Final

Site Investigation Report
Area M2, Subsection of Area 45

Fort McClellan
Calhoun County, Alabama

Prepared for:

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Table of Contents

Page

List of Tables iii
List of Figures iii
List of Acronyms iv
Executive Summary ES-1
1.0 Introduction 1-1
1.1 Project Description 1-1
1.2 Purpose and Objectives 1-2
1.3 Site Description and History 1-2
2.0 Previous Investigations 2-1
3.0 Current Site Investigation Activities 3-1
3.1 UXO Clearance 3-1
3.2 Environmental Sampling 3-1
3.2.1 Surface and Depositional Soil Sampling 3-1
3.2.2 Subsurface Soil Sampling 3-2
3.2.3 Surface Water Sampling 3-3
3.2.4 Sediment Sampling 3-3
3.3 Surveying of Sample Locations 3-4
3.4 Analytical Program 3-4
3.5 Sample Preservation, Packaging, and Shipping 3-5
3.6 Investigation-Derived Waste Management and Disposal 3-5
3.7 Variances/Nonconformances 3-6
3.7.1 Variances 3-6
3.7.2 Nonconformances 3-6
3.8 Data Quality 3-6
4.0 Site Characterization 4-1
4.1 Regional and Site Geology 4-1
4.1.1 Regional Geology 4-1
4.1.2 Site Geology 4-4
4.2 Site Surface Hydrology 4-5
5.0 Summary of Analytical Results 5-1
5.1 Surface and Depositional Soil Analytical Results 5-1

Table of Contents *(continued)*

Page

5.2 Subsurface Soil Analytical Results 5-3
5.3 Surface Water Analytical Results 5-4
5.4 Sediment Analytical Results 5-5
6.0 Summary and Conclusions and Recommendations 6-1
7.0 References 7-1
Attachment 1 – List of Abbreviations and Acronyms
Appendix A - Sample Collection Logs and Analysis Request/Chain of Custody Records
Appendix B - Boring Logs
Appendix C - Survey Data
Appendix D - Summary of Validated Analytical Data
Appendix E - Data Validation Summary Report
Appendix F - Variances
Appendix G - Summary Statistics for Background Media, Fort McClellan, Alabama

List of Tables

Table	Title	Follows Page
3-1	Sampling Locations and Rationale	3-1
3-2	Surface, Subsurface, and Depositional Soil Sample Designations and QA/QC Samples	3-1
3-3	Surface Water and Sediment Sample Designations and QA/QC Samples	3-3
3-4	Surface Water Field Parameters	3-3
3-5	Variances to the Site-Specific Field Sampling Plan	3-6
5-1	Surface and Depositional Soil Analytical Results	5-1
5-2	Subsurface Soil Analytical Results	5-1
5-3	Surface Water Analytical Results	5-1
5-4	Sediment Analytical Results	5-1

List of Figures

Figure	Title	Follows Page
1-1	Site Location Map	1-2
1-2	Site Map	1-2
3-1	Sample Location Map	3-1
5-1	Analytical Results Exceeding Human Health SSSLs and Established Background Values	5-1

List of Acronyms

See Attachment 1.

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK04, IT Corporation (IT) completed a site investigation (SI) at Area M2, Subsection of Area 45 at Fort McClellan (FTMC), Calhoun County, Alabama. This report summarizes SI activities conducted at Area M2, Subsection of Area 45 at FTMC. The SI was conducted to determine whether chemical constituents are present at Area M2, Subsection of Area 45 and, if present, whether the concentrations would present an unacceptable risk to human health or the environment. The SI at Area M2, Subsection of Area 45 consisted of the sampling and analyses of 14 surface soil samples, 3 depositional soil samples, 14 subsurface soil samples, 2 surface water samples, and 2 sediment samples.

The analytical results indicate that metals, volatile organic compounds, and semivolatile organic compounds (SVOC) were detected in the environmental media sampled. Nitroexplosives and perchlorate were not detected in any of the samples collected. Lewisite and chemical warfare material (CWM) breakdown products were not detected in the soil samples for which these constituents were analyzed. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, detected constituent concentrations were compared to the human health site-specific screening levels (SSSL) and ecological screening values (ESV) for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the Base Realignment and Closure environmental restoration program at FTMC. Additionally, metal concentrations exceeding SSSLs and ESVs were compared to media-specific background screening values.

The potential impact to human receptors is expected to be minimal. Although the site is projected for industrial/commercial future use, the soils analytical data were screened against residential human health SSSLs to evaluate the site for possible unrestricted future use. The concentrations of five metals (arsenic, chromium, iron, manganese, and vanadium) exceeded residential human health SSSLs in soils. However, with the exception of arsenic (one location), chromium (two locations), and iron (four locations) in subsurface soils, the metals concentrations were within background concentrations or the range of background values determined by SAIC (1998). The SVOC benzo(a)pyrene was detected in one surface soil sample at a concentration (0.2 mg/kg) exceeding the residential human health SSSL.

Because of elevated arsenic concentrations and the presence of two Decontamination Solution Number 2 cans on the site, several surface and subsurface soil samples were sent to Quanterra Environmental Services Laboratory for additional analyses. These samples were analyzed for CWM breakdown products to determine whether the arsenic concentrations were the result of chemical weapons use at the site. The analytical results indicate that no CWM breakdown products were detected. Additionally, five soil samples were sent to the Edgewood Chemical Biological Center for further analysis. The results of these analyses indicate that no lewisite or lewisite breakdown products were detected in the samples.

Arsenic and thallium were detected in one surface water sample at concentrations exceeding recreational site user SSSLs and background concentrations. The arsenic concentration was within the range of background values and the thallium result was flagged with a "B" data qualifier indicating that thallium was also detected in an associated laboratory or field blank. Given the limited impacted area, the metals detected in site media are not expected to pose a threat to human health.

Beryllium (one surface soil sample) and thallium (one surface water sample) were detected in site media at concentrations exceeding ESVs and the range of background values. In addition, a total of six SVOCs (PAH compounds) were detected in one surface soil sample and one sediment sample at concentrations exceeding ESVs. The concentrations of the SVOCs exceeding ESVs ranged from 0.054 mg/kg to 1.6 mg/kg. However, the potential impact to ecological receptors is expected to be minimal based on the future land use of the parcel. The site is currently undeveloped but is projected for industrial/commercial use.

Based on the results of the SI, past operations at Area M2, Subsection of Area 45 do not appear to have adversely impacted the environment (with the exception of UXO). The metals and organic compounds detected in site media do not pose an unacceptable risk to human health and the environment. Therefore, the site is released for unrestricted reuse with regard to hazardous, toxic, and radioactive waste. UXO investigation at Area M2 is being addressed separately by the U.S. Army.

1.0 Introduction

The U.S. Army has selected Fort McClellan (FTMC) located in Calhoun County, Alabama, for closure by the Base Realignment and Closure (BRAC) Commission under Public Laws 100-526 and 101-510. The 1990 Base Closure Act, Public Law 101-510 established the process by which U.S. Department of Defense (DOD) installations would be closed or realigned. The BRAC environmental restoration program requires investigation and cleanup of federal properties prior to transfer to the public domain. The U.S. Army is conducting environmental studies of the impact of suspected contaminants at parcels at FTMC under the management of the U.S. Army Corps of Engineers (USACE), Mobile District. The USACE contracted with IT Corporation (IT) to perform the site investigation (SI) at Area M2, Subsection of Area 45, through Contract Number DACA21-96-D-0018, Task Order CK04.

This SI report presents specific information and results compiled from the SI, including unexploded ordnance (UXO) clearance (immediately prior to collecting soil and sediment samples) and field sampling and analysis activities, conducted at Area M2. UXO investigation and removal at Area M2 is being performed as a separate activity.

1.1 Project Description

Area M2, Subsection of Area 45 was identified as an area to be investigated prior to property transfer. Area M2, Subsection of Area 45 was identified as a Category 1 site in the environmental baseline survey (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 1 sites are areas where no storage, release, or disposal (including migration) has occurred. Although Area M2 was designated as a Category 1 site, based on historical site operations and the presence of UXO at the site, further environmental investigation of this parcel was necessary prior to property transfer.

A site-specific field sampling plan (SFSP) attachment (IT, 2000a) and a site-specific safety and health plan (SSHP) attachment for Area M2, Subsection of Area 45 were finalized in March 2000. The SFSP and SSHP were prepared to provide technical guidance for sample collection and analysis at Area M2, Subsection of Area 45. The SFSP was used in conjunction with the SSHP as attachments to the installation-wide work plan (IT, 1998), and the installation-wide sampling and analysis plan (SAP) (IT, 2000b). The SAP includes the installation-wide safety and health plan and quality assurance plan.

The SI included field work to collect 14 surface soil samples, 3 depositional soil samples, 14 subsurface soil samples, 2 surface water samples, and 2 sediment samples to determine whether potential site-specific chemicals are present at Area M2, Subsection of Area 45.

1.2 Purpose and Objectives

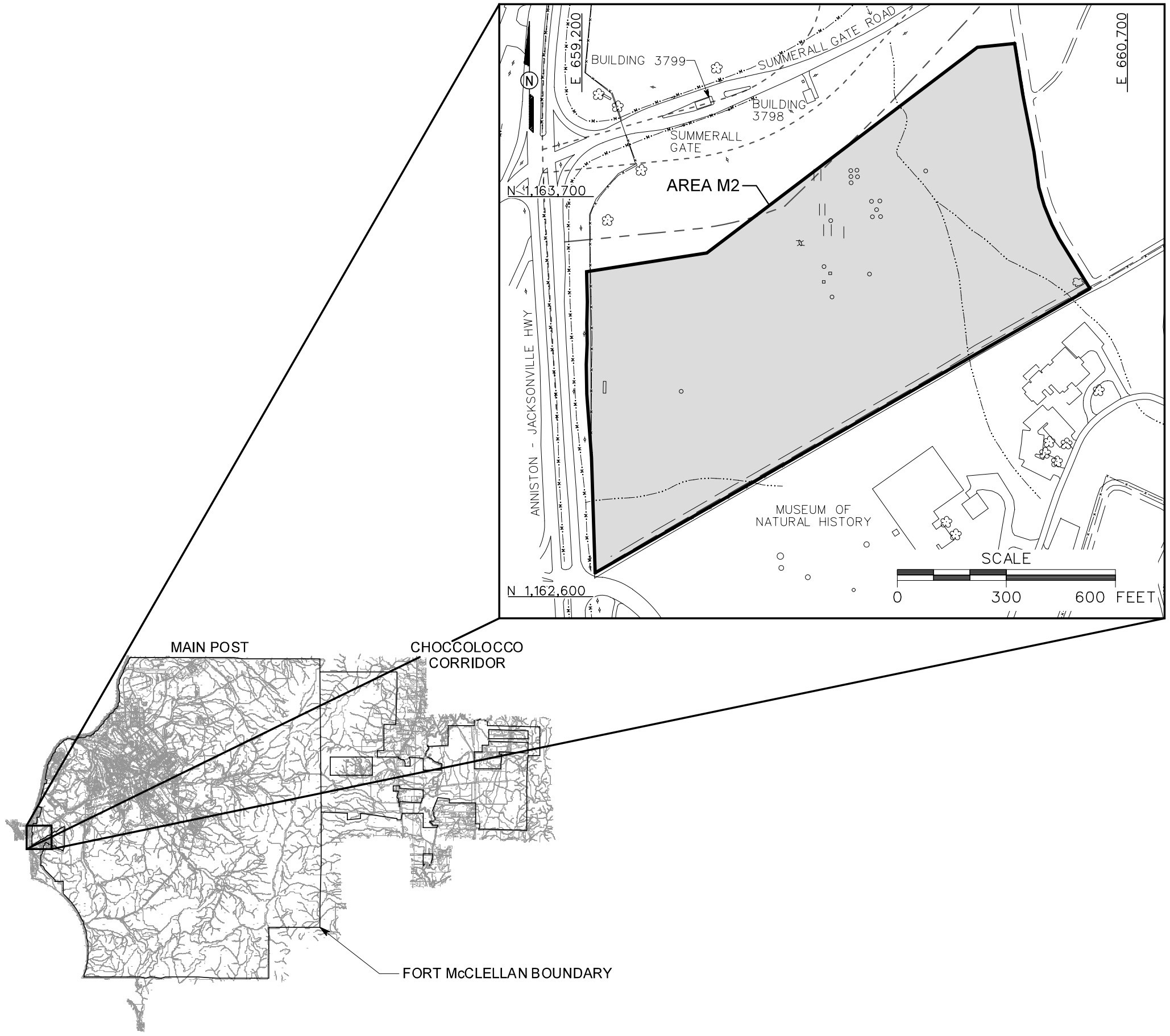
The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to determine whether chemical constituents are present at Area M2, Subsection of Area 45 at concentrations that would present an unacceptable risk to human health or the environment. The conclusions of the SI in Chapter 6.0 are based on the comparison of the analytical results to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed by IT as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC environmental restoration program at FTMC. The SSSLs and ESVs are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000c). Background metals screening values are presented in the *Final Background Metals Survey Report, Fort McClellan, Alabama* (Science Applications International Corporation [SAIC], 1998).

Based on the conclusions presented in this SI report, the BRAC Cleanup Team will decide to propose “No Further Action” at the site or to conduct additional work at the site.

1.3 Site Description and History

Area M2, Subsection of Area 45, is a 20.23-acre area located approximately 400 feet south-southeast of the Summerall Gate and Summerall Gate Road, east of the Anniston-Jacksonville highway, and adjacent to the western Main Post boundary of FTMC (Figures 1-1 and 1-2). The parcel is bounded to the south and east by a service road. A chainlink fence extends along the southern and western parcel boundary.

Area M2 is a subsection of Parcel 232Q-X. Parcel 232Q-X includes all areas south of Summerall Gate Road, north of known ranges east and west of Iron Mountain Road, east of the Main Post boundary, and west of the Motor Pool Area 3100, Parcel 146(7). This includes several other parcels within Parcel 232Q-X such as Area M2, the Former Weapons Demonstration Area, Parcel 194(7), and Training Area T4, the Former Biological Simulant Test Area, Parcel 181(7) (Figure 1-2).



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TREES / TREELINE
- PARCEL BOUNDARY
- BRIDGE
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- RAILROAD
- UTILITY POLE
- SURFACE MOUND
- SURFACE DEPRESSIONS (5-6' IN DIAMETER AND 3-4' DEEP)
- TRENCH LOCATION (12-18' IN LENGTH AND 1-3' DEEP)
- EASTERN BYPASS RIGHT OF WAY BOUNDARY
- EASTERN BYPASS PROPOSED ROADWAY

FIGURE 1-1
SITE LOCATION MAP
AREA M2, SUBSECTION OF AREA 45

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

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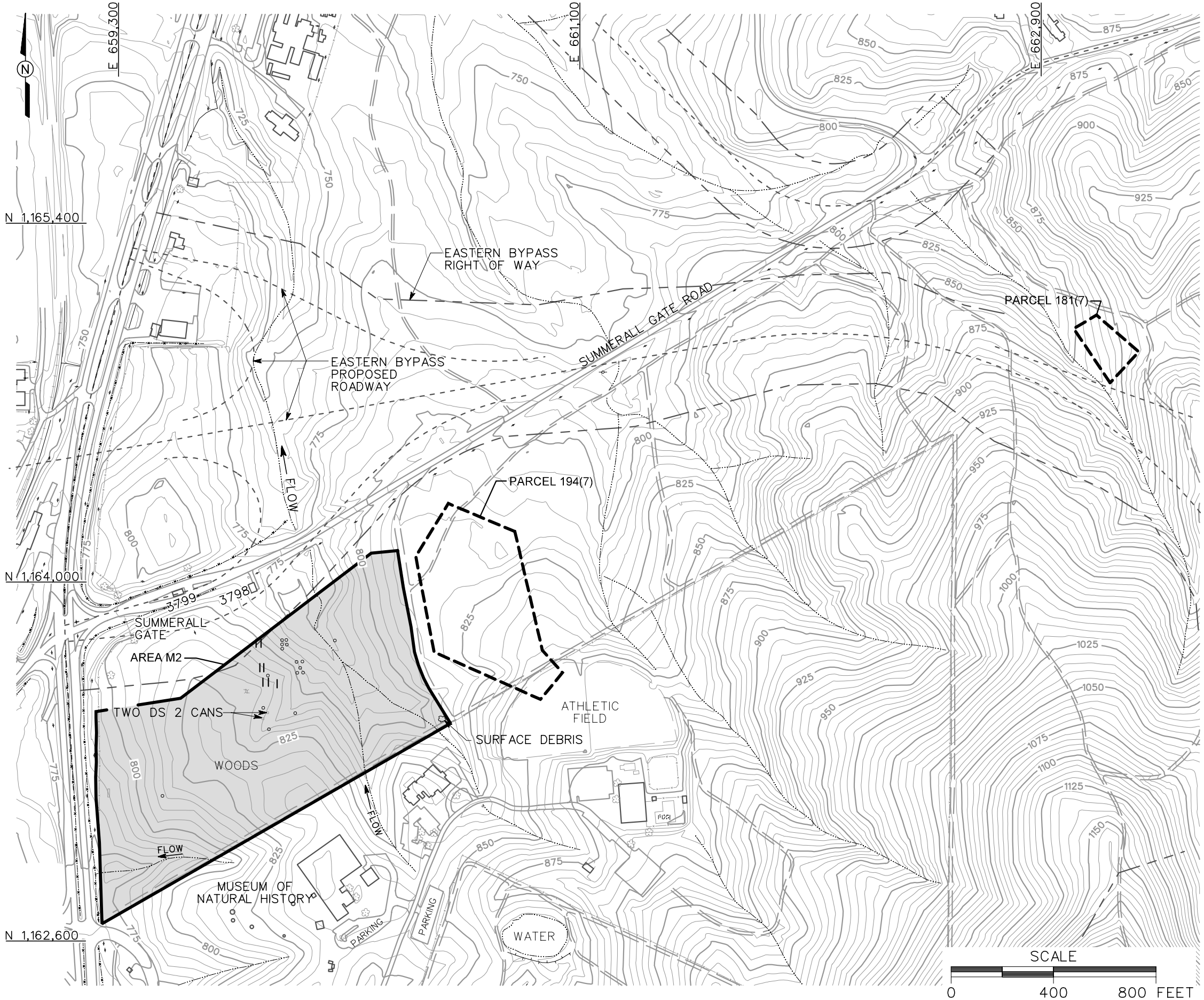

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FEET)
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- RAILROAD
- UTILITY POLE
- SURFACE MOUND
- SURFACE DEPRESSIONS (5-6' IN DIAMETER AND 3-4' DEEP)
- TRENCH LOCATION (12-18' IN LENGTH AND 1-3' DEEP)
- DS 2 DECONTAMINATION SOLUTION NO. 2
- EASTERN BYPASS RIGHT OF WAY BOUNDARY
- EASTERN BYPASS PROPOSED ROADWAY

FIGURE 1-2
SITE MAP
AREA M2, SUBSECTION OF AREA 45

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

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Several circular surface depressions (approximately 5 to 6 feet in diameter) were observed on the east-facing slope, near the east-central portion of the site. Additional surface depressions were noted near a topographic low near the east-central portion of the parcel, and at a topographic high location near the west central portion of the parcel. Surface debris (tires, rusted beverage cans, soda bottles, etc.) were observed in the extreme southeast corner of the study area during an IT sitewalk in February 2000.

The closest parcel to Area M2 is the Former Weapons Demonstration Area, Parcel 194(7). This parcel is located along the eastern border of Area M2 within Parcel 232Q-X. Parcel 194(7) was reportedly used in the 1950s for familiarization training with various munitions (ESE, 1998). Munitions demonstrated include the following (USACE, 1999):

- Flame throwers
- Smoke grenades
- Rifle smoke grenades
- Thermite grenades
- X-200 land mines filled with 5 gallons of napalm
- M5 and M4A2 Navy floating smoke generators
- Primacord
- White phosphorus
- M1 land mine filled with molasses residuum (innocuous simulant for mustard agent)
- Field Flame Expedient.

Parcel 194(7) appears cleared and the site of intense activity on aerial photographs taken in 1957 (USACE, 1999). Because of the proximity of Parcel 194(7) and Area M2, similar weapons demonstration activities may have occurred at Area M2.

The overall elevation of Area M2 ranges from about 770 to 840 feet mean sea level (msl), with the highest elevation near the south-central portion of the parcel sloping east and west. Shallow groundwater flow probably follows site topography, with movement to the northwest and to the west. Two small intermittent streams converge in the eastern portion of the parcel, flow north, and merge before exiting the parcel to the north (Figure 1-2). A gully crosses the southwest corner of the parcel with a westerly flow direction. Ponded water was observed in the draw during the IT site walk; however, flow was not observed at that time.

2.0 Previous Investigations

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 DOD 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 (including migration) has occurred
2. Areas where only release or disposal of petroleum products has occurred
3. Areas of contamination below action levels
4. Areas where all necessary remedial actions have been taken
5. Areas of known contamination with removal and/or remedial action underway
6. Areas of known contamination where required response actions have not been taken.
7. Areas that have not been evaluated or that require further evaluation.

For non-Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) environmental or safety issues, the parcel label includes the following components: a unique non-CERCLA issue number; the letter "Q" designating the parcel as a Community Environmental Response Facilitation Act (CERFA) Category 1 Qualified Parcel; and the code for the specific non-CERCLA issue(s) present (ESE, 1998). The non-CERCLA issue codes used are:

- A = Asbestos (in buildings)
- L = Lead-based paint (in buildings)
- P = Polychlorinated biphenyls
- R = Radon (in buildings)
- RD = Radionuclides/radiological issues
- X = Unexploded ordnance
- CWM = Chemical warfare material.

The EBS was conducted in accordance with CERFA (CERFA-Public Law 102-426) protocols and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, the Alabama Department of Environmental Management (ADEM), the U.S. Environmental Protection Agency (EPA) Region IV, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historic maps and aerial photographs were reviewed to document historic 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.

Area M2, Subsection of Area 45, was identified as a Category 1 CERFA site, qualified “X” for UXO. This CERFA site is a parcel where no known or recorded storage, release, or disposal (including migration) has occurred on site property, but is qualified for potential UXO. Area M2, Subsection of Area 45, requires additional evaluation to determine its environmental condition.

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by IT at Area M2, Subsection of Area 45, including UXO clearance and environmental sampling and analysis activities.

3.1 UXO Clearance

Area M2, Subsection of Area 45, does not fall within the "Possible Explosive Ordnance Impact Areas" or "Possible Artillery Impact Areas" shown on Plate 10 of the FTMC Archive Search Report Maps (USACE, 1999). However, based on the recommendation by USACE-Huntsville, UXO surface sweeps and downhole surveys of soil borings were required to support field activities at Area M2, Subsection of Area 45. The BRAC Cleanup Team is aware of local anecdotal evidence that ordnance may potentially be present at Area M2. Consequently, UXO avoidance activities were performed at Area M2, Subsection of Area 45 following methodology outlined in Section 4.1.7 of the SAP (IT, 2000b). IT UXO personnel used a Schonstedt Heliflux Magnetic Locator to perform a surface sweep of the corridors necessary to bring equipment to the sample location prior to site access. After the parcel was cleared for access, sample locations were cleared using a Foerster Ferex Electromagnetic Detector following procedures outlined in Section 4.1.7.3 of the SAP (IT, 2000b).

3.2 Environmental Sampling

The environmental sampling during the SI at Area M2, Subsection of Area 45, included the collection of surface and depositional soil samples, subsurface soil samples, surface water samples, and sediment samples for chemical analyses. The sample locations were determined by observing site physical characteristics noted during a site visit and by reviewing historical documents pertaining to activities conducted at the site. The sample locations, media, and rationale are summarized in Table 3-1. Samples were submitted for laboratory analyses of site-related parameters listed in Section 3.4.

3.2.1 Surface and Depositional Soil Sampling

Surface soil samples were collected from 14 locations and depositional soil samples were collected from 3 locations at Area M2, Subsection of Area 45, as shown on Figure 3-1. Sampling locations and rationale are presented in Table 3-1. Sample designations, depths, and quality assurance/quality control (QA/QC) samples are listed in Table 3-2. Surface and depositional soil sampling locations were determined in the field by the on-site geologist based on UXO clearance, sampling rationale, site topography, and buried and overhead utilities.

Table 3-1

Sampling Locations and Rationale
Area M2, Subsection of Area 45
Fort McClellan, Calhoun County, Alabama

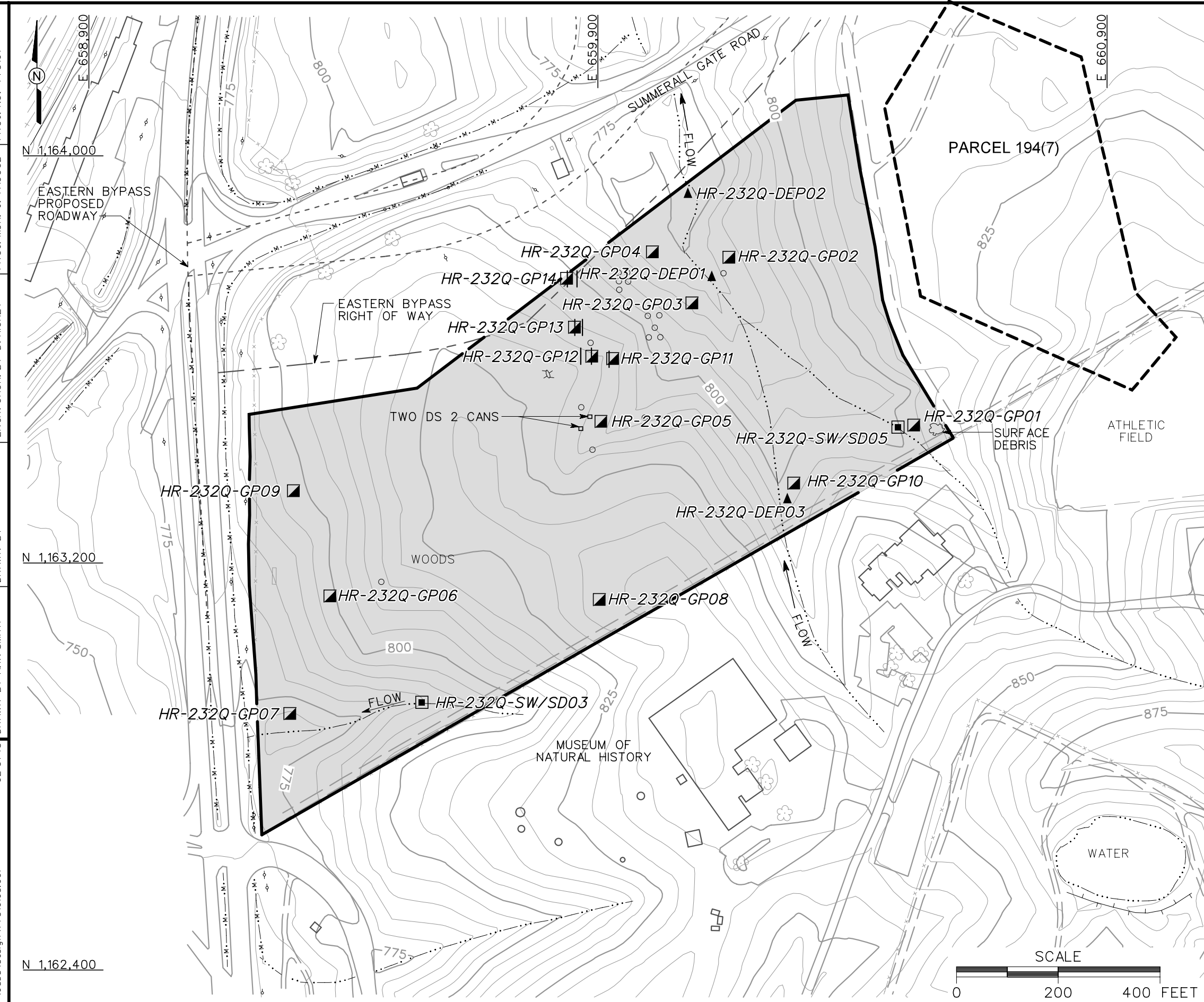
Sample Location	Sample Media	Sample Location Rationale
HR-232Q-GP01	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected downslope of surface debris near the southeast corner of the parcel to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-GP02	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected adjacent to a surface depression east of the north-south trending surface drainage feature to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-GP03	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected downslope of a group of surface depressions west of the north-south trending surface drainage feature to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-GP04	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected downslope of two surface depressions near the north-central portion of the parcel to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-GP05	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected downslope of a surface depression in the central portion of the parcel to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-GP06	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected downslope of a surface depression in the west-central portion of the parcel to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-GP07	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected at a topographic low location near the southwest corner of the parcel to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-GP08	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected near the south-central parcel boundary to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-GP09	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected near the north western corner of the parcel to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-GP10	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected near the southeastern parcel boundary to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-GP11	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected in the southern trench in the north central area of the site to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-GP12	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected in the northern trench in the north central area of the site to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-GP13	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected in the trench east of the mound in the north central area of the site to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-GP14	Surface soil and subsurface soil	Surface soil and subsurface soil samples were collected in the trench west of the depression in the north central area of the site to determine if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site.
HR-232Q-DEP01	Depositional soil	A depositional soil sample was collected downstream of the confluence of the two small intermittent streams that merge and flow north in the eastern section of the site. This sample location was originally planned as a surface water/sediment sampling location, however, due to the absence of surface water and sediment at the location it was changed to a depositional soil sample.
HR-232Q-DEP02	Depositional soil	A depositional soil sample was collected at the north edge of the parcel downstream of the confluence of the two small intermittent streams that merge and flow north in the eastern section of the site. This sample location was originally planned as a surface water/sediment sampling location, however, due to the absence of surface water and sediment at the location it was changed to a depositional soil sample.
HR-232Q-DEP03	Depositional soil	A depositional soil sample was collected approximately 100 feet north-northwest to a topographic low by the southern parcel boundary in the western intermittent stream that flows north in the eastern section of the site. This sample location was originally planned as a surface water/sediment sampling location, however, due to the absence of surface water and sediment at the location it was changed to a depositional soil sample.
HR-232Q-SW/SD03	Surface water and Sediment	Surface water and sediment samples were collected in a small intermittent stream which flows west across the southwestern corner of the site to determine if contaminant releases have occurred from runoff in this area of the site of Area M2.
HR-232Q-SW/SD05	Surface water and Sediment	Surface water and sediment samples were collected in a small intermittent stream which flows north in the eastern section of the site to determine if contaminants from off-site sources are being transported on-site via surface water pathways.

Table 3-2

Surface, Subsurface, and Depositional Soil Sample Designations and QA/QC Samples
Area M2, Subsection of Area 45
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples: Field Duplicates	QA/QC Samples: Field Splits	QA/QC Samples: MS/MSD	Analytical Suite
HR-232Q-GP01	HR-232Q-GP01-SS-EC0001-REG	0-0.5	HR-232Q-GP01-SS-EC0008-FD		HR-232Q-GP01-SS-EC0001-MS HR-232Q-GP01-SS-EC0001-MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate
	HR-232Q-GP01-DS-EC0002-REG	4-8				
HR-232Q-GP02	HR-232Q-GP02-SS-EC0003-REG	0-0.5				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate
	HR-232Q-GP02-DS-EC0004-REG	8-12				
HR-232Q-GP03	HR-232Q-GP03-SS-EC0005-REG	0-0.5				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, CWM breakdown products
	HR-232Q-GP03-DS-EC0006-REG	2-4				
HR-232Q-GP04	HR-232Q-GP04-SS-EC0007-REG	0-0.5		HR-232Q-GP04-SS-EC0009-FS		TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, CWM breakdown products
	HR-232Q-GP04-DS-EC0010-REG	8-12				
HR-232Q-GP05	HR-232Q-GP05-SS-EC0011-REG	0-0.5				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, CWM breakdown products
	HR-232Q-GP05-DS-EC0012-REG	4-8				
HR-232Q-GP06	HR-232Q-GP06-SS-EC0013-REG	0-0.5				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, Lewisite (and breakdown products)
	HR-232Q-GP06-DS-EC0014-REG	8-12				
HR-232Q-GP07	HR-232Q-GP07-SS-EC0015-REG	0-0.5				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, Lewisite (and breakdown products)[a]
	HR-232Q-GP07-DS-EC0016-REG	8-12				
HR-232Q-GP08	HR-232Q-GP08-SS-EC0017-REG	0-0.5				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, Lewisite (and breakdown products)[a]
	HR-232Q-GP08-DS-EC0018-REG	4-7				
HR-232Q-GP09	HR-232Q-GP09-SS-EC0019-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, Lewisite (and breakdown products)[a]
	HR-232Q-GP09-DS-EC0020-REG	8-12				
HR-232Q-GP10	HR-232Q-GP10-SS-EC0021-REG	0-0.5				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate
	HR-232Q-GP10-DS-EC0022-REG	8-12				
HR-232Q-GP11	HR-232Q-GP11-SS-EC0023-REG	0-0.5				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, CWM breakdown products
	HR-232Q-GP11-DS-EC0024-REG	8-12				
HR-232Q-GP12	HR-232Q-GP12-SS-EC0025-REG	0-0.5			HR-232Q-GP12-DS-EC0026-MS HR-232Q-GP12-DS-EC0026-MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, CWM breakdown products
	HR-232Q-GP12-DS-EC0026-REG	8-12				
HR-232Q-GP13	HR-232Q-GP13-SS-EC0027-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, CWM breakdown products
	HR-232Q-GP13-DS-EC0028-REG	8-12	HR-232Q-GP13-DS-EC0029-FD	HR-232Q-GP13-DS-EC0030-FS		
HR-232Q-GP14	HR-232Q-GP14-SS-EC0031-REG	0-0.5				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate, CWM breakdown products
	HR-232Q-GP14-DS-EC0032-REG	8-12				
HR-232Q-DEP01	HR-232Q-DEP01-DEP-EC0033-REG	0-0.5				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate
HR-232Q-DEP02	HR-232Q-DEP02-DEP-EC0034-REG	0-0.5				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate
HR-232Q-DEP03	HR-232Q-DEP03-DEP-EC0035-REG	0-0.5				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate

[a]Subsurface soil sample only.
CWM - Chemical warfare material.
FD - Field duplicate.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FEET)
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- RAILROAD
- UTILITY POLE
- SURFACE MOUND
- SURFACE DEPRESSIONS (5-6' IN DIAMETER AND 3-4' DEEP)
- TRENCH LOCATION (12-18' IN LENGTH AND 1-3' DEEP)
- DS 2 — DECONTAMINATION SOLUTION NO. 2
- EASTERN BYPASS RIGHT OF WAY BOUNDARY
- EASTERN BYPASS PROPOSED ROADWAY
- SURFACE WATER/SEDIMENT SAMPLE LOCATION
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- DEPOSITIONAL SOIL SAMPLE LOCATION

FIGURE 3-1
SAMPLE LOCATION MAP
AREA M2,
SUBSECTION OF AREA 45

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

DWG. NO.: ...\773191es.097 | PROJ. NO.: 773191
INITIATOR: D. HICKEY | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: D. HICKEY
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 5/25/00 | DRAWN BY: A.W. SMITH
11/16/00 02:31:48 DBILLING c:\cadd\design\773191es.097

Sample Collection. Surface soil samples were collected from the upper 1 foot of soil by using either a stainless-steel hand auger or direct-push methodology as specified in Section 4.7.1.1 of the SAP (IT, 2000b). Depositional soil samples were collected from the upper 1 foot of soil using a stainless-steel hand auger. Surface and depositional soil samples were collected by first removing any surface debris, such as rocks or vegetation, from the immediate sample area. The soil was collected with the sampling device and screened with a photoionization detector (PID) in accordance with Section 4.7.1.1 of the SAP. Samples for volatile organic compound (VOC) analysis were collected directly from the sampler with three EnCore® samplers. The remaining portion of the sample was transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4. Sample collection logs are included in Appendix A.

3.2.2 Subsurface Soil Sampling

Subsurface soil samples were collected from 14 soil borings installed at Area M2, Subsection of Area 45, as shown on Figure 3-1. Subsurface soil sampling locations and rationale are presented in Table 3-1. Subsurface soil sample designations, depths, and QA/QC samples are listed in Table 3-2. Soil boring sampling locations were determined in the field by the on-site geologist based on UXO clearance, sampling rationale, site topography, and buried and overhead utilities. IT contracted TEG, Inc., a direct-push technology subcontractor, to assist in subsurface soil sample collection at Area M2, Subsection of Area 45.

Sample Collection. Subsurface soil samples were collected from soil borings at depths greater than 1 foot bgs in the unsaturated zone. The soil borings were advanced and soil samples collected using the direct-push sampling procedures specified in Section 4.9.1.1 of the SAP (IT, 2000b). Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4.

Soil samples were collected continuously to 12 feet bgs or until direct-push sampler refusal was encountered. Subsurface soil samples were field screened using a PID in accordance with Section 4.7.1.1 of the SAP (IT, 2000b) to measure for volatile organic vapors. The sample showing the highest reading was selected and sent to the laboratory for analysis; however, at those locations where PID readings were below background, the deepest sample interval above groundwater was submitted for analyses. Samples to be analyzed for VOCs were collected directly from the sampler with three EnCore® samplers. The remaining portion of the sample was transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. Samples submitted for laboratory analyses are summarized in Table 3-2. The

on-site geologist logging each borehole constructed a detailed lithological log. The lithological log for each borehole is included in Appendix B.

At the completion of subsurface soil sampling, boreholes were abandoned with bentonite chips (then hydrated with potable water) following borehole abandonment procedures summarized in Appendix B of the SAP (IT, 2000b).

3.2.3 Surface Water Sampling

Two surface water samples were collected from the intermittent streams that flow through Area M2, Subsection of Area 45 at the locations shown on Figure 3-1. The surface water sampling locations and rationale are listed in Table 3-1. The surface water sample designations and QA/QC samples are listed in Table 3-3. The actual sampling locations were determined in the field, based on drainage pathways and actual field observations.

Sample Collection. Surface water samples were collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP (IT, 2000b). Surface water samples were collected by dipping a clean stainless-steel pitcher in the water and pouring the water into the appropriate sample containers. Surface water samples were collected after field parameters had been measured using a Hydrolab® water quality unit. Surface-water field parameters are listed in Table 3-4. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-3 using methods outlined in Section 3.4.

3.2.4 Sediment Sampling

Two sediment samples were collected at the same locations as the surface water samples presented in Section 3.2.3. The locations of the sediment samples are shown on Figure 3-1. Sediment sampling locations and rationale are presented in Table 3-1. The sediment sample designations and QA/QC samples are listed in Table 3-3. The actual sediment sampling locations were determined in the field, based on drainage pathways and actual field observations.

Sample Collection. Sediment samples were collected with a clean stainless-steel trowel in accordance with the procedures specified in Section 4.9.1.2 of the SAP (IT, 2000b). Samples to be analyzed for VOCs were collected directly from the trowel with three EnCore® samples. The remaining portion of the sample was transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. Sample collection logs are included in Appendix A. The sediment samples were analyzed for the parameters listed in Table 3-3 using methods outlined in Section 3.4.

Table 3-3

Surface Water and Sediment Sample Designations and QA/QC Samples
Area M2, Subsection of Area 45
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-232Q-SW/SD03	HR-232Q-SW/SD03-SW-EC2005-REG	N/A				TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate (TOC, Grain Size for sediment only)
	HR-232Q-SW/SD03-SD-EC1004-REG	0-0.5				
HR-232Q-SW/SD05	HR-232Q-SW/SD05-SW-EC2007-REG	N/A	HR-232Q-SW/SD05-SW-EC2002-FD		HR-232Q-SW/SD05-SW-EC2004-MS HR-232Q-SW/SD05-SW-EC2004-MSD	TCL VOCs, TCL SVOCs, TAL Metals, Nitroexplosives, Perchlorate (TOC, Grain Size for sediment only)
	HR-232Q-SW/SD05-SD-EC1006-REG	0-0.5	HR-232Q-SW/SD05-SD-EC1002-FD			

FD - Field Duplicate
ft - feet.
MS/MSD - Matrix spike/matrix spike duplicate.
NA - Not applicable.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
TOC - Total organic carbon.
VOC - Volatile organic compound.

Table 3-4

Surface Water Field Parameters
Area M2, Subsection of Area 45
Fort McClellan, Calhoun County, Alabama

Sample Location	Date	Media	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mV)	Temperature (^oC)	Turbidity (NTUs)	pH (SU)
HR-232Q-SW/SD03	30-Mar-00	SW	0.029	6.91	NR	13.3	405	5.56
HR-232Q-SW/SD05	30-Mar-00	SW	0.135	5.46	NR	14.6	7	7.16

^oC - Degrees Celsius.
mg/L - Milligrams per liter.
mS/cm - Millisiemen per centimeter.
mV - Millivolt.
NR - Reading not recorded.
NTUs - Nephelometric turbidity units.
SU - Standard Unit.
SW - Surface water.

3.3 Surveying of Sample Locations

Sample locations were surveyed using global positioning system survey techniques described in Section 4.3 of the SAP (IT, 2000b), and conventional civil survey techniques described in Section 4.19 of the SAP (IT, 2000b). Horizontal coordinates were referenced to the U.S. State Plane Coordinate System (Alabama East Zone, North American Datum of 1983 [NAD83]). Elevations were referenced to the North American Vertical Datum of 1988 (NAVD88). Horizontal coordinates and elevations are included in Appendix C.

3.4 Analytical Program

Samples collected during the SI were analyzed for various physical and chemical properties. The specific suite of analyses performed is based on the potential site-specific chemicals historically used at the site and EPA, ADEM, FTMC, and USACE requirements. Target analyses for samples collected at Area M2, Subsection of Area 45 included the following:

- Target Compound List (TCL) VOCs - Method 5035/8260B
- TCL Semivolatile Organic Compounds (SVOC) - Method 8270C
- Target Analyte List Metals - Method 6010B/7000
- Nitroexplosives - Method 8330
- Perchlorate - Method 314
- Chemical Warfare Material (CWM) breakdown products – Methods 8321M and 8270M
- Lewisite and Lewisite breakdown products – Method 8270M
- Total Organic Carbon - Method 9060 (sediment only)
- Grain Size - American Society for Testing and Materials D421/D422 (sediment only).

The samples were analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 6-1 in Appendix B of the SAP (IT, 2000b). Data were reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of Appendix B of the SAP [IT, 2000b]). Chemical data were reported via hard copy data packages by the laboratory using Contract Laboratory Program-like forms. These packages were validated in accordance with EPA National Functional Guidelines by Level III criteria. A

summary of validated data is included in Appendix D. The Data Validation Summary Report is included in Appendix E.

3.5 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping followed requirements specified in Section 4.13.2 of the SAP (IT, 2000b). Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SI are listed in Section 5.0, Table 5-1, of Appendix B of the SAP (IT, 2000b). Sample documentation and chain of custody were recorded as specified in Section 4.13 of the SAP (IT, 2000b).

Completed analysis request and chain of custody records (Appendix A) were secured and included with each shipment of sample coolers to Quanterra Environmental Services in Knoxville, Tennessee. Split samples were shipped to USACE South Atlantic Division Laboratory in Marietta, Georgia.

3.6 Investigation-Derived Waste Management and Disposal

Investigation-derived waste (IDW) was managed and disposed as outlined in Appendix D of the SAP (IT, 2000b). The IDW generated during the SI Area M2, Subsection of Area 45 was segregated as follows:

- Soil boring cuttings
- Decontamination fluids
- Personal protective equipment (PPE).

Solid IDW was stored inside the fenced area surrounding Buildings 335 and 336 in lined rolloff bins prior to final disposal. Solid IDW was characterized using toxicity characteristic leaching procedure analyses. Based on the results, soil boring cuttings and PPE generated during the SI at Area M2, Subsection of Area 45 were disposed as nonregulated waste at the Industrial Waste Landfill on the Main Post of FTMC.

Liquid IDW was contained in the existing 20,000-gallon sump associated with the Building T-338 vehicle washrack. Liquid IDW was characterized by VOC, SVOC, and metals analyses. Based on the analyses, liquid IDW was discharged as nonregulated waste to the FTMC wastewater treatment plant on the Main Post.

3.7 Variances/Nonconformances

3.7.1 Variances

Three variances to the SFSP were recorded during completion of the SI at Area M2, Subsection of Area 45. The variances did not alter the scope of the investigation or the sampling rationale presented in Table 4-2 of the SFSP (IT, 2000a). Variances to the SFSP are summarized in Table 3-5 and included in Appendix F.

3.7.2 Nonconformances

There were not any nonconformances to the SFSP recorded during completion of the SI at Area M2, Subsection of Area 45.

3.8 Data Quality

The field sample analytical data are presented in tabular form in Appendix D. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the SI work plan; the FTMC SAP and quality assurance plan; and standard, accepted methods and procedures. Sample collection logs pertaining to the collection of these samples were reviewed and organized for this report and are included in Appendix A. As discussed in Section 3.7, three variances to the SFSP were recorded during completion of the SI. However, the variances did not impact the usability of the data.

Data Validation. A complete (100 percent) Level III data validation effort was performed on the reported analytical data. Appendix E consists of a data validation summary report that was prepared to discuss the results of the validation. Selected results were rejected or otherwise qualified based on the implementation of accepted data validation procedures and practices during the validation effort. These qualified parameters are highlighted in the report. The validation-assigned qualifiers were added to the FTMC IT Environmental Management System™ database for tracking and reporting. The qualified data were used in the comparison to the SSSLs and ESVs developed by IT. Rejected data (assigned an “R” data qualifier) were not used in the comparison to the SSSLs and ESVs.

The laboratory reported a single nonconformance during the analysis of the samples from Parcel M2 that involved the nitroexplosives analysis by EPA SW-846 Method 8330. One sample delivery group (SDG), CK4232Q2, was received and logged into the laboratory without having the requested nitroexplosives analysis included on their internal chain of custody. The samples that comprise this SDG are: EC0001, EC0002, EC0008, EC0013, EC0014, EC0015, EC0016,

Table 3-5

Variances to the Site-Specific Field Sampling Plan
Area M2, Subsection of Area 45
Fort McClellan, Calhoun County, Alabama

Variance to the SFSP	Justification for Variance	Impact to Site Investigation
Surface water and sediment sample locations HR232Q-SW/SD01, HR-232Q-SW/SD02, and HR-232Q-SW/WD04 were changed to depositional soil sample locations HR-232Q-DEP01, HR-232Q-DEP02, HR-232Q-DEP03, respectively. Location HR-232Q-DEP03 was also moved 100 feet north-northwest to a topographic low.	These locations and sample matrices were modified due to the absence of surface water and sediment in the stream.	None.
Sample location HR-232Q-SW/SD03 was moved approximately 290 feet east-northeast of the proposed location.	This sample location was moved due to the absence of surface water and sediment at the proposed location.	The variance assured that surface water and sediment samples could be collected.
Sample location HR-232Q-SW/SD05 was moved approximately 150 northwest of the proposed location.	This sample location was moved due to the absence of surface water and sediment at the proposed location.	The variance assured that surface water and sediment samples could be collected.

EC0017, EC0018, EC0019, EC0020, EC0021, and EC0022 (all are soil samples). This nonconformance resulted in the analysis not being performed until after the recommended sample extraction holding time of 14 days had been exceeded by 72 hours. Because of the location of the samples within the parcel, the difficulty and expense that would be incurred for resampling, and the fact that for all other nitroexplosives analyses for Parcel M2 no constituents were present above the reporting limits, the decision was made to analyze the samples beyond the recommended holding time. The sample results for this SDG indicated that no nitroexplosive compounds were detected above the reporting limits.

Per EPA guidelines, IT data validation personnel flagged the resulting values with "UJ" qualifiers indicating that the consitituent was not detected above an estimated reporting limit. Appendix E contains the data validation summary report that identifies this nonconformance and documents that the effected results were properly qualified in the FTMC ITEMS™ database. These results should be considered estimated due to the slight holding time exceedance, but usable for their intended purpose.

All data presented in this report, except where qualified, meet the principle data quality objective for this SI.

4.0 Site Characterization

Subsurface investigations performed at Area M2, Subsection of Area 45 provided soil data used to characterize the site. Because wells were not installed at the site, a hydrogeological characterization was not performed.

4.1 Regional and Site Geology

4.1.1 Regional Geology

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

The majority of Calhoun County, including the Main Post of FTMC, lies within the Appalachian fold and thrust structural belt (Valley and Ridge Province) where southeastward-dipping thrust faults with associated minor folding are the predominant structural features. The fold and thrust belt consists of Paleozoic sedimentary rocks that have been asymmetrically folded and thrust-faulted with major structures and faults striking in a northeast-southwest direction. Northwestward transport of the Paleozoic rock sequence along the thrust faults has resulted in the imbricate stacking of large slabs of rock referred to as thrust sheets. Within an individual thrust sheet, smaller faults may splay off the larger thrust fault, resulting in imbricate stacking of rock units within an individual thrust sheet (Osborne and Szabo, 1984). Geologic contacts in this region generally strike parallel to the faults and repetition of lithologic units is common in vertical sequences. Geologic formations within the Valley and Ridge Province portion of Calhoun County have been mapped by Warman and Causey (1962), Osborne and Szabo (1984), and Moser and DeJarnette (1992), and vary in age from Lower Cambrian to Pennsylvanian.

The basal unit of the sedimentary sequence in Calhoun County is the Cambrian Chilhowee Group. The Chilhowee Group is comprised of the Cochran, Nichols, Wilson Ridge, and Weisner Formations (Osborne and Szabo, 1984), but in Calhoun County is either undifferentiated or divided into the Cochran and Nichols Formations and an upper undifferentiated Wilson Ridge and Weisner Formation. The Cochran is composed of poorly sorted arkosic sandstone and conglomerate with interbeds of greenish-gray siltstone and mudstone. Massive to laminated, greenish-gray and black mudstone makes up the Nichols Formation with thin interbeds of

siltstone and very fine-grained sandstone (Szabo et al., 1988). These two formations are mapped only in the eastern part of the county.

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

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

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and southwest of the Main Post as mapped by Warman and Causey (1962) and Osborne and Szabo (1984). The Rome Formation consists of variegated thinly interbedded grayish-red-purple mudstone, shale, siltstone, and greenish-red and light gray sandstone, with locally occurring limestone and dolomite. The Conasauga Formation overlies the Rome Formation and occurs along anticlinal axes in the northeastern portion of Pelham Range (Warman and Causey, 1962), (Osborne and Szabo, 1984) and the northern portion of the Main Post (Osborne et al., 1997). The Conasauga Formation is composed of dark-gray, finely to coarsely crystalline medium- to thick-bedded dolomite with minor shale and chert (Osborne et al., 1989).

Overlying the Conasauga Formation is the Knox Group, which is composed of the Copper Ridge and Chepultepec dolomites of Cambro-Ordovician age. The Knox Group is undifferentiated in Calhoun County and consists of light medium gray, fine to medium crystalline, variably bedded to laminated, siliceous dolomite and dolomitic limestone that weathers to a chert residuum

(Osborne and Szabo, 1984). The Knox Group underlies a large portion of the Pelham Range area.

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

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

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

The Mississippian Fort Payne Chert and the Maury Formation overlie the Frog Mountain Sandstone and are composed of dark- to light-gray limestone with abundant chert nodules and greenish-gray to grayish-red phosphatic shale with increasing amounts of calcareous chert toward the upper portion of the formation (Osborne and Szabo, 1984). These units occur in the northwestern portion of Pelham Range. Overlying the Fort Payne Chert is the Floyd Shale, also of Mississippian Age, which consists of thin-bedded, fissile brown to black shale with thin intercalated limestone layers and interbedded sandstone. Osborne and Szabo (1984) reassigned the Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of Fort McClellan, to the Ordovician Athens Shale on the basis of fossil data.

The Jacksonville Thrust Fault is the most significant structural geologic feature in the vicinity of FTMC, both for its role in determining the stratigraphic relationships in the area and for its contribution to regional water supplies. The trace of the fault extends northeastward for approximately 39 miles between Bynum, Alabama and Piedmont, Alabama. The fault is interpreted as a major splay of the Pell City Fault (Osborne and Szabo, 1984). The Ordovician sequence comprising the Eden thrust sheet is exposed at FTMC through an eroded "window" or "fenster" in the overlying thrust sheet. Rocks within the window display complex folding with the folds being overturned, and tight to isoclinal. The carbonates and shales locally exhibit well-developed cleavage (Osborne and Szabo, 1984). The FTMC window is framed on the northwest by the Rome Formation, north by the Conasauga Formation, northeast, east, and southwest by the Shady Dolomite, and southeast and southwest by the Chilhowee Group (Osborne et al., 1997).

4.1.2 Site Geology

The soils at Area M2, Subsection of Area 45, fall into Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded (AcC2) and the Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded (AcE2) (U.S. Department of Agriculture [USDA], 1961). The soils on the east and west ends of the site are AcE2 and the soils through the middle of the parcel are AcC2.

The Anniston and Allen series of soils consists of strongly acid, deep well-drained soils that have developed in old local alluvium. The parent material washed from the adjacent higher lying Linker, Muskingum, Enders, and Montevallo soils, which developed from weathered sandstone, shale, and quartzite. The surface sandstone and quartzite gravel and cobbles, as much as 8 inches in diameter, are on the surface and throughout the soil. The depth to bedrock at these sites ranges from 2 feet to greater than 10 feet. The depth to the water table is likely greater than 20 feet. The typical soil description is 2 to 10 feet of well-drained stony loam to clay loam over stratified local alluvium, limestone, or shale bedrock. Shallow groundwater direction at the site is likely controlled by topography.

Soils in the middle of the site from north to south fall into the AcC2 (USDA, 1961). This mapping unit consists of friable soils that have developed in old alluvium on foot slopes and along the base of mountains. The color of the surface soil ranges from very dark brown and dark brown to reddish brown and dark reddish brown. The texture of subsoil ranges from light clay loam to clay or silty clay loam. The alluvium ranges in thickness from 2 feet to more than 8 feet. Infiltration and runoff are medium, permeability is moderate, and the capacity for available moisture is high. Organic matter is moderately low. Some severely eroded areas may be common on the surface for the AcC2 soil type, as well as a few shallow gullies.

Soils across the east and north ends of the site fall into the Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded (AcE2) (USDA, 1961). This mapping unit consists of surface soil that is very dark brown to very dark grayish-brown gravelly loam, 6 to 8 inches thick. In many places, severely eroded patches and shallow gullies are common. The plow layer is reddish-brown to dark reddish-brown gravelly clay loam.

Bedrock beneath the Main Post of FTMC, including Area M2, Subsection of Area 45, is mapped as Ordovician limestone and shale formations, including the Newala and Longview Limestones, Lenoir Limestone, Athens Shale, Little Oak Limestone, and Chickamauga Limestone. These units occur within the eroded "window" in the uppermost structural thrust sheet at FTMC and underlie much of the developed area of the Main Post. The Mississippian Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC, was reassigned to the Ordovician Athens Shale by Osborne and Szabo in 1984, on the basis of fossil data (SAIC, 1993).

Based on direct-push boring data collected during the SI, sediments beneath Area M2, Subsection of Area 45, consist of predominantly thin silts and clays with some thin zones of sand and gravel-sized fragments of shale and sandstone. A layer of organic matter was identified at location HR-232Q-GP09 but is not prominent across the site.

4.2 Site Surface Hydrology

Precipitation in the form of rainfall averages about 54 inches annually in Anniston, Alabama, with infiltration rates annually exceeding evapotranspiration rates. The major surface water features on the Main Post of FTMC include Remount Creek, Cane Creek, and Cave Creek. These waterways flow in a general northwest to westerly direction towards the Coosa River on the western boundary of Calhoun County.

Surface runoff at Area M2, Subsection of Area 45, follows site topography and generally flows from a high area near the south-central portion of the site to north, east, and west. Two small intermittent streams converge at the east end of the parcel flowing north and merge before exiting the parcel to the north. A surface drainage feature crosses the southwest corner of the parcel with a west flow direction. Ponded water was observed in the draw during an IT site walk in February 2000; however, flow was not observed at that time.

5.0 Summary of Analytical Results

The results of the chemical analyses of samples collected at Area M2, Subsection of Area 45, indicate that metals, VOCs, and SVOCs have been detected in the various site media. Nitroexplosives and perchlorate were not detected in any of the samples collected. Lewisite and CWM breakdown products were not detected in the soil samples for which these constituents were analyzed. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, detected constituent concentrations were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC environmental restoration program at FTMC. Metal concentrations exceeding the SSSLs and ESVs were subsequently compared to background metals screening values (background concentrations) (SAIC, 1998) to determine if the metals concentrations are within natural background concentrations. Summary statistics for background metals samples collected at FTMC (SAIC, 1998) are included in Appendix G.

The following sections and Tables 5-1 through 5-4 summarize the results of the comparison of detected constituents to the SSSLs, ESVs, and background screening values. Figure 5-1 shows detected constituent concentrations exceeding both human health SSSLs and background values. Complete analytical results are presented in Appendix D.

5.1 Surface and Depositional Soil Analytical Results

Fourteen surface soil samples and three depositional soil samples were collected for chemical analyses at Area M2, Subsection of Area 45. Samples were collected from within the upper 1-foot of soil at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs, ESVs, and background screening values (metals), as presented in Table 5-1.

Metals. Twenty metals were detected in surface and depositional soil samples collected from Area M2, Subsection of Area 45. Seventeen of the detected metals were present in each of the surface and depositional soil samples. Of the remaining three metals (antimony, selenium, and thallium), antimony was detected at only two locations (HR-232Q-GP11 and HR-232Q-GP14), selenium was detected at only one location (HR-232Q-GP07), and thallium was detected at four locations (HR-232Q-DEP02, HR-232Q-GP11, HR-232Q-GP13, and HR-232Q-GP14).

Table 5-1

Surface and Depositional Soil Analytical Results
Area M2, Subsection of Area 45
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-232Q-DEP01					HR-232Q-DEP02					HR-232Q-DEP03					HR-232Q-GP01					HR-232Q-GP02				
Sample Number					EC0033					EC0034					EC0035					EC0001					EC0003				
Sample Date					30-Mar-00					30-Mar-00					30-Mar-00					28-Mar-00					27-Mar-00				
Sample Depth (Feet)					0- .5					0- .5					0- .5					0- .5					0- .5				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																													
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	9.80E+03			YES	YES	9.78E+03			YES	YES	3.59E+03				YES	5.32E+03				YES	5.81E+03				YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	9.10E+00			YES		1.45E+01		YES	YES	YES	2.80E+00			YES		1.46E+01		YES	YES	YES	3.40E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	3.44E+01					3.07E+01					2.05E+01	J				2.45E+01	J				4.14E+01	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	6.00E-01	J				6.70E-01					2.00E-01	B				4.60E-01	J				3.50E-01	J			
Calcium	mg/kg	1.72E+03	NA	NA	4.25E+02	J				2.33E+02	J				3.47E+02	J				8.27E+01	J				2.44E+02	J			
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.30E+01				YES	2.25E+01				YES	6.20E+00				YES	9.40E+00				YES	4.90E+00	J			YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	1.83E+01		YES			1.70E+01		YES			2.10E+00	J				1.42E+01	J				3.90E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.55E+01		YES			1.66E+01		YES			3.10E+00					2.63E+01	J	YES			4.10E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.12E+04			YES	YES	2.60E+04			YES	YES	7.32E+03			YES	YES	1.47E+04			YES	YES	6.16E+03			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.63E+01					2.74E+01					6.60E+00					1.81E+01	J				1.85E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	2.93E+02	J				2.38E+02	J				1.25E+02	J				1.76E+02	J				1.59E+02	J			
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	3.45E+02				YES	4.90E+02			YES	YES	1.39E+02				YES	1.76E+02	J			YES	4.26E+02			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	7.10E-02	B				9.20E-02		YES			3.90E-02	B				2.90E-02	J				8.20E-02		YES		
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	8.80E+00					9.60E+00					2.00E+00	J				1.09E+01	J	YES			3.40E+00	J			
Potassium	mg/kg	8.00E+02	NA	NA	2.05E+02	J				1.85E+02	J				5.28E+01	J				1.97E+02	J				1.07E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					ND					ND					ND					ND				
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					5.60E-01	J		YES		ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	3.59E+01				YES	3.99E+01				YES	1.19E+01				YES	2.45E+01				YES	1.03E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	3.34E+01					3.55E+01					1.03E+01					3.30E+01	J				1.85E+01	J			
SEMIVOLATILE ORGANIC COMPOUNDS																													
Benzo(a)anthracene	mg/kg	NA	8.51E-01	5.21E+00	ND					ND					ND					ND					ND				
Benzo(a)pyrene	mg/kg	NA	8.51E-02	1.00E-01	ND					ND					ND					ND					ND				
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	5.98E+01	ND					ND					ND					ND					ND				
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	1.19E+02	ND					ND					ND					ND					ND				
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	1.48E+02	ND					ND					ND					ND					ND				
Carbazole	mg/kg	NA	3.11E+01	NA	ND					ND					ND					ND					ND				
Chrysene	mg/kg	NA	8.61E+01	4.73E+00	ND					ND					ND					ND					ND				
Dibenz(a,h)anthracene	mg/kg	NA	8.61E-02	1.84E+01	ND					ND					ND					ND					ND				
Fluoranthene	mg/kg	NA	3.09E+02	1.00E-01	ND					ND					ND					ND					ND				
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	1.09E+02	ND					ND					ND					ND					ND				
Phenanthrene	mg/kg	NA	2.32E+03	1.00E-01	ND					ND					ND					ND					ND				
Pyrene	mg/kg	NA	2.33E+02	1.00E-01	ND					ND					ND					ND					ND				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	1.20E-01	B				1.40E-01	B				1.40E-01	B				1.00E-01	B				1.30E-01	B			
VOLATILE ORGANIC COMPOUNDS																													
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					ND					ND					ND					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	ND					ND					ND					1.10E-02	B				2.00E-02	J			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	2.80E-03	B				2.80E-03	B				3.10E-03	B				4.20E-03	B				4.00E-03	B			
Naphthalene	mg/kg	NA	1.55E+02	1.00E-01	ND					ND					ND					ND					1.30E-03	J			
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	ND					ND					ND					ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Area M2, Subsection of Area 45
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-232Q-GP03					HR-232Q-GP04					HR-232Q-GP05					HR-232Q-GP06					HR-232Q-GP07				
Sample Number					EC0005					EC0007					EC0011					EC0013					EC0015				
Sample Date					27-Mar-00					27-Mar-00					27-Mar-00					28-Mar-00					28-Mar-00				
Sample Depth (Feet)					0- .5					0- .5					0- .5					0- .5					0- .5				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																													
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	8.08E+03			YES	YES	1.36E+04			YES	YES	9.03E+03			YES	YES	7.63E+03				YES	7.98E+03			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	5.70E+00			YES		5.10E+00			YES		4.70E+00			YES		1.70E+01		YES	YES	YES	5.10E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	4.57E+01	J				8.27E+01	J				7.89E+01	J				2.31E+01	J				8.38E+01	J			
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	4.20E-01	J				1.10E+00		YES		YES	5.80E-01	J				2.60E-01	B				5.60E-01	J			
Calcium	mg/kg	1.72E+03	NA	NA	2.19E+02	J				1.29E+02	J				2.10E+02	J				8.27E+01	J				6.32E+02	J			
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	9.60E+00	J			YES	6.80E+00	J			YES	1.19E+01	J			YES	3.90E+01		YES	YES	YES	6.90E+00				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	7.30E+00					1.09E+01					6.00E+00					2.10E+00	J				7.10E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	6.40E+00					6.80E+00					4.70E+00					6.50E+00	J				7.40E+00	J			
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.15E+04			YES	YES	8.70E+03			YES	YES	1.11E+04			YES	YES	2.26E+04			YES	YES	7.82E+03			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.85E+01					2.98E+01					1.78E+01					1.22E+01	J				3.93E+01	J			
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	1.55E+02	J				2.50E+02	J				1.84E+02	J				1.85E+02	J				2.17E+02	J			
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.06E+03			YES	YES	2.96E+03		YES	YES	YES	1.41E+03			YES	YES	9.19E+01	J				1.52E+03	J		YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	4.10E-02					6.80E-02					4.30E-02					2.20E-02	J				7.30E-02				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	4.90E+00	J				1.04E+01		YES			6.50E+00					4.40E+00	J				5.60E+00	J			
Potassium	mg/kg	8.00E+02	NA	NA	9.85E+01	J				1.01E+02	J				1.07E+02	J				1.40E+02	J				1.42E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					ND					ND					ND					5.70E-01	J	YES		
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.13E+01				YES	1.62E+01				YES	1.81E+01				YES	3.83E+01				YES	1.37E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.57E+01	J				2.39E+01	J				1.69E+01	J				1.42E+01	J				3.03E+01	J			
SEMIVOLATILE ORGANIC COMPOUNDS																													
Benzo(a)anthracene	mg/kg	NA	8.51E-01	5.21E+00	ND					ND					ND					ND					ND				
Benzo(a)pyrene	mg/kg	NA	8.51E-02	1.00E-01	ND					ND					ND					ND					ND				
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	5.98E+01	ND					ND					ND					ND					ND				
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	1.19E+02	ND					ND					ND					ND					ND				
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	1.48E+02	ND					ND					ND					ND					ND				
Carbazole	mg/kg	NA	3.11E+01	NA	ND					ND					ND					ND					ND				
Chrysene	mg/kg	NA	8.61E+01	4.73E+00	ND					ND					ND					ND					ND				
Dibenz(a,h)anthracene	mg/kg	NA	8.61E-02	1.84E+01	ND					ND					ND					ND					ND				
Fluoranthene	mg/kg	NA	3.09E+02	1.00E-01	ND					ND					ND					ND					ND				
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	1.09E+02	ND					ND					ND					ND					ND				
Phenanthrene	mg/kg	NA	2.32E+03	1.00E-01	ND					ND					ND					ND					ND				
Pyrene	mg/kg	NA	2.33E+02	1.00E-01	ND					ND					ND					ND					ND				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	1.50E-01	B				1.30E-01	B				1.40E-01	B				9.20E-02	B				2.00E-01	B			
VOLATILE ORGANIC COMPOUNDS																													
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					ND					ND					ND					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	3.90E-02	J				2.10E-02	J				4.80E-02	J				ND					ND				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	4.30E-03	B				5.20E-03	B				4.60E-03	B				3.20E-03	B				4.20E-03	B			
Naphthalene	mg/kg	NA	1.55E+02	1.00E-01	ND					ND					ND					ND					ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	ND					1.80E-03	J				ND					ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND					5.60E-03	J				ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Area M2, Subsection of Area 45
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-232Q-GP08					HR-232Q-GP09					HR-232Q-GP10					HR-232Q-GP11					HR-232Q-GP12				
Sample Number					EC0017					EC0019					EC0021					EC0023					EC0025				
Sample Date					28-Mar-00					28-Mar-00					28-Mar-00					29-Mar-00					29-Mar-00				
Sample Depth (Feet)					0- .5					0- .5					0- .5					0- .5					0- .5				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																													
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	6.23E+03				YES	8.94E+03			YES	YES	4.34E+03				YES	1.04E+04			YES	YES	8.34E+03			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND					6.10E-01	J				ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	6.70E+00			YES		8.50E+00			YES		2.10E+00			YES		2.82E+01		YES	YES	YES	6.10E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	4.34E+01	J				6.73E+01	J				2.44E+01	J				4.86E+01					6.85E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	3.90E-01	J				4.80E-01	J				2.40E-01	B				5.30E-01	J				3.90E-01	B			
Calcium	mg/kg	1.72E+03	NA	NA	6.36E+01	J				3.86E+02	J				8.04E+01	J				3.18E+02	J				6.23E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.85E+01				YES	9.80E+00				YES	6.40E+00				YES	2.14E+01				YES	8.73E+01		YES	YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	4.00E+00	J				1.12E+01	J				2.20E+00	J				5.30E+00	J				5.60E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	7.00E+00	J				5.80E+00	J				2.80E+00	J				1.91E+01		YES			5.70E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.67E+04			YES	YES	1.14E+04			YES	YES	6.11E+03			YES	YES	3.70E+04		YES	YES	YES	1.37E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.28E+01	J				3.76E+01	J				1.13E+01	J				3.45E+01	J				2.03E+01	J			
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	1.77E+02	J				2.41E+02	J				1.01E+02	J				2.42E+02	J				2.01E+02	J			
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	2.90E+02	J			YES	1.31E+03	J		YES	YES	2.70E+02	J			YES	2.71E+02				YES	4.69E+02			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	3.00E-02	J				4.30E-02					4.00E-02					1.00E-01		YES		YES	1.00E-01		YES		YES
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	4.70E+00	J				6.90E+00	J				2.40E+00	J				9.40E+00					4.00E+00	J			
Potassium	mg/kg	8.00E+02	NA	NA	9.55E+01	J				1.81E+02	J				6.13E+01	J				2.04E+02	J				1.78E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					ND					ND					ND					ND				
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND					6.20E-01	J		YES		ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.96E+01				YES	1.98E+01				YES	1.10E+01				YES	6.45E+01		YES	YES	YES	2.43E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	3.43E+01	J				2.58E+01	J				1.06E+01	J				3.91E+01	J				2.48E+01	J			
SEMIVOLATILE ORGANIC COMPOUNDS																													
Benzo(a)anthracene	mg/kg	NA	8.51E-01	5.21E+00	3.80E-02	J				ND					ND					ND					ND				
Benzo(a)pyrene	mg/kg	NA	8.51E-02	1.00E-01	5.50E-02	J				ND					ND					ND					ND				
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	5.98E+01	4.40E-02	J				ND					ND					ND					ND				
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	1.19E+02	ND					ND					ND					ND					ND				
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	1.48E+02	ND					ND					ND					ND					ND				
Carbazole	mg/kg	NA	3.11E+01	NA	ND					ND					ND					ND					ND				
Chrysene	mg/kg	NA	8.61E+01	4.73E+00	4.20E-02	J				ND					ND					ND					ND				
Dibenz(a,h)anthracene	mg/kg	NA	8.61E-02	1.84E+01	ND					ND					ND					ND					ND				
Fluoranthene	mg/kg	NA	3.09E+02	1.00E-01	6.80E-02	J				ND					ND					ND					ND				
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	1.09E+02	ND					ND					ND					ND					ND				
Phenanthrene	mg/kg	NA	2.32E+03	1.00E-01	ND					ND					ND					ND					ND				
Pyrene	mg/kg	NA	2.33E+02	1.00E-01	7.60E-02	J				ND					ND					ND					ND				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	1.00E-01	B				1.20E-01	B				1.00E-01	B				1.20E-01	B				1.10E-01	B			
VOLATILE ORGANIC COMPOUNDS																													
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					ND					ND					ND					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	5.90E-02	J				1.30E-02	J				6.20E-02	J				8.20E-03	B				1.80E-02	J			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	4.60E-03	B				3.50E-03	B				5.80E-03	B				3.50E-03	B				3.40E-03	B			
Naphthalene	mg/kg	NA	1.55E+02	1.00E-01	ND					ND					ND					ND					ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	ND					ND					ND					ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	1.80E-03	J				ND					ND					ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Area M2, Subsection of Area 45
Fort McClellan, Calhoun County, Alabama

Sample Location Sample Number Sample Date Sample Depth (Feet)					HR-232Q-GP13 EC0027 29-Mar-00 0- 1					HR-232Q-GP14 EC0031 29-Mar-00 0- .5				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
METALS														
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.06E+04			YES	YES	1.14E+04			YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					6.00E-01	J			
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	1.12E+01			YES	YES	1.00E+01			YES	YES
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	1.53E+02		YES			1.73E+02		YES		YES
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	9.60E-01		YES			6.80E-01				
Calcium	mg/kg	1.72E+03	NA	NA	9.53E+02					2.45E+03		YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	5.32E+01		YES	YES	YES	6.54E+01		YES	YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	6.00E+00	J				1.26E+01				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	3.20E+01		YES			9.90E+00				
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.99E+04			YES	YES	4.76E+04		YES	YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	4.47E+01	J	YES			4.39E+01	J	YES		
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	2.69E+02	J				4.05E+02	J			
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.20E+03			YES	YES	1.37E+03			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	1.50E-01		YES		YES	1.30E-01		YES		YES
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	8.00E+00					1.59E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	2.03E+02	J				2.88E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					ND				
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	7.50E-01	J		YES		6.50E-01	J		YES	
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	3.13E+01				YES	3.59E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	6.04E+01	J	YES		YES	1.47E+02	J	YES		YES
SEMIVOLATILE ORGANIC COMPOUNDS														
Benzo(a)anthracene	mg/kg	NA	8.51E-01	5.21E+00	ND					1.30E-01	J			
Benzo(a)pyrene	mg/kg	NA	8.51E-02	1.00E-01	ND					2.00E-01	J		YES	YES
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	5.98E+01	ND					2.30E-01	J			
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	1.19E+02	ND					1.60E-01	J			
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	1.48E+02	ND					1.60E-01	J			
Carbazole	mg/kg	NA	3.11E+01	NA	ND					4.80E-02	J			
Chrysene	mg/kg	NA	8.61E+01	4.73E+00	ND					1.60E-01	J			
Dibenz(a,h)anthracene	mg/kg	NA	8.61E-02	1.84E+01	ND					5.40E-02	J			
Fluoranthene	mg/kg	NA	3.09E+02	1.00E-01	ND					4.00E-01	J			YES
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	1.09E+02	ND					1.20E-01	J			
Phenanthrene	mg/kg	NA	2.32E+03	1.00E-01	ND					3.70E-01	J			YES
Pyrene	mg/kg	NA	2.33E+02	1.00E-01	ND					3.60E-01	J			YES
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	1.50E-01	B				1.30E-01	B			
VOLATILE ORGANIC COMPOUNDS														
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	7.80E-03	J				ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	2.20E-01	J				2.60E-02	J			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	4.70E-03	B				4.10E-03	B			
Naphthalene	mg/kg	NA	1.55E+02	1.00E-01	ND					ND				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	ND					ND				
p-Cymene	mg/kg	NA	1.55E+03	NA	ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Area M2, Subsection of Area 45, Parcel 232(Q)
Fort McClellan, Calhoun County, Alabama

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama* , July.

[b] Residential human health 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 - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-2

Subsurface Soil Analytical Results
Area M2, Subsection of Area 45
Fort McClellan, Calhoun County, Alabama

Sample Location				HR-232Q-GP01				HR-232Q-GP02				HR-232Q-GP03				HR-232Q-GP04				HR-232Q-GP05			
Sample Number				EC0002				EC0004				EC0006				EC0010				EC0012			
Sample Date				28-Mar-00				27-Mar-00				27-Mar-00				27-Mar-00				27-Mar-00			
Sample Depth (Feet)				4-8				8-12				2-4				8-12				4-8			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																							
Aluminum	mg/kg	1.36E+04	7.80E+03	1.41E+03				7.62E+03				9.04E+03			YES	1.13E+04			YES	9.64E+03			YES
Antimony	mg/kg	1.31E+00	3.11E+00	ND				ND				1.10E+00	J			ND				ND			
Arsenic	mg/kg	1.83E+01	4.26E-01	1.75E+01			YES	2.37E+01		YES	YES	2.24E+01		YES	YES	9.80E+00			YES	2.04E+01		YES	YES
Barium	mg/kg	2.34E+02	5.47E+02	3.80E+01	J			8.40E+00	J			1.46E+01	J			1.11E+01	J			3.20E+01	J		
Beryllium	mg/kg	8.60E-01	9.60E+00	8.30E-01				3.60E-01	J			4.00E-01	J			2.90E-01	B			2.90E-01	B		
Calcium	mg/kg	6.37E+02	NA	4.42E+01	J			ND				5.13E+01	J			1.39E+01	J			2.81E+01	J		
Chromium	mg/kg	3.83E+01	2.32E+01	6.70E+00				2.84E+01	J		YES	8.30E+01	J	YES	YES	4.75E+01	J	YES	YES	9.56E+01	J	YES	YES
Cobalt	mg/kg	1.75E+01	4.68E+02	1.22E+01	J			5.10E+00	J			1.20E+01				7.50E+00				4.20E+00	J		
Copper	mg/kg	1.94E+01	3.13E+02	3.12E+01	J	YES		2.40E+01		YES		8.50E+00				1.11E+01				1.57E+01			
Iron	mg/kg	4.48E+04	2.34E+03	1.42E+04			YES	4.42E+04			YES	7.95E+04		YES	YES	2.96E+04			YES	4.25E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	2.41E+01	J			2.06E+01				1.76E+01				1.37E+01				1.76E+01			
Magnesium	mg/kg	7.66E+02	NA	6.50E+01	J			6.91E+01	J			8.50E+01	J			1.41E+02	J			1.11E+02	J		
Manganese	mg/kg	1.36E+03	3.63E+02	3.77E+02	J		YES	1.75E+02				3.07E+02				2.56E+02				3.35E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	1.10E-01		YES		3.80E-02	J			4.90E-02				3.20E-02	J			3.50E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	1.75E+01	J	YES		1.03E+01				1.87E+01		YES		5.90E+00				6.80E+00			
Potassium	mg/kg	7.11E+02	NA	7.09E+01	J			1.22E+02	J			8.72E+01	J			9.42E+01	J			1.51E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	9.60E-01		YES		ND				ND				ND				ND			
Thallium	mg/kg	1.40E+00	5.08E-01	8.40E-01	J		YES	6.00E-01	J		YES	8.80E-01	J		YES	ND				ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	2.03E+01				6.50E+01		YES	YES	9.74E+01		YES	YES	4.72E+01				7.66E+01		YES	YES
Zinc	mg/kg	3.49E+01	2.34E+03	3.52E+01	J	YES		2.96E+01	J			4.22E+01	J	YES		1.80E+01	J			1.96E+01	J		
VOLATILE ORGANIC COMPOUNDS																							
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	ND				ND				ND				ND				ND			
Methylene chloride	mg/kg	NA	8.41E+01	3.80E-03	B			4.50E-03	B			5.20E-03	B			6.30E-03	B			4.70E-03	B		
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND				ND				1.40E-03	J			1.90E-03	J			ND			
SEMIVOLATILE ORGANIC COMPOUNDS																							
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	1.10E-01	B			1.30E-01	B			1.10E-01	B			1.30E-01	B			1.40E-01	B		

Table 5-2

Subsurface Soil Analytical Results
Area M2, Subsection of Area 45
Fort McClellan, Calhoun County, Alabama

Sample Location				HR-232Q-GP06				HR-232Q-GP07				HR-232Q-GP08				HR-232Q-GP09				HR-232Q-GP10			
Sample Number				EC0014				EC0016				EC0018				EC0020				EC0022			
Sample Date				28-Mar-00				28-Mar-00				28-Mar-00				28-Mar-00				28-Mar-00			
Sample Depth (Feet)				8-12				8-12				4-7				8-12				8-12			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																							
Aluminum	mg/kg	1.36E+04	7.80E+03	7.03E+03				5.68E+03				7.09E+03				7.85E+03			YES	9.08E+03			YES
Antimony	mg/kg	1.31E+00	3.11E+00	ND				ND				ND				7.10E-01	J			ND			
Arsenic	mg/kg	1.83E+01	4.26E-01	2.17E+01		YES	YES	2.82E+01		YES	YES	2.76E+01		YES	YES	5.10E+01		YES	YES	8.30E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	2.94E+01	J			3.09E+01	J			6.40E+00	J			4.09E+01	J			1.17E+01	J		
Beryllium	mg/kg	8.60E-01	9.60E+00	2.40E-01	B			3.60E-01	J			1.40E-01	B			6.70E-01				2.30E-01	B		
Calcium	mg/kg	6.37E+02	NA	3.55E+01	J			2.80E+02	J			1.31E+02	J			3.16E+01	J			3.61E+01	J		
Chromium	mg/kg	3.83E+01	2.32E+01	2.53E+01			YES	8.40E+00				3.29E+01			YES	1.74E+01				2.08E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	2.90E+00	J			6.50E+01	J	YES		1.50E+00	J			7.90E+00	J			2.70E+00	J		
Copper	mg/kg	1.94E+01	3.13E+02	1.77E+01	J			7.41E+01	J	YES		1.09E+01	J			4.32E+01	J	YES		1.28E+01	J		
Iron	mg/kg	4.48E+04	2.34E+03	2.70E+04			YES	2.36E+04			YES	5.03E+04		YES	YES	5.20E+04		YES	YES	3.03E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.49E+01	J			6.21E+01	J	YES		8.60E+00	J			3.24E+01	J			7.70E+00	J		
Magnesium	mg/kg	7.66E+02	NA	1.66E+02	J			1.31E+02	J			7.52E+01	J			1.72E+02	J			1.21E+02	J		
Manganese	mg/kg	1.36E+03	3.63E+02	1.47E+02	J			4.83E+03	J	YES	YES	3.39E+01	J			3.99E+02	J		YES	7.00E+01	J		
Mercury	mg/kg	7.00E-02	2.33E+00	3.40E-02	J			1.20E-01		YES		1.50E-02	J			3.40E-02	J			3.90E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	7.00E+00	J			9.19E+01	J	YES		3.70E+00	J			2.13E+01	J	YES		4.80E+00	J		
Potassium	mg/kg	7.11E+02	NA	1.90E+02	J			1.54E+02	J			8.41E+01	J			3.29E+02	J			1.04E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	ND				ND				ND				ND				ND			
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				ND				1.00E+00	J		YES	ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	4.08E+01				3.13E+01				7.42E+01		YES	YES	7.23E+01		YES	YES	4.86E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	1.97E+01	J			8.18E+01	J	YES		1.07E+01	J			6.13E+01	J	YES		1.50E+01	J		
VOLATILE ORGANIC COMPOUNDS																							
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	ND				ND				7.50E-04	J			ND				ND			
Methylene chloride	mg/kg	NA	8.41E+01	4.10E-03	B			4.20E-03	B			4.10E-03	B			3.90E-03	B			4.80E-03	B		
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND				ND				ND				ND				ND			
SEMIVOLATILE ORGANIC COMPOUNDS																							
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	1.10E-01	B			1.20E-01	B			8.70E-02	B			1.90E-01	B			8.80E-02	B		

Table 5-2

Subsurface Soil Analytical Results
Area M2, Subsection of Area 45
Fort McClellan, Calhoun County, Alabama

Sample Location				HR-232Q-GP11				HR-232Q-GP12				HR-232Q-GP13				HR-232Q-GP14			
Sample Number				EC0024				EC0026				EC0028				EC0032			
Sample Date				29-Mar-00				29-Mar-00				29-Mar-00				29-Mar-00			
Sample Depth (Feet)				8-12				8-12				8-12				8-12			
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	1.11E+04			YES	7.85E+03			YES	6.01E+03				1.09E+04			YES
Antimony	mg/kg	1.31E+00	3.11E+00	ND				ND				ND				ND			
Arsenic	mg/kg	1.83E+01	4.26E-01	1.59E+01			YES	3.45E+01		YES	YES	2.19E+01		YES	YES	1.92E+01		YES	YES
Barium	mg/kg	2.34E+02	5.47E+02	1.15E+01	J			4.26E+01				7.70E+00	J			2.42E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	1.70E-01	B			8.80E-01		YES		2.60E-01	B			2.10E-01	B		
Calcium	mg/kg	6.37E+02	NA	3.60E+02	J			1.59E+02	J			5.16E+01	J			4.24E+02	J		
Chromium	mg/kg	3.83E+01	2.32E+01	4.25E+01		YES	YES	1.57E+01				1.92E+01				3.66E+01			YES
Cobalt	mg/kg	1.75E+01	4.68E+02	2.20E+00	J			1.69E+01				2.40E+00	J			2.10E+00	J		
Copper	mg/kg	1.94E+01	3.13E+02	1.61E+01				4.37E+01		YES		1.30E+01				1.33E+01			
Iron	mg/kg	4.48E+04	2.34E+03	4.43E+04			YES	5.06E+04		YES	YES	3.60E+04			YES	4.34E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	9.30E+00	J			4.61E+01	J	YES		9.00E+00	J			1.03E+01	J		
Magnesium	mg/kg	7.66E+02	NA	1.80E+02	J			1.54E+02	J			5.71E+01	J			1.53E+02	J		
Manganese	mg/kg	1.36E+03	3.63E+02	1.15E+02				4.84E+02			YES	9.42E+01				1.74E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	1.20E-01		YES		1.30E-01		YES		5.30E-02	B			9.40E-02		YES	
Nickel	mg/kg	1.29E+01	1.54E+02	4.10E+00	J			2.70E+01		YES		6.50E+00				4.00E+00	J		
Potassium	mg/kg	7.11E+02	NA	2.46E+02	J			2.48E+02	J			1.28E+02	J			1.74E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	ND				ND				ND				ND			
Thallium	mg/kg	1.40E+00	5.08E-01	7.30E-01	J		YES	1.10E+00	J		YES	7.10E-01	J		YES	ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	7.19E+01		YES	YES	7.01E+01		YES	YES	5.65E+01			YES	7.91E+01		YES	YES
Zinc	mg/kg	3.49E+01	2.34E+03	4.55E+01	J	YES		1.77E+02	J	YES		2.21E+01	J			4.12E+01	J	YES	
VOLATILE ORGANIC COMPOUNDS																			
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	ND				ND				ND				ND			
Methylene chloride	mg/kg	NA	8.41E+01	3.70E-03	B			4.50E-03	B			4.00E-03	B			3.50E-03	B		
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND				ND				ND				ND			
SEMIVOLATILE ORGANIC COMPOUNDS																			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	1.20E-01	B			8.60E-02	B			1.00E-01	B			1.40E-01	B		

Table 5-2

Subsurface Soil Analytical Results
Area M2, Subsection of Area 45
Fort McClellan, Calhoun County, Alabama

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama,* July.

[b] 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 - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-3

Surface Water Analytical Results
Area M2, Subsection of Area 45, Parcel 232(Q)
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-232Q-SW/SD03					HR-232Q-SW/SD05				
Sample Number					EC2005					EC2007				
Sample Date					30-Mar-00					30-Mar-00				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
METALS														
Aluminum	mg/L	5.26E+00	1.53E+01	8.70E-02	1.13E+01	J	YES		YES	4.78E-01	J			YES
Arsenic	mg/L	2.10E-03	7.30E-04	1.90E-01	7.20E-03	J	YES	YES		ND				
Barium	mg/L	7.53E-02	1.10E+00	3.90E-03	6.08E-02	J			YES	2.28E-02	J			YES
Calcium	mg/L	2.52E+01	NA	1.16E+02	2.40E+00	J				1.91E+01				
Chromium	mg/L	1.11E-02	4.08E-02	1.10E-02	9.80E-03	J				ND				
Cobalt	mg/L	NA	9.31E-01	3.00E-03	3.10E-03	J			YES	ND				
Copper	mg/L	1.27E-02	6.23E-01	6.54E-03	6.50E-03	B				ND				
Iron	mg/L	1.96E+01	4.70E+00	1.00E+00	1.42E+01			YES	YES	7.87E-01				
Lead	mg/L	8.60E-03	1.50E-02	1.32E-03	6.60E-03				YES	ND				
Magnesium	mg/L	1.10E+01	NA	8.20E+01	1.46E+00	J				5.20E+00				
Manganese	mg/L	5.65E-01	6.40E-01	8.00E-02	2.08E-01				YES	7.17E-02				
Mercury	mg/L	NA	4.25E-03	1.00E-05	7.30E-05	J			YES	ND				
Nickel	mg/L	2.24E-02	3.10E-01	8.77E-02	6.20E-03	J				ND				
Potassium	mg/L	2.56E+00	NA	5.30E+01	2.72E+00	J	YES			7.11E-01	J			
Sodium	mg/L	3.44E+00	NA	6.80E+02	ND					7.59E-01	J			
Thallium	mg/L	2.40E-03	1.01E-03	4.00E-03	5.30E-03	B	YES	YES	YES	ND				
Vanadium	mg/L	1.52E-02	7.90E-02	1.90E-02	2.62E-02	J	YES		YES	ND				
Zinc	mg/L	4.03E-02	4.65E+00	5.89E-02	2.95E-02					7.90E-03	J			
VOLATILE ORGANIC COMPOUNDS														
Acetone	mg/L	NA	1.57E+00	7.80E+01	2.20E-03	B				1.20E-03	B			

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama* , July.

[b] 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 - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-4

Sediment Analytical Results
Area M2, Subsection of Area 45, Parcel 232(Q)
Fort McClellan, Calhoun County, Alabama

Sample Location					HR-232Q-SW/SD03					HR-232Q-SW/SD05				
Sample Number					EC1004					EC1006				
Sample Date					30-Mar-00					30-Mar-00				
Sample Depth (Feet)					0- .5					0- .5				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
METALS														
Aluminum	mg/kg	8.59E+03	1.15E+06	NA	7.36E+03					3.75E+03				
Arsenic	mg/kg	1.13E+01	5.58E+01	7.24E+00	6.30E+00					8.90E+00				YES
Barium	mg/kg	9.89E+01	8.36E+04	NA	5.64E+01					2.26E+01	J			
Beryllium	mg/kg	9.70E-01	1.50E+02	NA	4.30E-01	B				3.90E-01	B			
Calcium	mg/kg	1.11E+03	NA	NA	3.42E+02	J				3.28E+03	J	YES		
Chromium	mg/kg	3.12E+01	2.79E+03	5.23E+01	9.90E+00					8.80E+00				
Cobalt	mg/kg	1.10E+01	6.72E+04	5.00E+01	6.30E+00					2.04E+01	J	YES		
Copper	mg/kg	1.71E+01	4.74E+04	1.87E+01	6.00E+00					1.69E+01				
Iron	mg/kg	3.53E+04	3.59E+05	NA	1.60E+04					1.52E+04				
Lead	mg/kg	3.78E+01	4.00E+02	3.02E+01	1.59E+01					1.10E+01				
Magnesium	mg/kg	9.06E+02	NA	NA	2.66E+02	J				3.64E+02	J			
Manganese	mg/kg	7.12E+02	4.38E+04	NA	5.46E+02					4.39E+02				
Mercury	mg/kg	1.10E-01	2.99E+02	1.30E-01	6.10E-02	B				4.10E-02	B			
Nickel	mg/kg	1.30E+01	1.76E+04	1.59E+01	5.90E+00					1.25E+01	J			
Potassium	mg/kg	1.01E+03	NA	NA	2.07E+02	J				8.83E+01	J			
Vanadium	mg/kg	4.09E+01	4.83E+03	NA	2.05E+01					2.49E+01				
Zinc	mg/kg	5.27E+01	3.44E+05	1.24E+02	2.78E+01					3.47E+01				
SEMIVOLATILE ORGANIC COMPOUNDS														
Acenaphthene	mg/kg	NA	5.59E+04	3.30E-01	5.70E-02	J				ND				
Anthracene	mg/kg	NA	2.99E+05	3.30E-01	2.70E-01	J				ND				
Benzo(a)anthracene	mg/kg	NA	8.93E+01	3.30E-01	6.50E-01				YES	ND				
Benzo(a)pyrene	mg/kg	NA	8.93E+00	3.30E-01	5.00E-01				YES	ND				
Benzo(b)fluoranthene	mg/kg	NA	8.93E+01	6.55E-01	4.20E-01					ND				
Benzo(ghi)perylene	mg/kg	NA	2.79E+04	6.55E-01	2.30E-01	J				ND				
Benzo(k)fluoranthene	mg/kg	NA	8.93E+02	6.55E-01	4.40E-01					ND				
Carbazole	mg/kg	NA	3.26E+03	NA	1.30E-01	J				ND				
Chrysene	mg/kg	NA	9.79E+03	3.30E-01	6.10E-01				YES	ND				
Dibenz(a,h)anthracene	mg/kg	NA	9.79E+00	3.30E-01	1.10E-01	J				ND				
Fluoranthene	mg/kg	NA	3.73E+04	3.30E-01	1.50E+00				YES	ND				
Fluorene	mg/kg	NA	3.73E+04	3.30E-01	6.40E-02	J				ND				
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.93E+01	6.55E-01	2.40E-01	J				ND				
Phenanthrene	mg/kg	NA	2.79E+05	3.30E-01	1.20E+00				YES	ND				
Pyrene	mg/kg	NA	3.06E+04	3.30E-01	1.60E+00				YES	ND				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	5.41E+03	1.82E-01	1.10E-01	B				1.20E-01	B			
VOLATILE ORGANIC COMPOUNDS														
Acetone	mg/kg	NA	1.03E+05	4.53E-01	8.70E-03	B				ND				
Methylene chloride	mg/kg	NA	9.84E+03	1.26E+00	3.50E-03	B				3.60E-03	B			

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

[b] 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).

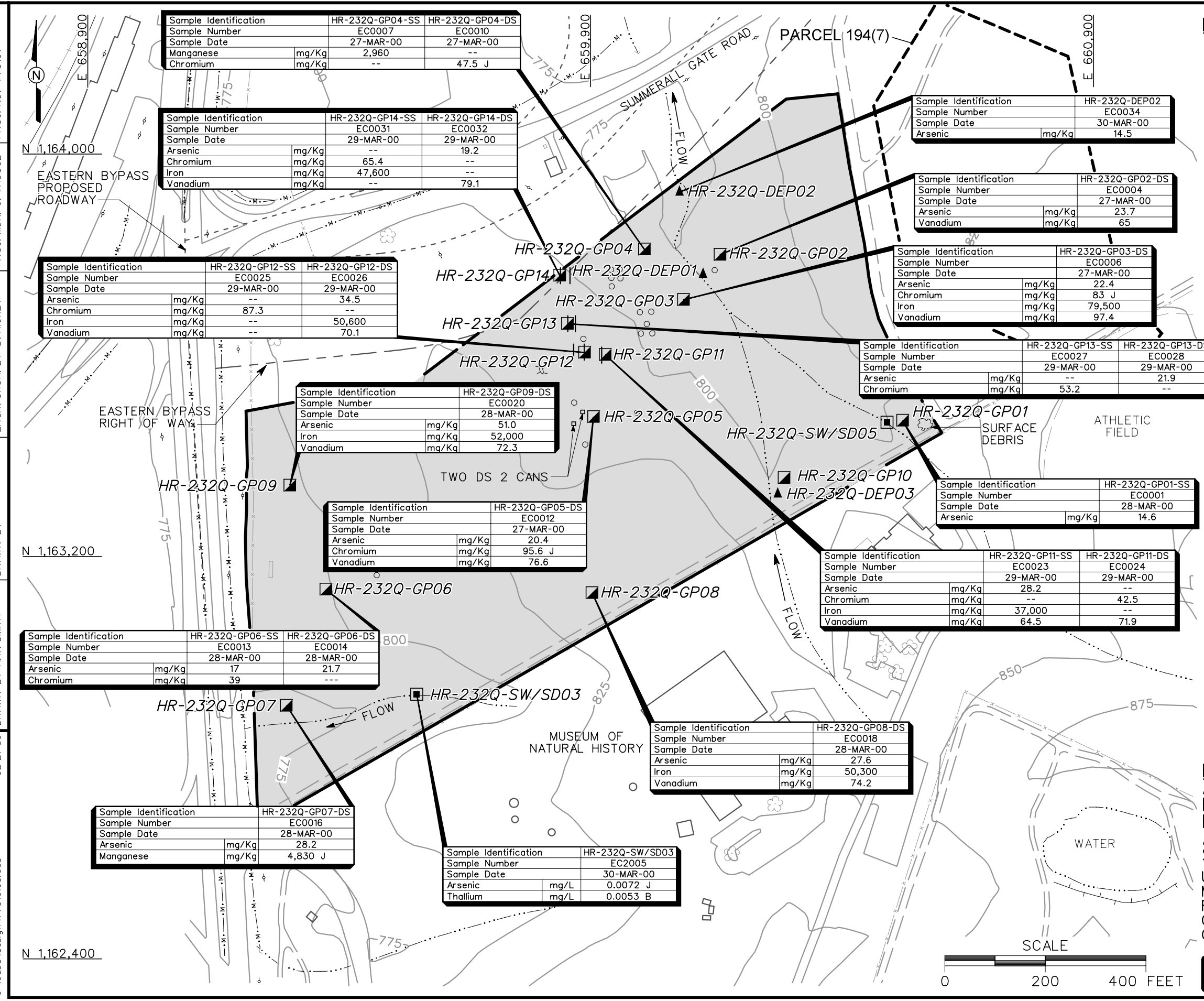
J - Result is greater than stated method detection limit but less than or equal to specified reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.



Sample Identification		HR-232Q-GP04-SS	HR-232Q-GP04-DS
Sample Number		EC0007	EC0010
Sample Date		27-MAR-00	27-MAR-00
Manganese	mg/Kg	2,960	--
Chromium	mg/Kg	--	47.5 J

Sample Identification		HR-232Q-GP14-SS	HR-232Q-GP14-DS
Sample Number		EC0031	EC0032
Sample Date		29-MAR-00	29-MAR-00
Arsenic	mg/Kg	--	19.2
Chromium	mg/Kg	65.4	--
Iron	mg/Kg	47,600	--
Vanadium	mg/Kg	--	79.1

Sample Identification		HR-232Q-GP12-SS	HR-232Q-GP12-DS
Sample Number		EC0025	EC0026
Sample Date		29-MAR-00	29-MAR-00
Arsenic	mg/Kg	--	34.5
Chromium	mg/Kg	87.3	--
Iron	mg/Kg	--	50,600
Vanadium	mg/Kg	--	70.1

Sample Identification		HR-232Q-GP09-DS
Sample Number		EC0020
Sample Date		28-MAR-00
Arsenic	mg/Kg	51.0
Iron	mg/Kg	52,000
Vanadium	mg/Kg	72.3

Sample Identification		HR-232Q-GP05-DS
Sample Number		EC0012
Sample Date		27-MAR-00
Arsenic	mg/Kg	20.4
Chromium	mg/Kg	95.6 J
Vanadium	mg/Kg	76.6

Sample Identification		HR-232Q-GP06-SS	HR-232Q-GP06-DS
Sample Number		EC0013	EC0014
Sample Date		28-MAR-00	28-MAR-00
Arsenic	mg/Kg	17	21.7
Chromium	mg/Kg	39	---

Sample Identification		HR-232Q-GP07-DS
Sample Number		EC0016
Sample Date		28-MAR-00
Arsenic	mg/Kg	28.2
Manganese	mg/Kg	4,830 J

Sample Identification		HR-232Q-SW/SD03
Sample Number		EC2005
Sample Date		30-MAR-00
Arsenic	mg/L	0.0072 J
Thallium	mg/L	0.0053 B

Sample Identification		HR-232Q-GP08-DS
Sample Number		EC0018
Sample Date		28-MAR-00
Arsenic	mg/Kg	27.6
Iron	mg/Kg	50,300
Vanadium	mg/Kg	74.2

Sample Identification		HR-232Q-DEP02
Sample Number		EC0034
Sample Date		30-MAR-00
Arsenic	mg/Kg	14.5

Sample Identification		HR-232Q-GP02-DS
Sample Number		EC0004
Sample Date		27-MAR-00
Arsenic	mg/Kg	23.7
Vanadium	mg/Kg	65

Sample Identification		HR-232Q-GP03-DS
Sample Number		EC0006
Sample Date		27-MAR-00
Arsenic	mg/Kg	22.4
Chromium	mg/Kg	83 J
Iron	mg/Kg	79,500
Vanadium	mg/Kg	97.4

Sample Identification		HR-232Q-GP13-SS	HR-232Q-GP13-DS
Sample Number		EC0027	EC0028
Sample Date		29-MAR-00	29-MAR-00
Arsenic	mg/Kg	--	21.9
Chromium	mg/Kg	53.2	--

Sample Identification		HR-232Q-GP01-SS
Sample Number		EC0001
Sample Date		28-MAR-00
Arsenic	mg/Kg	14.6

Sample Identification		HR-232Q-GP11-SS	HR-232Q-GP11-DS
Sample Number		EC0023	EC0024
Sample Date		29-MAR-00	29-MAR-00
Arsenic	mg/Kg	28.2	--
Chromium	mg/Kg	--	42.5
Iron	mg/Kg	37,000	--
Vanadium	mg/Kg	64.5	71.9

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FEET)
- TREES / TREELINE
- PARCEL BOUNDARY
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- RAILROAD
- UTILITY POLE
- SURFACE MOUND
- SURFACE DEPRESSIONS (5-6' IN DIAMETER AND 3-4' DEEP)
- TRENCH LOCATION (12-18' IN LENGTH AND 1-3' DEEP)
- DS 2 — DECONTAMINATION SOLUTION NO. 2
- EASTERN BYPASS RIGHT OF WAY BOUNDARY
- EASTERN BYPASS PROPOSED ROADWAY
- SURFACE WATER/SEDIMENT SAMPLE LOCATION
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- DEPOSITIONAL SOIL SAMPLE LOCATION
- B — ANALYTE DETECTED IN LABORATORY BLANK AT CONCENTRATION GREATER THAN THE REPORTING LIMIT (AND GREATER THAN ZERO)
- J — RESULT IS GREATER THAN STATED METHOD DETECTION LIMIT BUT LESS THAN OR EQUAL TO SPECIFIED REPORTING LIMIT

FIGURE 5-1
ANALYTICAL RESULTS EXCEEDING HUMAN HEALTH SSSLs AND ESTABLISHED BACKGROUND VALUES AREA M2 SUBSECTION OF AREA 45

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

DWG. NO.: ...\773191es.098 | PROJ. NO.: 773191
INITIATOR: D. HICKEY | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: D. HICKEY
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 5/25/00 | DRAWN BY: A.W. SMITH
11/16/00 02:27:39
DBILLING c:\cadd\design\773191es.098

The concentrations of seven metals (aluminum, arsenic, chromium, iron, manganese, thallium, and vanadium) exceeded residential human health SSSLs. Of these metals, arsenic (four locations), chromium (four locations), iron (two locations), manganese (one location), and vanadium (one location) concentrations also exceeded background concentrations, but were within the range of background values determined by SAIC (1998).

Arsenic (four locations), barium (one location), beryllium (one location), chromium (four locations), iron (two locations), manganese (one location), mercury (four locations), vanadium (one location), and zinc (two locations) concentrations exceeded ESVs. With the exception of the beryllium result, these metals concentrations were within the range of background values (Appendix G).

Volatile Organic Compounds. Six VOCs, including 2-butanone, acetone, methylene chloride, naphthalene, trichlorofluoromethane, and p-cymene, were detected in surface and depositional soil samples collected at Area M2, Subsection of Area 45. The methylene chloride results and two of the eight acetone results were flagged with a "B" data qualifier signifying that these compounds were also detected in an associated laboratory or field blank. In addition, the remaining results were flagged with a "J" data qualifier signifying that the result is greater than the method detection limit but less than the specified reporting limit. Naphthalene (HR-232Q-GP02), 2-butanone (HR-232Q-GP13), and trichlorofluoromethane (HR-232Q-GP04) were each detected in only one of the samples; p-cymene was detected in only two samples (HR-232Q-GP05 and HR-232Q-GP08).

None of the VOCs detected in surface and depositional soils was present at a concentration exceeding residential human health SSSLs or ESVs.

Semivolatile Organic Compounds. Thirteen SVOCs were detected in surface and depositional soil samples collected at Area M2, Subsection of Area 45. Bis(2-ethylhexyl)phthalate was detected at each sample location; however, the results were flagged with a "B" data qualifier signifying that the compound was also detected in an associated laboratory or field blank. The remaining SVOC analytical results were flagged with a "J" data qualifier signifying that the result is greater than the method detection limit but less than the specified reporting limit. Bis(2-ethylhexyl)phthalate was the only detected SVOC in fifteen of the seventeen surface and depositional soil samples. Sample location HR-232Q-GP14 contained all thirteen of the detected SVOCs and sample location HR-232Q-GP08 contained seven of the thirteen detected SVOCs.

The benzo(a)pyrene concentration at HR-232Q-GP14 exceeded the SSSL and ESV. Fluoranthene, phenanthrene, and pyrene concentrations exceeded ESVs at HR-232Q-GP14.

5.2 Subsurface Soil Analytical Results

Fourteen subsurface soil samples were collected for chemical analyses at Area M2, Subsection of Area 45. Subsurface soil samples were collected at depths greater than 1 foot bgs at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-2.

Metals. Twenty metals were detected in subsurface soils at Area M2, Subsection of Area 45. The concentrations of seven metals (aluminum, arsenic, chromium, iron, manganese, thallium, and vanadium) exceeded residential human health SSSLs in subsurface soils. Of these metals, arsenic (ten locations), chromium (four locations), iron (four locations), manganese (one location), and vanadium (eight locations) concentrations also exceeded background concentrations. With the exception of arsenic (HR-232Q-GP09), chromium (HR-232Q-GP03 and HR-232Q-GP05), and iron (four locations), these metals concentrations were within the range of background values (Appendix G).

Volatile Organic Compounds. Three VOCs, including 1,2,4-trimethylbenzene, methylene chloride, and trichlorofluoromethane, were detected in subsurface soil samples collected at Area M2, Subsection of Area 45. Methylene chloride was detected in each of the subsurface soil samples; however, the analytical results were flagged with a “B” data qualifier signifying that methylene chloride was also detected in an associated laboratory or field blank. The VOC 1,2,4-trimethylbenzene was detected at only one location (HR-232Q-GP08) and trichlorofluoromethane was detected at only two locations (HR-232Q-GP03 and HR-232Q-GP04).

None of the detected VOCs was present at a concentration exceeding residential human health SSSLs.

Semivolatile Organic Compounds. The SVOC bis(2-ethylhexyl)phthalate was detected in each of the subsurface soil samples; however, the bis(2-ethylhexyl)phthalate analytical results were flagged with a “B” data qualifier signifying that the compound was also detected in an associated laboratory or field blank.

The bis(2-ethylhexyl)phthalate concentrations were below the residential human health SSSL.

5.3 Surface Water Analytical Results

Two surface water samples were collected at Area M2, Subsection of Area 45, at the sample locations shown on Figure 3-1. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background screening values, as presented in Table 5-3.

Metals. Eighteen metals were detected in unfiltered surface water samples collected at Area M2, Subsection of Area 45. Arsenic, chromium, cobalt, copper, lead, mercury, nickel, thallium and vanadium were each detected at only one location (HR-232Q-SW/SD03). The copper and thallium results were flagged with a "B" data qualifier signifying that these metals were also detected in an associated laboratory or field blank.

Three metals (arsenic, iron, and thallium) were detected at sample location HR-232Q-SW/SD03 at concentrations exceeding recreational site user human health SSSLs. The arsenic and thallium results also exceeded background concentrations; however, the arsenic result was within the range of background values and the thallium result was flagged with a "B" data qualifier.

Aluminum, thallium, and vanadium concentrations exceeded ESVs and background concentrations at sample location HR-232Q-SW/SD03. The aluminum and vanadium results were within the range of background values established by SAIC (1998).

Volatile Organic Compounds. Acetone was detected in both of the surface water samples collected at Area M2, Subsection of Area 45. However, the analytical results were flagged with a "B" data qualifier signifying that acetone was also detected in an associated laboratory or field blank.

The acetone concentrations were below the SSSL and ESV.

Semivolatile Organic Compounds. SVOCs were not detected in surface water samples collected at Area M2, Subsection of Area 45.

5.4 Sediment Analytical Results

Two sediment samples were collected at Area M2, Subsection of Area 45 at the sample locations shown on Figure 3-1. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background screening values, as presented in Table 5-4.

Metals. Seventeen metals were detected in sediment samples collected at Area M2, Subsection of Area 45. The beryllium and mercury analytical results were flagged with a "B" data qualifier signifying that these metals were also detected in an associated laboratory or field blank. All of the seventeen metals were detected at both sample locations.

None of the metals detected in sediment samples was present at a concentration exceeding recreational site user human health SSSLs. The arsenic concentration at sample location HR-232Q-SW/SD05 exceeded the ESV but was below the background concentration.

Volatile Organic Compounds. Acetone and methylene chloride were detected in sediment samples collected at Area M2. The analytical results were flagged with a "B" data qualifier signifying that these compounds were also detected in an associated laboratory or field blank. The acetone and methylene chloride concentrations were below SSSLs and ESVs.

Semivolatile Organic Compounds. Sixteen SVOCs were detected in sediment samples collected at Area M2, Subsection of Area 45. The SVOC bis(2-ethylhexyl)phthalate was the only compound detected in both samples, however, the analytical results were flagged with a "B" data qualifier signifying that bis(2-ethylhexyl)phthalate was also detected in an associated laboratory or field blank. The sample collected at location HR-232Q-SW/SD03 contained each of the sixteen detected SVOCs, while sample location HR-232Q-SW/SD05 contained only bis(2-ethylhexyl)phthalate.

The concentrations of six SVOCs (benzo[a]anthracene, benzo[a]pyrene, chrysene, fluoranthene, phenanthrene, and pyrene) at sample location HR-232Q-SW/SD03 exceeded ESVs but were below recreational site user human health SSSLs.

Total Organic Carbon and Grain Size. Two sediment samples were collected and analyzed for TOC and grain size. The TOC content ranged from 12,800 to 13,200 mg/kg of carbon present in the sediment samples. TOC and grain-size distribution results are presented in Appendix D.

6.0 Summary and Conclusions and Recommendations

IT, under contract with USACE, completed an SI at Area M2, Subsection of Area 45, at FTMC, Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at Area M2, Subsection of Area 45, and if present, whether the concentrations would present an unacceptable risk to human health or the environment. The SI at Area M2, Subsection of Area 45 consisted of the sampling and analyses of 14 surface soil samples, 14 subsurface soil samples, 2 surface water samples, 2 sediment samples, and 3 depositional soil samples.

The analytical results indicate that metals, VOCs, and SVOCs were detected in the environmental media sampled. Nitroexplosives and perchlorate were not detected in any of the samples collected. Lewisite and CWM breakdown products were not detected in the soil samples for which these constituents were analyzed. Analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the on-going site investigations being performed under the BRAC environmental restoration program at FTMC. Additionally, metal concentrations exceeding SSSLs and ESVs were compared to media-specific background screening values (SAIC, 1998).

The potential impact to human receptors is expected to be minimal. Although the site is projected for industrial/commercial future use, the soils analytical data were screened against residential human health SSSLs to evaluate the site for possible unrestricted future use. The concentrations of five metals (arsenic, chromium, iron, manganese, and vanadium) exceeded residential human health SSSLs in soils. However, with the exception of arsenic (one location), chromium (two locations), and iron (four locations) in subsurface soils, the metals concentrations were within background concentrations or the range of background values determined by SAIC (1998). The SVOC benzo(a)pyrene was detected in one surface soil sample at a concentration (0.2 mg/kg) exceeding the residential human health SSSL.

Because of elevated arsenic concentrations and the presence of two Decontamination Solution Number 2 cans on the site, several surface and subsurface soil samples were sent to Quanterra Environmental Services Laboratory for additional analyses. These samples were analyzed for CWM breakdown products to determine whether the arsenic concentrations were the result of chemical weapons use at the site. The analytical results indicate that no CWM breakdown products were detected. Additionally, five soil samples were sent to the Edgewood Chemical

Biological Center for further analysis. The results of these analyses indicate that no lewisite or lewisite breakdown products were detected in the samples.

Arsenic and thallium were detected in one surface water sample at concentrations exceeding recreational site user SSSLs and background concentrations. The arsenic concentration was within the range of background values and the thallium result was flagged with a “B” data qualifier indicating that thallium was also detected in an associated laboratory or field blank. Given the limited impacted area, the metals detected in site media are not expected to pose a threat to human health in the industrial or residential land use scenario.

Beryllium (one surface soil sample) and thallium (one surface water sample) were detected in site media at concentrations exceeding ESVs and the range of background values. In addition, a total of six SVOCs (PAH compounds) were detected in one surface soil sample and one sediment sample at concentrations exceeding ESVs. The concentrations of the SVOCs exceeding ESVs ranged from 0.054 mg/kg to 1.6 mg/kg. However, the potential impact to ecological receptors is expected to be minimal based on the future land use of the parcel. The site is currently undeveloped but is projected for industrial/commercial use.

Based on the results of the SI, past operations at Area M2, Subsection of Area 45 do not appear to have adversely impacted the environment (with the exception of UXO). The metals and organic compounds detected in site media do not pose an unacceptable risk to human health and the environment. Therefore, the site is released for unrestricted reuse with regard to hazardous, toxic, and radioactive waste. UXO investigation at Area M2 is being addressed separately by the U.S. Army.

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