

**Final
Site-Specific Field Sampling Plan,
Site-Specific Safety and Health Plan, and Site-Specific
Unexploded Ordnance Safety Plan Attachments
Possible Range, Parcel 237Q-X and Impact Area,
Parcel 238Q-X, Choccolocco Corridor**

**Fort McClellan
Calhoun County, Alabama**

**Task Order CK10
Contract No. DACA21-96-D-0018
IT Project No. 796887**

June 2001

Revision 0

**Final
Site-Specific Field Sampling Plan Attachment
Site Investigation at Possible Range, Parcel 237Q-X and
Impact Area, Parcel 238Q-X, Choccolocco Corridor**

**Fort McClellan
Calhoun County, Alabama**

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June 2001

Revision 0

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List of Acronyms

See Attachment 1, List of Abbreviations and Acronyms.

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, IT Corporation (IT) will conduct site investigation activities at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, at Fort McClellan, Calhoun County, Alabama, to determine the presence or absence of potential site-specific chemicals at this site. The purpose of this site-specific field sampling plan (SFSP) is to provide technical guidance for sampling activities at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor.

The U.S. Environmental Protection Agency (EPA) Environmental Photographic Interpretation Center (EPIC) reported a Possible Range, Parcel 237Q-X, and a nearby Impact Area, Parcel 238Q-X, within southeastern Choccolocco Corridor. A review of the EPIC photographs by the Environmental Science and Engineering, Inc. (ESE) staff indicated that the Possible Range and Impact Area appeared to more closely resemble a landing strip designed to accommodate small aircraft than a weapons range. The impact area is difficult to resolve on the EPIC aerial photograph composite. These parcels were conservatively assigned a UXO qualifier (-X) by ESE in the Final Environmental Baseline Survey.

According to the Archive Search Report (ASR), a training site identified as T-46 Practice Grenade Assault Range was observed on the 1967 range map within southeastern Choccolocco Corridor. This site is adjacent to the western end of the Possible Range, Parcel 237Q-X. According to the ASR, training debris (e.g., expended rifle blanks and pyrotechnic devices such as smoke grenades) probably remains on the Possible Range site. There was not any other information about the T-46 Practice Grenade Assault Range provided in the ASR.

Specifically, IT will collect ten surface soil samples, ten subsurface soil samples, three groundwater samples, five surface water samples, and five sediment samples at this site. Potential contaminant sources at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, are primarily unknown, but may include nitroexplosives and lead. Chemical analyses of the samples collected during the field program will include nitroexplosives and metals. In addition, sediment samples will be analyzed for total organic carbon and grain size. Results from these analyses will be compared with site-specific screening levels and ecological screening values presented in the IT July 2000 *Final Human Health and*

Ecological Screening Values and PAH Background Summary Report and regulatory agency guidelines.

The Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, appear to be the sites of unknown training activities; therefore, unexploded ordnance (UXO) surface sweeps and downhole surveys of soil borings will be required to support field activities at Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance.

The U.S. Army Corps of Engineers-Huntsville Center of Excellence is conducting separate investigations at Fort McClellan to determine the presence or absence of unexploded ordnance (UXO). Possible Range, Parcel 237Q-X and Impact Area, Parcel 238Q-X, Choccolocco Corridor, will be investigated for UXO as part of the Charlie Area Engineering Evaluation/Cost Analysis (EE/CA) investigation which is scheduled to begin in July 2001.

This SFSP attachment to the installation-wide sampling and analysis plan (SAP) for the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, will be used in conjunction with the site-specific safety and health plan, the site-specific UXO safety plan, the installation-wide work plan, and the SAP. The SAP includes the installation-wide safety and health plan, waste management plan, ordnance and explosives management plan, and quality assurance plan. Site-specific hazard analyses are included in the site-specific safety and health plan.

1.0 Project Description

1.1 Introduction

The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) of the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, under Task Order CK10, Contract Number DACA21-96-D-0018.

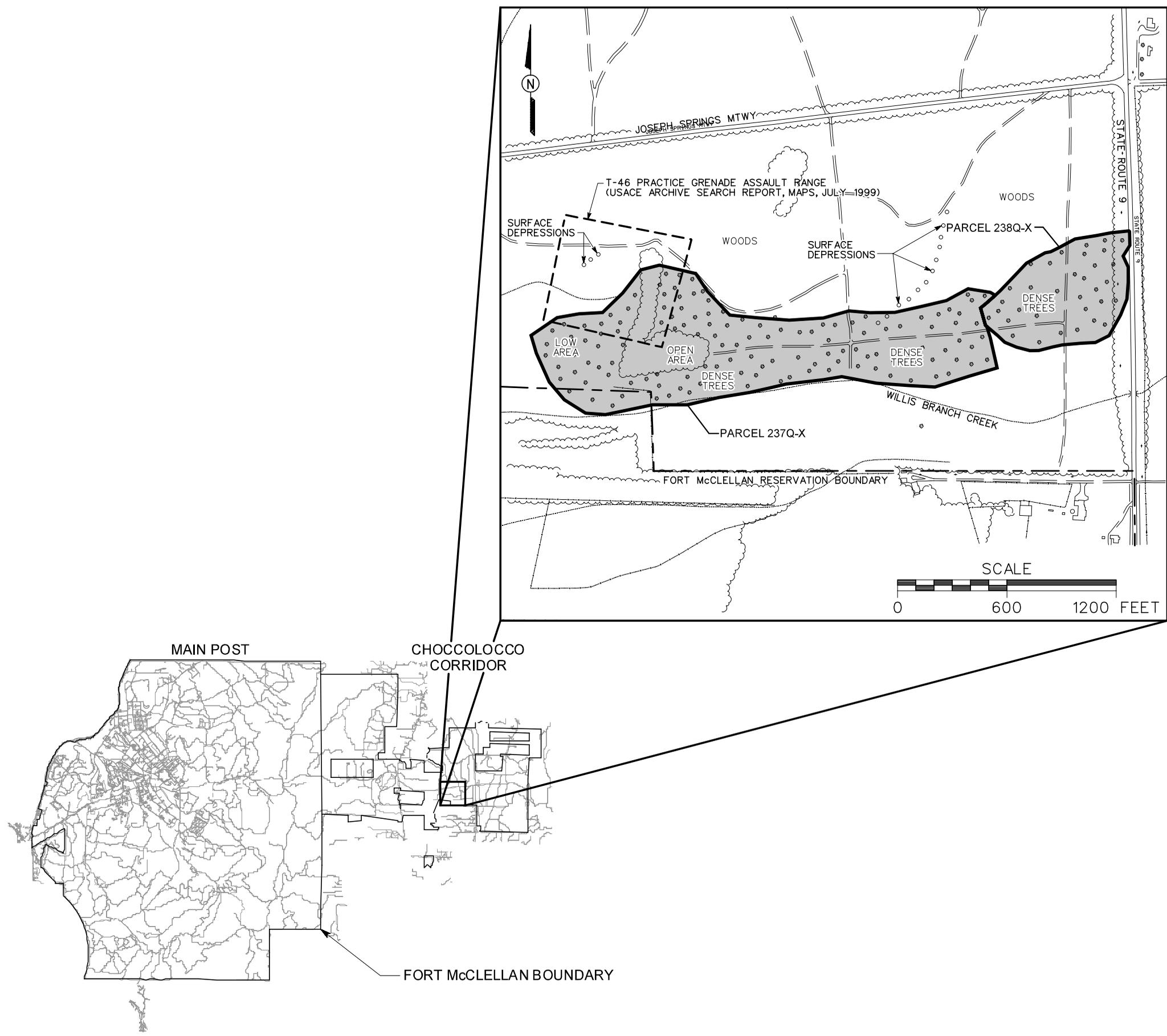
This site-specific field sampling plan (SFSP) attachment to the installation-wide sampling and analysis plan (SAP) (IT, 2000a) for FTMC has been prepared to provide technical guidance for sample collection and analysis at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor. This SFSP will be used in conjunction with the site-specific safety and health plan (SSHP) and the site-specific unexploded ordnance (UXO) safety plan developed for the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, and the installation-wide work plan (WP) (IT, 1998) and SAP. The SAP includes the installation-wide safety and health plan (SHP), waste management plan, ordnance and explosives management plan, and quality assurance plan (QAP). Site-specific hazard analyses are included in the SSHP.

1.2 Site Description

The U.S. Environmental Protection Agency (EPA) Environmental Photographic Interpretation Center (EPIC) (EPA, 1990) reported a Possible Range, Parcel 237Q-X, and a nearby Impact Area, Parcel 238Q-X, within southeastern Choccolocco Corridor (Figures 1-1 and 1-2) (Environmental Science and Engineering, Inc. [ESE], 1998). A review of the EPIC photographs by the ESE staff indicated that the Possible Range and Impact Area appeared to more closely resemble a landing strip designed to accommodate small aircraft than a weapons range (ESE, 1998). The impact area is difficult to resolve on the EPIC aerial photo composite (ESE, 1998). These parcels were conservatively assigned a UXO qualifier (-X) by ESE in the Final Environmental Baseline Survey (ESE, 1998).

According to the U.S. Army Corps of Engineers *Archive Search Report, Maps (ASR), Fort McClellan, Anniston, Alabama*, a training site identified as T-46 Practice Grenade Assault Range

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 PROJ. NO.: 796887
 INITIATOR: J. RAGSDALE
 PROJ. MGR.: J. YACOUB
 DRAFT. CHECK. BY:
 ENGR. CHECK. BY: J. RAGSDALE
 DATE LAST REV.:
 DRAWN BY:
 STARTING DATE: 03/19/01
 DRAWN BY: D. BOMAR
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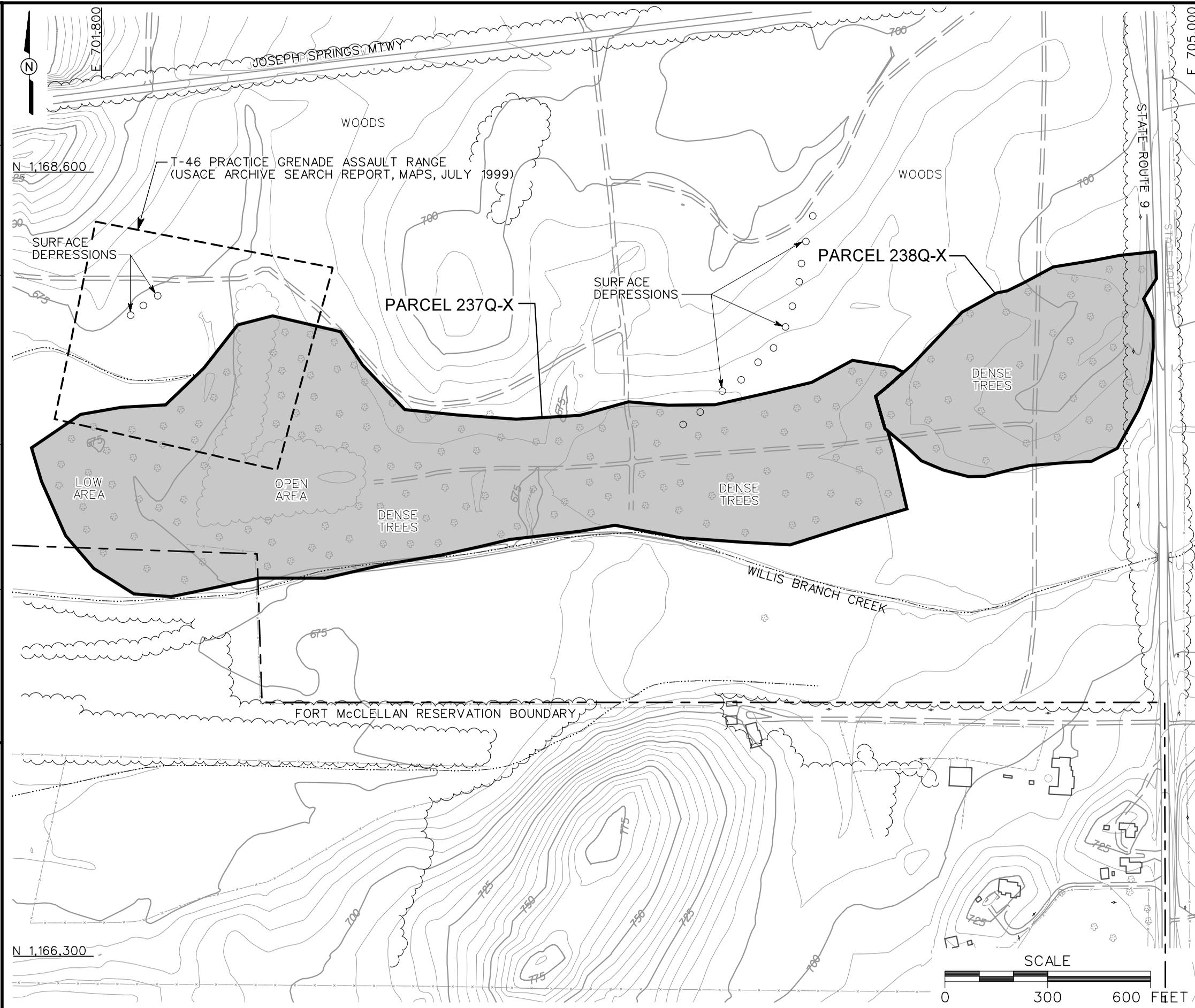
- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - BUILDING
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - FORT McCLELLAN RESERVATION BOUNDARY
 - BRIDGE
 - CULVERT WITH HEADWALL
 - SURFACE DRAINAGE / CREEK
 - FENCE
 - UTILITY POLE
 - SURFACE DEPRESSION

FIGURE 1-1
 SITE LOCATION MAP
 POSSIBLE RANGE, PARCEL 237Q-X
 AND IMPACT AREA, PARCEL 238Q-X

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 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



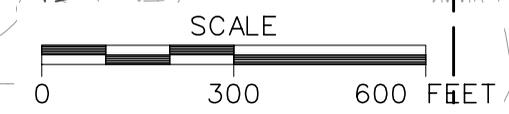
DWG. NO.: \796887.es.175
 PROJ. NO.: 796887
 INITIATOR: J. RAGSDALE
 PROJ. MGR.: J. YACOB
 DRAFT. CHK. BY:
 ENGR. CHK. BY: J. RAGSDALE
 DATE LAST REV.:
 DRAWN BY:
 STARTING DATE: 03/20/01
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- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - BUILDING
 - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - FORT McCLELLAN RESERVATION BOUNDARY
 - BRIDGE
 - CULVERT WITH HEADWALL
 - SURFACE DRAINAGE / CREEK
 - FENCE
 - UTILITY POLE
 - SURFACE DEPRESSION

FIGURE 1-2
SITE MAP
POSSIBLE RANGE, PARCEL 237Q-X
AND IMPACT AREA, PARCEL 238Q-X

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



was observed on the 1967 range map within southeastern Choccolocco Corridor (USACE, 1999a). This site is adjacent to the northwestern end of the Possible Range, Parcel 237Q-X. According to the ASR, training debris (e.g., expended rifle blanks and pyrotechnic devices such as smoke grenades) probably remains on the Possible Range site (USACE, 1999a). There was not any other information about the T-46 Practice Grenade Assault Range provided in the ASR.

A review of aerial photographs revealed that the site appears to more closely resemble a dirt landing strip than a range and impact area. The 1937 and 1940 aerial photographs show the site before FTMC use with most of the site without trees and used for cultivation. The 1940 aerial photograph appears to show a farm site with a driveway, large trees, and buildings in the center of Parcel 238Q-X (Figure 1-3). A 1969 aerial photograph shows the two parcels with more trees covering the sites and a wide bare center strip extending from the western end of Parcel 237Q-X through most of Parcel 238Q-X (Figure 1-4). This view of the parcels appears more like a landing strip than a weapons range. There is not any evidence of the buildings and large trees that appeared in the 1940 aerial photograph, only a bare area in the center of Parcel 238Q-X. The 1976 aerial photograph shows the site with more trees and a dirt road in the center that connects a large bare area in the western part of Parcel 237Q-X with a small bare area in the center of Parcel 238Q-X (Figure 1-5). The dirt road connecting the two bare areas is hardly distinguishable in the 1998 aerial photograph because it appears overgrown with trees. The Possible Range or air strip would have been in use between 1940 to 1976 based on the review of the available aerial photographs. The Impact Area, Parcel 238Q-X is located to the east of the Possible Range and next to State Route 9. This is an unlikely site for an impact area given the slight elevation increase and the proximity of State Route 9, which existed on the aerial photographs prior to any sign of FTMC use.

The elevation of the site varies between 675 feet and 700 feet above mean sea level (North American Vertical Datum of 1988). Surface water in the immediate area appears to drain to the west. Local shallow groundwater direction at the site is probably controlled by topography; therefore, groundwater direction in the residuum is likely to the west.

Soils at Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, fall into the following four soil series (U.S. Department of Agriculture [USDA], 1961):

- The Rarden soil series
- The Captina soil series

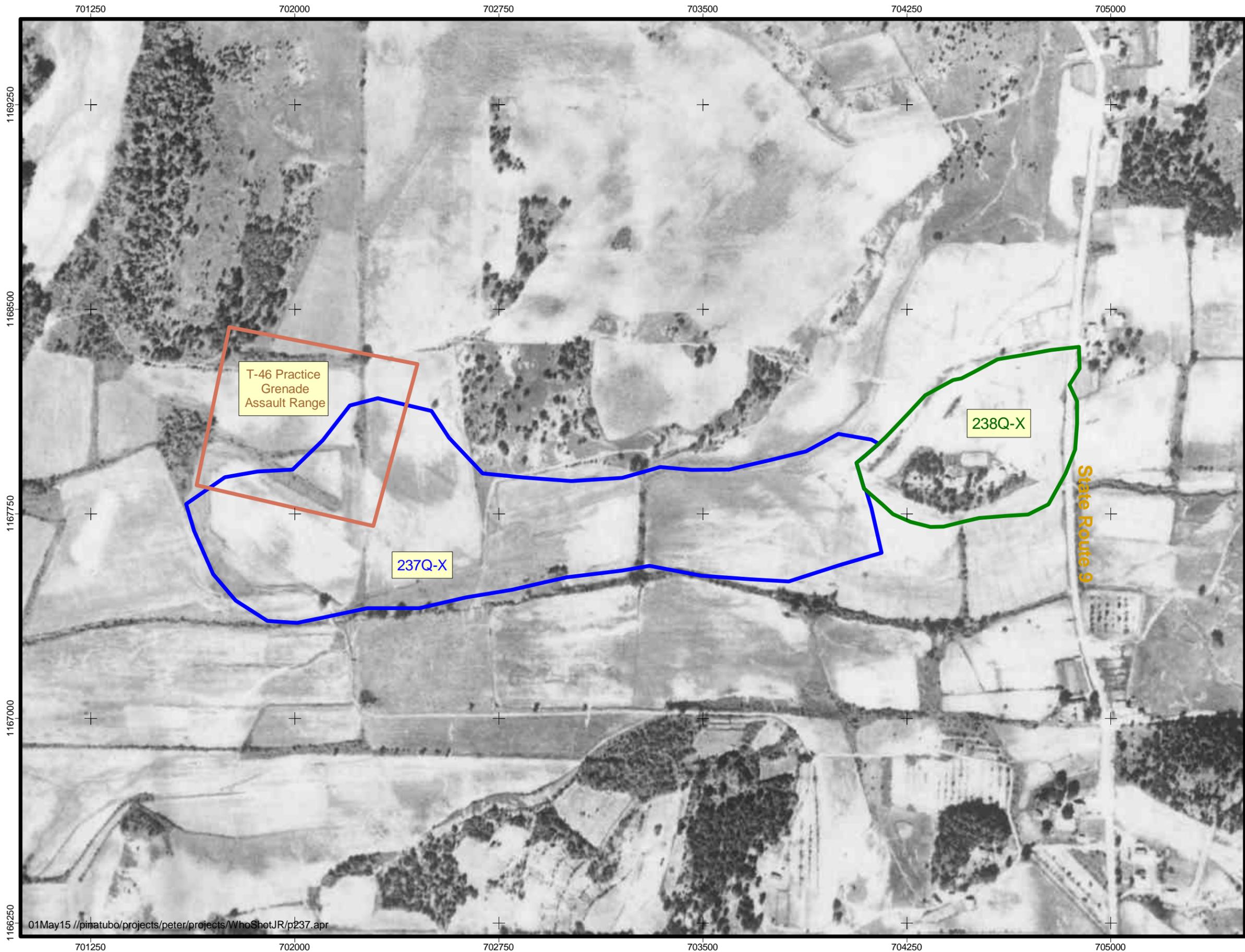
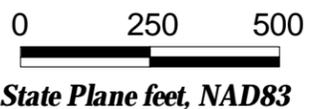


Figure 1-3
 1940 Aerial Photograph,
 Possible Range,
 Parcel 237Q-X and
 Impact Area,
 Parcel 238Q-X,
 Choccolocco Corridor

Legend

-  T-46 Practice Grenade Assault Range
-  238Q-X
-  237Q-X



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 Calhoun County, Alabama
 Contract No. DACA21-96-D-0018



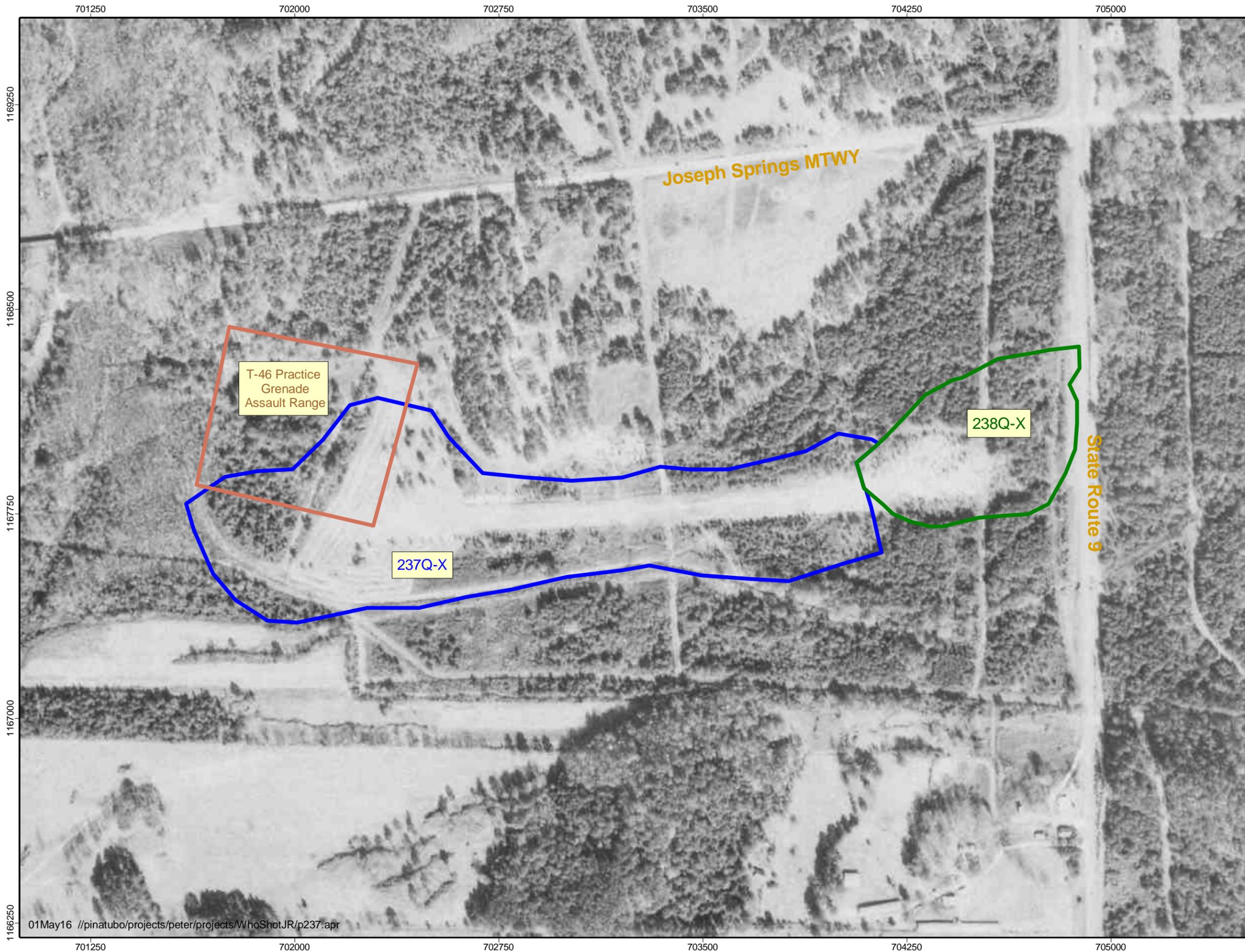


Figure 1-4

1969 Aerial Photograph,
Possible Range,
Parcel 237Q-X and
Impact Area,
Parcel 238Q-X,
Choccolocco Corridor

Legend

-  T-46 Practice Grenade Assault Range
-  238Q-X
-  237Q-X



State Plane feet, NAD83



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Calhoun County, Alabama
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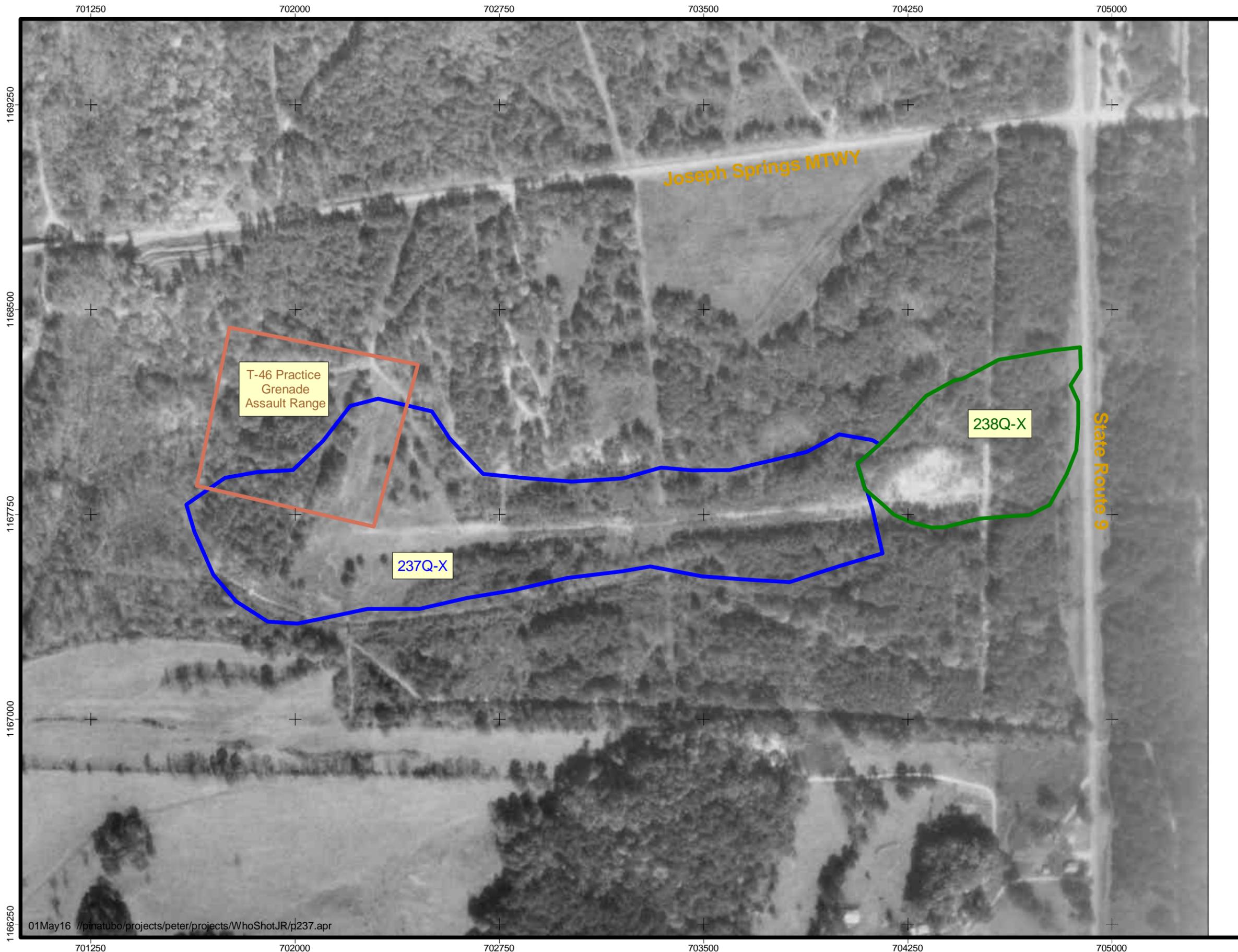


Figure 1-5

1976 Aerial Photograph,
Possible Range,
Parcel 237Q-X and
Impact Area,
Parcel 238Q-X,
Choccolocco Corridor

Legend

-  T-46 Practice Grenade Assault Range
-  238Q-X
-  237Q-X



State Plane feet, NAD83



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Calhoun County, Alabama
Contract No. DACA21-96-D-0018



- The Robertsville soil series
- The Sequatchie soil series.

The Rarden soil series consists of moderately well-drained, strongly acid to very strongly acid soils (USDA, 1961). These soils generally occur in large areas on wide shale ridges having slopes of 2 to 10 percent. These soils have developed from the residuum of shale and fine-grained, platy sandstone or limestone. In eroded areas, the surface soil is brown silt loam. The subsoil is yellowish-red clay or silty clay mottled with strong brown color. Concretions and fragments of sandstone, up to one-half inch diameter, are common on the surface and in the soil. Depth to bedrock is usually 1.5 to 4 feet. Depth to groundwater is typically greater than 20 feet.

The Captina soil series consists of strongly to very strongly acid, moderately well drained soils with fragipan (USDA, 1961). These soils occur throughout the county in small areas on stream terraces. They have developed in old general alluvium that washed from soils underlain by limestone, cherty limestone, and shale. The surface soil commonly is dark-brown to very dark grayish-brown silt loam, and the subsoil is yellowish-brown to yellowish-red silty clay loam. The fragipan (compact layer) is at depths ranging from 14 to 34 inches. Depth to bedrock is usually 4 feet or greater. Depth to groundwater is typically 1 to 3 feet (perched).

The Robertsville soil series consists of poorly drained, strongly acid to very strongly acid soils with a fragipan (USDA, 1961). These soils occur in small areas on stream terraces throughout the county. They have developed in old general alluvium that has washed from soils underlain by limestone, cherty limestone, and shale. The surface soil generally is dark grayish-brown to very dark grayish-brown silt loam. The subsoil is light brownish-gray to light gray silty clay loam. The fragipan is at depths of 12 to 27 inches. Depth to bedrock is typically 3 to 6 feet. Depth to groundwater is usually 0 to 1 foot.

The Sequatchie soil series consists of well-drained, strongly acid soils on low stream terraces. These soils are fairly extensive along the Coosa River, and they occur in small areas along many creeks in the county. They have developed in alluvium that has washed chiefly from soil underlain by sandstone. Some alluvium, however, was washed from soils underlain by limestone and mixtures of other material. The surface soil is dark grayish-brown fine sandy loam. The subsoil is dark-brown fine sandy clay loam. Depth to bedrock is typically 8 feet or greater. Depth to groundwater is usually greater than 6 feet.

Most of the Impact Range Parcel, 238Q-X, consists of the soil mapping unit Rarden silty clay loam, shallow, 6 to 10 percent slopes, severely eroded (ReC3) (USDA, 1961). Soils at this site consist of severely eroded soils that have 6 to 10 percent slopes and a thin solum (USDA, 1961). Erosion has removed all of the original brown silt loam surface soil. The 2- to 4- inch plow layer is now a yellowish red to dark red silty clay loam. Shallow gullies are common. The tilth is poor.

The Possible Range, Parcel 237Q-X, is covered by three soil mapping units. The eastern half of the parcel is covered by Captina silt loam, 0 to 6 percent slopes (CcB) (USDA, 1961). This soil mapping unit has a thick surface soil, a high rate of infiltration, and slow to medium runoff. The surface soil is dark-brown to very dark grayish-brown silt loam; weak, fine-crumb structure; and friable and strongly acid. The subsoil ranges from yellowish-brown to yellowish-red. The fragipan ranges in thickness from 4 to 20 inches and in compactness from weak to strong. Also included are places where the plow layer is severely eroded; it is brown to reddish-brown silty clay loam.

Two soil mapping units cover the western half of Possible Range, Parcel 237Q-X. The northern area of the western half of Possible Range, Parcel 237Q-X, consists of Robertsville silt loam, 0 to 2 percent slopes (RoA) (USDA, 1961). The surface soil for this mapping unit ranges from dark grayish-brown and dark brown to light brownish-gray in color and is usually mottled. The subsoil ranges from light brownish-gray to light gray; the color and number of mottles are variable. A few small areas have gravel on the surface. The fragipan is at depths ranging from 12 to 27 inches. The fragipan ranges in thickness from 8 to 18 inches and in compactness from weak to strong. The soil has fair to good tilth, and runoff is very slow. Permeability and infiltration are slow, and the capacity for available moisture is low.

The southern area of the western half of Possible Range, Parcel 237Q-X, is covered by the soil mapping unit Sequatchie fine sandy loam, 0 to 2 percent slopes (ScA) (USDA, 1961). This soil mapping unit is a friable soil found on low stream terraces. The surface soil ranges from dark grayish-brown to dark brown in color. The subsoil ranges from dark brown to yellowish-brown in color and from fine sandy clay loam to light silty clay loam in texture. In some areas, the lower soil is mottled. Some areas include a gravelly fine sandy surface soil. Also, a few areas are underlain by a firm, silty clay subsoil. This soil has good tilth, and runoff is slow. Infiltration and internal drainage are medium. Permeability is moderate, and the capacity for available moisture is moderate to high.

1.3 Scope of Work

The scope of work for activities associated with the SI at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, as specified by the statement of work (USACE, 1999b), includes the following tasks:

- Develop the SFSP attachment.
- Develop the SSHP attachment.
- Conduct a surface and near-surface UXO survey over all areas to be included in the supplemental sampling effort.
- Provide downhole UXO support for all intrusive drilling to determine buried downhole hazards.
- Collect ten surface soil samples, ten subsurface soil samples, three groundwater samples, five surface water samples, and five sediment samples to determine whether potential site-specific chemicals (PSSC) are present at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, and to provide data useful for supporting any future planned corrective measures and closure activities.
- Analyze samples for the parameters listed in Section 4.5.

The Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, appear to be sites of unknown training activities; therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at this site. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance. The site-specific UXO safety plan will be used to support sample collection activities at Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, if incidental ordnance, explosive, and UXO are encountered.

The U.S. Army Corps of Engineers-Huntsville Center of Excellence is conducting separate investigations at Fort McClellan to determine the presence or absence of unexploded ordnance (UXO). Possible Range, Parcel 237Q-X and Impact Area, Parcel 238Q-X, Choccolocco Corridor, will be investigated for UXO as part of the Charlie Area Engineering Evaluation/Cost Analysis (EE/CA) investigation which is scheduled to begin in July 2001.

At completion of the field activities and sample analyses, draft and final SI summary reports will be prepared to summarize the results of the activities, to evaluate the absence or presence of PSSCs at this site, and to recommend further actions, if appropriate. SI sampling reports will be prepared in accordance with current EPA-Region IV, and the Alabama Department of Environmental Management (ADEM) guidelines.

2.0 Summary of Existing Environmental Studies

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

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

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 = UXO
- CWM = Chemical warfare material.

The EBS was conducted in accordance with the CERFA (CERFA-Public Law 102-426) protocols and U.S. Department of Defense policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, EPA-Region 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 historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

The Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, are parcels where no known or recorded storage, release, or disposal (including migration) have occurred on site property, but the parcels are qualified (-X) for potential UXO. The Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, also require additional evaluation to determine the environmental condition of the parcels.

3.0 Site-Specific Data Quality Objectives

3.1 Overview

The data quality objective (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the action selection for the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor. This section incorporates the components of the DQO process described in the publication EPA 540-R-93-071 *Data Quality Objectives Process for Superfund* (EPA, 1993). The DQO process as applied to the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, is described in more detail in Section 4.3 of the WP. Table 3-1 provides a summary of the factors used to determine the appropriate quantity of samples and the procedures necessary to meet the objectives of the SI and establish a basis for future action at this site.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Chapter 4.0 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah (CESAS) Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

3.2 Data Users and Available Data

The available data related to the SI at Possible Range, Parcel 237Q-X and Impact Area, Parcel 238Q-X, Choccolocco Corridor, presented in Table 3-1, have been used to formulate a site-specific conceptual model. This conceptual model was developed to support the development of this SFSP, which is necessary to meet the objectives of these activities and to establish a basis for future action at the site. The users of the data and information generated during field activities are primarily EPA, USACE, ADEM, FTMC, and the USACE supporting contractors. This SFSP, along with the necessary companion documents, has been designed to provide the regulatory agencies with sufficient detail to reach a determination as to the adequacy of the scope of work. The program has also been designed to provide the level of defensible data and information required to confirm or rule out the existence of residual chemical contamination in site media.

Table 3-1

**Summary of Data Quality Objectives
Possible Range, Parcel 237Q-X and Impact Area, Parcel 238Q-X, Choccolocco Corridor
Site Investigation
Fort McClellan, Calhoun County, Alabama**

Users	Available Data	Conceptual Site Model	Media of Concern	Data Uses and Objectives	Data Types	Analytical Level	Data Quantity
EPA, ADEM USACE, DOD FTMC, IT Corporation, other contractors, and possible future land users	None	<u>Contaminant Source</u> Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X (explosives and lead) <u>Migration Pathways</u> Infiltration to subsurface soil, infiltration and leaching to groundwater, biotransfer to venison, dust emissions and volatilization to ambient air, groundwater discharge to surface water, and runoff and erosion to surface water and sediment <u>Potential Receptors</u> Residents (future), Recreational site user (current and future) <u>PSSC</u> metals and nitroexplosives	<u>Surface soil</u>	SI to confirm the presence or absence of contamination in the site media	<u>Surface soil</u> TAL Metals and Nitroexplosives	Definitive data in CESAS Level B data packages	10 direct-push surface soil samples + QC
			<u>Subsurface Soil</u>		<u>Subsurface Soil</u> TAL Metals and Nitroexplosives		
			<u>Groundwater</u>	Definitive quality data for future decision- making	<u>Groundwater</u> TAL Metals and Nitroexplosives	Definitive data in CESAS Level B data packages	3 groundwater samples + QC
			<u>Surface Water</u>		<u>Surface Water</u> TAL Metals and Nitroexplosives	Definitive data in CESAS Level B data packages	5 surface water samples + QC
			<u>Sediment</u>		<u>Sediment</u> TAL Metals, Nitroexplosives, TOC and Grain Size	Definitive data in CESAS Level B data packages	5 sediment samples + QC

ADEM - Alabama Department of Environmental Management.
CESAS - Corps of Engineers South Atlantic Savannah.
DOD - U.S. Department of Defense.
EPA - U.S. Environmental Protection Agency.
FTMC - Fort McClellan.
USACE - U.S. Army Corps of Engineers.

SI - Site investigation.
QC - Quality control.
TAL - Target analyte list.
TOC - Total organic carbon.
PSSC - Potential site-specific chemical.

3.3 Conceptual Site Exposure Model

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating potential risks and hazards to human health in the risk assessment. The CSEM includes receptors and potential exposure pathways appropriate to all plausible scenarios. The CSEM facilitates a consistent and comprehensive evaluation of risk to human health through graphically presenting all possible exposure pathways, including sources, release and transport pathways, and exposure routes. In addition, the CSEM helps to ensure that potential pathways are not overlooked. The elements of a complete exposure pathway and CSEM are:

- Source (i.e., contaminated environmental) media
- Contaminant release mechanisms
- Contaminant transport pathways
- Receptors
- Exposure pathways.

Contaminant release mechanisms and transport pathways are not relevant for direct receptor contact scenarios with a contaminated source medium.

Primary contaminant releases were probably limited to leaks and spills that entered surface soil. Potential contaminant transport pathways include infiltration and leaching to subsurface soil and groundwater, biotransfer to deer through browsing, dust emissions and volatilization to ambient air, groundwater discharge to surface water, surface water runoff, and erosion to surface water and sediment.

Currently the range and the impact areas are not utilized and are not maintained. The range and the impact area are not fenced, and therefore people may trespass at the site for hunting. There is not sufficient surface water to support fish habitat for fishing. The only plausible receptors under this current land-use scenario are a recreational site user who may hunt. Other potential receptors considered, but not included under the current land-use scenario, are the:

- **Groundskeeper.** The ranges are not currently maintained and will not be in the future.
- **Construction Worker.** The site is unused, and no development or construction is occurring or scheduled.
- **Resident.** The site is not currently used for residential purposes.

Future land use in this area is shown as remediation reserve and passive recreation (FTMC, 1997). The site may not be deemed safe for public access until remediation has been completed, because of the potential for UXO (FTMC, 1997). Plausible future land-use receptor scenarios addressed in the CSEM include:

- **Resident.** Although the site is not planned for residential use, the residential scenario is considered in order to provide information for the project manager and regulators.
- **Recreational Site User.** Because the future site is planned for passive recreational use, and hunting is a viable option, the recreational site user is included. Fish ingestion will not be evaluated because the streams are too small to support fish for consumption.

A summary of relevant contaminant release and transport mechanisms, source and exposure media, and receptors and exposure pathways for this site is provided in Table 3-1 and Figure 3-1.

3.4 Decision-Making Process, Data Uses, and Needs

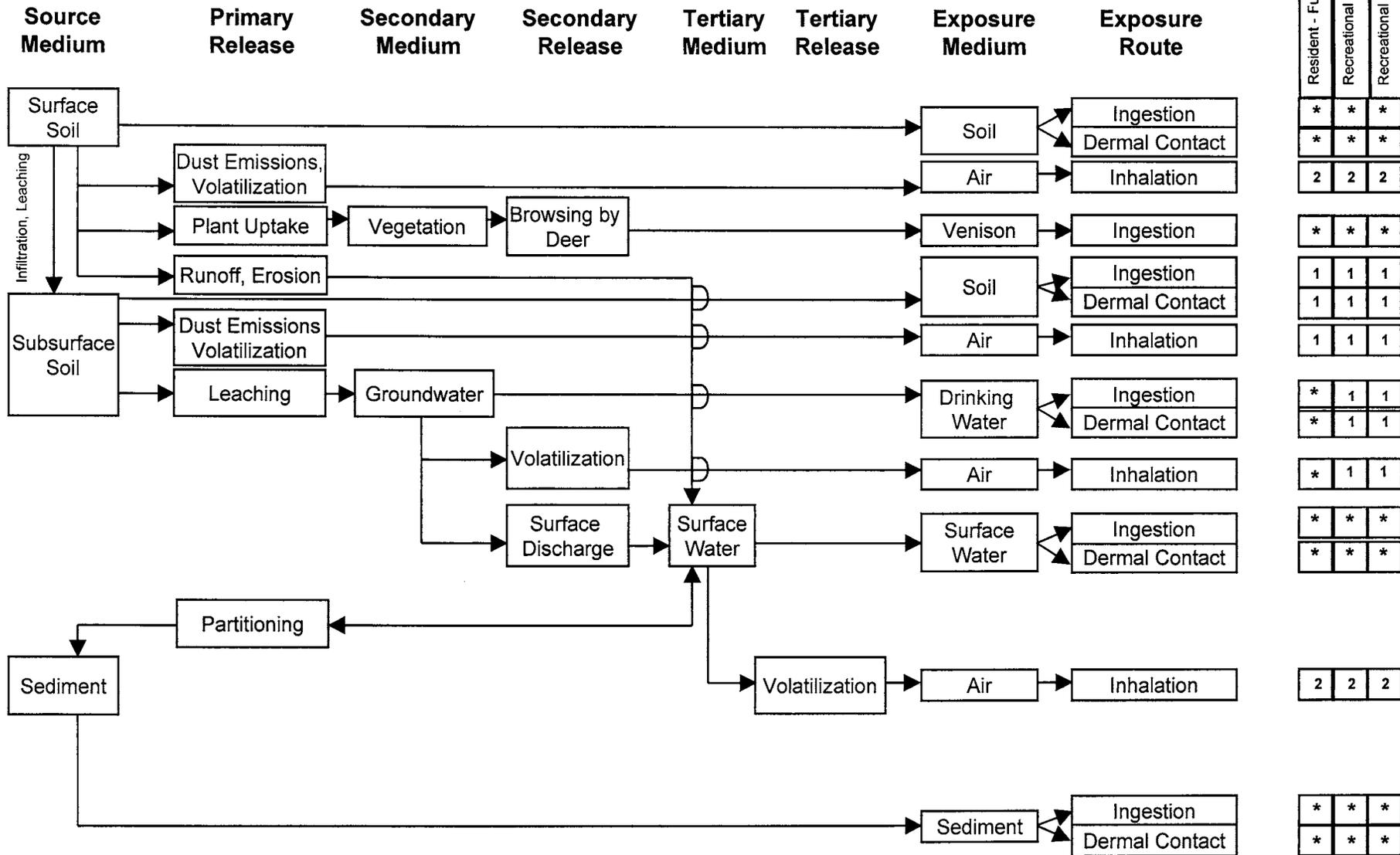
The decision-making process is a seven-step process that is presented in detail in Section 4.3 of the WP and will be followed during the SI at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor. Data uses and needs are summarized in Table 3-1.

3.4.1 Risk Evaluation

Confirmation of contamination at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, will be based on comparing detected site chemicals of potential concern to site-specific screening levels developed in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). EPA definitive data with CESAS Level B data packages will be used to determine whether or not PSSCs are detected in site media. Definitive data will be adequate for confirming the presence of site contamination and for supporting a feasibility study and risk assessment.

Assessment of potential ecological risk associated with sites or parcels (e.g., surface water and sediment sampling, specific ecological assessment methods) will be addressed in accordance with the procedures in the WP.

Figure 3-1
Human Health Conceptual Site Exposure Model
Possible Range, Parcel 237Q-X, and Impact Area,
Parcel 238Q-X, Choccolocco Corridor
Fort McClellan, Alabama



* = Complete exposure pathway evaluated in the streamlined risk assessment.
 1 = Incomplete exposure pathway.
 2 = Although theoretically complete, this pathway is judged to be insignificant and is not evaluated in the streamlined risk assessment.

3.4.2 Data Types and Quality

Surface soil, subsurface soil, groundwater, surface water, and sediment samples will be collected and analyzed to meet the objectives of the SI at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor. Quality assurance/quality control (QA/QC) samples will be collected for all sample types as described in Chapter 4.0 of this SFSP. Samples will be analyzed by EPA-approved SW-846 Methods Update III, where available; comply with EPA definitive data requirements; and be reported using hard-copy data packages. In addition to meeting the quality needs of this SI, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

3.4.3 Precision, Accuracy, and Completeness

Laboratory requirements of precision, accuracy, and completeness for this SI are provided in Section 9.0 of the QAP.

4.0 Field Activities

4.1 UXO Survey Requirements and Utility Clearances

The Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, appear to be the sites of unknown training activities and, therefore, IT will conduct UXO avoidance activities, including surface sweeps and downhole surveys of soil borings.

4.1.1 Surface UXO Survey

A UXO sweep will be conducted over areas that will be included in the sampling and surveying activities to identify UXO on or near the surface that may present a hazard to on-site workers during field activities. Low-sensitivity magnetometers will be used to locate surface and shallow-buried metal objects. UXO located on the surface will be identified and conspicuously marked for easy avoidance. Subsurface metallic anomalies will not be disturbed and will also be marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in Chapter 4.0 and Appendices D and E of the approved SAP (IT, 2000a).

4.1.2 Downhole UXO Survey

During the soil boring and downhole sampling, downhole UXO surveys will be performed to determine if buried metallic objects are present. UXO monitoring, as described in Chapter 4.0 of the SAP (IT, 2000a), will continue until undisturbed soil is encountered or the borehole has been advanced to 12 feet below ground surface, whichever is reached first.

4.1.3 Utility Clearances

After the UXO surface survey has cleared the area to be sampled and prior to performing any intrusive sampling, a utility clearance will be performed at locations where soil and groundwater samples will be collected, using the procedure outlined in Section 4.2.6 of the SAP (IT, 2000a). The site manager will mark the proposed locations with stakes, coordinate with the local utility companies to clear the proposed locations for utilities, and obtain digging permits. Once the locations are approved (for both UXO and utility avoidance) for intrusive sampling, the stakes will be labeled as cleared.

4.2 Environmental Sampling

The environmental sampling program at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, includes the collection of surface soil, subsurface soil, groundwater, surface water, and sediment samples for chemical analysis. These samples will be collected and analyzed to provide data for characterizing the site to determine the environmental condition of the site and any further action to be conducted at the site. Additionally, samples will be collected from environmental media in locations that will assist in the assessment of potential ecological impacts resulting from activities at the site.

4.2.1 Surface Soil Sampling

Surface soil samples will be collected from ten locations at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor.

4.2.1.1 Sample Locations and Rationale

The sampling rationale for each surface soil sample location is listed in Table 4-1. Proposed sampling locations are shown in Figure 4-1. Surface soil sample designations and required QA/QC sample requirements are summarized in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.1.2 Sample Collection

Surface soil samples will be collected from the upper 1 foot of soil by direct-push methodology as specified in Section 4.7.1.1 of the SAP (IT, 2000a). Collected soil samples will be screened using a photoionization detector (PID) in accordance with Section 4.15 of the SAP. Surface soil samples will be screened for information purposes only and not to select samples for analysis. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. Sample documentation and chain-of-custody (COC) will be recorded as specified in Section 4.13 of the SAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.2 Subsurface Soil Sampling

Subsurface soil samples will be collected from ten borings installed at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor.

Table 4-1

**Sampling Locations And Rationale
Possible Range, Parcel 237Q-X and Impact Area, Parcel 238Q-X, Choccolocco Corridor
Site Investigation
Fort McClellan, Alabama**

(Page 1 of 2)

Sample Location	Sample Media	Sample Location Rationale
HR-237Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed downslope of surface depressions near the central area of the Morgan Mountain Attack site, northwest of Parcel 237Q-X. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
HR-237Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the western end of Parcel 237Q-X, downslope of most of the parcel. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
HR-237Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed near the north-central area of Parcel 237Q-X. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
HR-237Q-GP04	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed near the central area of Parcel 237Q-X, near a dirt cross roads. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
HR-237Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring and monitoring well for surface soil, subsurface soil, and groundwater samples to be placed in the northwestern area of Parcel 237Q-X and in the southeast corner of Morgan Mountain Attack site. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-237Q-MW02	Surface soil, subsurface soil, and groundwater	Soil boring and monitoring well for surface soil, subsurface soil, and groundwater samples to be placed in the western half of the Parcel 237Q-X, south of Morgan Mountain Attack site. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-237Q-SW/SD01	Surface water, sediment	Sample location is south of the eastern end of Parcel 237Q-X on the intermittent stream that flows west along the southern boundary of the parcel. Sample data will indicate if contaminant releases have occurred from run off upstream of Parcel 237Q-X, possibly from Parcel 238Q-X. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
HR-237Q-SW/SD02	Surface water, sediment	Sample location is south of the central area of Parcel 237Q-X on the intermittent stream that flows west along the southern boundary of the parcel. Sample data will indicate if contaminant releases have occurred from run off in the area of Parcel 237Q-X. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.

Table 4-1

**Sampling Locations And Rationale
Possible Range, Parcel 237Q-X and Impact Area, Parcel 238Q-X, Choccolocco Corridor
Site Investigation
Fort McClellan, Alabama**

(Page 2 of 2)

Sample Location	Sample Media	Sample Location Rationale
HR-237Q-SW/SD03	Surface water, sediment	Sample location is south of the western end of Parcel 237Q-X on the intermittent stream that flows west along the southern boundary of the parcel. Sample data will indicate if contaminant releases have occurred from run off in the area of Parcel 237Q-X. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
HR-237Q-SW/SD04	Surface water, sediment	Sample location is north of the western end of Parcel 237Q-X on the intermittent stream that flows west from the northwest end of Parcel 237Q-X and the center of Morgan Mountain Attack site. Sample data will indicate if contaminant releases have occurred from run off in the area of Parcel 237Q-X and Morgan Mountain Attack site. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.
HR-238Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the western area of Parcel 238Q-X. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
HR-238Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the southern area of Parcel 238Q-X. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
HR-238Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the eastern area of Parcel 238Q-X. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
HR-238Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring and monitoring well for surface soil, subsurface soil, and groundwater samples to be placed in the western end of Parcel 238Q-X, east of Parcel 237Q-X. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated soil exists at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
HR-238Q-SW/SD01	Surface water, sediment	Sample location is south of the eastern end of Parcel 238Q-X on the intermittent stream, south of the parcel, that flows west from under State Route 9. Sample data will indicate if contaminant releases have occurred from run off upstream of Parcel 238Q-X. Sample data will also be used to assess potential impacts to aquatic biota in the stream and other ecological receptors that may utilize that stream for food and/or habitat purposes.

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Possible Range, Parcle 237Q-X and Impact Area, Parcel 238Q-X, Choccolocco Corridor
Site Investigation
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-237Q-GP01	HR-237Q-GP01-SS-JA0001-REG	0-1				TAL Metals and Nitroexplosives
	HR-237Q-GP01-DS-JA0002-REG	a				
HR-237Q-GP02	HR-237Q-GP02-SS-JA0003-REG	0-1				TAL Metals and Nitroexplosives
	HR-237Q-GP02-DS-JA0004-REG	a			HR-237Q-GP02-DS-JA0004-MS/MSD	
HR-237Q-GP03	HR-237Q-GP03-SS-JA0005-REG	0-1				TAL Metals and Nitroexplosives
	HR-237Q-GP03-DS-JA0006-REG	a				
HR-237Q-GP04	HR-237Q-GP04-SS-JA0007-REG	0-1				TAL Metals and Nitroexplosives
	HR-237Q-GP04-DS-JA0008-REG	a				
HR-237Q-MW01	HR-237Q-MW01-SS-JA0009-REG	0-1				TAL Metals and Nitroexplosives
	HR-237Q-MW01-DS-JA0010-REG	a				
HR-237Q-MW02	HR-237Q-MW02-SS-JA0011-REG	0-1				TAL Metals and Nitroexplosives
	HR-237Q-MW02-DS-JA0012-REG	a	HR-237Q-MW02-DS-JA0013-FD			
HR-238Q-GP01	HR-238Q-GP01-SS-JC0001-REG	0-1				TAL Metals and Nitroexplosives
	HR-238Q-GP01-DS-JC0002-REG	a				
HR-238Q-GP02	HR-238Q-GP02-SS-JC0003-REG	0-1				TAL Metals and Nitroexplosives
	HR-238Q-GP02-DS-JC0004-REG	a				
HR-238Q-GP03	HR-238Q-GP03-SS-JC0005-REG	0-1				TAL Metals and Nitroexplosives
	HR-238Q-GP03-DS-JC0006-REG	a	HR-238Q-GP03-DS-JC0007-FD			
HR-238Q-MW01	HR-238Q-MW01-SS-JC0008-REG	0-1				TAL Metals and Nitroexplosives
	HR-238Q-MW01-DS-JC0009-REG	a				

^a Actual sample depth selected for analysis will be at the discretion of the site geologist and will be based on field observation.

ft. - Foot.

FD - Field duplicate.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

TAL - Target analyte list.

4.2.2.1 Sample Locations and Rationale

Subsurface soil samples will be collected from the soil borings proposed on Figure 4-1. The sampling rationale for each subsurface soil sample location is listed in Table 4-1. Subsurface soil samples to be collected are listed in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field observations and utility clearance results.

4.2.2.2 Sample Collection

Subsurface soil samples will be collected from soil borings at a depth greater than 1 foot below ground surface in the unsaturated zone. The soil borings will be advanced and soil samples collected using the direct-push sampling procedures specified in Section 4.7.1.1 of the SAP (IT, 2000a).

Soil samples will be collected continuously for the first 12 feet or until either groundwater or refusal is reached. A detailed lithological log will be recorded by the on-site geologist for each borehole. At least one subsurface sample from each borehole will be selected for analysis. The collected subsurface soil samples will be field-screened using a PID in accordance with Section 4.15 of the SAP to measure samples exhibiting elevated readings exceeding background (readings in ambient air). Typically, the subsurface soil sample showing the highest reading (above background) will be selected and sent to the laboratory for analysis. If none of the samples indicates a reading exceeding background using the PID, the deepest interval from the soil boring will be sampled and submitted to the laboratory for analysis. Subsurface soil samples will be selected for analysis from any depth interval if the on-site geologist suspects PSSCs at the interval. Site conditions such as lithology may also determine the actual sample depth interval submitted for analysis. More than one subsurface soil sample will be collected if field measurements and observations indicate a possible layer of PSSCs and/or additional sample data would provide insight to the existence of any PSSCs.

Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.3 Permanent Residuum Monitoring Wells

Three permanent residuum monitoring wells will be installed at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor. The permanent residuum monitoring well locations are shown on Figure 4-1. The rationale for each monitoring well locations is presented in Table 4-1. The monitoring well boreholes will be drilled to the top of bedrock, or until adequate groundwater is encountered to install a well with a 10- to 20-foot screen. Monitoring wells will be installed using a truck-mounted hollow-stem auger drill rig. The monitoring well casing will consist of new 2-inch inside-diameter, Schedule 40, threaded, flush-joint polyvinyl chloride pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap polyvinyl chloride well screen, approximately 10 to 20 feet long. The well will be installed so the well screen straddles the water table.

Soil samples for lithology will be collected continuously every 5 feet to the total depth of the hole during hollow-stem auger drilling to provide a detailed lithologic log. The samples will be collected for lithology using a 24-inch-long, 2-inch-or-larger-diameter split-spoon sampler. The soil borings will be logged in accordance with American Standard for Testing and Materials Method D 2488 using the Unified Soil Classification System. The soil samples will be screened in the field using a PID. The monitoring wells will be drilled, installed, and developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000a). The exact monitoring well locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.4 Groundwater Sampling

Groundwater samples will be collected from the three monitoring wells completed at the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, as presented in Section 4.2.3.

4.2.4.1 Sample Locations and Rationale

Groundwater samples will be collected from the monitoring well locations shown on Figure 4-1. The groundwater sampling rationale is listed in Table 4-1. The groundwater sample designations, depths, and required QA/QC sample quantities are listed in Table 4-3.

4.2.4.2 Sample Collection

Prior to sampling monitoring wells, static water levels will be measured from each of the monitoring wells installed at the site to define the groundwater flow in the residuum aquifer.

Table 4-3

**Groundwater Sample Designations and QA/QC Sample Quantities
Possible Range, Parcel 237Q-X and Impact Area, Parcel 238Q-X, Choccolocco Corridor
Site Investigation
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
HR-237Q-MW01	HR-237Q-MW01-GW-JA3001-REG	Groundwater	a			HR-237Q-MW01-GW-JA3001-MS/MSD	TAL Metals and Nitroexplosives
HR-237Q-MW02	HR-237Q-MW02-GW-JA3002-REG	Groundwater	a				TAL Metals and Nitroexplosives
HR-238Q-MW01	HR-238Q-MW01-GW-JC3001-REG	Groundwater	a	HR-238Q-MW01-GW-JC3002-FD			TAL Metals and Nitroexplosives

^aSample depth will depend on where sufficient first water is encountered to collect a water sample.

FD - Field duplicate.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

TAL - Target analyte list.

Water level measurements will be performed as outlined in Section 4.18 of the SAP (IT, 2000a). Groundwater samples will be collected in accordance with the procedures outlined in Section 4.9.1.4 of the SAP.

Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP (IT, 2000a). The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.5 Surface Water Sampling

Five surface water samples will be collected from site of the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor. Surface water samples will be collected from intermittent streams in and around the site.

4.2.5.1 Sample Locations and Rationale

The rationale for each surface water sampling location is listed in Table 4-1. The surface water samples will be collected from the proposed locations on Figure 4-1. Surface water sample designations and QA/QC sample requirements are listed in Table 4-4. The exact sampling locations will be determined in the field by the ecological sampler, based on drainage pathways and actual field observations.

4.2.5.2 Sample Collection

The surface water samples will be collected in accordance with procedures specified in Section 4.9.1.3 of the SAP (IT, 2000a). Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.6 Sediment Sampling

Five sediment samples will be collected from the site of the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor. These sediment samples will be collected at the same locations as the surface water samples described in Section 4.2.6.

Table 4-4

**Surface Water and Sediment Sample Designations and QA/QC Sample Quantities
Possible Range, Parcel 237Q-X and Impact Area, Parcel 238Q-X, Choccolocco Corridor
Site Investigation
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
HR-237Q-SW/SD01	HR-237Q-SW/SD01-SW-JA2001-REG	Surface Water	N/A				TAL Metals and Nitroexplosives (TOC, Grain Size for sediment only)
	HR-237Q-SW/SD01-SD-JA1001-REG	Sediment	0-0.5				
HR-237Q-SW/SD02	HR-237Q-SW/SD02-SW-JA2002-REG	Surface Water	N/A				TAL Metals and Nitroexplosives (TOC, Grain Size for sediment only)
	HR-237Q-SW/SD02-SD-JA1002-REG	Sediment	0-0.5			HR-237Q-SW/SD02-SD-JA1002-MS/MSD	
HR-237Q-SW/SD03	HR-237Q-SW/SD03-SW-JA2003-REG	Surface Water	N/A				TAL Metals and Nitroexplosives (TOC, Grain Size for sediment only)
	HR-237Q-SW/SD03-SD-JA1003-REG	Sediment	0-0.5				
HR-237Q-SW/SD04	HR-237Q-SW/SD04-SW-JA2004-REG	Surface Water	N/A				TAL Metals and Nitroexplosives (TOC, Grain Size for sediment only)
	HR-237Q-SW/SD04-SD-JA1004-REG	Sediment	0-0.5	HR-237Q-SW/SD04-SD-JA1005-FD			
HR-238Q-SW/SD01	HR-238Q-SW/SD01-SW-JC2001-REG	Surface Water	N/A				TAL Metals and Nitroexplosives (TOC, Grain Size for sediment only)
	HR-238Q-SW/SD01-SD-JC1001-REG	Sediment	0-0.5				

FD - Field duplicate.

MS/MSD - Matrix spike/matrix spike duplicate.

NA - Not applicable.

QA/QC - Quality assurance/quality control.

REG - Field sample.

TAL - Target analyte list.

TOC - Total organic carbon.

4.2.6.1 Sample Locations and Rationale

The proposed locations for the sediment samples are shown in Figure 4-1. The rationale for each sediment sampling location is presented in Table 4-1. The sediment sample designation and QA/QC sample requirements are listed in Table 4-4. The actual sediment sample points will be at the discretion of the ecological sampler, based on the drainage pathways and actual field observations.

4.2.6.2 Sample Collection

Sediment samples will be collected in accordance with the procedures specified in Section 4.9.1.2 of the SAP. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. The sediment samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.3 Decontamination Requirements

Decontamination will be performed on sampling and nonsampling equipment to prevent cross-contamination between sampling locations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.1 of the SAP (IT, 2000a). Decontamination of nonsampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.2 of the SAP.

4.4 Surveying of Sample Locations

All areas at this site must be cleared for UXO avoidance before any surveying activities will commence. Sampling locations will be marked with pin flags, stakes, and/or flagging and will be surveyed using either global positioning system (GPS) or conventional civil survey techniques, as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum, 1983. Elevations will be referenced to the North American Vertical Datum of 1988.

Horizontal coordinates for soil, sediment, and surface water locations will be recorded using a GPS to provide accuracy within 1 meter. Because of the need to use permanent monitoring wells to determine water levels, a higher level of accuracy is required in surveying the wells.

Monitoring wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques, as required. Procedures to be used for GPS surveying are described in Section 4.3 of the SAP. Conventional land survey requirements are presented in Section 4.19 of the SAP.

4.5 Analytical Program

Samples collected at locations specified in this chapter of this SFSP will be analyzed for a specific suites of chemicals and elements based on the history of site usage, as well as EPA, ADEM, FTMC, and USACE requirements. Target analyses for samples collected from the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor, consist of the following list of analytical suites:

- Target Analyte List Metals - Method 6010B/7000.
- Nitroexplosives - Method 8330.

In addition, the sediment samples will be analyzed for the following list of parameters:

- Total Organic Carbon - Method 9060
- Grain Size - ASTM D-421/D-422.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 4-5 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with CESAS Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms and electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

4.6 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping will follow the procedures specified in Section 4.13.2 of the SAP (IT, 2000a). Completed analysis request/COC records will be secured and included with each shipment of coolers to:

Attn: Sample Receiving/Elizabeth McIntyre
EMAX Laboratories, Inc.
1835 205th Street
Torrance, California 90501
Telephone: (310) 618-8889.

4.7 Investigation-Derived Waste Management

Management and disposal of the investigation-derived wastes (IDW) will follow procedures and requirements as described in Appendix D of the SAP (IT, 2000a). The IDW generated at the

Table 4-5

**Analytical Samples
Site Investigation
Possible Range, Parcel 237Q-X and Impact Area, Parcel 238Q-X, Choccolocco Corridor
Fort McClellan, Calhoun County, Alabama**

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples ^a				EMAX Total No. Analysis	QA Lab Total No. Analysis	
				No. of Sample Points	No. of Events	No. of Field Samples	Field Dups (10%)	Splits w/ QA Lab (0%)	MS/MSD (5%)	Trip Blank (1/ship)			Eq. Rinse (1/wk/matrix)
Possible Range, Parcel 237Q-X and Impact Area, Parcel 238Q-X: 8 water matrix samples (3 groundwater samples and 5 surface water samples); 25 soil matrix samples (10 surface soil samples, 10 subsurface soil samples, and 5 sediment samples)													
Total TAL Metals	6010B/7000	water	normal	8	1	8	1		1		1	12	0
Nitroexplosives	8330	water	normal	8	1	8	1		1		1	12	0
TAL Metals	6010B/7000	soil	normal	25	1	25	3		1		1	31	0
Nitroexplosives	8330	soil	normal	25	1	25	3		1		1	31	0
TOC	9060	sediment	normal	5	1	5						5	0
Grain Size	ASTM D-421/D-422	sediment	normal	5	1	5						5	0
Range 24 Lower, Parcel 81Q Subtotal:				76			8	0	4	0	4	96	0

^aField duplicate, QA split, and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number. Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to: EMAX Laboratories, Inc.
1835 205th Street
Torrance, California 90501
Attn: Sample Receiving/Elizabeth McIntyre
Tel: 310-618-8889
Fax: 310-618-0818

MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
TAL - Target analyte list.
TOC - Total organic carbon.
ASTM- American Society for Testing and Materials.

Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor is expected to include decontamination fluids and disposable personal protective equipment. The IDW will be staged in the fenced area surrounding Buildings 335 and 336 while awaiting final disposal.

4.8 Site-Specific Safety and Health

Health and safety requirements for this SI are provided in the SSHP attachment for the Possible Range, Parcel 237Q-X, and Impact Area, Parcel 238Q-X, Choccolocco Corridor. The SSHP attachment will be used in conjunction with the installation-wide SHP.

5.0 Project Schedule

The project schedule for the SI activities will be provided by the IT Project Manager to the Base Realignment and Closure Cleanup Team and will be in accordance with the WP.

6.0 References

Environmental Science and Engineering, Inc. (ESE), 1998, *Final Environmental Baseline Survey, Fort McClellan, Alabama*, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

Fort McClellan (FTMC), 1997, *Fort McClellan Comprehensive Reuse Plan*, Fort McClellan Reuse and Redevelopment Authority of Alabama, prepared under contract to the Calhoun County Commission, November.

IT Corporation (IT), 2000a, *Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama*, August.

IT Corporation (IT), 2000b, *Final Human Health and Ecological Screening Values and PAH Background Summary Report*, July.

IT Corporation (IT), 1998, *Final Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama*, August.

U.S. Army Corps of Engineers (USACE), 1999a, *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama*, July.

U.S. Army Corps of Engineers (USACE), 1999b, *Statement of Work for Task Order CK10, Remedial Investigations (RIs) at the Chemical Warfare Material Sites, RIs at the Fuel/Training Areas, RIs at the Print Plants/Motor Pools, RIs at the Ground Scars/Boiler Plants, RI at Range 24A, Site Investigations (SIs) at the Historic Ranges, and a Groundwater Investigation at Rideout Field at Fort McClellan, Alabama*, June.

U.S. Army Corps of Engineers (USACE), 1994, *Requirements for the Preparation of Sampling and Analysis Plan*, Engineer Manual EM 200-1-3, September 1.

U.S. Department of Agriculture (USDA), 1961, *Soil Survey, Calhoun County, Alabama*, Soil Conservation Service, Series 1958, No. 9, September.

U.S. Environmental Protection Agency (EPA), 1993, *Data Quality Objectives Process for Superfund, Interim Final Guidance*, EPA 540-R-93-071, September.

U.S. Environmental Protection Agency (EPA), 1990, *Installation Assessment, Army Closure Program, Fort McClellan, Anniston, Alabama (TS-PIC-89334)*, Environmental Photographic Interpretation Center (EPIC), Environmental Monitoring Systems Laboratory.

ATTACHMENT 1
LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2,4-D	2,4-dichlorophenoxyacetic acid	CERFA	Community Environmental Response Facilitation Act	DRO	diesel range organics
2,4,5-T	2,4,5-trichlorophenoxyacetic acid	CESAS	Corps of Engineers South Atlantic Savannah	DS	deep (subsurface) soil
2,4,5-TP	silvex	CG	carbonyl chloride (phosgene)	DS2	Decontamination Solution Number 2
3D	3D International Environmental Group	CFC	chlorofluorocarbon	DWEL	drinking water equivalent level
Abs	skin absorption	ch	inorganic clays of high plasticity	E&E	Ecology and Environment, Inc.
AC	hydrogen cyanide	CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine	EBS	environmental baseline survey
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded	CK	cyanogen chloride	EE/CA	engineering evaluation and cost analysis
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded	cl	inorganic clays of low to medium plasticity	Elev.	elevation
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded	Cl.	chlorinated	EM	electromagnetic
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded	CLP	Contract Laboratory Program	EM31	Geonics Limited EM31 Terrain Conductivity Meter
ACGIH	American Conference of Governmental Industrial Hygienists	CN	chloroacetophenone	EM61	Geonics Limited EM61 High-Resolution Metal Detector
ADEM	Alabama Department of Environmental Management	CNB	chloroacetophenone, benzene, and carbon tetrachloride	EOD	explosive ordnance disposal
AEL	airborne exposure limit	CNS	chloroacetophenone, chloropicrin, and chloroform	EODT	explosive ordnance disposal team
AHA	ammunition holding area	Co-60	cobalt-60	EPA	U.S. Environmental Protection Agency
AL	Alabama	COC	chain of custody; contaminant of concern	EPC	exposure point concentration
amb.	amber	COE	Corps of Engineers	EPIC	Environmental Photographic Interpretation Center
ANAD	Anniston Army Depot	Con	skin or eye contact	ER	equipment rinsate
APT	armor-piercing tracer	COPC	contaminant of potential concern	ESE	Environmental Science and Engineering, Inc.
ARAR	applicable or relevant and appropriate requirement	COPEC	contaminant of potential environmental concern	ESV	ecological screening value
ASP	ammunition supply point	CRL	certified reporting limit	Exp.	explosives
ASR	Archives Search Report	CRZ	contamination reduction zone	E-W	east to west
AST	aboveground storage tank	Cs-137	cesium-137	EZ	exclusion zone
ASTM	American Society for Testing and Materials	CS	ortho-chlorobenzylidene-malononitrile	FAR	Federal Acquisition Regulations
AWWSB	Anniston Water Works and Sewer Board	CSEM	conceptual site exposure model	FB	field blank
'B'	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)	ctr.	container	FD	field duplicate
BCT	BRAC Cleanup Team	CWA	chemical warfare agent	FedEx	Federal Express, Inc.
BEHP	bis(2-ethylhexyl)phthalate	CWM	chemical warfare material; clear, wide mouth	FFE	field flame expedient
BFB	bromofluorobenzene	CX	dichloroformoxime	Fil	filtered
BG	Bacillus globigii	D	duplicate; dilution	Flt	filtered
bgs	below ground surface	DANC	decontamination agent, non-corrosive	FMP 1300	Former Motor Pool 1300
BHC	betahexachlorocyclohexane	°C	degrees Celsius	Foster Wheeler	Foster Wheeler Environmental Corporation
bkg	background	°F	degrees Fahrenheit	Frtn	fraction
bls	below land surface	DCE	dichloroethene	FS	field split; feasibility study
BOD	biological oxygen demand	DDD	dichlorodiphenyldichloroethane	ft	feet
BRAC	Base Realignment and Closure	DDE	dichlorodiphenyldichloroethene	ft/ft	feet per foot
Braun	Braun Intertec Corporation	DDT	dichlorodiphenyltrichloroethane	FTA	Fire Training Area
BTAG	Biological Technical Assistance Group	DEH	Directorate of Engineering and Housing	FTMC	Fort McClellan
BTEX	benzene, toluene, ethyl benzene, and xylenes	DEP	depositional soil	g	gram
BTOC	below top of casing	DI	deionized	G-856	Geometrics, Inc. G-856 magnetometer
BW	biological warfare	DIMP	di-isopropylmethylphosphonate	G-858G	Geometrics, Inc. G-858G magnetic gradiometer
BZ	breathing zone; 3-quinuclidinyl benzilate	DMMP	dimethylmethylphosphonate	gal	gallon
C	ceiling limit value	DOD	U.S. Department of Defense	gal/min	gallons per minute
Ca	carcinogen	DOT	Department of Transportation	GB	sarin
CCAL	continuing calibration	DP	direct-push	gc	clay gravels; gravel-sand-clay mixtures
CCB	continuing calibration blank	DPDO	Defense Property Disposal Office	GC	gas chromatograph
CD	compact disc	DPT	direct-push technology	GC/MS	gas chromatograph/mass spectrometer
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	DQO	data quality objective	GFAA	graphite furnace atomic absorption
		DRMO	Defense Reutilization and Marketing Office	GIS	Graphical Information System

List of Abbreviations and Acronyms (Continued)

gm	silty gravels; gravel-sand-silt mixtures	L	lewisite; liter	NIOSH	National Institute for Occupational Safety and Health
gp	poorly graded gravels; gravel-sand mixtures	LC ₅₀	lethal concentration for 50 percent of population tested	No.	number
gpm	gallons per minute	LD ₅₀	lethal dose for 50 percent of population tested	NOAA	National Oceanic and Atmospheric Administration
GPR	ground-penetrating radar	l	liter	NOAEL	no-observed-adverse-effects-level
GPS	global positioning system	LCS	laboratory control sample	NR	not requested; not recorded
GS	ground scar	LEL	lower explosive limit	ns	nanosecond
GSA	General Services Administration	LOAEL	lowest-observed-adverse-effects-level	N-S	north to south
GSBP	Ground Scar Boiler Plant	LT	less than the certified reporting limit	NS	not surveyed
GSSI	Geophysical Survey Systems, Inc.	max	maximum	nT	nanotesla
GST	ground stain	MCL	maximum contaminant level	NTU	nephelometric turbidity unit
GW	groundwater	MDL	method detection limit	O&G	oil and grease
gw	well-graded gravels; gravel-sand mixtures	mg/kg	milligrams per kilogram	OD	outside diameter
HA	hand auger	mg/L	milligrams per liter	OE	ordnance and explosives
HCl	hydrochloric acid	mg/m ³	milligrams per cubic meter	oh	organic clays of medium to high plasticity
HD	distilled mustard	mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils	ol	organic silts and organic silty clays of low plasticity
HDPE	high-density polyethylene	MHz	megahertz	OP	organophosphorus
Herb.	herbicides	µg/g	micrograms per gram	ORP	oxidation-reduction potential
HNO ₃	nitric acid	µg/kg	micrograms per kilogram	OSHA	Occupational Safety and Health Administration
hr	hour	µg/L	micrograms per liter	OWS	oil/water separator
H&S	health and safety	µmhos/cm	micromhos per centimeter	oz	ounce
HSA	hollow-stem auger	min	minimum	PAH	polynuclear aromatic hydrocarbon
HTRW	hazardous, toxic, and radioactive waste	MINICAMS	miniature continuous air sampling system	Parsons	Parsons Engineering Science, Inc.
'I'	out of control, data rejected due to low recovery	ml	inorganic silts and very fine sands	Pb	lead
ICAL	initial calibration	mL	milliliter	PCB	polychlorinated biphenyl
ICB	initial calibration blank	mm	millimeter	PCE	perchloroethene
ICP	inductively-coupled plasma	MM	mounded material	PCP	pentachlorophenol
ICS	interference check sample	MOGAS	motor vehicle gasoline	PDS	Personnel Decontamination Station
ID	inside diameter	MPA	methyl phosphonic acid	PEL	permissible exposure limit
IDL	instrument detection limit	MR	molasses residue	Pest.	pesticide
IDLH	immediately dangerous to life or health	MS	matrix spike	PG	professional geologist
IDM	investigative derived media	mS/cm	millisiemens per centimeter	PID	photoionization detector
IDW	investigation-derived waste	MSD	matrix spike duplicate	PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
IMPA	isopropylmethyl phosphonic acid	MTBE	methyl tertiary butyl ether	POL	petroleum, oils, and lubricants
IMR	Iron Mountain Road	msl	mean sea level	PP	peristaltic pump
in.	inch	MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes, severely eroded	ppb	parts per billion
Ing	ingestion	mV	millivolts	PPE	personal protective equipment
Inh	inhalation	MW	monitoring well	ppm	parts per million
IP	ionization potential	N/A	not applicable; not available	PPMP	Print Plant Motor Pool
IPS	International Pipe Standard	NAD	North American Datum	ppt	parts per thousand
IRDMIS	Installation Restoration Data Management Information System	NAD83	North American Datum of 1983	PRG	preliminary remediation goals
ISCP	Installation Spill Contingency Plan	NAVD88	North American Vertical Datum of 1988	PSSC	potential site-specific chemical
IT	IT Corporation	NCP	National Contingency Plan	pt	peat or other highly organic silts
ITEMS	IT Environmental Management System™	ND	not detected	PVC	polyvinyl chloride
'J'	estimated concentration	NE	no evidence; northeast	QA	quality assurance
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded	NFA	No Further Action	QA/QC	quality assurance/quality control
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded	ng/L	nanograms per liter	QAP	installation-wide quality assurance plan
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes	NGVD	National Geodetic Vertical Datum	QC	quality control
K	conductivity	NIC	notice of intended change	QST	QST Environmental Inc.

List of Abbreviations and Acronyms (Continued)

qty	quantity	SU	standard unit	WP	installation-wide work plan
Qual	qualifier	SVOC	semivolatile organic compound	WS	watershed
'R'	rejected; resample	SW	surface water	WSA	Watershed Screening Assessment
RAO	removal action objective	SW-846	U.S. EPA <i>Test Methods for Evaluating Solid Waste: Physical/Chemical Methods</i>	WWI	World War I
RBC	EPA Region III Risk Based Concentration	SZ	support zone	WWII	World War II
RCRA	Resource Conservation and Recovery Act	TAL	target analyte list	XRF	x-ray fluorescence
RDX	cyclonite	TAT	turn around time	yd ³	cubic yards
ReB3	Rarden silty clay loams	TB	trip blank		
REG	field sample	TCA	trichloroethane		
REL	recommended exposure limit	TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin		
RFA	request for analysis	TCDF	tetrachlorodibenzofurans		
RI	remedial investigation	TCE	trichloroethene		
RL	reporting limit	TCL	target compound list		
RPD	relative percent difference	TCLP	toxicity characteristic leaching procedure		
RRF	relative response factor	TDGCL	thiodiglycol		
RSD	relative standard deviation	TDGCLA	thiodiglycol chloroacetic acid		
RTK	real-time kinematic	TERC	Total Environmental Restoration Contract		
SAD	South Atlantic Division	TIC	tentatively identified compound		
SAE	Society of Automotive Engineers	TLV	threshold limit value		
SAIC	Science Applications International Corporation	TN	Tennessee		
SAP	installation-wide sampling and analysis plan	TOC	top of casing; total organic carbon		
sc	clayey sands; sand-clay mixtures	TPH	total petroleum hydrocarbons		
Sch.	schedule	TRADOC	U.S. Army Training and Doctrine Command		
SD	sediment	TRPH	total recoverable petroleum hydrocarbons		
SDG	sample delivery group	TWA	time weighted average		
SDZ	safe distance zone; surface danger zone	UCL	upper confidence limit		
SEMS	Southern Environmental Management & Specialties, Inc.	UCR	upper certified range		
SFSP	site-specific field sampling plan	'U'	not detected above reporting limit		
SGF	standard grade fuels	USACE	U.S. Army Corps of Engineers		
SHP	installation-wide safety and health plan	USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine		
SI	site investigation	USAEC	U.S. Army Environmental Center		
SL	standing liquid	USAEHA	U.S. Army Environmental Hygiene Agency		
sm	silty sands; sand-silt mixtures	USACMLS	U.S. Army Chemical School		
SM	<i>Serratia marcescens</i>	USAMPS	U.S. Army Military Police School		
SOP	standard operating procedure	USATEU	U.S. Army Technical Escort Unit		
sp	poorly graded sands; gravelly sands	USATHAMA	U.S. Army Toxic and Hazardous Material Agency		
SP	sump pump	USCS	Unified Soil Classification System		
Sr-90	strontium-90	USDA	U.S. Department of Agriculture		
Ss	stony rough land, sandstone series	USEPA	U.S. Environmental Protection Agency		
SS	surface soil	UST	underground storage tank		
SSC	site-specific chemical	UXO	unexploded ordnance		
SSHO	site safety and health officer	VOA	volatile organic analyte		
SSHP	site-specific safety and health plan	VOC	volatile organic compound		
SSSL	site-specific screening level	VOH	volatile organic hydrocarbon		
STB	supertropical bleach	VQlfr	validation qualifier		
STEL	short-term exposure limit	VQual	validation qualifier		
STOLS	Surface Towed Ordnance Locator System [®]	VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)		
Std. units	standard units	Weston	Roy F. Weston, Inc.		

SAIC – Data Qualifiers, Codes and Footnotes, 1995 Remedial Investigation

N/A – Not analyzed

ND – Not detected

Boolean Codes

LT – Less than the certified reporting limit

Flagging Codes

9 – Non-demonstrated/validated method performed for USAEC

B – Analyte found in the method blank or QC blank

C – Analysis was confirmed

D – Duplicate analysis

I – Interfaces in sample make quantitation and/or identification to be suspicious

J – Value is estimated

K – Reported results are affected by interfaces or high background

N – Tentatively identified compound (match greater than 70%)

Q – Sample interference obscured peak of interest

R – Non-target compound analyzed for but not detected (GC/MS methods)

S – Non-target compound analyzed for and detected (GC/MS methods)

T – Non-target compound analyzed for but not detected (non GC/MS methods)

U – Analysis in unconfirmed

Z – Non-target compound analyzed for and detected (non-GC/MS methods)

Qualifiers

J – The low-spike recovery is low

N – The high-spike recovery is low

R – Data is rejected