+00	J	YES	YES	
Sodium	mg/kg	6.43E+02	7.02E+02	NA	5.45E+01	J				7.16E+01	J				4.67E+01	J			
Vanadium	mg/kg	9.90E+01	6.49E+01	5.31E+01	5.10E+01					6.34E+01				YES	4.24E+01				
Zinc	mg/kg	8.90E+01	3.49E+01	2.34E+03	4.18E+01	J		YES		4.59E+01	J		YES		9.75E+01		YES	YES	
VOLATILE ORGANIC COMPOUNDS																			
1,1,2,2-Tetrachloroethane	mg/kg	NA	NA	3.13E+00	2.00E-02					1.30E-02					1.70E-02				
2-Butanone	mg/kg	NA	NA	4.66E+03	ND					ND					ND				
Acetone	mg/kg	NA	NA	7.76E+02	2.80E-02	J				1.20E-02	J				ND				
Methylene chloride	mg/kg	NA	NA	8.41E+01	ND					ND					ND				
Tetrachloroethene	mg/kg	NA	NA	1.21E+01	ND					ND					ND				
Toluene	mg/kg	NA	NA	1.55E+03	ND					ND					ND				
Trichloroethene	mg/kg	NA	NA	5.72E+01	3.30E-03	J				2.20E-03	J				9.60E-03				
Trichlorofluoromethane	mg/kg	NA	NA	2.33E+03	2.60E-03	J				1.30E-03	J				1.20E-03	J			
p-Cymene	mg/kg	NA	NA	1.55E+03	ND					ND					ND				

Table 2-6

**Subsurface Soil Sample Analytical Results
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 6 of 6)

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

^a UBR - Upper background range as given in Science Applications International Corporation (SAIC), 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

^b BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998.

^c Residential human health site-specific screening level (SSSL) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 2-7

**Groundwater Sample Analytical Results
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 4)

Parcel Sample Location Sample Number Sample Date					CWM-183 CWM-183-MW01 TG3001 18-Dec-01					CWM-183 CWM-183-MW02 TG3002 12-Dec-01					CWM-183 CWM-183-MW03 TG3003 12-Dec-01				
Parameter	Units	UBR ^a	BKGD ^b	SSSL ^c	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL	Result	Qual	>UBR	>BKG	>SSSL
METALS																			
Aluminum	mg/L	9.60E+00	2.34E+00	1.56E+00	8.60E-02	J				1.65E-01	B				9.28E-02	B			
Arsenic	mg/L	2.24E-01	1.78E-02	4.40E-05	3.32E-03	B			YES	ND					ND				
Barium	mg/L	4.01E-01	1.27E-01	1.10E-01	5.45E-02					1.99E-01			YES	YES	1.06E-01				
Calcium	mg/L	4.52E+02	5.65E+01	NA	2.87E+00					2.01E+01					1.01E+02			YES	
Cobalt	mg/L	2.50E-02	2.34E-02	9.39E-02	1.14E-02	J				ND					ND				
Copper	mg/L	2.35E-01	2.55E-02	6.26E-02	ND					ND					ND				
Iron	mg/L	2.58E+01	7.04E+00	4.69E-01	3.20E-01	J				1.76E+00				YES	1.81E+00				YES
Lead	mg/L	2.70E-02	8.00E-03	1.50E-02	ND					ND					ND				
Magnesium	mg/L	1.49E+02	2.13E+01	NA	4.34E+00					1.43E+01					1.11E+01				
Manganese	mg/L	5.82E+00	5.81E-01	7.35E-02	2.57E-01			YES		2.73E-01				YES	2.53E+00			YES	YES
Mercury	mg/L	NA	NA	4.69E-04	ND					1.64E-04	B				ND				
Nickel	mg/L	NA	NA	3.13E-02	ND					ND					ND				
Potassium	mg/L	6.85E+01	7.20E+00	NA	6.18E+00					5.27E+00					2.74E+00	J			
Selenium	mg/L	NA	NA	7.82E-03	ND					ND					4.74E-03	B			
Sodium	mg/L	6.47E+01	1.48E+01	NA	5.85E+00	B				8.63E+00	B				2.36E+01	B		YES	
Thallium	mg/L	5.30E-03	1.46E-03	1.01E-04	ND					4.63E-03	B		YES	YES	4.20E-03	B		YES	YES
Vanadium	mg/L	1.10E-02	1.70E-02	1.10E-02	ND					ND					ND				
Zinc	mg/L	1.16E+00	2.20E-01	4.69E-01	ND					ND					ND				
SEMIVOLATILE ORGANIC COMPOUNDS																			
Bis(2-Ethylhexyl)phthalate	mg/L	NA	NA	4.31E-03	ND					9.90E-02				YES	ND				
VOLATILE ORGANIC COMPOUNDS																			
1,1,2,2-Tetrachloroethane	mg/L	NA	NA	2.03E-04	ND					ND					1.30E-03				YES
1,1,2-Trichloroethane	mg/L	NA	NA	7.15E-04	ND					ND					3.00E-04	J			
1,2-Dichloroethane	mg/L	NA	NA	4.48E-04	ND					ND					ND				
Acetone	mg/L	NA	NA	1.56E-01	1.30E-02	B				ND					6.20E+00	J			YES
Bromodichloromethane	mg/L	NA	NA	1.08E-03	ND					ND					ND				
Chloroform	mg/L	NA	NA	1.15E-03	ND					ND					1.30E-03				YES
Cis-1,2-Dichloroethene	mg/L	NA	NA	1.55E-02	ND					ND					4.20E-03				
Dibromochloromethane	mg/L	NA	NA	7.91E-04	ND					ND					ND				
Methylene chloride	mg/L	NA	NA	7.85E-03	ND					ND					5.20E-04	B			
Tetrachloroethene	mg/L	NA	NA	1.26E-03	ND					ND					7.70E-04	J			
Toluene	mg/L	NA	NA	2.59E-01	ND					ND					ND				
Trans-1,2-Dichloroethene	mg/L	NA	NA	3.07E-02	ND					ND					6.70E-04	J			
Trichloroethene	mg/L	NA	NA	4.51E-03	ND					ND					1.20E-01				YES
Vinyl chloride	mg/L	NA	NA	3.20E-05	ND					ND					ND				
p-Cymene	mg/L	NA	NA	2.26E-01	ND					ND					1.90E-03	J			

Table 2-7

**Groundwater Sample Analytical Results
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 4)

Parcel Sample Location Sample Number Sample Date					CWM-183 CWM-183-MW10 TG3012 17-Dec-01				
Parameter	Units	UBR ^a	BKGD ^b	SSSL ^c	Result	Qual	>UBR	>BKG	>SSSL
METALS									
Aluminum	mg/L	9.60E+00	2.34E+00	1.56E+00	ND				
Arsenic	mg/L	2.24E-01	1.78E-02	4.40E-05	6.93E-03	B			YES
Barium	mg/L	4.01E-01	1.27E-01	1.10E-01	6.39E-02				
Calcium	mg/L	4.52E+02	5.65E+01	NA	7.33E+01			YES	
Cobalt	mg/L	2.50E-02	2.34E-02	9.39E-02	1.41E-02	J			
Copper	mg/L	2.35E-01	2.55E-02	6.26E-02	ND				
Iron	mg/L	2.58E+01	7.04E+00	4.69E-01	2.31E+00				YES
Lead	mg/L	2.70E-02	8.00E-03	1.50E-02	ND				
Magnesium	mg/L	1.49E+02	2.13E+01	NA	9.29E+00				
Manganese	mg/L	5.82E+00	5.81E-01	7.35E-02	5.41E+00			YES	YES
Mercury	mg/L	NA	NA	4.69E-04	1.29E-04	J			
Nickel	mg/L	NA	NA	3.13E-02	1.58E-02	B			
Potassium	mg/L	6.85E+01	7.20E+00	NA	3.29E+00	J			
Selenium	mg/L	NA	NA	7.82E-03	ND				
Sodium	mg/L	6.47E+01	1.48E+01	NA	1.18E+01	B			
Thallium	mg/L	5.30E-03	1.46E-03	1.01E-04	ND				
Vanadium	mg/L	1.10E-02	1.70E-02	1.10E-02	ND				
Zinc	mg/L	1.16E+00	2.20E-01	4.69E-01	ND				
SEMIVOLATILE ORGANIC COMPOUNDS									
Bis(2-Ethylhexyl)phthalate	mg/L	NA	NA	4.31E-03	ND				
VOLATILE ORGANIC COMPOUNDS									
1,1,2,2-Tetrachloroethane	mg/L	NA	NA	2.03E-04	ND				
1,1,2-Trichloroethane	mg/L	NA	NA	7.15E-04	ND				
1,2-Dichloroethane	mg/L	NA	NA	4.48E-04	ND				
Acetone	mg/L	NA	NA	1.56E-01	1.30E+01	J			YES
Bromodichloromethane	mg/L	NA	NA	1.08E-03	ND				
Chloroform	mg/L	NA	NA	1.15E-03	2.30E-03	B			YES
Cis-1,2-Dichloroethene	mg/L	NA	NA	1.55E-02	ND				
Dibromochloromethane	mg/L	NA	NA	7.91E-04	ND				
Methylene chloride	mg/L	NA	NA	7.85E-03	3.80E-04	B			
Tetrachloroethene	mg/L	NA	NA	1.26E-03	ND				
Toluene	mg/L	NA	NA	2.59E-01	ND				
Trans-1,2-Dichloroethene	mg/L	NA	NA	3.07E-02	ND				
Trichloroethene	mg/L	NA	NA	4.51E-03	7.70E-04	J			
Vinyl chloride	mg/L	NA	NA	3.20E-05	ND				
p-Cymene	mg/L	NA	NA	2.26E-01	5.90E-03				

Table 2-7

**Groundwater Sample Analytical Results
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

(Page 4 of 4)

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

^a UBR - Upper background range as given in Science Applications International Corporation (SAIC), 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

^b BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998.

^c Residential human health site-specific screening level (SSSL) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Compound was positively identified; reported value is an estimated concentration.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 2-8

**Surface Water Sample Analytical Results
Training Area T-6 (Naylor Field), Parcel 183(6)
Fort McClellan, Calhoun County, Alabama**

Parcel Sample Location Sample Number Sample Date						CWM-183 CWM-183-SW/SD02 TG2002 9-Nov-01					
Parameter	Units	UBR ^a	BKG ^b	SSSL ^c	ESV ^c	Result	Qual	>UBR	>BKG	>SSSL	>ESV
METALS											
Barium	mg/L	2.00E-01	7.54E-02	1.10E+00	3.90E-03	8.65E-02			YES		YES
Calcium	mg/L	6.41E+01	2.52E+01	NA	1.16E+02	6.95E+01		YES	YES		
Iron	mg/L	2.32E+02	1.96E+01	4.70E+00	1.00E+00	3.00E-01	J				
Magnesium	mg/L	2.44E+01	1.10E+01	NA	8.20E+01	8.14E+00					
Manganese	mg/L	6.06E+00	5.65E-01	6.40E-01	8.00E-02	1.01E-01	J				YES
Potassium	mg/L	7.12E+00	2.56E+00	NA	5.30E+01	9.50E-01	J				
Sodium	mg/L	1.52E+01	3.44E+00	NA	6.80E+02	1.98E+00					
VOLATILE ORGANIC COMPOUNDS											
1,1,2,2-Tetrachloroethane	mg/L	NA	NA	5.01E-03	2.40E-01	3.30E-03					
Chloroform	mg/L	NA	NA	1.69E-01	2.89E-01	2.10E-04	B				
Cis-1,2-Dichloroethene	mg/L	NA	NA	1.49E-01	1.16E+01	1.40E-03					
Trichloroethene	mg/L	NA	NA	8.80E-02	2.19E+01	1.80E-02					

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

^a UBR - Upper background range as given in Science Applications International Corporation (SAIC), 1998,

Final Background Metals Survey Report, Fort McClellan, Alabama, July.

^b BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998.

^c Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000),

Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

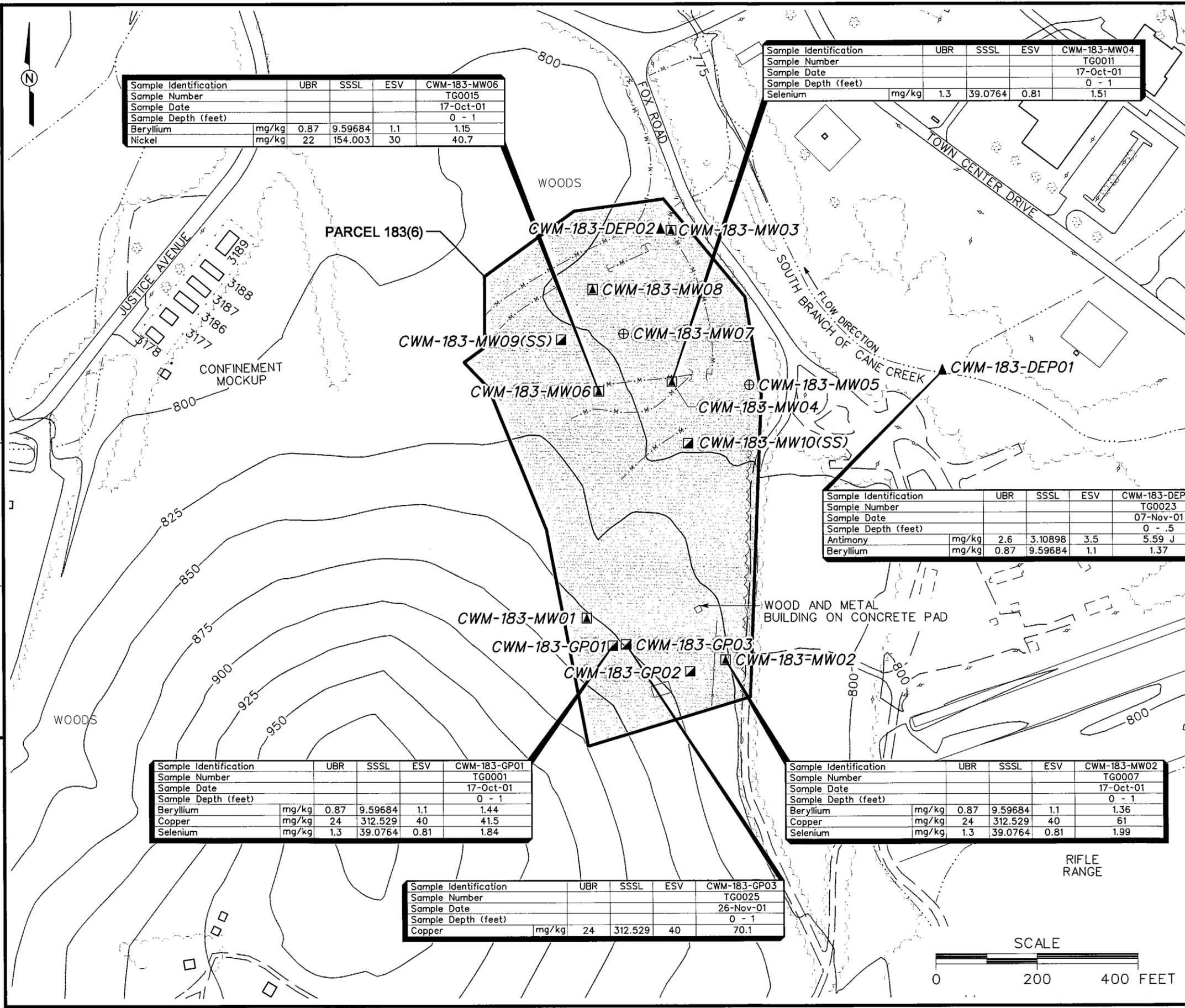
J - Compound was positively identified; reported value is an estimated concentration.

mg/L - Milligrams per liter.

NA - Not available.

Qual - Data validation qualifier.

DWG. NO.: \838936es.023
 PROJ. NO.: 838936
 INITIATOR: J. REMO
 PROJ. MGR.: J. YACOUB
 DRAFT. CHK. BY: S. MORAN
 ENGR. CHK. BY: S. MORAN
 STARTING DATE: 09/25/02 DATE LAST REV.:
 DRAWN BY: D. BOMAR
 10/07/02 03:19:31 PM
 c:\acdd\design\838936es.023



Sample Identification	UBR	SSSL	ESV	CWM-183-MW06
Sample Number				TG0015
Sample Date				17-Oct-01
Sample Depth (feet)				0 - 1
Beryllium	mg/kg	0.87	9.59684	1.1
Nickel	mg/kg	22	154.003	30
				40.7

Sample Identification	UBR	SSSL	ESV	CWM-183-MW04
Sample Number				TG0011
Sample Date				17-Oct-01
Sample Depth (feet)				0 - 1
Selenium	mg/kg	1.3	39.0764	0.81
				1.51

Sample Identification	UBR	SSSL	ESV	CWM-183-DEP01
Sample Number				TG0023
Sample Date				07-Nov-01
Sample Depth (feet)				0 - 5
Antimony	mg/kg	2.6	3.10898	3.5
Beryllium	mg/kg	0.87	9.59684	1.1
				5.59 J
				1.37

Sample Identification	UBR	SSSL	ESV	CWM-183-GP01
Sample Number				TG0001
Sample Date				17-Oct-01
Sample Depth (feet)				0 - 1
Beryllium	mg/kg	0.87	9.59684	1.1
Copper	mg/kg	24	312.529	40
Selenium	mg/kg	1.3	39.0764	0.81
				1.44
				41.5
				1.84

Sample Identification	UBR	SSSL	ESV	CWM-183-MW02
Sample Number				TG0007
Sample Date				17-Oct-01
Sample Depth (feet)				0 - 1
Beryllium	mg/kg	0.87	9.59684	1.1
Copper	mg/kg	24	312.529	40
Selenium	mg/kg	1.3	39.0764	0.81
				1.36
				61
				1.99

Sample Identification	UBR	SSSL	ESV	CWM-183-GP03
Sample Number				TG0025
Sample Date				26-Nov-01
Sample Depth (feet)				0 - 1
Copper	mg/kg	24	312.529	40
				70.1

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- FORMER BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE
- MOUND
- DEPRESSION
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- DEPOSITIONAL SOIL SAMPLE LOCATION
- RESIDUUM MONITORING WELL LOCATION (DRY WELL)
- J
- COMPOUND WAS POSITIVELY IDENTIFIED; REPORTED VALUE IS AN ESTIMATED CONCENTRATION
- mg/kg MILLIGRAMS PER KILOGRAM
- UBR UPPER BACKGROUND RANGE
- SSSL SITE-SPECIFIC SCREENING LEVEL
- ESV ECOLOGICAL SCREENING VALUE

NOTE:
 1. "B"-FLAGGED DATA NOT SHOWN.

FIGURE 2-3
METALS RESULTS EXCEEDING SSSLs/ESVs AND UBRs IN SURFACE AND DEPOSITIONAL SOILS TRAINING AREA T-6 (NAYLOR FIELD) PARCEL 183(6)

U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



1
2 The VOC concentrations in surface and depositional soils were below SSSLs. However, the
3 concentrations of three VOCs exceeded ESVs: chloroform (CWM-183-GP02 and CWM-183-
4 MW08), styrene (CWM-183-DEP02), and trichloroethene (CWM-183-GP02, CWM-183-
5 MW03, CWM-183-MW04, CWM-183-MW07, and CWM-183-GP08). Figure 2-4 shows the
6 sample locations with VOC results exceeding ESVs.

7
8 **Semivolatile Organic Compounds.** SVOCs were not detected in the surface and
9 depositional soil samples collected at the site.

10
11 **CWM Breakdown Products.** CWM breakdown products were not detected in the surface
12 and depositional soil samples collected at the site.

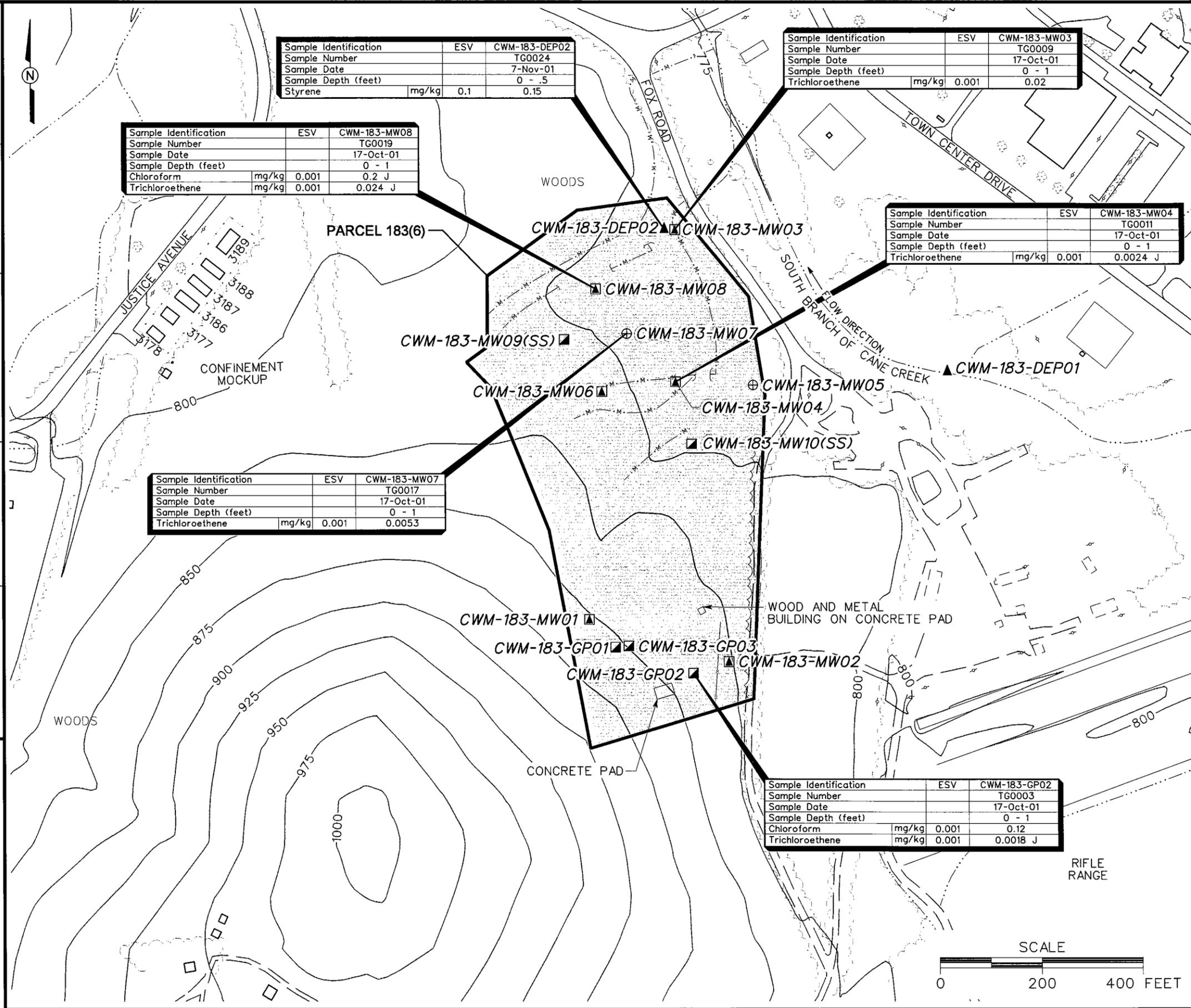
13 14 **2.2.2.2 Subsurface Soil Analytical Results**

15 Thirteen subsurface soil samples were collected at Training Area T-6, Parcel 183(6), as shown
16 on Figure 2-2. Analytical results were compared to residential human health SSSLs and metals
17 background concentrations, as presented in Table 2-6.

18
19 **Metals.** Twenty metals were detected in subsurface soil samples collected at Parcel 183(6).
20 The concentrations of six metals (aluminum, arsenic, chromium, iron, manganese, and
21 vanadium) exceeded SSSLs. Of the six metals that exceeded SSSLs, only aluminum (twelve
22 sample locations), iron (CWM-183-GP02 and CWM-183-MW06), manganese (CWM-183-
23 MW09), and vanadium (CWM-183-MW04) exceeded their respective background
24 concentrations. With the exception of aluminum at four locations, these metals concentrations
25 were within their respective upper background ranges (Appendix F). Figure 2-5 shows the
26 sample locations with metals results exceeding SSSLs and upper background range.

27
28 **Volatile Organic Compounds.** Nine VOCs were detected in subsurface soil samples
29 collected at the site. One acetone result, one methylene chloride result, and two
30 trichlorofluoromethane results were flagged with a “B” data qualifier, signifying that these
31 compounds were also detected in an associated laboratory or field blank sample. The majority of
32 the remaining VOC results were flagged with a “J” data qualifier, indicating that concentrations
33 were estimated. VOC concentrations in the subsurface soil samples ranged from 0.0011 to 0.4
34 mg/kg and were below SSSLs. Figure 2-6 shows the sample locations with detected VOC
35 results.

DWG. NO.: 1838936es.024
 PROJ. NO.: 838936
 INITIATOR: J. REMO
 PROJ. MGR.: J. YACOB
 DRAFT. CHK. BY: S. MORAN
 ENGR. CHK. BY: S. MORAN
 STARTING DATE: 09/25/02 DATE LAST REV.:
 DRAWN BY:
 10/07/02
 03:24:49 PM
 DRAWN BY: D. BOMAR
 dbomar
 c:\cadd\design\838936es.024

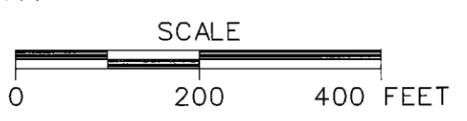


- ### LEGEND
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - BUILDING
 - FORMER BUILDING
 - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - CULVERT WITH HEADWALL
 - SURFACE DRAINAGE / CREEK
 - MANMADE SURFACE DRAINAGE FEATURE
 - FENCE
 - UTILITY POLE
 - MOUND
 - DEPRESSION
 - SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
 - GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
 - DEPOSITIONAL SOIL SAMPLE LOCATION
 - RESIDUUM MONITORING WELL LOCATION (DRY WELL)
 - J
 - COMPOUND WAS POSITIVELY IDENTIFIED; REPORTED VALUE IS AN ESTIMATED CONCENTRATION
 - MILLIGRAMS PER KILOGRAM
 - ECOLOGICAL SCREENING VALUE

NOTE:
 1. "B"-FLAGGED DATA NOT SHOWN.

FIGURE 2-4
VOCs EXCEEDING ESVs
IN SURFACE AND DEPOSITIONAL SOIL
TRAINING AREA T-6 (NAYLOR FIELD)
PARCEL 183(6)

U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



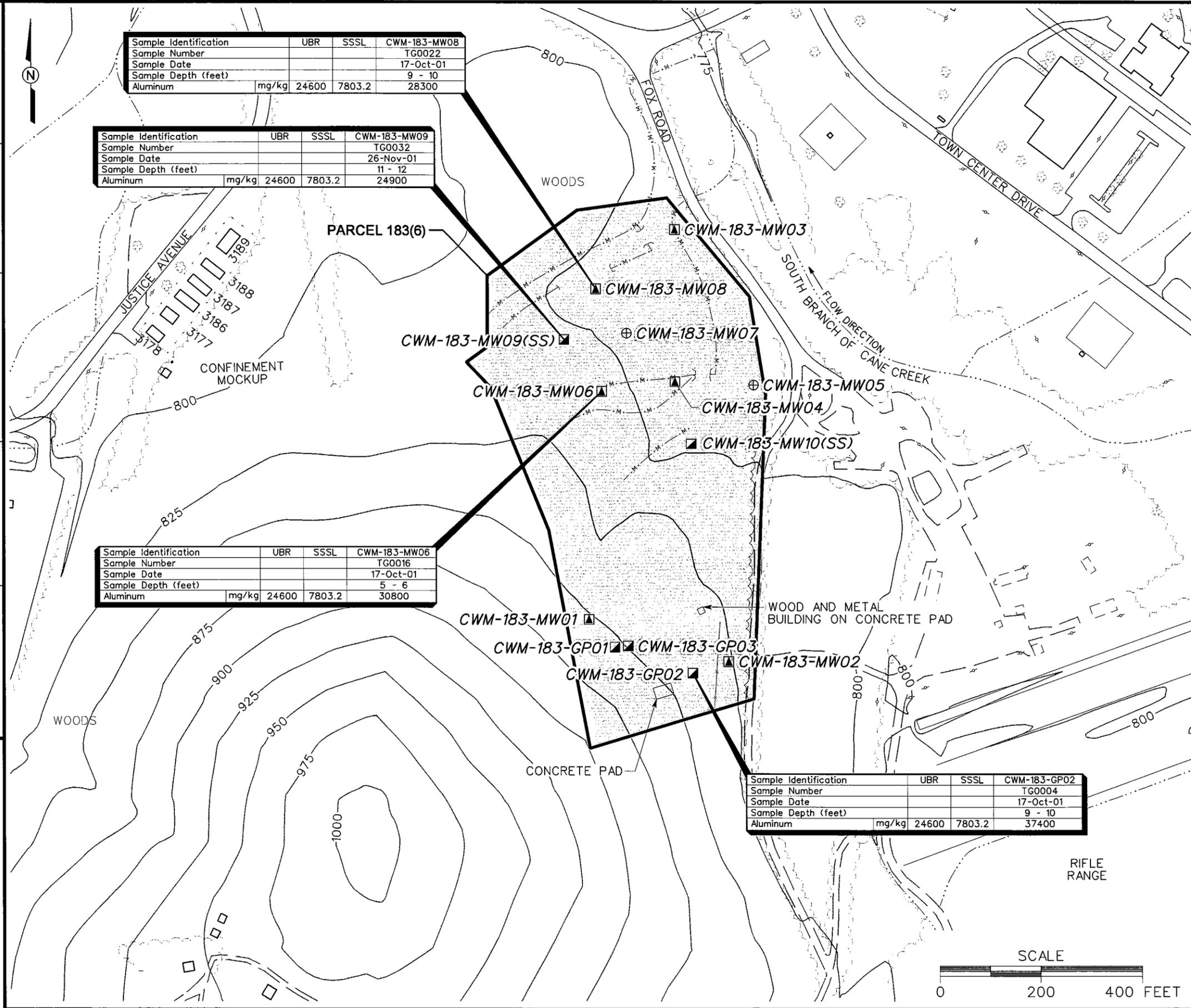
10/07/02
 03:33:26 PM
 c:\cadd\design\838936es.025
 dboomar

STARTING DATE: 09/25/02 DATE LAST REV.:
 DRAWN BY: D. BOMAR

DRAFT. CHK. BY: ENGR. CHK. BY: S. MORAN

INITIATOR: J. REMO
 PROJ. MGR.: J. YACOB

DWG. NO.: ...838936es.025
 PROJ. NO.: 838936



Sample Identification	UBR	SSSL	CWM-183-MW08
Sample Number			TG0022
Sample Date			17-Oct-01
Sample Depth (feet)			9 - 10
Aluminum	mg/kg	24600	7803.2
			28300

Sample Identification	UBR	SSSL	CWM-183-MW09
Sample Number			TG0032
Sample Date			26-Nov-01
Sample Depth (feet)			11 - 12
Aluminum	mg/kg	24600	7803.2
			24900

Sample Identification	UBR	SSSL	CWM-183-MW06
Sample Number			TG0016
Sample Date			17-Oct-01
Sample Depth (feet)			5 - 6
Aluminum	mg/kg	24600	7803.2
			30800

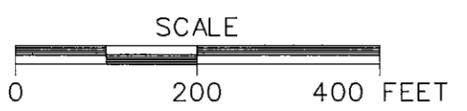
Sample Identification	UBR	SSSL	CWM-183-GP02
Sample Number			TG0004
Sample Date			17-Oct-01
Sample Depth (feet)			9 - 10
Aluminum	mg/kg	24600	7803.2
			37400

- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - BUILDING
 - FORMER BUILDING
 - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - CULVERT WITH HEADWALL
 - SURFACE DRAINAGE / CREEK
 - MANMADE SURFACE DRAINAGE FEATURE
 - FENCE
 - UTILITY POLE
 - MOUND
 - DEPRESSION
 - SURFACE AND SUBSURFACE SAMPLE LOCATION
 - GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
 - RESIDUUM MONITORING WELL LOCATION (DRY WELL)
 - mg/kg MILLIGRAMS PER KILOGRAM
 - UBR UPPER BACKGROUND RANGE
 - SSSL SITE-SPECIFIC SCREENING LEVEL

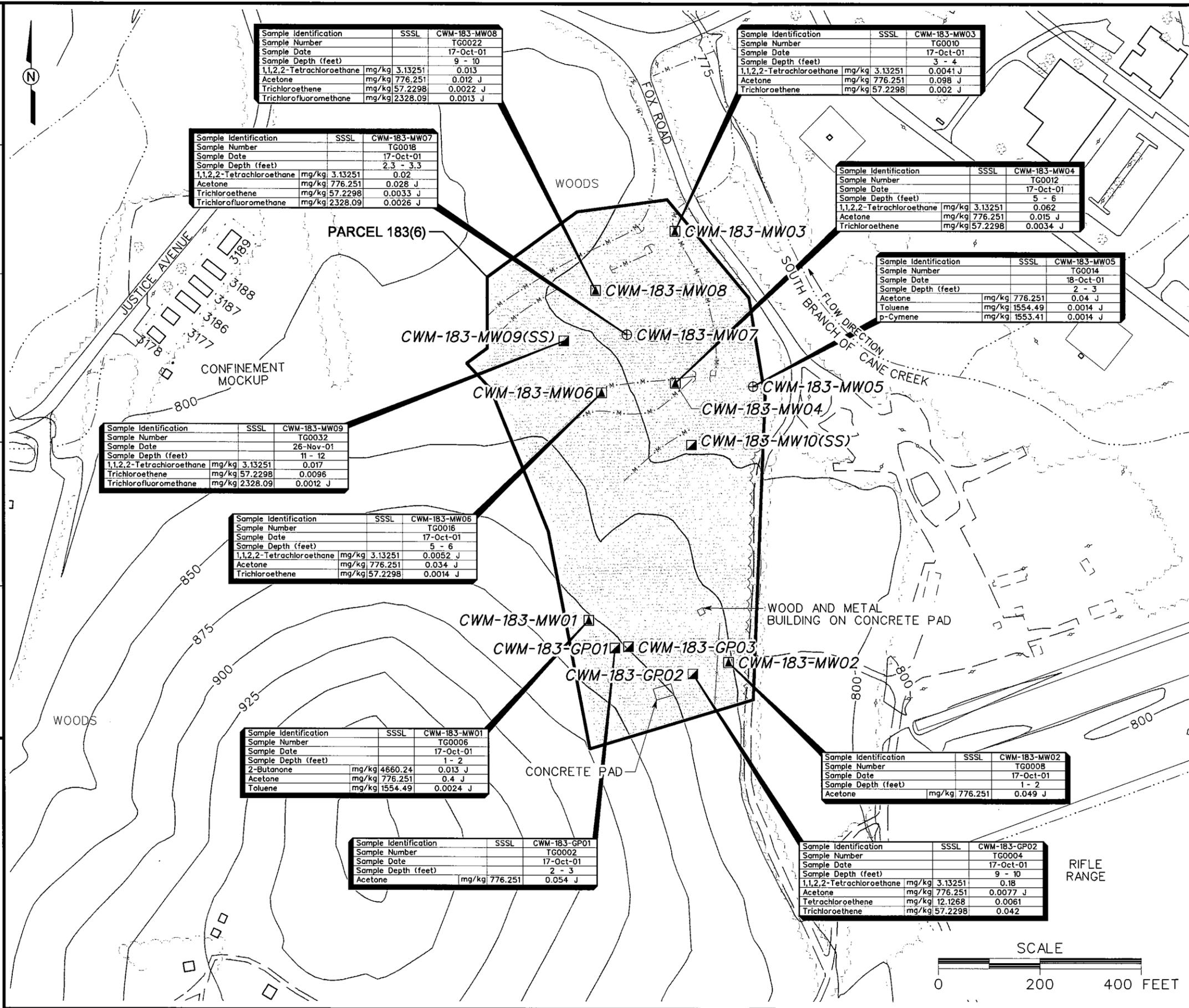
NOTE:
 1. "B"-FLAGGED DATA NOT SHOWN.

FIGURE 2-5
 METALS RESULTS EXCEEDING SSSLs AND UBRs IN SUBSURFACE SOIL TRAINING AREA T-6 (NAYLOR FIELD) PARCEL 183(6)

U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



10/07/02 03:40:37 PM
 DWG. NO.: ...838936es.026
 PROJ. NO.: 838936
 INITIATOR: J. REMO
 PROJ. MGR.: J. YACOB
 DRAFT. CHK. BY: ENGR. CHK. BY: S. MORAN
 STARTING DATE: 09/25/02 DATE LAST REV.:
 DRAWN BY:



LEGEND

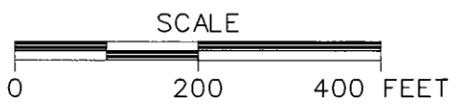
- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- FORMER BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE
- MOUND
- DEPRESSION
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- RESIDUUM MONITORING WELL LOCATION (DRY WELL)
- COMPOUND WAS POSITIVELY IDENTIFIED; REPORTED VALUE IS AN ESTIMATED CONCENTRATION
- mg/kg MILLIGRAMS PER KILOGRAM
- SSSL SITE-SPECIFIC SCREENING LEVEL

NOTES:

- ALL VOCs RESULTS ARE BELOW SSSLs.
- "B"-FLAGGED DATA NOT SHOWN.

FIGURE 2-6
VOCs DETECTED IN SUBSURFACE SOIL
TRAINING AREA T-6 (NAYLOR FIELD)
PARCEL 183(6)

U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



cbomar
 c:\cadd\design\838936es.026

1 **Semivolatile Organic Compounds.** SVOCs were not detected in the subsurface soil
2 samples collected at the site.

3
4 **CWM Breakdown Products.** CWM breakdown products were not detected in the subsurface
5 soil samples collected at the site.

6 7 **2.2.2.3 Groundwater Analytical Results**

8 Seven groundwater samples were collected for chemical analysis at Training Area T-6, Parcel
9 183(6), at the locations shown on Figure 2-2. Analytical results were compared to residential
10 human health SSSLs and metals background screening values, as presented in Table 2-7.

11
12 **Metals.** Eighteen metals were detected in groundwater samples collected at Parcel 183(6). The
13 concentrations of seven metals (aluminum, arsenic, barium, iron, manganese, nickel, and
14 thallium) exceeded SSSLs. Of these metals, aluminum (CWM-183-MW04), barium (CWM-
15 183-MW02, CWM-183-MW04, and CWM-183-MW06), manganese (CWM-183-MW03,
16 CWM-183-MW04, and CWM-183-MW10), and thallium (CWM-183-MW02 and CWM-183-
17 MW03) also exceeded their respective background concentrations. With the exception of the
18 manganese result at CWM-183-MW04, these metals concentrations were within their respective
19 upper background ranges (Appendix F). The manganese result at CWM-183-MW04 (6.8
20 milligrams per liter [mg/L]) minimally exceeded its upper background range (5.82 mg/L).

21
22 **Volatile Organic Compounds.** Fifteen VOCs were detected in groundwater samples. One
23 acetone result, two chloroform results, the methylene chloride results, and one toluene result
24 were flagged with a “B” data qualifier, signifying that these compounds were also detected in an
25 associated laboratory or field blank sample. VOC concentrations in the groundwater samples
26 ranged from 0.00024 to 13 mg/L. The concentrations of nine VOCs exceeded their respective
27 SSSLs:

- 28
- 29 • 1,1,2,2-Tetrachloroethane (0.0013 to 0.025 mg/L) in four wells
- 30
- 31 • 1,1,2 -Trichloroethane (0.0018 and 0.00073 mg/L) in two wells (CWM-183-MW04
- 32 and CWM-183-MW08)
- 33
- 34 • 1,2-Dichloroethane (0.0008 mg/L) in one well (CWM-183-MW04)
- 35
- 36 • Acetone (6.2 and 13 mg/L) in two wells (CWM-183-MW03 and CWM-183-MW10)
- 37
- 38 • Bromodichloromethane (0.0015 mg/L) in one well (CWM-183-MW06)
- 39
- 40 • Chloroform (0.0013 to 0.6 mg/L) in four wells

- Tetrachloroethene (0.0029 mg/L) in one well (CWM-183-MW08)
- Trichloroethene (0.009 to 0.22 mg/L) in four wells
- Vinyl chloride (0.00082 mg/L) in one well (CWM-183-MW04).

Figure 2-7 shows the sample locations with VOCs detected in groundwater. Figure 2-8 is an isopleth map showing the horizontal extent of total chlorinated VOCs in groundwater.

Semivolatile Organic Compounds. One SVOC (bis[2-ethylhexyl]phthalate) was detected in one groundwater sample (CWM-183-MW02). The bis(2-ethylhexyl)phthalate result (0.099 mg/L) exceeded its SSSL (0.0043 mg/L). bis(2-Ethylhexyl)phthalate, however, is a common sample contaminant.

CWM Breakdown Products. CWM breakdown products were not detected in the groundwater samples collected at the site.

2.2.2.4 Surface Water Analytical Results

One surface water sample was collected for chemical analysis at Parcel 183(6), as shown on Figure 2-2. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background concentrations, as presented in Table 2-8.

Metals. Seven metals were detected in the surface water sample collected at the site. The metals concentrations in the sample were below SSSLs. The barium and manganese results exceeded ESVs. Only barium exceeded its respective background concentration. However, the barium result was within the upper background range (Appendix F).

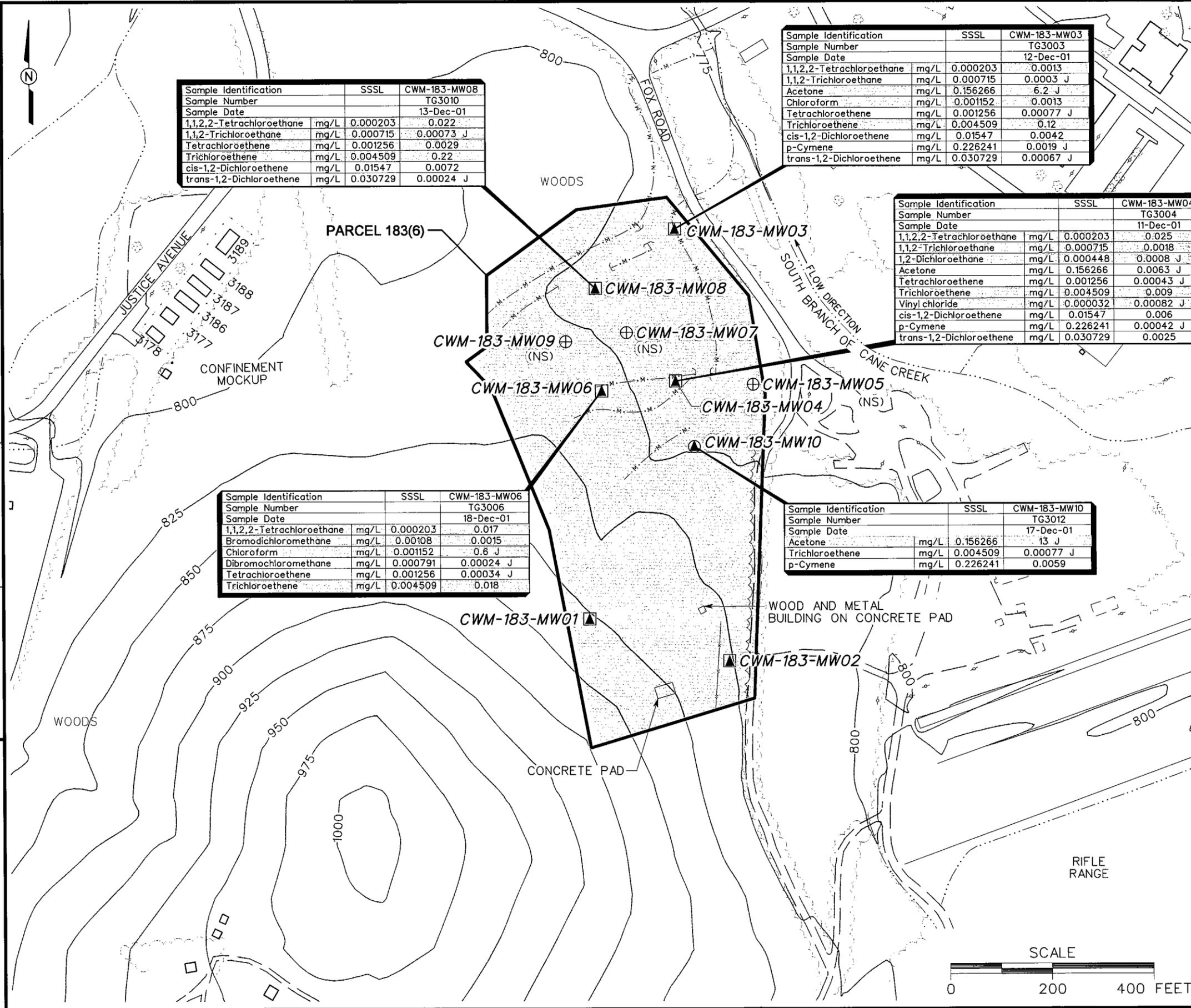
Volatile Organic Compounds. Four VOCs (1,1,2,2- tetrachloroethane, chloroform, cis-1,2-dichloroethene, and trichloroethene) were detected in the surface water sample collected at the site. The chloroform result was flagged with a “B” data qualifier, signifying that this compound was also detected in an associated laboratory or field blank sample.

The VOC concentrations in the surface water sample were below SSSLs and ESVs.

Semivolatile Organic Compounds. SVOCs were not detected in the surface water sample collected at the site.

Fig 2-7
2-8

DWG. NO.: ... \838936es.027
 PROJ. NO.: 838936
 INITIATOR: J. REMO
 PROJ. MGR.: J. YACOB
 DRAFT. CHK. BY: S. MORAN
 ENGR. CHK. BY: S. MORAN
 DATE LAST REV.:
 DRAWN BY:
 STARTING DATE: 09/25/02
 DRAWN BY: D. BOMAR
 10/07/02
 03:45:05 PM
 c:\cadd\design\838936es.027



Sample Identification	SSSL	CWM-183-MW08
Sample Number		TG3010
Sample Date		13-Dec-01
1,1,2,2-Tetrachloroethane	mg/L 0.000203	0.022
1,1,2-Trichloroethane	mg/L 0.000715	0.00073 J
Tetrachloroethene	mg/L 0.001256	0.0029
Trichloroethene	mg/L 0.004509	0.22
cis-1,2-Dichloroethene	mg/L 0.01547	0.0072
trans-1,2-Dichloroethene	mg/L 0.030729	0.00024 J

Sample Identification	SSSL	CWM-183-MW03
Sample Number		TG3003
Sample Date		12-Dec-01
1,1,2,2-Tetrachloroethane	mg/L 0.000203	0.0013
1,1,2-Trichloroethane	mg/L 0.000715	0.0003 J
Acetone	mg/L 0.156266	6.2 J
Chloroform	mg/L 0.001152	0.0013
Tetrachloroethene	mg/L 0.001256	0.00077 J
Trichloroethene	mg/L 0.004509	0.12
cis-1,2-Dichloroethene	mg/L 0.01547	0.0042
p-Cymene	mg/L 0.226241	0.0019 J
trans-1,2-Dichloroethene	mg/L 0.030729	0.00067 J

Sample Identification	SSSL	CWM-183-MW04
Sample Number		TG3004
Sample Date		11-Dec-01
1,1,2,2-Tetrachloroethane	mg/L 0.000203	0.025
1,1,2-Trichloroethane	mg/L 0.000715	0.0018
1,2-Dichloroethane	mg/L 0.000448	0.0008 J
Acetone	mg/L 0.156266	0.0063 J
Tetrachloroethene	mg/L 0.001256	0.00043 J
Trichloroethene	mg/L 0.004509	0.009
Vinyl chloride	mg/L 0.000032	0.00082 J
cis-1,2-Dichloroethene	mg/L 0.01547	0.006
p-Cymene	mg/L 0.226241	0.00042 J
trans-1,2-Dichloroethene	mg/L 0.030729	0.0025

Sample Identification	SSSL	CWM-183-MW06
Sample Number		TG3006
Sample Date		18-Dec-01
1,1,2,2-Tetrachloroethane	mg/L 0.000203	0.017
Bromodichloromethane	mg/L 0.00108	0.0015
Chloroform	mg/L 0.001152	0.6 J
Dibromochloromethane	mg/L 0.000791	0.00024 J
Tetrachloroethene	mg/L 0.001256	0.00034 J
Trichloroethene	mg/L 0.004509	0.018

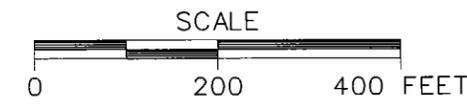
Sample Identification	SSSL	CWM-183-MW10
Sample Number		TG3012
Sample Date		17-Dec-01
Acetone	mg/L 0.156266	13 J
Trichloroethene	mg/L 0.004509	0.00077 J
p-Cymene	mg/L 0.226241	0.0059

- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - BUILDING
 - FORMER BUILDING
 - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - CULVERT WITH HEADWALL
 - SURFACE DRAINAGE / CREEK
 - MANMADE SURFACE DRAINAGE FEATURE
 - FENCE
 - UTILITY POLE
 - MOUND
 - DEPRESSION
 - GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
 - RESIDUUM MONITORING WELL LOCATION (DRY WELL)
 - COMPOUND WAS POSITIVELY IDENTIFIED; REPORTED VALUE IS AN ESTIMATED CONCENTRATION
 - mg/L MILLIGRAMS PER LITER
 - SSSL SITE-SPECIFIC SCREENING LEVEL
 - (NS) NOT SAMPLED
 - CONCENTRATION EXCEEDS SSSL

NOTE:
 1. "B"-FLAGGED DATA NOT SHOWN.

FIGURE 2-7
VOCs DETECTED IN GROUNDWATER TRAINING AREA T-6 (NAYLOR FIELD) PARCEL 183(6)

U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



DWG. NO.: ... \838936es.028
 PROJ. NO.: 838936
 INITIATOR: J. REMO
 PROJ. MGR.: J. YACCOB
 DRAFT. CHCK. BY:
 ENGR. CHCK. BY: S. MORAN
 STARTING DATE: 09/25/02 DATE LAST REV.:
 DRAWN BY:
 10/08/02 11:37:10 AM
 db omar
 c:\cadd\design\838936es.028

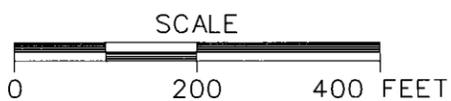


- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - BUILDING
 - FORMER BUILDING
 - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - CULVERT WITH HEADWALL
 - SURFACE DRAINAGE / CREEK
 - MANMADE SURFACE DRAINAGE FEATURE
 - FENCE
 - UTILITY POLE
 - MOUND
 - DEPRESSION
 - GROUNDWATER SAMPLE LOCATION
 - GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
 - RESIDUUM MONITORING WELL LOCATION (DRY WELL)
 - TOTAL CHLORINATED VOC CONCENTRATION (mg/L) (DASHED WHERE INFERRED)
 - TOTAL CHLORINATED VOC CONCENTRATION IN MILLIGRAMS PER LITER (mg/L)
 - ND NOT DETECTED
 - NS NOT SAMPLED

NOTE:
 1. TOTAL CHLORINATED VOC CONCENTRATIONS EXCLUDES "B"-FLAGGED DATA AND METHYLENE CHLORIDE RESULTS.

FIGURE 2-8
 TOTAL CHLORINATED VOC CONCENTRATIONS IN GROUNDWATER TRAINING AREA T-6 (NAYLOR FIELD) PARCEL 183(6)

U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



1
2 **CWM Breakdown Products.** CWM breakdown products were not detected in the surface
3 water sample collected at the site.
4

5 **2.2.2.5 Sediment Sampling**

6 One sediment sample was collected for chemical and physical analyses at the site, as shown on
7 Figure 2-2. Analytical results were compared to recreational site user human health SSSLs,
8 ESVs, and metals background concentrations, as presented in Table 2-9.
9

10 **Metals.** Eighteen metals were detected in the sediment sample collected at the site. Metal
11 concentrations in the sediment sample were below SSSLs. Three metals (arsenic, copper, and
12 mercury) were detected at concentrations exceeding their ESVs and respective background
13 concentrations. However, only the copper and mercury results exceeded their respective ESVs
14 and upper background ranges (Appendix F).
15

16 **Volatile Organic Compounds.** Five VOCs (1,1,2,2-tetrachloroethane, 2-butanone, acetone,
17 cis-1,2-dichloroethene, and trichloroethene) were detected in the sample. The 1,1,2,2-
18 tetrachloroethane, 2-butanone, and cis-1,2-dichloroethene results were flagged with a “J” data
19 qualifier, indicating that these compounds were detected at estimated concentrations below
20 laboratory reporting limits.
21

22 The concentrations of VOCs in the sediment sample were below SSSLs and ESVs.
23

24 **Semivolatile Organic Compounds.** SVOCs were not detected in the sediment sample
25 collected at the site.
26

27 **CWM Breakdown Products.** CWM breakdown products were not detected in the sediment
28 sample collected at the site.
29

30 **Total Organic Carbon and Grain Size.** The sediment sample was analyzed for TOC and
31 grain size. The TOC concentration was 32.9 mg/kg. The TOC and grain size results are
32 summarized in Appendix G.
33

34 **2.2.3 SI Summary and Conclusions**

35 Comparison of the analytical data to the SSSLs, ESVs, and background screening values
36 indicates the chemicals of potential concern are metals (in soils and groundwater), VOCs
37 (groundwater), and one SVOC (groundwater) at Training Area T-6. However, the SVOC (bis[2-
38 ethylhexyl]phthalate) is not believed to be site-related. Two metals in soils (aluminum and

1 antimony) exceeded their respective SSSLs and upper background ranges in one or more of the
2 samples. In groundwater, only manganese exceeded its SSSL and upper background range in
3 one sample. Nine VOCs exceeded SSSLs in groundwater: 1,1,2,2-tetrachloroethane, 1,1,2-
4 trichloroethane, 1,2-dichloroethane, acetone, bromodichloromethane, chloroform,
5 tetrachloroethane, trichloroethene, and vinyl chloride. Although acetone concentrations
6 exceeded its SSSL in groundwater, acetone was not detected in the soils, suggesting that a source
7 is not present. Based on the soil and groundwater results and the fact that acetone is a common
8 laboratory contaminant, acetone's status as a site-related chemical of concern has not been
9 conclusively determined. Therefore, the proposed RI field activities (Chapter 4.0) will be used
10 to determine the nature and extent of acetone at Parcel 183(6).

11
12 The most significant finding of the SI was the detection of the aforementioned chlorinated VOCs
13 in groundwater. Based on the results of the SI, an RI was recommended to determine the nature
14 and extent of contamination at Training Area T-6. The additional data will aid in the
15 development of the site hydrogeologic model as well as provide information necessary for the
16 completion of the human health and ecological risk assessments. Data collected during the RI
17 will also confirm or deny acetone's presence in groundwater.