Final Work Plan
Remedial Investigation/Feasibility Study
Pinecastle Jeep Range

Orange County, Florida
FUDS Project No. I04FL0405

Contract: W912DY-04-D-0005
Delivery Order No. 0019

Prepared For:
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May 2008

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May 30, 2008

U.S. Army Engineering and Support Center, Huntsville
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Subject: Final RI/FS Work Plan
Former Pinecastle Jeep Range, Orange County, Florida
Remedial Investigation / Feasibility Study
Contract W912DY-04-D-0005, Delivery Order 0019

Dear Ms. Johnson:

Parsons has prepared this Final RI/FS Work Plan, dated May 30, 2008, in accordance with the Performance Work Statement. A digital version of the work plan is provided on CDs contained with each binder. Copies have been distributed as shown on the attached sheet.

If you have any questions or comments, please contact me at (678) 969-2409.

Sincerely,
Parsons Infrastructure & Technology, Inc.

John Chulick
Project Manager

C: Distribution list

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FINAL
WORK PLAN

REMEDIAL INVESTIGATION / FEASIBILITY STUDY
FORMER PINECASTLE JEEP RANGE
ORANGE COUNTY, FLORIDA
FUDS PROJECT NO. I04FL0405

prepared for:

U.S. ARMY CORPS OF ENGINEERS, JACKSONVILLE DISTRICT
and
U.S. ARMY ENGINEERING AND SUPPORT CENTER HUNTSVILLE

Contract No. W912DY-04-D-0005
Delivery Order No. 19

prepared by:

PARSONS

Revision No. 0
May 30, 2008

Greg Hedrick
QC Reviewer: _____ **5/30/2008**
(Signature) **(Date)**

John Chulick
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TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

AAB	Army Air Base
AAF	Army Air Field
ACGIH	American Conference of Governmental Industrial Hygienists
ADR	automated data review
AEL	airborne exposure limit
AHA	activity hazard analysis
APP	Accident Prevention Plan
APPL	Agriculture and Priority Pollutants Laboratories, Inc.
AR	Army regulation
ARAR	applicable or relevant and appropriate requirements
ASR	Archives Search Report
BATF	Bureau of Alcohol, Tobacco, Firearms, and Explosives
BG	background
bgs	below ground surface
BIP	blown-in-place or blow-in-place
CADD	computer aided design and drafting
CAP	contractor-acquired property
CCV	continuing calibration verification
CDC	Centers for Disease Control and Prevention
CEMVS	U.S. Army Corps of Engineers, St. Louis District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESAJ	U.S. Army Corps of Engineers, Jacksonville District
CFR	Code of Federal Regulations
CHP	Certified Health Physicist
CIH	Certified Industrial Hygienist
COC	chain-of-custody
COI	constituents of interest
CLP	contract laboratory program
CPR	cardiopulmonary resuscitation

CSP	Certified Safety Professional
CWM	chemical warfare materiel
CZMP	Coastal Zone Management Program
DA	Department of the Army
DA PAM	Department of the Army pamphlet
DDESB	Department of Defense Explosives Safety Board
DEP	Defense Environmental Programs
DERP	Defense Environmental Restoration Program
DFAR	Defense Federal Acquisition Regulation
DGM	digital geophysical mapping
DID	data item description
DOACS	Department of Agriculture and Consumer Services
DoD	Department of Defense
DOT	Department of Transportation
DQCR	Daily Quality Control Report
DQO	data quality objective
DTL	Demolition Team Leader
EDD	electronic data delivery
EM	Engineer manual
EMR	Experience modification rate
EOD	Explosive ordnance disposal
EPA	Environmental Protection Agency
EP	Engineering pamphlet
EPP	Environmental Protection Plan
ER	Engineer Regulation
ESAP	Environmental Sampling and Analysis Plan
ESAT	explosives storage and transportation
ESRI	Environmental Systems Research Institute
EZ	exclusion zone
°F	degrees Fahrenheit
F-B	flash-to-bang

FAR	Federal Acquisition Regulation
FD	field duplicate
FDEP	Florida Department of Environmental Protection
FFP	firm fixed price
FNAI	Florida Natural Areas Inventory
FP	false positive
FS	Feasibility Study
FSP	Field Sampling Plan
FUDS	Formerly Used Defense Site
FWC	Florida Fish and Wildlife Conservation Commission
GC	Gas chromatography
GFCI	ground-fault circuit interrupter
GFP	government-furnished property
GIS	geographical information systems
GPO	geophysical prove-out
GPS	global positioning system
H&S	health and safety
HAZCOM	hazard communication
HAZWOPER	Hazardous Waste Operations and Emergency Response
HE	high explosive
HFD	hazard fragmentation distance
HPLC	high-pressure liquid chromatography
HTRW	hazardous, toxic, or radiological waste
IAW	in accordance with
IBD	inhabited building distance
ICP	inductively coupled plasma
ICV	initial calibration verification
IDLH	immediately dangerous to life or health
IDW	investigative-derived waste
INPR	Inventory Project Report
LCS/LCSD	laboratory control sample/laboratory control sample duplicate

MB	method blank
MC	munitions constituents
MD	munitions debris
MDL	method detection limit
MGFD	munition with greatest fragmentation distance
MEC	munitions and explosives of concern
MI	manual integration
MM CX	Military Munitions Center of Expertise
MMRP	Military Munitions Response Program
MSSL	Medium-Specific Screening Levels
MPPEH	material potential presenting an explosive hazard
MQL	method quantitation limits
MRS	Munitions Response Site
MS	mass spectrometry
MS/MSD	matrix spikes/matrix spike duplicates
MSD	minimum separation distance
MSDS	material safety data sheets
MSL	mean sea level
mV	millivolt
NAD	North American Datum
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NCR	nonconformance report
NDAI	no Department of Defense action indicated
NELAC	National Environmental Laboratory Accreditation Conference
NELAP	National Environmental Laboratory Accreditation Program
NEW	net explosive weight
NHA	National Heritage Areas
NHL	National Historic Landmarks
NIOSH	National Institute of Occupational Safety and Health
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration

NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRIS	National Register Information System
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWRS	National Wildlife Refuge System
OCHP	Office of Cultural and Historical Programs
OERIA	Ordnance and Explosives Risk Impact Assessment
OSHA	Occupational Safety and Health Administration
PAO	Public Affairs Office
PAED	public access exclusion distance
PARCC	precision, accuracy, representativeness, completeness, and comparability
PC	personal computer
PDT	Project Delivery Team
PE	performance evaluation
PEL	permissible exposure limit
PETN	Pentaerythritol Tetranitrate
PID	photo-ionization detector
PLS	professional land surveyor
PM	Project Manager
PPE	Personal protective equipment
ppm	parts per million
PQL	practical quantitation limit
PRL	project reporting limit
PSHM	Project Safety and Health Manager
PSHO	Project Safety and Health Officer
PSR	Project Status Report
PWS	Performance Work Statement
QA	quality assurance
QAM	Quality Assurance Manual
QAPP	Quality Assurance Project Plan

QC	quality control
QCP	Quality Control Plan
QSM	Quality System Manual
RAC	Risk Assessment Code
RAGS	Risk Assessment Guidance for Superfund
RSD	relative standard deviation
RCWM	recovered chemical warfare materiel
RDECOM	U. S. Army Research, Development, and Engineering Command
RDT&E	research, development, testing, and evaluation
RDX	Cyclotetramethylenetetranitramine
RI/FS	Remedial Investigation/Feasibility Study
RMSF	Rocky Mountain Spotted Fever
RPD	relative percent difference
RTK	real-time kinematic
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SCBA	self-contained breathing apparatus
SDSFIE	Spatial data standards for facilities, infrastructure, and environment
SHARP	Safety, Health, and Risk Program
SHPO	State Historic Preservation Office
SM	Site Manager
SOP	standard operating procedure
SQL	sample quantitation limit
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SSO	Site Safety Officer
STEL	short-term exposure limit
SUV	sport utility vehicle
SUXOS	Senior UXO Supervisor
T&E	threatened and endangered species
T&M	time and materials

TBC	to be considered
TBD	to be determined
TCLP	toxicity characteristic leaching procedure
TCRA	Time-Critical Removal Action
TDEM	time domain electromagnetic (sensors)
TESS	Threatened and Endangered Species System
TLV	threshold limit value
TMP	Technical Management Plan
TNT	trinitrotoluene
TPP	Technical Project Planning
TWA	time weighted average
UL	Underwriters Laboratory
USA	USA Environmental, Inc.
USACE	U. S. Army Corps of Engineers
USAESCH	U. S. Army Engineering and Support Center, Huntsville
USATCES	U. S. Army Technical Center for Explosives Safety
USEPA	U. S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U. S. Geological Survey
UTM	Universal Transverse Mercator
UXO	unexploded ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer
VOC	volatile organic compound
WAAS	Wide Area Augmentation System
WBGT	wet bulb globe temperature
WP	work plan
WPL	worker protection limits

CHAPTER 1
INTRODUCTION

1.1 PROJECT AUTHORIZATION

1.1.1. Parsons Infrastructure & Technology Group, Inc. (Parsons) is serving as the prime contractor to the U.S. Army Engineering and Support Center, Huntsville (USAESCH) under Contract W912DY-04-D-0005, Delivery Order 0019. This delivery order was established to perform a Remedial Investigation/Feasibility Study (RI/FS) at the Pinecastle Jeep Range, located in Orange County, Florida. A copy of the Performance Work Statement (PWS) is included as Appendix A.

1.1.2. This project falls under the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP/FUDS). The FUDS project number for the Pinecastle Jeep Range is I04FL040501.

1.1.3. The work conducted for this project will be performed in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 104, and the National Contingency Plan, Sections 300.120(d)-300.400(e). All activities involving work in areas potentially containing unexploded ordnance (UXO) hazards shall be conducted in full compliance with Department of Defense (DoD), Department of Army, U.S. Army Corps of Engineers (USACE), state and local requirements regarding personnel, equipment, and procedures. Activities under this PWS fall under the applicable provisions of 29 Code of Federal Regulations (CFR) 1910.120.

1.2 PURPOSE AND SCOPE

1.2.1. The objective of this task order is to obtain government acceptance of a Decision Document meeting the requirements of USACE Engineering Regulation (ER) 200-3-1 and Military Munitions Center of Expertise (MM CX) Interim Guidance Document 06-04. Work to be accomplished includes the conduct of a RI, FS, and all necessary activities required to accomplish this objective.

1.2.2. This RI/FS Work Plan has been prepared for the former Pinecastle Jeep Range in accordance with Data Item Description (DID) MR-001 and the PWS. Parsons understands the objectives of this project will be met when the following is accomplished:

- Work plans are prepared in accordance with the PWS and referenced governing regulations and requirements. These plans identify appropriate

field work elements and define and present a cost-effective approach to the planning and implementation of field work.

- A munitions and explosives of concern (MEC) and munitions constituents (MC) RI is safely completed that sufficiently characterizes the site, identifies and quantifies any associated risks, and supports a FS for remedial action.
- A FS report is completed that identifies at least one appropriate, applicable, cost-effective, implementable remedy.
- A Proposed Plan is prepared presenting the recommended alternative to the public.
- A Decision Document based on the RI/FS report is prepared that meets government acceptance.

1.3 WORK PLAN ORGANIZATION

1.3.1. This RI/FS Work Plan covers the remedial investigation and all associated preparatory activities necessary for work at the former Pinecastle Jeep Range, and therefore includes several plans (in accordance with DID MR-001, Type I Work Plan), each discussing a different aspect of the RI/FS. These plans are summarized below.

1. Introduction: Chapter 1 of this work plan details the overall scope and objective of the project, presents the organization of the work plan, and presents an overview of the site and its history.
2. Technical Management Plan: Chapter 2, the Technical Management Plan, details the organizational structure, lines of authority, and communication of the project team.
3. Field Investigation Plan: Chapter 3, the Field Investigation Plan, describes the approaches to be taken for the procedures that will be implemented to complete the required field work.
4. Quality Control Plan: Chapter 4, the Quality Control (QC) Plan, describes Parsons' procedures for controlling and measuring the quality of work performed, including the organization, responsibilities, and policies to be implemented.
5. Explosives Management Plan: Chapter 5, Explosives Management Plan, describes details for management of explosives used to destroy UXO recovered during the project, including acquisition receipt, storage, transportation, and inventory.
6. Explosives Siting Plan: Chapter 6, Explosives Siting Plan. This chapter is a placeholder section only. The Explosives Siting Plan is prepared as a separate document that contains the criteria for planning and siting explosives for demolition events that may be required during the project.

7. Environmental Protection Plan: Chapter 7 describes the Environmental Protection Plan (EPP), which provides general information and lists applicable requirements.
8. Property Management Plan: Chapter 8 will describe how property management will be performed.
9. Interim Holding Facility Siting Plan for Recovered Chemical Warfare Materiel (RCWM) Projects: Chapter 9 is not applicable to this project and will serve as a placeholder section only.
10. Physical Security Plan for RCWM Project Sites: Chapter 10 is not applicable to the project and will serve as a placeholder section only.
11. References: Chapter 11 includes a list of references used in the preparation of this work plan.

1.3.2. Additional information and plans are attached to this work plan as appendices:

A. Performance Work Statement: The PWS, dated February 12, 2008, is included as Appendix A.

B. Site Maps: Appendix B will be used as a placeholder: all maps will be contained in the body of the report for ease of referencing.

C. Local Points of Contact: Various points of contact are listed in Appendix C to this work plan.

D. Accident Prevention Plan: The Accident Prevention Plan (APP) is attached as Appendix D of this work plan. The APP describes the health and safety procedures, personal protection standards, and environmental health hazards applicable to this project.

E. Sampling and Analysis Plan: The Sampling and Analysis Plan (SAP) in Appendix E, outlines the anticipated sampling and analysis procedures for the project. The SAP contains a list of the required analytes and the associated sampling procedures.

F. Forms: Relevant forms and templates are provided in Appendix F.

G. Minimum Separation Distance (MSD) Calculations: Appendix G presents the MSD Calculation Sheets for the former Pinecastle Jeep Range RI/FS.

H. Resumes: Key UXO personnel are already listed in the USAESCH database and, therefore, will not be included in Appendix H. This appendix includes key resumes of management and safety personnel.

I. Technical Project Planning (TPP): This appendix, Appendix I, will include the TPP Memorandum associated with the meeting held March 27, 2008.

J. Standard Operating Procedures (SOPs). Appendix J contains procedures that may be used in conducting field operations.

K. Evacuation Plan. An Evacuation Plan is provided as Appendix K to establish procedures for evacuating the exclusion zones for MEC operations.

L. Public Comments. Appendix L contains the comments and written responses received from the March 27, 2008 workshop.

1.4 PROJECT LOCATION

The RI/FS project will be conducted over the entire property of the former Pinecastle Jeep Range. The location of the site, as described below in Subsection 1.5.1, is shown on Figure 1.1.

1.5 SITE DESCRIPTION

1.5.1 Site Location

The former Pinecastle Jeep Range consists of approximately 14,338 acres and is located approximately three miles east-northeast of the Orlando International Airport in Orange County, Florida. Approximately 81 acres of a bombing range circle extend outside the FUDS boundary making the total area of investigation approximately 14,419 acres. The location and boundaries of the former Pinecastle Jeep Range are based on the 1994 Inventory Project Report (USACE, 1994) and are presented on Figure 1.1.

1.5.2 Topography

The topography across the former Pinecastle Jeep Range is characterized as relatively flat. Areas of the site contain low rolling hills with ridges generally oriented north to south. Numerous swamps and other low-lying wetland areas are interspersed throughout the site. Elevations across the site range from approximately 75 to 90 feet above mean sea level (MSL).

1.5.3 Climate

The climate in the former Pinecastle Jeep Range area is subtropical and is characterized by long, warm, and relatively humid summers and mild and relatively dry winters. The temperature of the area is greatly influenced by winds that sweep across the Florida peninsula from the Atlantic Ocean and the Gulf of Mexico. The average annual temperature of the region is 72.6 °F with the hottest temperatures generally occurring in August and the coolest temperatures occurring in January. The average annual rainfall is approximately 53 inches with the majority of the precipitation occurring from June through September (USACE, 1997).

1.5.4 Vegetation

The vegetation across the site consists of manicured lawns in the residential areas, moderate grassland areas, underbrush in the wetland areas, and areas of heavy underbrush and forest.

1.5.5 Geology

1.5.5.1. The former Pinecastle Jeep Range is located in the central Floridian Section of the Coastal Plain physiographic province. This peninsular area of Florida has been divided into three physiographic zones - the Southern Distal Zone, the Central or Mid-peninsular Zone, and Northern or Proximal Zone. The site area is located entirely within the Central or Mid-peninsular Zone, which is characterized by a series of ridges and valleys that parallel both the Atlantic coastline and the longitudinal axis of the peninsula (USACE, 1997). The dominant influence on sedimentation in the area has been the Peninsular arch, a northwest-trending feature that was continuously positive from early Mesozoic until Late Cretaceous time and was intermittently positive during Cenozoic time. Southwest of, and parallel to the Peninsular arch is the Ocala Uplift, which affects only rocks of the middle Eocene age and younger. It is a gentle anticlinal flexure approximately 230 miles long and 70 miles wide exposed near the surface in west-central Florida (USACE, 1997). The west-central peninsula of Florida consists of igneous and metamorphic basement rock overlain by 4,000 feet of sedimentary rock, principally limestones (USACE, 1997).

1.5.5.2. The parent material of the site soils consisted of beds of sandy and clayey materials that were transported by the sea, which often covered the area during the Pleistocene Epoch. During the high stands of the sea, Miocene and Pliocene sediments were eroded and re-deposited or were reworked on the shallow sea bottom to form terraces. The site soils are nearly level to gently sloping, very poorly drained to moderately well drained in the urban areas. Sandy soils are predominant throughout the area of the site. The majority of the site is underlain by soils that typically have a surface layer of fine, black sand approximately four inches thick. Below this to approximately 17 inches is gray fine sand. The upper subsoil to a depth of 22 inches is black, fine sand, with lower subsoil to 27 inches dark brown fine sand (USACE, 1997).

1.6 SITE HISTORY

1.6.1. Pinecastle Jeep Range was established during 1943, when the U.S. Government leased approximately 14,338 acres of land in Orange County, Florida for its use. The property was also known as the Tactical Demonstration Range, the Orlando Range, Pinecastle Range, Pinecastle Bombing Range and Pinecastle Chemical Demonstration Range, and was an off-post, or auxiliary site, of Pinecastle Army Air Field (AAF). Although a sub-installation of the Pinecastle AAF, a number of elements of the Army Air Force Tactical Center headquartered at Orlando Army Air Base used the facility for gunnery range training, with the Army Air Forces School of Applied Tactics (AAFSAT) using the site for Combined Tactical Demonstration exercise for student instruction in employment of aerial weapons.

1.6.2. In 1943, a ground moving-target jeep range was constructed. A moving target range, or "jeep" type range, was a standard range developed during World War II to permit practice with either hand-held or turret-mounted .50 caliber machineguns. The targets generally consisted of 6 ft by 6 ft cloth banners stretched between 12-foot poles on top of jeeps. The jeeps ran on a triangular system of rails, or tracks, behind berms that protected the jeep from low shots.

1.6.3. In May of 1943, plans for additional small arms ranges were developed including one for a 45-position rifle range with targets placed up to 300 yards away for the Orlando AAB and a separate 15-target rifle range for Pinecastle AAF. The anticipated construction times of the ranges varied from 40 to 45 days and were scheduled for completion by October 1943. Aerial photographs show that three ranges were constructed along the western edge of the property in the southwestern corner with the ranges facing eastward.

1.6.4. Pinecastle Jeep Range expanded from small arms use to air-to-ground use in June 1944, when documents referenced the site as the Tactical Demonstration Area at Pinecastle. In addition to small arms training, the property was used for demonstration tactical bombing (including high explosive (HE), fragmentation and incendiary bombs) and strafing. A request for construction of a bomb-proof shelter was made on July 8, 1944 to replace the existing log structure.

1.6.5. Demonstration exercises conducted at the range consisted of ordnance demonstrations, strafing of convoys, chemical demonstrations, and tactical air force demonstrations. The demonstrations were standardized programs that typically occurred one to three times per month. For the demonstrations, various types of bombing and strafing targets, many of which were simulated, were used including tanks, airfield with aircraft, a truck convoy, ship target, and a warehouse. For instance, the early battle tank targets were originally cloth-covered frames that were later replaced with actual tanks. Various fighter and bomber aircraft were flown for the simulated attacks on targets at Pinecastle Jeep Range. Information reviewed for a demonstration conducted in July 1945 includes the use of small arms ammunition (.50 caliber), 100 pound cluster bombs (practice), 100 pound practice bombs with spotting charge, 500 pound incendiary bombs (AN-M76), 100 pound inert general purpose bombs, 5-inch high velocity aircraft rockets (HVAR), 11.75-inch rockets, and 60-pound British Training Bombs.

1.6.6. The War Department declared the Pinecastle Jeep Range surplus effective December 2, 1946, and by December 5, 1947, the War Department terminated the lease on the range property. Range clearance activities were conducted at the former Pinecastle Jeep Range from March to September 1947, and during the summer of 1948. On August 6, 1948, the War Department terminated the lease with Magnolia Ranch, Inc. for the majority of the range (11,833 acres). Magnolia Ranch, Inc. subsequently filed damage claims and sued the government in the United States Court of Claims in 1952. An additional clearance effort occurred in 1953, and the case was settled in 1955.

1.7 CURRENT AND PROJECTED LAND USE

Currently, the site is owned by local government agencies and private individuals, and is used for various purposes including residential, highway/expressway, landfill, and undeveloped land. The county landfill continues to expand to the south of its current location. It is anticipated that future development will continue to encroach on the undeveloped lands of the former Pinecastle Jeep Range. Development is expected to be residential with some mixed commercial and retail.

1.8 PREVIOUS INVESTIGATIONS

1.8.1 1994 Inventory Project Report

The Inventory Project Report (INPR) was completed by USACE Jacksonville District (CESAJ) on July 14, 1994 (USACE, 1994). The INPR established the Pinecastle Jeep Range as a FUDS, established the preliminary site boundary, assigned the FUDS Project Number I04FL040501, and recommended an inspection to determine if further action was warranted based on the findings. The Findings and Determination of Eligibility for the site concluded that the Pinecastle Jeep Range was used as a bombing target by the Army and Navy between 1943 and 1946. The INPR established the approximately 14,419-acre site area based on a historical map.

1.8.2 1997 Archives Search Report

The Draft Archives Search Report (ASR) was completed by USACE, St. Louis District (CEMVS) in September 1997. The ASR was prepared after reviewing available records, interviews, site inspection, analysis, and reports that documented the history of the site. The ASR is the source of much of the historical information pertaining to site operations and identifies the key areas of focus for the SI. As part of the ASR, a site visit was conducted on May 19-20, 1997. The site visit team did not identify any munitions debris in the eastern portion of the site and were unable to gain access to the properties on the western end of the site. The ASR team noted potential bomb craters on some of the historical photos but could not gain access to many of these areas.

1.8.3 2004 Archives Search Report Supplement

1.8.3.1. The ASR Supplement was prepared by CEMVS as a range inventory supplement to the findings of the 1997 ASR. This document identified range areas and types of munitions that may have been used at the former Pinecastle Jeep Range, forming a preliminary conceptual site model (CSM) of range and munition use.

1.8.3.2. The ASR Supplement was prepared in 2004 and summarizes the information from the 1997 ASR and other associated investigations. The ASR Supplement provides a summary of the retained areas of concern known as Munitions Response Sites (MRSs), the acreage for each MRS, and other pertinent information. The ASR Supplement provided a breakdown for each MRS with the standard range configuration based on the use of each MRS. The MRSs identified in the ASR

Supplement for the Pinecastle Jeep Range, their suspected acreage, the types of munitions used, and the areas include:

- **MRS 01** - Chemical Demonstration Range (Risk Assessment Code [RAC]: 1) with 5 acres; suspected use of M1 Chemical Agent Identification Sets, Detonation (CAIS); blasting caps. The location of the range was estimated based on descriptions.
- **MRS 02** - Air-to-Ground Rocket Range (RAC: 2) with 1,419 acres; Small Arms, General; .50 Caliber Machine Gun; AN-M41, 20-lb Fragmentation Bomb; AN-M76, 500-lb Incendiary Bomb; M48, 20-lb Practice Bomb; M38A2, 100-lb Practice Bomb; HVAR, 5-inch Rocket. The location of the range was estimated based on the presumed target location.
- **MRS 03** - Range Complex No. 1 (RAC: 5) with 5,194 acres Small Arms, General; .50 Caliber Machine Gun. The extent of the range was estimated based on historical maps and aerial photographs.
- **MRS 04** - Range Complex No. 2 (RAC: 1) with 2,452 acres; Small Arms, General; AN-M30, 100-lb General Purpose Bomb; AN-M41, 20-lb Fragmentation Bomb; AN-M76, 500-lb Incendiary Bomb; AN-M67, 10-lb Incendiary Bomb; AN-M50, 4-lb Incendiary Bomb; AN-M69, 6-lb Incendiary Bomb; M48, 20-lb Practice Bomb; M1A1, Spotting Charge; M38A2, 100-lb Practice Bomb; 5-inch, Rocket, HVAR, HE and Practice; 11.75-inch, Rocket, Practice. The location of the range was based on documented and suspected bombing targets and the assumption of a 3,000-ft radius.

1.8.3.3. The Defense Environmental Programs (DEP) Annual Report to Congress for fiscal year 2005 had no available data recorded in the Military Munitions Response Program (MMRP) Inventory.

1.8.4 2007 Site Inspection

1.8.4.1. In 2007, the USAESCH conducted a site inspection for the former Pinecastle Jeep Range site. The SI evaluation included review of previous reports and field work consisting of qualitative reconnaissance and collecting soil samples. The reconnaissance identified munitions debris in the form of .50 caliber cartridge casings and balls at the southeast end of the Jeep Track (MRS 01). Multiple craters and possible burial pits were located in Range Complex No. 2 (MRS 04). Nitroglycerin was detected in three soil samples collected from MRS 04. In July 2007 following the SI field work, three practice fragmentation bombs with live fuzes and one M64, 6-lb Incendiary Bomb were found at the site and were destroyed by an explosive ordnance disposal (EOD) unit from Patrick Air Force Base (USACE, 2007).

1.8.4.2 The Site Inspection also scored each of the MRS using the Munitions Response Site Prioritization Protocol (MRSPP). The MRSPP provides a means for establishing the priority of actions taken at each MRS based on various factors including munitions types, accessibility and concentrations of munitions constituents. The Chemical Demonstration Range (MRS 01) was rated as having no known or suspected

hazard. The Air to Ground Rocket Range (MRS 02) was given Priority 4 (out of 8) based on the suspected explosives hazard. Range Complex #1 (MRS 03) was given Priority 8 based on the suspected explosives and munitions constituents hazards. Range Complex #2 (MRS 04) was given Priority 2 based on explosives hazards. Priority 1 is only available for sites with chemical warfare materiel hazards.

1.8.5 Time Critical Removal Action

1.8.5.1. Since Fall 2007, a Time Critical Removal Action (TCRA) has been conducted at parts of the former Pinecastle Jeep Range. The areas covered include the Odyssey Middle School, the Tivoli Gardens development, and the eastern part of the Warwick development. Undeveloped areas included the open field immediately south of the Odyssey Middle School known as the Mockingbird property. Numerous munitions were found and destroyed on the school and Mockingbird property. Munitions were also found in Tivoli Gardens. No hazardous munitions were found at the Warwick development during the TCRA; however, a private contractor found inert bombs there.

1.8.5.2 In addition to removal of MEC, the contractor also collected 25 soil samples from within the school property. The samples were analyzed for explosives, metals (antimony, barium, lead, iron, mercury, strontium, molybdenum), and DDT and its breakdowns DDE and DDD. The TCRA is ongoing and a report of the findings has not yet been prepared. The TCRA investigation areas are presented on Figure 1.1.

1.9 INITIAL SUMMARY OF RISK FROM MUNITIONS AND EXPLOSIVES OF CONCERN (MEC)

1.9.1. MEC, where it is present, is a safety hazard and constitutes an imminent and substantial endangerment to the public, on-site personnel, and the environment. MEC have been recovered from the site in the past and there is a potential for additional munitions to be present. Since the public can access many areas of site, there is the potential for the public to encounter MEC.

1.9.2. Potential MEC at the former Pinecastle Jeep Range consists of both munitions known to have been used at the site and those munitions that have been recovered. Types of munitions include projectiles, mortars, bombs, and rockets. A listing of the ordnance known to have been used at the former Pinecastle Jeep Range including ordnance recovered is presented in Table 1.1.

1.9.3. The results of the SI show a possibility that MC may also be present at the site. In certain concentrations and site conditions, MC may pose risks to human health and the environment. Table 1.1 also presents a list of potential MC associated with each munition.

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Cartridge, .30 Caliber	M2 Ball M1 Tracer M2 Armor Piercing M1 Ball M16 Tracer	Brass, Steel, Aluminum	Lead antimony, Single- or double-base powder, Primer Composition, Tungsten Chrome Steel, Tracer Composition	Lead, antimony, copper, zinc, nitrocellulose, molybdenum, aluminum, strontium, magnesium, nitroglycerin, dinitrotoluene
Cartridge, 45 caliber, Small Arms	General	Brass, steel, aluminum	Smokeless powder, primer mix	Lead, barium nitrate, barium peroxide, antimony, lead styphanate, PETN (Pentaerythritol Tetranitrate),magnesium, tetracene, nitrocellulose, diphenylamine, strontium peroxide, calcium resinate, barium nitrate, dinitrotoluene , potassium chlorate, potassium nitrate, potassium sulfide, copper, nitroglycerin, iron, nickel, zinc
Cartridge , 50 Caliber, Machine Gun	M2 Ball M2 Armor Piercing (AP) M1 Tracer M10 Tracer M17 Tracer M21 Tracer M1Incendiary M23 Incendiary M1 Blank	Brass, steel, aluminum	Lead antimony, Tungsten chrome steel, Tracer Composition, Incendiary Composition, Single based propellant, Double based propellant, Primer composition	Calcium, Iron, Strontium, Lead, Magnesium, Molybdenum, Antimony, Potassium, Perchlorate, Nitroglycerin, Nitrocellulose, Diphenylamine

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Cartridge, 20mm, Armor Piercing-Tracer (AP-T) (M75)				
Cartridge Case	M21A1	Copper Alloy	M12 Propellant, M36 Primer	Copper, Zinc, Nitrocellulose, Diphenylamine, Potassium Sulfate, Lead Thiocyanate, Antimony Sulfide, PETN
Projectile, 20mm, Armor Piercing-Tracer	M75	Steel	Solid, Tracer Mixture	Iron, Magnesium, Aluminum, Strontium Nitrate, Zinc
Cartridge, 37mm, HE-T SD (M54)				
Cartridge Case	M17	Brass	M1 Propellant, Primer Mixture	Antimony Sulfide, Copper, Dibutlyphalate, Dinitrotoluene, Diphenylamine, Lead Thiocyanate, Nitrocellulose, Potassium Chlorate, TNT (Trinitrotoluene), Zinc
Fuze, Point Detonating	M56	Aluminum Alloy	Tetryl, Primer Mixture	Aluminum, Antimony Sulfide, Carborundum, Copper, Lead Azide, Potassium Chlorate, Tetryl,
Projectile, 37mm, HE	M54	Steel	Black Powder, Tetryl, Ignition Charge	Barium Peroxide, Magnesium Powder, Potassium Nitrate, Tetryl, Calcium Resinate
Tracer		N/A	Tracer Composition	Strontium Nitrate, Magnesium Powder, Aluminum Powder, Polyvinyl Chloride
Cartridge, 37mm, Armor Piercing-Tracer (AP-T) (M80)				
Cartridge Case	M17	Brass	M1 Propellant, Primer Mixture	Antimony Sulfide, Copper, Dibutlyphalate, Dinitrotoluene, Diphenylamine, Lead Thiocyanate, Nitrocellulose, Potassium Chlorate, TNT (Trinitrotoluene), Zinc

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Projectile, 37mm, Practice with Tracer	M80	Steel	Solid Steel, Tracer Mixture	Aluminum Alloy, Iron, Magnesium, Strontium Nitrate
Cartridge, 57mm, APC-T (M86)				
Cartridge Case	M23	Steel	M1 Propellant, Primer Mixture	Antimony Sulfide, Dibutlyphalate, Dinitrotoluene, Diphenylamine, Iron, Lead Thiocyanate, Nitrocellulose, Potassium Chlorate, Potassium Nitrate, TNT
Fuze, Projectile, Base Detonating	M72	Steel	Tetryl, Primer Mixture	Iron, Lead Azide Tetryl
Projectile, 57mm, APC-T	M86	Steel	Explosive D, Tracer Mixture	Aluminum, Ammonium Picrate, Barium Peroxide, Iron, Magnesium, Strontium Nitrate
Cartridge, 57mm, HE (M306 Series)				
Cartridge Case	M30A1B1, M30A1B2	Steel	Primer Mixture, Propellant	Barium Nitrate, Diphenylamine, Iron, Lead Styphnate, Lead Sulfide, Nitrocellulose, Potassium Nitrate, Potassium Sulfate, Sulfur, Tetracene
Fuze, Projectile, Point-Detonating	M503	Aluminum Alloy	Booster, Detonator	Aluminum, Antimony Sulfide, Copper, Lead Azide, Lead Thiocyanate, Potassium Chlorate, Tetryl, Zinc
Projectile, 57mm, HE	M306 Series	Steel	TNT	Iron, TNT (Trinitrotoluene)

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Cartridge, 60mm, Smoke (M302)				
Fuze, Projectile, Point-Detonating	M82	Brass, Plastic	Booster, Detonator	Antimony Sulfide, Copper, Carborundum, Lead Azide, Potassium Chlorate, Tetryl, Zinc
Fuze, Projectile, Point-Detonating	M527	Aluminum Alloy	Booster, Detonator	Aluminum, Antimony Sulfide, Barium Nitrate, Copper, Carborundum, Composition A (RDX and Stearic Acid), Lead Azide, Lead Styphnate, Potassium Chlorate, RDX (Cyclotetramethylenetetranitramine), Tetracene, Tetryl, Zinc
Projectile, 60mm, WP	M302	Steel	Booster, White Phosphorus	Tetryl, TNT (Trinitrotoluene), Composition A (RDX and Stearic Acid), White Phosphorus
Propelling Assembly	M3, (X)M181	Kraft Paper, Steel	Propellant, M9, Black Powder, Primer Mix No.70, Propellant, M8	Antimony Sulfide, Diethylphthalate, Iron, Lead Thiocyanate, Nitrocellulose, Nitroglycerin, Potassium Chlorate, Potassium Nitrate, TNT (Trinitrotoluene), Sulfur
Cartridge, 60mm, HE (M49A2)				
Fuze, Projectile, Point-Detonating	M52, M52A1, M52A2, M52A2B1	Aluminum Alloy, Zinc Alloy	Booster, Detonator	Aluminum, Antimony Sulfide, Carborundum, Copper, Iron, Lead Azide, Magnesium, Potassium Chlorate, Tetryl, Zinc
Projectile, 60mm, HE	M49A2	Steel	TNT (Trinitrotoluene)	Iron, TNT (Trinitrotoluene)
Propelling Assembly	M3, M3A1	Kraft Paper, Steel	Propellant, M9, Black Powder, Primer Mix No.70, Propellant, M8	Antimony Sulfide, Diethylphthalate, Iron, Lead Thiocyanate, Nitrocellulose, Nitroglycerin, Potassium Chlorate, Potassium Nitrate, TNT (Trinitrotoluene), Sulfur

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Shot, 75mm, Fixed, Armor Piercing (AP) (M72)				
Cartridge Case	M18	Copper	Propellant, M1or M2, Primer Mixture	Antimony Sulfide, Barium Nitrate, Copper, Dibutlyphalate, Dinitrotoluene, Diphenylamine, Lead Thiocyanate, Nitrocellulose, Nitroglycerin, Potassium Chlorate, Potassium Nitrate, Sulfur, TNT (Trinitrotoluene), Zinc
Shot, 75mm, Armor-Piercing (AP)	M72	Solid Steel	N/A	Iron
Tracer			Tracer Compound	Magnesium-Aluminum Alloy, Strontium Nitrate
Shell, 75mm, Semi-Fixed HE (M41A1)				
Cartridge Case	M5	Brass	M1 Propellant, Primer Mixture	Antimony Sulfide, Copper, Dibutylphthalate, Dinitrotoluene, Diphenylamine, Lead Thiocyanate, Nitrocellulose, Potassium Chlorate, Potassium Nitrate, Sulfur, TNT (Trinitrotoluene), Zinc
Fuze, Projectile, Point-Detonating	M48	Steel	Booster, Primer Mixture, Tetryl	Antimony Sulfide, Carborundum, Lead Azide, Lead Sulphocyanate, Iron, Potassium Chlorate, Potassium Nitrate, RDX, Sulfur, TNT (Trinitrotoluene), Tetryl
Fuze, Projectile, Time Super-Quick	M54	Steel	Detonator, Ignition Charge, Primer Mixture, Relay	Antimony Sulfide, Barium Nitrate, Boron, Carborundum, Iron, Lead Azide, Lead Styphnate, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Sulfur, TNT (Trinitrotoluene)
Projectile, 75mm, HE	M41A1	Steel	TNT	Iron, TNT (Trinitrotoluene)

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Shell, 75mm, Smoke (WP) (MkII)				
Cartridge Case	M18	Copper	Propellant, M1or M2, Primer Mixture	Antimony Sulfide, Barium Nitrate, Copper, Dibutlyphalate, Dinitrotoluene, Diphenylamine, Lead Thiocyanate, Nitrocellulose, Nitroglycerin, Potassium Chlorate, Potassium Nitrate, Sulfur, TNT (Trinitrotoluene), Zinc
Fuze, Projectile, Point-Detonating	M46	Steel	Detonator, Primer Mixture	Antimony Sulfide, Carborundum, Iron, Lead Azide, Potassium Chlorate
Projectile, 75mm, Smoke (WP)	MkII	Steel	Booster, White Phosphorus	Iron, Tetryl, White Phosphorus
Cartridge, 76mm, HE (M42)				
Cartridge Case		Brass	M1 Propellant, Primer Mixture	Antimony Sulfide, Copper, Dibutylphthalate, Dinitrotoluene, Diphenylamine, Lead Thiocyanate, Nitrocellulose Potassium Chlorate, Zinc
Fuze, Projectile, Point-Detonating	M51	Steel	Tetryl, TNT, Black Powder	Antimony Sulfide, Carborundum, Lead Azidde, Lead Sulphocyanate, Potassium Chlorate, Potassium Nitrate, Tetryl, TNT
Projectile, 76mm, HE	M42	Steel	TNT	Iron, TNT
Cartridge, 76mm, Armor Piercing (AP) (M79)				
Cartridge Case		Brass	M1 Propellant, Primer Mixture	Antimony Sulfide, Copper, Dibutylphthalate, Dinitrotoluene, Diphenylamine, Lead Thiocyanate, Nitrocellulose Potassium Chlorate, Zinc

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Projectile, 76mm, AP	M79	Steel	Solid, Tracer	Aluminum, Barium Peroxide, Iron, Magnesium, Strontium Nitrate
Cartridge, 81mm, Smoke, White Phosphorus (M57)				
Fuze, Projectile, Point-Detonating	M52	Steel	RDX, Tetryl	Aluminum, Antimony Sulfide, Carborundum, Copper, Iron, Lead Azide, Magnesium, Tetryl
Projectile, 81mm, Smoke, White Phosphorus	M57	Steel	White Phosphorus, Tetryl	Barium Stearate, Iron, Tetryl, White Phosphorus
Propelling Assembly		Kraft Paper, Steel	Propellant, M9, Black Powder, Primer Mix No.70, Propellant, M8	Antimony Sulfide, Diethylphthalate, Lead Thiocyanate, Nitrocellulose, Nitroglycerin, Potassium Chlorate, Potassium Chlorate, TNT (Trinitrotoluene)
Cartridge, 81mm, HE (M43)				
Fuze, Projectile, Point-Detonating	M525	Aluminum Alloy	RDX, Tetryl	Aluminum, Copper, Iron, Lead, Magnesium, RDX, Tetryl, Zinc
Projectile, 81mm, HE	M43	Steel	TNT (Trinitrotoluene)	Iron, TNT (Trinitrotoluene)
Propelling Assembly		Kraft Paper, Steel	Propellant, M9, Black Powder, Primer Mix No.70, Propellant, M8	Antimony Sulfide, Diethylphthalate, Lead Thiocyanate, Nitrocellulose, Nitroglycerin, Potassium Chlorate, Potassium Chlorate, TNT (Trinitrotoluene)

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Cartridge, 90mm, HE-T (M71A1)				
Cartridge Case	M19B1	Steel	M1, M6, M15 Propellant, Primer Mixture	Antimony Sulfide, Dibutylphthalate, Dinitrotoluene, Diphenylamine, Lead Thiocyanate, Iron, Nitrocellulose, Potassium Chlorate, Potassium Nitrate, TNT (Trinitrotoluene)
Fuze, Projectile, Point-Detonating	M557	Steel, Zinc Chromate	Tetryl, Primer Mixture, Black Powder	Antimony Sulfide, Carborundum, Iron, Lead Azide, Lead Sulphocyanate, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Tetryl, TNT (Trinitrotoluene), Zinc
Fuze, Projectile, Mechanical Time,	M43	Steel	Black Powder, Booster, Primer Mixture, Tetryl	Antimony Sulfide, Iron, Lead Azide, Lead Thiocyanate, Iron, Potassium Chlorate, Potassium Nitrate, Sulfur, Tetryl, TNT (Trinitrotoluene)
Projectile, 90mm, HE	M71, M71A1	Steel	TNT or Amatol (50/50 Mix)	TNT (Trinitrotoluene) or Ammonium Nitrate, TNT (Trinitrotoluene)
Tracer	M10	Steel	Tracer Composition,	Aluminum Powder, Barium Peroxide, Magnesium Powder, Strontium Nitrate
Shell, 90mm, Armor Piercing-Tracer (AP-T) (M77)				
Cartridge Case	M19B1	Steel	M1, M6, M15 Propellant, Primer Mixture	Antimony Sulfide, Dibutylphthalate, Dinitrotoluene, Diphenylamine, Lead Thiocyanate, Iron, Nitrocellulose, Potassium Chlorate, Potassium Nitrate, TNT (Trinitrotoluene)
Projectile, 90mm, AP-T	M77	Steel	Solid Steel, Tracer	Aluminum Powder, Barium Peroxide, Iron, Magnesium Powder, Strontium Nitrate

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Cartridge, 105mm, HE (M1)				
Cartridge Case	M14	Brass	M67 Propellant Charge, Primer Mix	Antimony Sulfide, Copper, Dibutlyphalate, Dinitrotoluene, Diphenylamine, Lead, Lead Thiocyanate, Nitrocellulose, Potassium Chlorate, TNT (Trinitrotoluene), Zinc
Fuze, Projectile, Point-Detonating	M48	Steel	Booster, Primer Mixture, Tetryl	Antimony Sulfide, Carborundum, Lead Azide, Lead Sulphocyanate, Iron, Potassium Chlorate, Potassium Nitrate, Sulfur, TNT (Trinitrotoluene), Tetryl
Fuze, Projectile, Point-Detonating	M51	Steel	Tetryl, Primer Mix	Antimony Sulfide, Carborundum, Iron, Lead Azide, Potassium Chlorate, Tetryl
Projectile, 105mm, HE	M1	Steel	TNT (Trinitrotoluene), Amatol	Ammonium Nitrate, TNT (Trinitrotoluene)
Cartridge, 105mm, Smoke, White Phosphorus (WP) (M60)				
Cartridge Case	M14	Brass	M67 Propellant Charge, Primer Mix	Antimony Sulfide, Copper, Dibutlyphalate, Dinitrotoluene, Diphenylamine, Lead, Lead Thiocyanate, Nitrocellulose, Potassium Chlorate, TNT (Trinitrotoluene), Zinc
Fuze, Point-Detonating	M51	Steel	Primer Mixture, Tetryl	Antimony Sulfide, Carborundum, Iron, Lead Azide, Potassium Chlorate, Tetryl
Projectile, 105mm, Smoke, WP	M60	Steel	Burster, White Phosphorus	Iron, RDX (Cyclotrimethylenetrinitramine), Tetryl, TNT (Trinitrotoluene)

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Bomb, 3-lb, Miniature Practice (AN-Mk23)				
Bomb Body	AN-Mk 23	Iron Alloy	N/A	Iron
Cartridge, Signal, Bomb	Mk4 Mod 0	Cardboard, Steel	Black Powder, Primer Mixture, Red Phosphorus	Antimony Sulfide, Barium Nitrate, Lead Azide, Lead Thiocyanate, Pentaerythritoltetranitrate, Potassium Chlorate, Potassium Nitrate, Red Phosphorus (1), Sulfur, TNT (Trinitrotoluene)
Cartridge, Signal, Bomb	Mk4 Mod 1	Cardboard, Steel	Black Powder, Primer Mixture, Zinc Oxide	Antimony Sulfide, Barium Nitrate, Lead Azide, Lead Thiocyanate, Pentaerythritoltetranitrate, Potassium Chlorate, Potassium Nitrate, Sulfur, TNT (Trinitrotoluene), Zinc
Cartridge, Signal, Bomb	Mk4 Mod 2	Cardboard, Steel	Black Powder, Primer Mixture, Zinc Oxide	Iron, Lead Azide, Potassium Nitrate, Zinc Antimony Sulfide, Barium Nitrate, Lead Azide, Lead Thiocyanate, Pentaerythritoltetranitrate, Potassium Chlorate, Potassium Nitrate, Sulfur, TNT (Trinitrotoluene), Zinc
Cartridge, Signal, Bomb	Mk4 Mod 3	Aluminum	Primer Mixture, Smokeless Powder, Red Phosphorus	Aluminum, Antimony Sulfide, Barium Nitrate, Dinitrotoluene, Diphenylamine, Dibutylphthalate, Lead Azide, Lead Styphnate, Lead Thiocyanate, Nitrocellulose, Pentaerythritoltetranitrate, Red Phosphorus(1), TNT (Trinitrotoluene)
Cartridge, Signal, Bomb	Mk4 Mod 4	Aluminum	Primer Mixture, Smokeless Powder, Zinc Oxide	Aluminum, Antimony Sulfide, Barium Nitrate, Dinitrotoluene, Diphenylamine, Dibutylphthalate, Lead Azide, Lead Styphnate, Lead Thiocyanate, Nitrocellulose, Pentaerythritoltetranitrate, TNT (Trinitrotoluene), Zinc
Cartridge, Signal, Bomb	Mk5	Plastic	Fluorescein Dye	N/A

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Bomb, 4lb, Fragmentation (M83)				
Bomb, 4lb, Fragmentation	M83	Steel	TNT or Ednatol	Iron, TNT (Trinitrotoluene) or Halite, Iron, TNT (Trinitrotoluene)
Fuze, Bomb	M129, M130, M131	Steel	Detonator, Primer Mixture	Antimony Sulfide, Barium Nitrate, Iron, Lead Azide, Lead Thiocyanate, Potassium Chlorate, PETN (Pentaerythritol Tetranitrate), Tetryl, TNT (Trinitrotoluene)
Bomb, 20lb, Fragmentation (M41)				
Bomb, 20lb, Fragmentation	M41	Steel	TNT or Amatol 50/50	Iron, TNT (Trinitrotoluene) or Ammonium Nitrate, Iron, TNT (Trinitrotoluene)
Fuze	M120	Steel	Booster, Detonator, Lead, Primer Mixture	Antimony Sulfide, Iron, Lead Azide, Lead Thiocyanate, Potassium Chlorate, Tetryl
Fuze	M158	Steel	Booster, Detonator, Primer Mixture	Antimony Sulfide, Carborundum, Iron, Lead Azide, Potassium Chlorate, Tetryl
Bomb, 23lb, Fragmentation (M40)				
Bomb, 23lb, Fragmentation	M40	Steel	TNT	Iron, TNT (Trinitrotoluene)
Fuze	M120	Steel	Booster, Detonator, Lead, Primer Mixture	Antimony Sulfide, Iron, Lead Azide, Lead Thiocyanate, Potassium Chlorate, Tetryl

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Bomb, 20lb, Practice (M48)				
Bomb, 20lb, Practice	M48	Cast Iron	Spotting Charge	Iron, Potassium Nitrate, Sulfur
Fuze, Bomb, Nose	M110	Steel	Primer Mixture, Booster	Antimony Sulfide, Barium Nitrate, Iron, Lead Azide, Lead Thiocyanate, Potassium Chlorate, Tetryl, TNT (Trinitrotoluene
Bomb, 100 lb, Practice (M38A2)				
Bomb, 100 lb, Practice	M38A2	Steel	Sand	N/A
Charge, Spotting, Bomb	M1A1	Steel, Tin	Black Powder Smokeless Powder Primer Mix	Antimony Sulfide, Barium Nitrate, Dinitrotoluene, Diphenylamine, Lead Azide, Lead Thiocyanate, Nitrocellulose, Nitroglycerin, Pentaerythritoltetranitrate, Potassium Chlorate, Potassium Nitrate, Potassium Sulfate, Sulfur, Tin, TNT (Trinitrotoluene)
Charge, Spotting, Bomb	M3	Steel, Tin	Black Powder. Dark Smoke Composition, Primer Mix	Aluminum, Anthracene, Antimony Sulfide, Barium Nitrate, Copper, Dinitrotoluene, Diphenylamine, Hexachloretane, Iron, Lead Dioxide, Lead Styphnate, Magnesium, Nitrocellulose, Nitroglycerin, PETN (Pentaerythritol Tetranitrate), Potassium Nitrate, Sulfur, Tetracene, Tin, Zinc, Zirconium
Charge, Spotting, Bomb	M5	Glass	FS smoke mixture (Sulfur-trioxide chlorosulfonic acid solution)	N/A(1)

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Bomb, 100-lb, GP	AN-M30	Steel	50/50 Amatol with TNT boosters or TNT with Tetryl boosters or Tritonal	Ammonium Nitrate, Iron, Tetryl, TNT (Trinitrotoluene) or Iron, TNT (Trinitrotoluene), Tetryl or Flaked Aluminum, Iron, TNT (Trinitrotoluene)
Bomb, 250lb, General Purpose	AN-M57	Steel	Amatol or TNT or Tritonal	Ammonium Nitrate, Iron, TNT (Trinitrotoluene) or TNT (Trinitrotoluene), Iron or Flaked Aluminum, Iron, TNT (Trinitrotoluene)
Bomb, 1,000 LB, General Purpose	M65 & M65A1	Steel	Amatol or TNT or Tritonal	Ammonium Nitrate, TNT (Trinitrotoluene) or TNT (Trinitrotoluene) or TNT (Trinitrotoluene), Flaked Aluminum

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Bomb, 2000 lb, General, Purpose (AN-M66)				
Bomb, 2000 lb, General, Purpose	AN-M66	Steel	Amatol or TNT or Tritonal	Ammonium Nitrate, TNT (Trinitrotoluene) or TNT (Trinitrotoluene) or TNT (Trinitrotoluene), Flaked Aluminum
Fuze, Bomb, Nose	M103	Steel	Tetryl, Primer Mixture	Barium Nitrate, Iron, Lead Thiocyanate, Potassium Chlorate, Tetryl, TNT (Trinitrotoluene)
Fuze, Bomb, Nose	M110	Steel	Tetryl, Primer Mixture, TNT (Trinitrotoluene)	Barium Nitrate, Iron, Iron, Lead Azide, Lead Thiocyanate, Potassium Chlorate, Tetryl. TNT (Trinitrotoluene)
Fuze, Bomb, Tail	M100, AN-M100A1	Steel	Primer Mix, Tetryl, Black Powder	Antimony Sulfide, Iron, Lead Azide, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Sulfur, Tetryl
Fuze, Bomb, Tail	M102	Steel	Black Powder, Primer Mixture, TNT (Trinitrotoluene)	Barium Nitrate, Iron, Lead Azide, Lead Thiocyanate, Potassium Chlorate, Potassium Perchlorate, Tetryl, TNT (Trinitrotoluene), Sulfur
Fuze, Bomb, Tail	M106	Steel	Primer Mix, Black Powder, Tetryl	Antimony Sulfide, Lead Azide, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Tetryl
Fuze, Bomb, Tail	M114	Steel	Tetryl, Primer Mixture, TNT (Trinitrotoluene	Barium Chromate, Barium Nitrate, Iron, Lead Azide, Lead Thiocyanate, Nickel, Potassium Chlorate, Potassium Perchlorate, Tetryl, TNT (Trinitrotoluene), Zirconium-Nickel Alloy
Bomb, 2lb, Incendiary	AN-M52	Magnesium Alloy	First Fire Mixture, Primer Mixture, Thermate	Aluminum Powder, Antimony Sulfide, Barium Nitrate, Iron Oxide, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Sodium Nitrate, Sulfur, TNT (Trinitrotoluene)

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Bomb. 4lb, Incendiary	AN-M54	Steel	Burster, Thermite	Aluminum, Iron, Potassium Nitrate, Sulfur
Bomb, Incendiary, 6lb	`AN-M69	Steel	Burster, Igniter, Napalm, Primer Mixture,	Antimony Sulfide, Barium Nitrate, Lead Thiocyanate, Napthalene, Magnesium Powder, Potassium Chlorate, Potassium Nitrate, Sulfur, Tetryl, TNT (Trinitrotoluene), White Phosphorus
Bomb, 10lb, Incendiary	AN-M74	Steel	Booster, Ejection Charge, Primer Mixture, Napalm	Antimony Sulfide, Barium Nitrate, Iron, Lead Thiocyanate, Naphthalene, Potassium Chlorate, TNT (Trinitrotoluene), White Phosphorus
Bomb, 500lb, Incendiary (AN-M76)				
Bomb, 500lb, Incendiary	AN-M76	Steel	Burster, Igniter, PT-1 Incendiary Mixture	Iron, Magnesium, Sodium Nitrate, Tetryl, TNT (Trinitrotoluene), White Phosphorus
Fuze Bomb, Nose	AN-M103, M103	Steel	Tetryl, Primer Mix	Barium Nitrate, Iron, Lead Thiocyanate, Potassium Chlorate, Tetryl, TNT (Trinitrotoluene)
Fuze, Bomb, Tail	M100, AN-M100A1	Steel	Primer Mix, Tetryl, Black Powder	Antimony Sulfide, Iron, Lead Azide, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Sulfur, Tetryl
Rocket, 2.36-inch, HEAT (M6)				
Rocket Motor, 2.36-inch		Steel	M7 Propellant, Igniter, Electric Squib	Barium Nitrate, Diazodinitrophenol, Nitrocellulose, Nitroglycerin, Potassium Chlorate, Potassium Nitrate, Potassium Perchlorate
Rocket, Warhead	M6	Steel	Pentolite	Iron, PETN, TNT

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Fuze, Rocket, Base-Detonating	M400	Steel	Tetryl, Primer Mixture	Iron, Lead Azide, PETN (Pentaerythritol Tetranitrate), Tetryl
Rocket, 2.36-inch, Practice (M7)				
Rocket Motor, 2.36-inch		Steel	M7 Propellant, Igniter, Electric Squib	Barium Nitrate, Diazodinitrophenol, Nitrocellulose, Nitroglycerin, Potassium Chlorate, Potassium Nitrate, Potassium Perchlorate
Rocket, Warhead	M7	Steel	Plaster	Iron
Rocket, 2.36-inch, Smoke (M10)				
Rocket Motor, 2.36-inch		Steel	M7 Propellant, Igniter, Electric Squib	Barium Nitrate, Diazodinitrophenol, Nitrocellulose, Nitroglycerin, Potassium Chlorate, Potassium Nitrate, Potassium Perchlorate
Rocket, Warhead, Smoke	M10	Steel	White Phosphorus	Iron, White Phosphorus
Fuze, Rocket, Base-Detonating	M400	Steel	Tetryl, Primer Mixture	Iron, Lead Azide, PETN (Pentaerythritol Tetranitrate), Tetryl
Rocket, HVAR, Practice, 5-inch (MK5)				
Rocket, Motor, 5-inch	Mk 10 Mod 6	Steel	Black Powder, Ballistite	Chromium, Iron, Manganese, Molybdenum, Potassium Nitrate, Zinc, Nitrocellulose, Nitroglycerin
Rocket, Warhead, 5-inch, Practice	Mk6	Steel	Plaster	Iron

Table 1.1
Chemical Composition of MEC and Potential Munitions Constituents
Former Pinecastle Jeep Range

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Rocket, HVAR, HE, 5-inch (MK25)				
Rocket, Motor, 5-inch	Mk 10 Mod 6	Steel	Black Powder, Ballistite	Chromium, Iron, Manganese, Molybdenum, Potassium Nitrate, Zinc, Nitrocellulose, Nitroglycerin
Rocket, Warhead, 5-inch, HE	Mk 25	Steel	Composition B, Tetryl	Iron, RDX (Cyclotrimethylenetrinitramine), Tetryl, TNT (Trinitrotoluene)
Fuze, Rocket, Nose	Mk 149	Steel	Tetryl, PETN, Primer Mixture	Antimony Sulfide, Barium, Chromium, Iron, Lead Azide, Lead Styphnate, Molybdenim, PETN (Pentearythritoltetranitrate), Tetracene, Tetryl
Rocket, 11.75 inch, HE (Mk1 Mods 1, 2 and Mk2 Mod 0)				
Rocket, Motor, 11.75-inch	Mk1	Steel	Propellant, Mk 19	Barium Peroxide, Iron, Magnesium, Nitrocellulose, Nitroglycerin, Potassium Chlorate
Rocket, Warhead, 11.75-inch, HE	Mk1	Steel	Amatol , Black Powder , Picratol , Tetryl , TNT (Trinitrotoluene)	Ammonium Nitrate, Ammonium Picrate, Potassium Nitrate, Tetryl, TNT (Trinitrotoluene)
Rocket, 11.75 inch, General Purpose (Practice) (Mk3 Mods 0, 1, and 2)				
Rocket, Motor, 11.75-inch	Mk1	Steel	Propellant, Mk 19	Barium Peroxide, Iron, Magnesium, Nitrocellulose, Nitroglycerin, Potassium Chlorate
Rocket, Warhead, 11.75-inch, GP (Practice)	Mk3 Mods 0, 1 and 2	Steel	Inert	Iron

Figure 1.1

Pinecastle Jeep Range

Orange County
Orlando, Florida

Legend

- Area Boundary
- TCRA Area Boundary
- Chemical Demonstration Range
- Air-to-Ground Rocket Range
- Range Complex No.1
- Bombing Range
- FUDS Boundary

Site Location in Florida

N

Image: USGS 7.5' Topo Quadrangles, 1980
Projection: UTM Zone 17 NAD83, Units in Meters

2 1 0 2 Kilometers

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	**Pinecastle Jeep Range**		
DRAWN BY: BT			
CHECKED BY: GH	SCALE: As Shown	PROJECT NUMBER: 746163.03004	
SUBMITTED BY: MS	DATE: May 2008	PAGE NUMBER: 1-27	
	FILE: X:\GIS\Site_inspections_ne\Maps\Pinecastle_FL\Fig1_1.mxd		

CHAPTER 2
TECHNICAL MANAGEMENT PLAN

2.1 INTRODUCTION

The purpose of the Technical Management Plan (TMP) is to provide the approach and procedures that will be used to execute the tasks required to meet the project objectives. Field procedures for this project including digital geophysical mapping (DGM), intrusive investigation of anomalies, and MC sampling are provided in separate chapters of this work plan. This chapter focuses on project objectives, organization, personnel, communication and reporting, deliverables, schedule, billing, public relations, duties and responsibilities, as well as the functional relationship between the different organizations.

2.2 PROJECT OBJECTIVE

The primary objective and purpose for this task order is to perform a RI/FS for the former Pinecastle Jeep Range and all other necessary activities required to accomplish this objective. This objective will be met when the following are accomplished:

- Work plans are prepared in accordance with the PWS and reference governing regulations and requirements. These work plans identify appropriate field work and define and present a cost-effective approach to the planning and implementation of field work.
- Investigations are safely completed that are sufficient to determine the nature and extent (if present) of MEC and MC, identify and quantify any associated risk, and support follow on activities for a response action.
- Government acceptance of a decision document meeting the requirements of ER 200-3-1 and MM-CX Interim Guidance Document 06-04.

2.3 PROJECT ORGANIZATION

This subchapter describes the organizations along with their project role. Table 2.1 lists the organizations and their category of responsibility. In addition to the key organizations listed in Table 2.1, local governments, local emergency management agencies, property owners and other stakeholders also will have roles as part of the Project Delivery Team (PDT). The PDT is responsible for establishing the project data quality objectives (DQOs) and for making most of the project decisions.

Table 2.1
Key Project Organizations

Organization	Responsibility Category
U.S. Army Corps of Engineers, Jacksonville District (CESAJ)	Project Management
U.S. Army Engineering Support Center, Huntsville (USAESCH)	Project Management
Parsons	Project Management, Technical Support
Florida Department of Environmental Protection (FDEP)	Review and Concurrence
Orange County	Review and Concurrence
City of Orlando	Review and Concurrence

2.3.1 U.S. Army Corps of Engineers, Jacksonville District (CESAJ)

CESAJ is the lifecycle Project Manager for the former Pinecastle Jeep Range RI/FS. CESAJ responsibilities include review of project plans and documents, obtaining rights-of-entry to properties in the work area, working with the news media and the public, and coordinating with federal, state, and local agencies on issues pertaining to implementation of this project and protection of ecological and cultural resources. Other responsibilities include coordinating any necessary evacuations, providing proper notifications to the Florida Department of Environmental Protection (FDEP), notifying the National Response Center and state officials in the event of a release or spill, and signing the hazardous waste manifest as generator of any hazardous waste.

2.3.2 U.S. Army Engineering Support Center, Huntsville (USAESCH)

USAESCH, the implementing agency for execution of this project, provides technical expertise for MEC and MC activities, and serves as the Project Manager (PM) for conducting the RI/FS. USAESCH responsibilities include procurement and direction of the prime contractor (Parsons) and supporting agencies, and the coordination of document reviews and approvals. As the PM, USAESCH is responsible for directing the contractor and controlling the budget and schedule. USAESCH also provides the on-site UXO-Qualified Safety Specialist.

2.3.3 Parsons

2.3.3.1 Parsons, as the prime contractor to USAESCH, has prepared this Work Plan and will provide overall technical support and services for implementation of the RI/FS. Parsons is responsible for performance of the activities detailed in the PWS (included as Appendix A).

2.3.3.2 Parsons may subcontract some services to ensure successful completion of the delivery order. These services may include, but are not limited to:

- Vegetation clearing;

- Land surveying;
- Transportation and disposal of investigation derived waste.

2.3.3.3 Parsons plans to use Agriculture and Priority Pollutants Laboratory, Inc. (APPL), Fresno, California to provide analytical services for MC and waste stream characterization (see Appendix E for additional information).

2.3.3.4 An UXO services contractor, USA Environmental, Inc. (USA), will supply some of the UXO-qualified personnel required for the project. USA will provide UXO services in support of the field operations, such as assisting with the intrusive excavation and site support. The UXO services contractor will also be responsible for conducting UXO operations, including purchasing, handling, detonating, and disposing of conventional MEC. USA will also provide properly trained and qualified personnel for all UXO operations.

2.3.4 Florida Department of Environmental Protection (FDEP)

The FDEP protects, conserves and manages Florida's natural resources and enforces the State's environmental laws. The project team will coordinate with FDEP throughout the project and FDEP will be a reviewer during the development of work plans and other project documents for the operations at the former Pinecastle Jeep Range. CESAJ will act as the primary contact to FDEP and will keep FDEP informed of project progress

2.3.5 Local Governmental Agencies

Representatives from Orange County and the City of Orlando will be informed of the schedule, significant project findings, and project progress throughout the RI/FS activities. Parsons will coordinate with the Orange County Environmental Protection Division concerning project activities in conservation lands and other environmentally-sensitive areas.

2.3.6 Responsibility Matrix

2.3.7.1 The responsibilities of the key field personnel on the former Pinecastle Jeep Range RI/FS are presented in Table 2.2. Figure 2.1 shows the health and safety organization structure for the former Pinecastle Jeep Range RI/FS. A complete description of the safety and health responsibilities is provided in the APP (Appendix D). The following Parsons personnel are responsible for health and safety for the project:

Project Manager	John Chulick, 678-969-2409
Site Manager	Al Ebner, 407-282-3578
Project Safety and Health Officer	Edward Grunwald, 678-969-2394
Project QC Manager	Neil Feist, 256-217-2510
Site Safety and Health Officer	Ken Cargel

Table 2.2
Responsibilities of Field Team Members

Title	General Description	Responsibilities
Parsons Project Manager (PM)	Reports to Parsons upper-level management. Has authority to direct the project and implement the PWS under contract to the USAESCH.	• *Coordinates and reviews the records, the Work Plan, the APP/Site Safety and Health Plan (SSHP), and the reports.* • *Organizes the field team* • *Obtains approval to start field work and coordinates activities with appropriate officials.* • *Employs the Project Safety and Health Officer (PSHO) to ensure that safety and health requirements are met.* • *Oversees the performance of all project team members.* • *Coordinates subcontract activities in conjunction with procurement specialists.* • *Assures that technical and contractual issues are resolved.* • *Controls cost and schedules targets.*
Parsons Site Manager (SM)	Responsible for field team operations and safety.	• *Manages field operations and determines the sequence and locations of intrusive and field team activities.* • *Provides primary on-site point-of-contact between Parsons and USAESCH.* • *Oversees subcontractor's field operations and reviews subcontractors' weekly status reports.* • *Coordinates with the Parsons PM to assure budgets and schedules are met during the field work.* • *Reports all QC failures and corrective actions to the PM and Quality Assurance Manager.* • *Enforces site control.* • *Documents field activities and reports to the Parsons PM. Documents any deviations from plans.* • *Responsible for understanding field procedures and ensuring that the procedures are followed*
Parsons Project Safety and Health Officer (PSHO)	Advises PM on all aspects of health and safety (H&S) and supervises the site safety and health officer (SSHO).	• *Provides technical support concerning health and safety issues.* • *Manages/oversees the preparation of the APP/SSHP.* • *Ensures that the Parsons health and safety protocols being followed conform with established industry protocols and standards.* • *Confirms each team member's suitability for work based on a physician's recommendation.* • *Certifies that all workers have proper training.* • *Investigates each accident or reportable incident.*

Table 2.2
Responsibilities of Field Team Members

Title	General Description	Responsibilities
Parsons Site Safety and Health Officer (SSHO)	Reports to the PSHO on all aspects of health and safety on site. Performs day-to-day H&S tasks. Stops work if any operation threatens work or public health or safety.	• *Knows emergency procedures, evacuation routes, and telephone numbers of the local hospital, poison control center, fire department, and police department.* • *Notifies USAESCH of emergency conditions.* • *Conducts hazard communications (HAZCOM) training.* • *Advises medical personnel of potential exposures and consequences.* • *Notifies emergency response personnel by telephone or radio in the event of an emergency.* • *Acts as spokesperson if an Occupational Safety and Health Administration (OSHA) inspector visits the site.* • *Conducts on site training concerning pertinent H&S issues and new concerns.* • *Reports all accidents or H&S incidents to the PSHO and USAESCH.* • *Provides UXO safety oversight* • *Conducts UXO safety briefings/training.* • *Reports/investigates accidents and incidents.*
UXO Quality Control Specialist (UXOQCS)	Coordinates with the Parsons PM, SM and QC Manager	• *Oversees and implements the QC Plan.* • *Monitors the project's performance in accordance with safety protocols and technical compliance.* • *Provides guidance, as required, and performs scheduled reviews of documentation (QC reports, field progress reports, and technical findings).*
Project QC Manager	Independent of the project team and interacts and communicates with subcontractor and USAESCH quality assurance (QA) personnel.	• *Reviews all QA/QC procedures to be used in the project.* • *Reviews subcontractor system audits and QC procedures to ensure compliance with the project QC guidelines* • *Performs a quality review to ensure the quality of deliverables from the project team.*
Field Team Member	Must consist of at least two people. Takes daily instruction from and reports directly to the SM.	• *Safely completes the on-site tasks.* • *Complies with all safety and work related SOPs, including APP/SSHP.* • *Coordinates with the SSHO to ensure all site safety considerations are enforced.* • *Notifies SSHO/SM or supervisor of suspected unsafe conditions.* • *Inspects personal protective equipment prior to, during, and after each use.*

Table 2.2
Responsibilities of Field Team Members

Title	General Description	Responsibilities
Senior UXO Supervisor (SUXOS)	Most senior UXO-qualified on-site representative and meets the USACE requirements for experience. Ability to temporarily stop work to correct safety deficiencies.	• *Ensures efficient performance of the approved Work Plan and APP/SSHP.* • *Makes daily progress reports to the Parsons SM.* • *Coordinates with other subcontractor activities/work on-site.* • *Ensure compliance with all safety and work related standard operating procedures.* • *Meets scheduled time lines and budgetary control amounts.* • *Complies with all federal and state regulations.* • *Coordinates with the SSHO to ensure all site safety considerations are enforced.* • *Responsible for task/team assigned equipment.*
UXO Supervisor (UXO Technician III)	Takes daily instruction from and reports directly to the SUXOS. Directs the action of his team in accordance with the approved plans and the daily verbal directions of the SUXOS.	• *Supervises the direct MEC field operations for assigned tasks.* • *Complies with all safety and work related SOPs, including the APP/SSHP.* • *Meets schedules on task/team time lines and budgetary control amounts.* • *Coordinates with the SSHO to ensure all site safety considerations are enforced.* • *Supervises assigned personnel.* • *Responsible for task/team assigned equipment and vehicles.*
UXO Technician II and I	Under direct supervision of the UXO Supervisor. Authorized to temporarily stop performance of work to immediately alert Down Range Team Leader of unsafe conditions.	• *Safe and efficient performance of MEC field operations, including location, identification, removal and disposal of MEC in accordance with the approved Work Plan and APP/SSHP.*
USAESCH Safety Specialist	Reports to USAESCH Safety Office.	• *Provides safety oversight of project related activities.* • *Monitors operations within the exclusion zone.* • *Ensures proper certification of MEC-related debris.* • *Stops work in case of unsafe conditions or if approved health and safety procedures are not being followed.*

Table 2.2
Responsibilities of Field Team Members

Title	General Description	Responsibilities
Project Geophysicist	Reports to Parsons PM	• *Contributes to geophysical section of the Work Plan and reports.* • *Monitors geophysical field activities and data processing.* • *Contributes to the Geophysical Prove-out Plan and report.*
Site Geophysicist	Reports to project Geophysicist.	• *Manages geophysical field activities.* • *Processes geophysical data.* • *Performs geophysical prove-out activities and processes geophysical prove-out data.*
Sampling Coordinator	Organizes the collection and shipment of environmental samples in accordance with the Sample Analysis Plan.	• *Supervises environmental sampling collection and shipment to the proper laboratories* • *Maintains accurate sampling logs* • *Provides sampling status reports to the Project Chemist and PM.*

2.4 PROJECT COMMUNICATION AND REPORTING

2.4.1 Record Keeping

All aspects of administering the task order must be substantiated by permanent records, such as written correspondence, notes, and photographs. It is essential to summarize important non-written communications with notes covering conferences, telephone calls, and discussions, giving the date, location, parties involved, and important topics discussed. Written correspondence is the most deliberate, as well as the most important, of the three general types of contractual communication (*i.e.*, person to person, telephone calls, and written correspondence). All incoming correspondence from a USACE representative that requires a reply must be responded to within five working days in one of the following manners:

- Reply in full;
- Interim reply (stating the date by which a full answer can be expected); or
- Acknowledgment of receipt.

2.4.2 Office Communications and Reporting

2.4.2.1. The Parsons PM is responsible for issuing the following documents throughout the project:

- Meeting minutes (due 5 business days after a meeting);
- Record of telephone conversations (due with the Project Status Report [PSR]); and

- PSRs (in accordance with DID MR-085).

2.4.2.2. A PSR will be issued pursuant to the terms of the contract. The PSR will include a summary of the work performed during the reporting period as well as work planned for performance in the upcoming period. The report will summarize results of meetings and telephone conversations that occurred during the reporting period.

2.4.3 Field Communications and Reporting

2.4.3.1. The following communications will be documented in a chronological communications log maintained by the Parsons Site Manager (SM) and the Site Safety and Health Officer (SSHO):

- Each and every occasion that MEC is encountered;
- When and why work is stopped for safety reasons;
- Health and safety violations;
- Personnel changes and reason for changes; and
- Any deviations from the approved work plan or SAP that occur in the field (for example, number of samples, analysis, or problems encountered).

2.4.3.2. When active onsite, a Daily Progress Report will be completed by the Parsons SM. The report will include the following:

- Discussion of work progress;
- Individuals contacted or interviewed;
- Problems encountered; and
- Discussion of work completed versus project schedule.

2.4.3.3. Additionally, Data Quality Control Reports (DQCR) will be prepared and submitted daily during sampling activities. The DQCR will include, at a minimum, weather information at the time of sampling, field instrument measurements and calibrations (if applicable), identification of all field and control samples collected, departures from the SAP, any problems encountered, and any government personnel directives.

2.5 PROJECT DELIVERABLES

Project deliverables will meet the schedule requirements of the project and will be prepared in accordance with the applicable DID format referenced in the PWS. Deliverables will undergo internal Parsons review prior to submittal to other organizations. The primary project deliverables are:

- TPP Memo.
- RI/FS Work Plan.

- Explosives Siting Plan.
- RI/FS Report.
- Proposed Plan.
- Decision Document.

2.6 PROJECT SCHEDULE

A project schedule has been prepared for work planning purposes (Figure 2.2). This schedule will be updated, when necessary, and submitted to USACE with the associated progress report. The included schedule is based on the current draft final work plan and the anticipated time needed for stakeholder review, Parsons' response to comments and final work plan preparation. Revisions to the project schedule will be included with the monthly PSR.

2.7 PERIODIC REPORTING

Over the course of the project, periodic reports such as daily progress reports and project status reports will be required to document project activities. Parsons will prepare these reports in accordance with the PWS, the applicable DIDs, and the project schedule.

2.8 COST AND BILLING

This project delivery order was awarded as a combination of firm fixed price (FFP) and time and materials (T&M) tasks. The FFP tasks are billed based on physical percent complete and work completed based on negotiated milestones or unit rates. Parsons will invoice the T&M tasks monthly along with the PSR and the back-up information required by the contract.

2.9 PROJECT PUBLIC RELATIONS SUPPORT

2.9.1 Site personnel will not disclose any data generated or reviewed during this project and will refer all requests for information concerning site conditions to the CESAJ Corporate Communications Office at (904) 232-2568. Information gathered by this project is the property of the DoD and distribution to any other source is prohibited.

2.9.2 Parsons will provide public relations support by conducting public meetings, attending Restoration Advisory Board meetings, arranging for public review of certain project documents, and updating the Administrative Record files. Meeting support includes obtaining meeting locations, public notifications, preparation of correspondence, preparation of presentation materials, and giving presentations.

2.10 SUBCONTRACT MANAGEMENT

2.10.1 UXO Subcontractor

Parsons will contract with USA Environmental, Inc. to provide support UXO personnel. Parsons will manage the UXO subcontractor by issuing a definitive scope of work. The UXO Subcontractor will furnish all labor, tools, equipment, supplies, materials, and licenses, and will perform all technical, professional, supervisory, QC, and other services necessary to complete the subcontract scope in accordance with the technical specifications, industry standards and schedule requirements set forth in the subcontract. Invoices will be submitted to Parsons according to the agreed payment schedule in the subcontract.

2.10.2 Contract Laboratory

Upon acceptance of the SAP by the project team, Parsons will subcontract with APPL, Inc in Fresno, California for laboratory analyses of media samples collected as part of the RI/FS. Parsons will manage APPL by issuing a definitive scope of work. APPL will furnish all labor, tools, equipment, supplies, material, and licenses, and perform all technical, professional, supervisory, QC, and other services necessary to complete the PWS in accordance with the technical specifications, industry standards, and schedule requirements set forth in the subcontract. Invoices will be submitted to Parsons once the required analytical work is complete and all data has been satisfactorily validated.

2.10.3 Other Subcontractors

Parsons will subcontract for additional services including brush clearing, land surveying, landscape restoration, blast monitoring, security, and court reporting. Parsons will manage these subcontractors by issuing definitive scopes of work. The subcontractors will furnish all labor, tools, equipment, supplies, material, and licenses, and perform all technical, professional, supervisory, QC, and other services necessary to complete their scopes in accordance with the technical specifications, industry standards, and schedule requirements set forth in the subcontract. Invoices will be submitted to Parsons on a monthly basis as work is completed.

2.11 FIELD OPERATIONS MANAGEMENT

2.11.1 This subchapter lists the major field operation components which Parsons will use to complete the field work. Detailed descriptions and field procedures to be followed during each of these steps are presented in the subsequent chapters and appendices of this work plan. Note that MC sampling may take place concurrently with other steps listed.

2.11.2 Field operations for the RI/FS at the former Pinecastle Jeep Range are separated into the following primary steps:

1. Site Preparation and Set-up
2. Geophysical Prove-out
3. Digital Geophysical Mapping
4. Geophysical Anomaly Reacquisition (to be conducted at each site prior to intrusive operations)
5. Intrusive Investigation and Mag and Dig
6. MEC demolition (as necessary)
7. MC Sampling
8. Site Restoration
9. Investigative Derived Waste Disposal
10. Site Demobilization

2.11.3 The steps listed above show the general sequence of activities. In actuality, activities may be at different stages in separate areas of the site. Also, based on results, some activities may need to be repeated in order to gather more information.

Figure 2.1
Project Organization
Remedial Investigation / Feasibility Study, Former Pinecastle Jeep Range

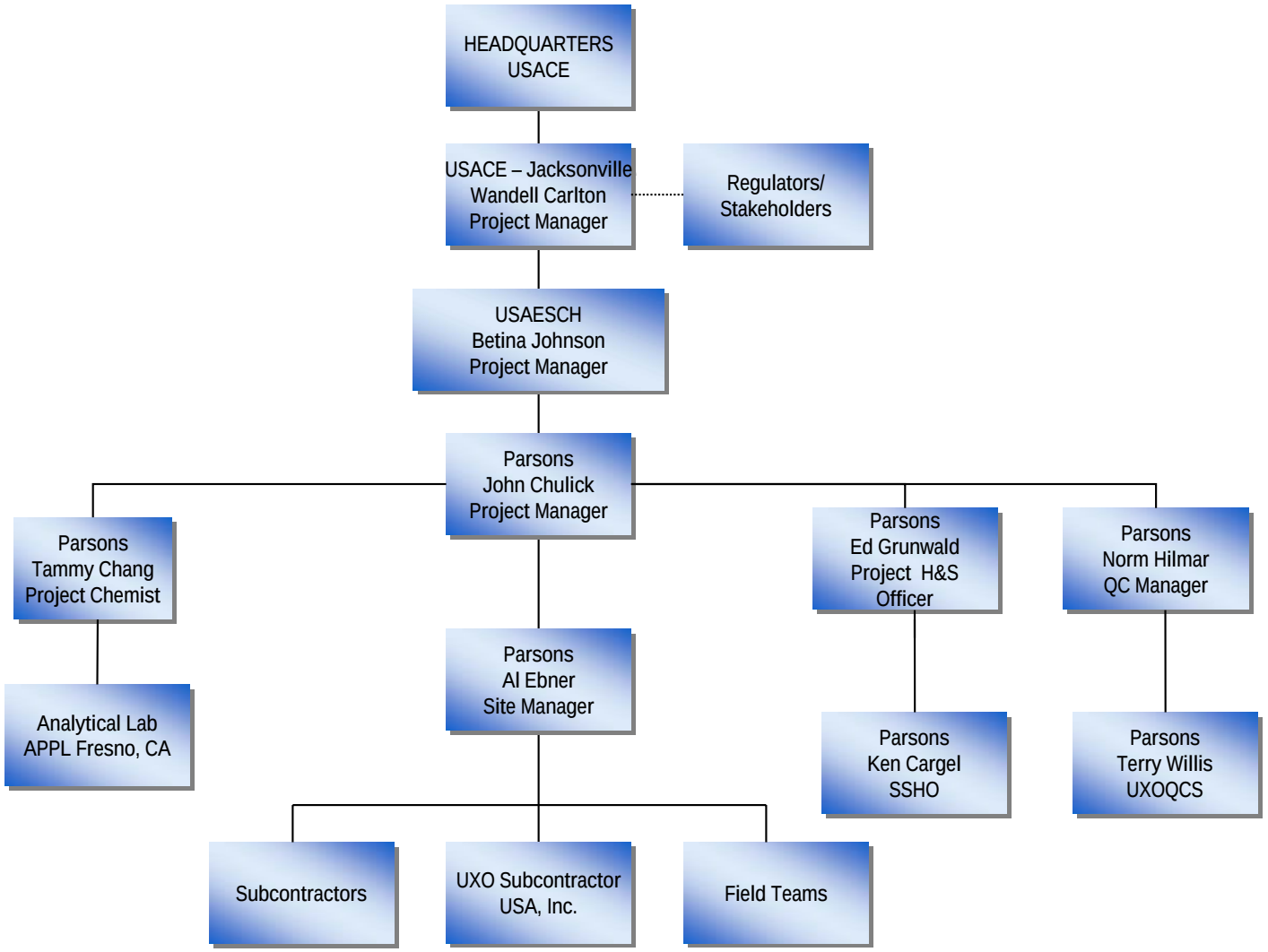
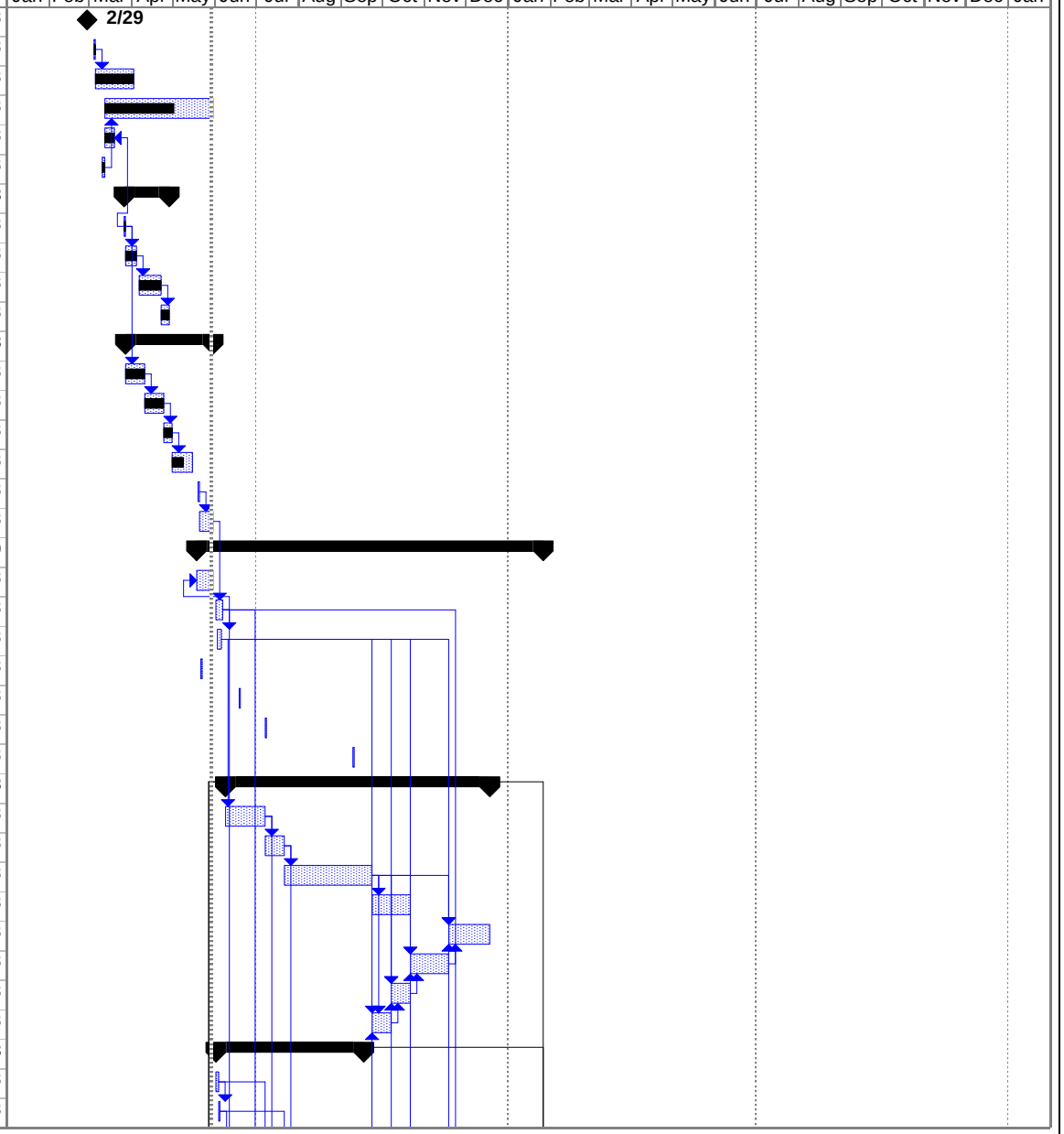


Figure 2.2: Pinecastle Jeep Range RI/FS - Schedule

ID	Task Name	Duration	Start	Finish
1	Task Order Award	0 days	Fri 2/29/08	Fri 2/29/08
2	Kickoff Telecon	1 day	Wed 3/5/08	Wed 3/5/08
3	Proposed Schedule	20 days	Thu 3/6/08	Wed 4/2/08
4	GIS on CD/DVD	56 days	Thu 3/13/08	Fri 5/30/08
5	Advance Packet/ CSM	5 days	Thu 3/13/08	Wed 3/19/08
6	Planning Meeting	2 days	Tue 3/11/08	Wed 3/12/08
7	**TPP Meeting #1**	**23 days**	**Thu 3/27/08**	**Mon 4/28/08**
8	Meeting	1 day	Thu 3/27/08	Thu 3/27/08
9	Draft TPP Memo	6 days	Fri 3/28/08	Fri 4/4/08
10	Comments	12 days	Mon 4/7/08	Tue 4/22/08
11	Final TPP Memo	4 days	Wed 4/23/08	Mon 4/28/08
12	**Work Plan**	**45 days**	**Fri 3/28/08**	**Fri 5/30/08**
13	Draft Work Plan	10 days	Fri 3/28/08	Thu 4/10/08
14	Comments	10 days	Fri 4/11/08	Thu 4/24/08
15	Draft Final Work Plan	4 days	Fri 4/25/08	Wed 4/30/08
16	Comments - RAB/Stakeholders	11 days	Thu 5/1/08	Thu 5/15/08
17	On Board Review	1 day	Tue 5/20/08	Tue 5/20/08
18	Final Work Plan	7 days	Wed 5/21/08	Fri 5/30/08
19	**Field Work**	**171 days**	**Mon 5/19/08**	**Mon 1/26/09**
20	Mobilize Command Staff	9 days	Mon 5/19/08	Fri 5/30/08
21	Mobilize Teams	5 days	Mon 6/2/08	Fri 6/6/08
22	Geophysical Proveout	3 days	Tue 6/3/08	Thu 6/5/08
23	Public Meeting - Area A	1 day	Thu 5/22/08	Thu 5/22/08
24	Public Meeting - Area B	1 day	Thu 6/19/08	Thu 6/19/08
25	Public Meeting - Area C	1 day	Tue 7/8/08	Tue 7/8/08
26	Public Meeting - Area D	1 day	Wed 9/10/08	Wed 9/10/08
27	**Geophysical Surveys**	**135 days**	**Mon 6/9/08**	**Thu 12/18/08**
28	Geophysics - Area A	20 days	Mon 6/9/08	Mon 7/7/08
29	Geophysics - Area B	10 days	Tue 7/8/08	Mon 7/21/08
30	Geophysics - Area C	45 days	Tue 7/22/08	Tue 9/23/08
31	Geophysics - Area D	20 days	Wed 9/24/08	Tue 10/21/08
32	Geophysics - Area E	20 days	Wed 11/19/08	Thu 12/18/08
33	Geophysics - Area F	20 days	Wed 10/22/08	Tue 11/18/08
34	Geophysics - Area G	10 days	Wed 10/8/08	Tue 10/21/08
35	Geophysics - Area H	10 days	Wed 9/24/08	Tue 10/7/08
36	**Brush Clearing**	**76 days**	**Mon 6/2/08**	**Wed 9/17/08**
37	Brush - Area A	2 days	Mon 6/2/08	Tue 6/3/08
38	Brush - Area B	1 day	Wed 6/4/08	Wed 6/4/08



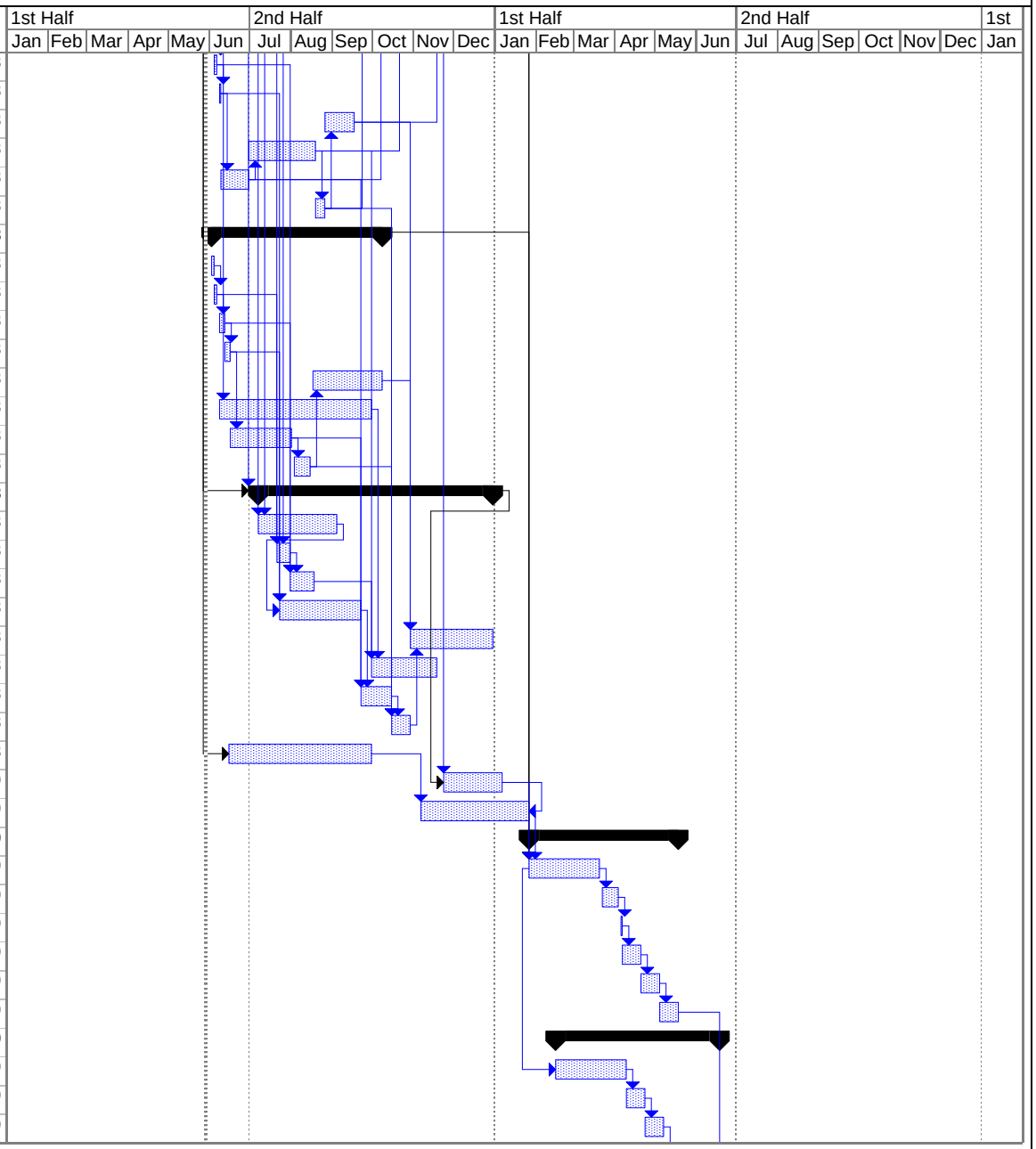
Project: Schedule
Date: Thu 5/29/08

Task | Progress | Summary | External Tasks | Split
Split | Milestone | Project Summary | External MileTask

Note: Work shown in Areas A - H is a example, no particular order or priority has been set. Holidays are non-working days.

Figure 2.2: Pinecastle Jeep Range RI/FS - Schedule

ID	Task Name	Duration	Start	Finish
39	Brush - Area C	2 days	Thu 6/5/08	Fri 6/6/08
40	Brush - Area D	1 day	Mon 6/9/08	Mon 6/9/08
41	Brush - Area E	15 days	Wed 8/27/08	Wed 9/17/08
42	Brush - Area F	35 days	Tue 7/1/08	Tue 8/19/08
43	Brush - Area G	15 days	Tue 6/10/08	Mon 6/30/08
44	Brush - Area H	5 days	Wed 8/20/08	Tue 8/26/08
45	**Surveying**	**90 days**	**Tue 6/3/08**	**Wed 10/8/08**
46	Surveying - Area A	2 days	Tue 6/3/08	Wed 6/4/08
47	Surveying - Area B	2 days	Thu 6/5/08	Fri 6/6/08
48	Surveying - Area C	4 days	Mon 6/9/08	Thu 6/12/08
49	Surveying - Area D	2 days	Fri 6/13/08	Mon 6/16/08
50	Surveying - Area E	37 days	Mon 8/18/08	Wed 10/8/08
51	Surveying - Area F	80 days	Mon 6/9/08	Tue 9/30/08
52	Surveying - Area G	33 days	Tue 6/17/08	Fri 8/1/08
53	Surveying - Area H	10 days	Mon 8/4/08	Fri 8/15/08
54	**Anomaly Excavation**	**118 days**	**Tue 7/8/08**	**Tue 12/30/08**
55	Excavation - Area A	42 days	Tue 7/8/08	Thu 9/4/08
56	Excavation - Area B	8 days	Tue 7/22/08	Thu 7/31/08
57	Excavation - Area C	12 days	Fri 8/1/08	Mon 8/18/08
58	Excavation - Area D	42 days	Thu 7/24/08	Mon 9/22/08
59	Excavation - Area E	37 days	Thu 10/30/08	Tue 12/30/08
60	Excavation - Area F	35 days	Wed 10/1/08	Tue 11/18/08
61	Excavation - Area G	17 days	Tue 9/23/08	Wed 10/15/08
62	Excavation - Area H	10 days	Thu 10/16/08	Wed 10/29/08
63	Phase I Sampling	15 wks	Mon 6/16/08	Tue 9/30/08
64	Phase II Sampling	5 wks	Mon 11/24/08	Tue 1/6/09
65	Analytical Data Submittal	50 days	Fri 11/7/08	Mon 1/26/09
66	**RI Report**	**80 days**	**Tue 1/27/09**	**Mon 5/18/09**
67	Draft RI Report	39 days	Tue 1/27/09	Fri 3/20/09
68	Comments	10 days	Mon 3/23/09	Fri 4/3/09
69	On Board Review	1 day	Mon 4/6/09	Mon 4/6/09
70	DF RI Report	10 days	Tue 4/7/09	Mon 4/20/09
71	Comments	10 days	Tue 4/21/09	Mon 5/4/09
72	Final RI Report	10 days	Tue 5/5/09	Mon 5/18/09
73	**Feasibility Study Report**	**89 days**	**Mon 2/16/09**	**Thu 6/18/09**
74	Draft FS Report	39 days	Mon 2/16/09	Thu 4/9/09
75	Comments	10 days	Fri 4/10/09	Thu 4/23/09
76	On Board Telecon	10 days	Fri 4/24/09	Thu 5/7/09



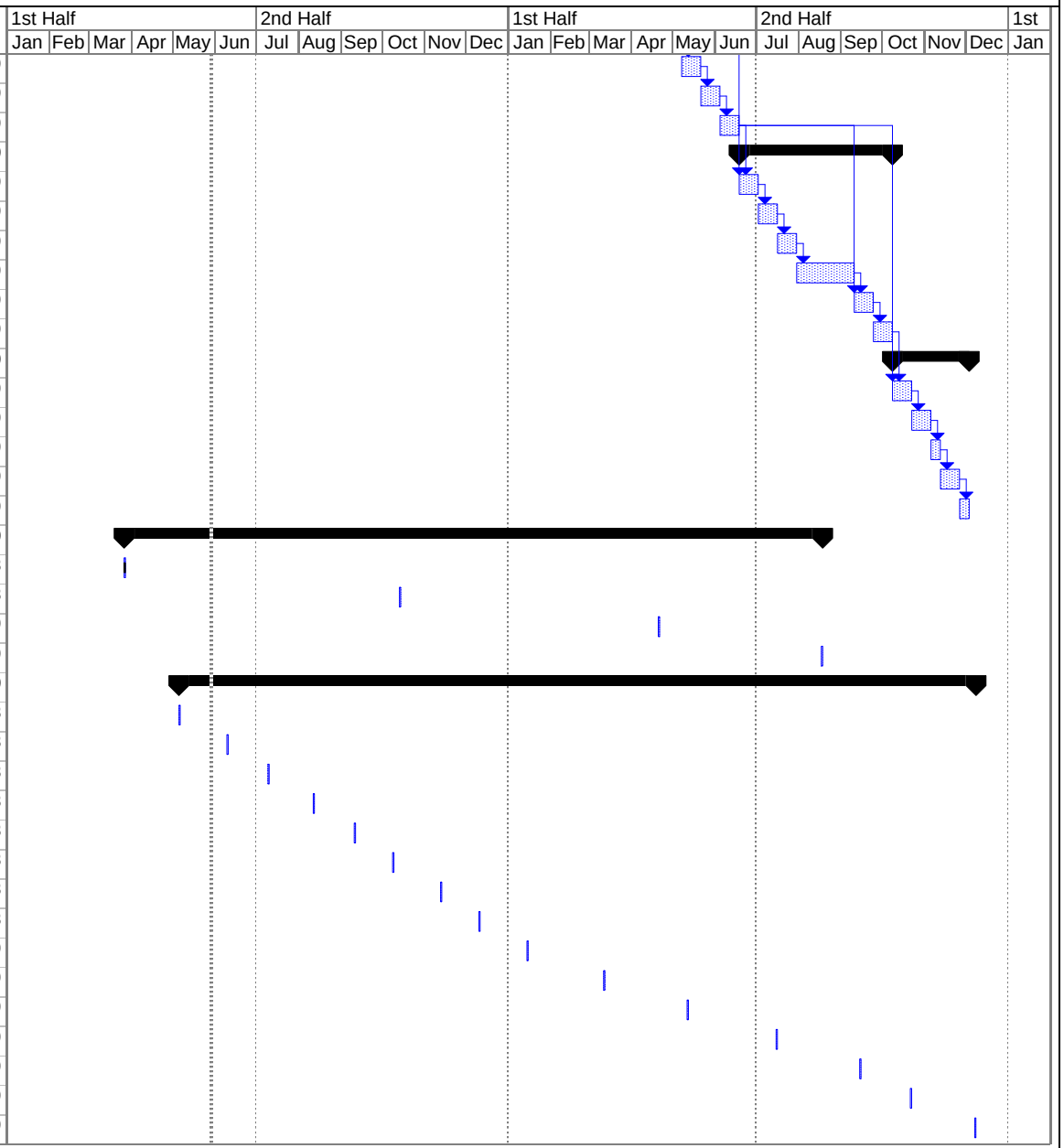
Project: Schedule
Date: Thu 5/29/08

Task | Progress | Summary | External Tasks | Split
Split | Milestone | Project Summary | External MileTask

Note: Work shown in Areas A - H is a example, no particular order or priority has been set. Holidays are non-working days.

Figure 2.2: Pinecastle Jeep Range RI/FS - Schedule

ID	Task Name	Duration	Start	Finish
77	DF FS Report	10 days	Fri 5/8/09	Thu 5/21/09
78	Comments	10 days	Fri 5/22/09	Thu 6/4/09
79	Final FS Report	10 days	Fri 6/5/09	Thu 6/18/09
80	**Proposed Plan**	**80 days**	**Fri 6/19/09**	**Thu 10/8/09**
81	Draft Proposed Plan	10 days	Fri 6/19/09	Thu 7/2/09
82	Comments	10 days	Fri 7/3/09	Thu 7/16/09
83	DF Proposed Plan	10 days	Fri 7/17/09	Thu 7/30/09
84	Public Review	30 days	Fri 7/31/09	Thu 9/10/09
85	Responsiveness Summary	10 days	Fri 9/11/09	Thu 9/24/09
86	Final Proposed Plan	10 days	Fri 9/25/09	Thu 10/8/09
87	**Decision Document**	**40 days**	**Fri 10/9/09**	**Thu 12/3/09**
88	Draft Decision Document	10 days	Fri 10/9/09	Thu 10/22/09
89	Comments	10 days	Fri 10/23/09	Thu 11/5/09
90	DF Decision Document	5 days	Fri 11/6/09	Thu 11/12/09
91	Comments	10 days	Fri 11/13/09	Thu 11/26/09
92	Final Decision Document	5 days	Fri 11/27/09	Thu 12/3/09
93	**Public Meetings**	**354 days**	**Thu 3/27/08**	**Tue 8/18/09**
94	Public Workshop	1 day	Thu 3/27/08	Thu 3/27/08
95	Meeting	1 day	Tue 10/14/08	Tue 10/14/08
96	Meeting	1 day	Tue 4/21/09	Tue 4/21/09
97	Meeting	1 day	Tue 8/18/09	Tue 8/18/09
98	**RAB Meetings**	**406 days**	**Tue 5/6/08**	**Tue 12/8/09**
99	RAB Meeting	1 day	Tue 5/6/08	Tue 5/6/08
100	RAB Meeting	1 day	Tue 6/10/08	Tue 6/10/08
101	RAB Meeting	1 day	Thu 7/10/08	Thu 7/10/08
102	RAB Meeting	1 day	Tue 8/12/08	Tue 8/12/08
103	RAB Meeting	1 day	Thu 9/11/08	Thu 9/11/08
104	RAB Meeting	1 day	Thu 10/9/08	Thu 10/9/08
105	RAB Meeting	1 day	Thu 11/13/08	Thu 11/13/08
106	RAB Meeting	1 day	Thu 12/11/08	Thu 12/11/08
107	RAB Meeting	1 day	Thu 1/15/09	Thu 1/15/09
108	RAB Meeting	1 day	Thu 3/12/09	Thu 3/12/09
109	RAB Meeting	1 day	Tue 5/12/09	Tue 5/12/09
110	RAB Meeting	1 day	Thu 7/16/09	Thu 7/16/09
111	RAB Meeting	1 day	Tue 9/15/09	Tue 9/15/09
112	RAB Meeting	1 day	Thu 10/22/09	Thu 10/22/09
113	RAB Meeting	1 day	Tue 12/8/09	Tue 12/8/09



Project: Schedule
Date: Thu 5/29/08

Task | Progress | Summary | External Tasks | Split
Split | Milestone | Project Summary | External MileTask

Note: Work shown in Areas A - H is a example, no particular order or priority has been set. Holidays are non-working days.

CHAPTER 3
FIELD INVESTIGATION PLAN

3.1 APPROACH

3.1.1 Overview

This Field Investigation Plan outlines the procedures Parsons will use to perform field activities for the former Pinecastle Jeep Range RI. The Field Investigation Plan is organized as presented below. Additional details relating to MC sampling and analysis are discussed in the SAP, included as Appendix E to this work plan.

- Subchapter 3.2 – Identification of Areas of Concern
- Subchapter 3.3 – Geophysical Prove-Out Plan
- Subchapter 3.4 – Geophysical Investigation Plan
- Subchapter 3.5 – Geospatial Information and Electronic Submittals
- Subchapter 3.6 - Intrusive Investigation
- Subchapter 3.7 – Munitions Constituent Sampling
- Subchapter 3.8 - Area-by-Area Approach
- Subchapter 3.9 – Investigation Derived Waste Plan
- Subchapter 3.10 – Risk Characterization and Analysis
- Subchapter 3.11 – Analysis of Institutional Controls
- Subchapter 3.12 – Preparation of the Recurring Review Plan

3.1.2 Site Characterization Goals

3.1.2.1 The primary objective and purpose of the investigation is to conduct a RI for the former Pinecastle Jeep Range. The goals of this RI are presented below.

- Evaluate the nature and extent of MEC that may be present within the boundary of the former Pinecastle Jeep Range. The focus of this goal will be on geophysical anomalies identified during the DGM of the investigation areas.
- Evaluate the nature and extent of MC that may be present at or around investigated anomalies, and if present, delineate the nature and extent of contamination.
- Evaluate the presence of munitions debris (MD) at suspect anomalous areas.

3.1.2.2. The RI will include the collection of soil, surface water, sediment, and groundwater samples (if determined by PDT). Analytical results will be compared to predetermined human health and ecological screening levels. A baseline ecological risk assessment will be conducted for those constituents that, based on the initial screening, pose a concern. The RI report will present a summary of the data collected, the risk assessment, and the conclusions.

3.1.2.3. At the completion of the RI, an FS will be conducted. The FS will develop and evaluate remedial alternatives and select the appropriate remedy for the site. The site remedy will be selected based on evaluating the threshold criteria (i.e., overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements [ARARS]), primary balancing criteria (i.e., short-term and long-term effectiveness; reduction of toxicity, mobility and volume through treatment and implementability and cost), and modifying criteria (i.e., community and support agency acceptance). The RI/FS will be considered complete upon USAESCH acceptance of a decision document meeting the requirements of ER 200-3-1 and MM-CX Interim Guidance Document 06-04.

3.1.3 Data Quality Objectives

3.1.3.1. Data quality objectives (DQOs) are qualitative and quantitative statements that specify the quality and the level of the data required to support the decision-making processes during each project. Guidance for the DQO development process is contained in Engineer Manual (EM) 200-1-2, *Technical Project Planning Process, Guidance for Performing Site Inspections under CERCLA* (EPA, 1992), and *Data Quality Objectives for Superfund* (EPA, 2000). The data collection objectives, the data uses, and the appropriate analytical data quality levels are identified in this section. Additionally, the sampling will be performed in agreement with the quality management program described in the EM 200-1-3, *Preparation of Sampling and Analysis Plans* and Engineer Regulation (ER) 1110-1-263, *Chemical Data Quality Management for Hazardous, Toxic, Radioactive Waste Remedial Activities.* DQOs have been established using the EPA 7-step method:

1. Step 1: *State the Problem* – Concisely describe the problem to be studied. Review prior studies and existing information to gain a sufficient understanding to define the problem.
2. Step 2: *Identify the Decision* – Identify what questions the study will attempt to resolve and what actions may result.
3. Step 3: *Identify the Inputs to the Decision* - Identify the information that needs to be obtained and the measurements that need to be taken to resolve the decision statement. Measurements would fall under guidelines described by the Institutional Analysis.
4. Step 4: *Define the Study Boundaries* – Specify the times and areas to which decisions will apply. Determine when and where data should be collected.

5. Step 5: *Develop a Decision Rule* – Define the statistical parameter of interest, specify the action level, and integrate the previous DQO outputs into a single statement that describes the logical basis for choosing among alternative actions.
6. Step 6: *Specify Tolerable Limits on Decision Errors* – Define the decision maker's tolerable decision error rates based on a consideration of the consequences of making an incorrect decision.
7. Step 7: *Optimize the Design* – Evaluate information from the previous steps and generate alternative data collection designs. Choose the most resource-effective design that meets all DQOs.

3.1.3.2. Overall project DQOs identified for the currently planned activities are presented below (Table 3.1). In addition, analytical DQOs are presented in Subchapter E.16 of the SAP (Appendix E).

3.1.3.3. Based on the available historical information relative to operations at the former Pinecastle Jeep Range and data from previous investigations, specific DQOs have been developed by the PDT for the following decision-making processes.

Table 3.1
RI Data Quality Objectives – Investigation of Geophysical Anomalies

Data Quality Objective	Project Specific Action
1. State the Problem	The discovery of MEC on the Mockingbird Property, and results of the Site Inspection prompted a Time Critical Removal Action (TCRA). If still present, MEC and MC may pose a risk to human health and the environment.
2. Identify the Decision	Are anomalies from the geophysical study consistent with buried MEC or munitions debris?
3. Identify Inputs to the Decision	A geophysical investigation will identify anomalies some of which may be attributed to additional potential burial pits at the PJR. Visual observations, geophysical reacquisition, and intrusive investigations will be used to confirm the presence or absence of MEC and other munitions debris.
4. Define the Boundaries of the Study	The RI will be limited to the specific areas in Areas A - H. Only those anomalies which can be attributed to munitions will be investigated. Anomaly investigation will not necessarily include complete removal of items of concern – i.e. visible items will be removed, but if a burial pit is encountered a TCRA or Non-Time Critical Removal Action may be required.
5. Develop a Decision Rule	The RI will be considered complete when the following criteria have been met. 1. All of the selected DGM anomalies and 100% of the Mag and Dig anomalies have been investigated.

Table 3.1 RI Data Quality Objectives – Investigation of Geophysical Anomalies	
Data Quality Objective	**Project Specific Action**
	2. Sufficient data are collected for the Feasibility Study. Recovered waste has been properly disposed of off-site.
6. Specify Limits on Decision Errors	A UXO-qualified technician will evaluate debris removed from excavations to determine if it is related to munitions.
7. Optimize the Design	Results of intrusive investigation of anomalies may be used to adjust the numbers of anomalies dug. For instance, if MEC is found along transects, additional transects and grids may be added to better characterize the area.

3.1.4 Data Incorporation

Data collected during the RI will be incorporated into the subsequent RI/FS report. These data may include such information as laboratory analytical reports, geophysical data, intrusive findings, and other information collected during the field activities.

3.1.5 MEC Exposure Analysis

MEC is a safety hazard and, as such, may constitute an imminent and substantial danger to the general public, site personnel, and the environment. Recent investigation activities suggest that MEC is likely to remain at a number of the Area of Concerns in the former Pinecastle Jeep Range.

3.1.6 Time Critical Removal Actions (TCRAs)

A TCRA was initiated in the fall of 2007 at the Odyssey Middle School, the Tivoli Gardens development, and the Warwick development. This action was performed after three practice fragmentation bombs with live fuzes and one M64, 6-lb incendiary bomb were discovered near the Odyssey Middle School on July 25, 2007. The TCRA is scheduled to continue through July 2008. If additional areas are found to be immediately dangerous to human life and health, they may be added to the TCRA during the course of the RI/FS.

3.1.7 Follow-on Activities

Data from the RI will be evaluated to distinguish whether a follow-on activity is needed for the former Pinecastle Jeep Range.

3.2 IDENTIFICATION OF AREAS OF CONCERN

The former Pinecastle Jeep Range encompasses approximately 14,419 acres including 81 acres of a bombing range circle that extend outside the FUDS boundary.

For the purpose of the RI, the site has been divided into eight areas identified as Area A through Area H (Figure 3.1). These area designations were established by the PDT and are based on former suspected military use and current land use. The investigation includes an area along the western edge of the site that extends beyond the former Pinecastle Jeep Range boundary (Area B – Figure 3.1). Although this area is located outside the indicated former Pinecastle Jeep Range boundary, it is located within the suspect bombing target circles established for the site. Area descriptions and the investigative approach for each area are discussed in detail in Subchapter 3.7.

3.3 GEOPHYSICAL PROVE-OUT PLAN

3.3.1 Purpose and Scope

As part of the RI at the former Pinecastle Jeep Range, a geophysical prove-out (GPO) will be conducted to determine the expected responses and limitations of the geophysical instruments. This GPO Plan states the parameters and conditions for testing that will exhibit the capability of the equipment chosen for the former Pinecastle Jeep Range RI to detect and accurately locate the various munitions expected at the site.

3.3.2 Technical Approach

3.3.2.1. The geophysical methods selected for demonstration in the GPO are based on Parsons' previous experience at other sites containing MEC. The instruments selected for the GPO include the Geonics EM61-MK2 electromagnetic metal-detector and the Geometrics G-858 magnetometer. These instruments will be tested in conjunction with a Real Time Kinematic (RTK) Global Positioning System (GPS). A fiducially based positioning approach will also be tested during the GPO to determine if that method will meet the project objectives where GPS equipment can not be used.

3.3.2.2. A formal analysis of the effectiveness of the chosen equipment and survey methods for the detection of MEC related material will be performed following the collection of data. To accomplish this analysis, the results of each survey will be processed as necessary in a manner similar to the procedures that will be used for the RI surveys. This will ensure that the final product of each survey will meet project objectives.

3.3.3 Test Plot Design

3.3.3.1. A test plot will be established with buried simulated and inert munitions of various types and sizes such as those encountered previously at the Pinecastle Jeep Range. The test munitions will be buried at a range of depths and orientations within a 100 ft by 200 foot grid. The munitions to be seeded in the grid include 20mm projectiles, 37mm projectiles, 60mm mortars, 4-lb incendiary bombs, 20-lb fragmentation bombs, 2.36-inch rockets, and 5-inch HVARs. Ideally, the test munitions will be inert ordnance, although simulated munitions may be used if inert munitions are not available. Test munitions will be obtained from a number of sources, as available, in the following order of priority:

1. USAESCH;
2. Inert or practice munitions found at the former Pinecastle Jeep Range as part of the TCRA;
3. Loaner test munitions from other locations, if available;
4. Test munitions purchased from commercial sources, if available; and
5. Simulated test munitions fabricated from hardware materials to mimic the size and characteristics of real munitions as closely as possible.

3.3.3.2. The GPO grid will be located in a geophysically quiet area on relatively flat, grassy ground. The location of the GPO grid will be determined at the start of field activities. The identification of a relatively quiet area will be determined using a Schonstedt magnetic locator, or similar instrument.

3.3.4 Site Preparation

3.3.4.1. The GPO site will be an area specifically selected as representative of the former Pinecastle Jeep Range (i.e., similar geologic conditions, isolation from overhead power lines, underground utilities, etc.). Once selected, the entire grid will be surface inspected by a qualified UXO technician and will be certified as free of surface MEC. Following this surface sweep, no UXO escorts will be required during geophysical data acquisition at the prove-out site.

3.3.4.2. When the grid is established and the staging area is set up, a geophysical investigation will be conducted over the grid using both the EM61-MK2 metal detector and the G-858 magnetometer to collect background data and locate pre-existing buried anomalies. The RTK GPS will be paired with the two geophysical instruments for these surveys and will be used to reacquire and mark the position of any pre-existing anomalies. The grid may be moved in one direction or another based on the number and locations of detected pre-existing anomalies that may cause interference with the GPO. If a limited number of pre-existing anomalies are detected in the background data, the grid will remain in the original location as planned, and the background anomalies will be documented. A description of the equipment and procedures for operation of the EM61-MK2 and G-858 are presented in Sections 3.3.7 through 3.3.13.

3.3.4.3. Following the evaluation of the collected background data by the site geophysicist, any pre-existing anomaly locations will be marked with spray paint. Pre-existing buried anomalies found in the GPO grid will not be disturbed during the GPO. All further activities, especially intrusive activities, will stay clear of the spray-painted anomaly locations by at least 5 feet.

3.3.5 Location Surveying

3.3.5.1. Land surveying operations will be conducted by a professional land surveyor (PLS) licensed in the State of Florida. The PLS will be accompanied at all times by a UXO technician who will provide escort and UXO avoidance services. If

possible, existing permanent survey monuments will be used. If not, a permanent monument will be established or semi-permanent marker stakes will be set by the PLS. The horizontal and vertical accuracy of the permanent monuments will be Class 1 – third order closures based on the English system. The predicted horizontal accuracy of the monuments will be ±3.0cm and referenced to the project coordinate system. Each permanent monument will be made of concrete with a 3¼- to 3½-inch domed aluminum survey marker. The monuments will be installed flush with the surface grade. The installed permanent monument or semi-permanent benchmark location will be used for the GPS base station.

3.3.5.2. All data submitted will use the project coordinate system, Universal Transverse Mercator Zone 17N. If possible, the GPO grid will be oriented either north-south or east-west, and the four grid corners will be located by the PLS to an accuracy of ±3 cm. The GPO grid will have an origin at the southwest corner (0 East, 0 North) determined by the PLS.

3.3.5.3. Surveying of the pre-existing anomalies will be performed by the site geophysicist following the initial background surveys. These locations will be avoided during the seeding operation. As the test munitions are placed (following the seeding procedure described in Subsection 3.3.6) they will be surveyed by the PLS to an accuracy of ±3 cm horizontal and ±5 cm vertical for the following points:

- Test munition tip;
- Test munition mid-point;
- Test munition tail; and
- Ground surface at the test munition location.

3.3.5.4. The coordinates of benchmark monuments, grid corners, pre-existing buried anomalies, and test munitions will be entered into a GIS database.

3.3.6 Seeding

3.3.6.1. During the seeding operation, the spray-painted locations signifying the location of the pre-existing buried objects will be avoided by a minimum of a 5-foot radius for all intrusive activities. Care will be taken to protect the spray-painted locations. If the paint at a location is removed for any reason (weather, grid set-up activities) the location of the anomaly will be reacquired and re-painted.

3.3.6.2. After site preparations are completed, inert or simulated ordnance items will be placed in the GPO grid. Information for each item will be entered in a table that will include the tracking number, horizontal and vertical orientation, and depth from the ground surface to the top of each test munition. An example of the test munition placement and numbering is presented in Table 3.2. Each type of munition presented in paragraph 3.3.3.1 will be buried at depths to demonstrate that the project objectives are technically feasible (DID MR-005-05.01). In general, duplicate items will be buried in an east-west orientation, a north-south orientation, and an up-down orientation, at each

depth studied. The number, orientation, and depths of the test munitions used in the GPO will be sufficient to characterize the capabilities and limitations of the proposed geophysical systems and to evaluate the ability of the proposed geophysical equipment to locate each type of MEC at the anticipated depths and orientations. Placement of the items will be accomplished by digging the holes using hand tools or a small excavator. It is anticipated that there will be no problems associated with digging the holes to the proposed depths with the exception of the holes for the 5-inch rockets and 20-lb fragmentation bombs. These items will be buried at the proposed depth or at the maximum depth reasonably achievable with the equipment on hand. It is not anticipated that these items would penetrate any deeper than a hole could be dug. The USAESCH may also elect to bury additional blind-test munitions at its discretion. In the event that a seed item is not detected by any of the instruments used in the GPO that item will be re-buried 2 inches higher than the original depth. The survey lines crossing the item will then be re-collected with the instrument that did not detect it. This process will be repeated until a reliable depth of detection can be determined for each seed item.

Table 3.2
Test Munition Placement and Numbering (Example)

Munition ID	Test Munition[1/]	Orientation	Inclination	Depth (inches)
GPO-1	20mm Projectile	East-West	Horizontal	6
GPO-2	20mm Projectile	N/A	Vertical	6
GPO-3	20mm Projectile	North-South	Horizontal	7
GPO-4	20mm Projectile	East-West	Horizontal	8
GPO-5	20mm Projectile	N/A	Vertical	9
GPO-6	20mm Projectile	North-South	Horizontal	9
GPO-7	37mm Projectile	East-West	Horizontal	12
GPO-8	37mm Projectile	N/A	Vertical	16
GPO-9	37mm Projectile	North-South	Horizontal	16
GPO-10	60mm Mortar	East-West	Horizontal	22
GPO-11	60mm Mortar	N/A	Vertical	26
GPO-12	60mm Mortar	North-South	Horizontal	26
GPO-13	4-lb Incendiary Bomb	East-West	Horizontal	16
GPO-14	4-lb Incendiary Bomb	N/A	Vertical	19
GPO-15	4-lb Incendiary Bomb	North-South	Horizontal	19
GPO-16	2.36-in Rocket	East-West	Horizontal	22
GPO-17	2.36-in Rocket	N/A	Vertical	25
GPO-18	2.36-in Rocket	North-South	Horizontal	25

Table 3.2
Test Munition Placement and Numbering (Example)

Munition ID	Test Munition[1/]	Orientation	Inclination	Depth (inches)
GPO-19	5-inch HVAR	East-West	Horizontal	55[2/]
GPO-20	5-inch HVAR	N/A	Vertical	55[2/]
GPO-21	5-inch HVAR	North-South	Horizontal	55[2/]
GPO-22	20-lb Frag. Bomb	East-West	Horizontal	40[2/]
GPO-23	20-lb Frag. Bomb	N/A	Vertical	40[2/]
GPO-24	20-lb Frag. Bomb	North-South	Horizontal	40[2/]

1/ All test munitions are inert rounds or simulated munitions.
2/ Indicated depth or maximum depth reasonably achievable.

3.3.6.3. As each test munition is buried, a record of the munition type, orientation (North-South, East-West) and inclination (horizontal-vertical) will be kept. The location of each item will be determined by the PLS. The test munition information will be added to the GIS database to be used for later comparisons in the GPO of instruments.

3.3.7 Geophysical Survey Equipment and Procedures

The main purposes of the GPO are to 1) demonstrate that the selected equipment and procedures can meet the project requirements, and 2) establish anomaly selection criteria to be used for the RI/FS. The GPO will be conducted to ensure the equipment and procedures will successfully detect buried ordnance items down to the target depth listed in Table 3.2 and within 1m of their horizontal location. The equipment and positioning methods that will be demonstrated as part of the GPO are shown in Table 3.3.

Table 3.3
Equipment and Positioning Methods

Geophysical Instrument	Positioning Method	Lane Spacing
EM61-MK2	Fiducial	0.6 and 0.8 meters
EM61-MK2	RTK GPS	0.6 and 0.8 meters
G-858	Fiducial	0.6 and 0.8 meters
G-858	RTK GPS	0.6 and 0.8 meters
Schonstedt (Magnetometer)	not applicable (N/A)	1 meter

3.3.8 EM61-MK2 Electromagnetic Survey

3.3.8.1. The EM61-MK2 consists of two 0.5m by 1m coils, separated vertically by a distance of 30cm, set on a pair of wheels and pulled by the operator. The EM61-MK2 device generates an electromagnetic pulse that triggers eddy currents in the subsurface. The eddy current decay produces a secondary magnetic field that is monitored by a receiving coil or coils. These secondary magnetic fields are received as data and stored

in a data logger until they can be downloaded to a personal computer for interpretation. The EM61-MK2 data logger collects data at automatic time intervals determined by the user to about 15 times per second. The logger can also be set to record data received from either the top coil or three or four different time gates from the bottom coil.

3.3.8.2. An EM61-MK2 electromagnetic metal-detector and the RTK GPS will be mounted on a wheeled cart platform with the bottom coil either 20 or 40cm above the ground surface. The wheel-size to be used for the project will be determined using the height optimization test described in Subsection 3.4.13.6. Prior to data collection, the equipment will be allowed to warm up for at least 5 minutes. The sensors will then be hand pulled over the GPO grid twice, once using GPS navigation (Trimble 5800 or Leica 1200) and once using fiducial navigation. Surveys will be conducted using 0.6m and 0.8m lane spacing, with the data logger set to record EM61-MK2 data at a rate of 15 Hz and GPS/RTS data at a rate of 1 Hz.

3.3.8.3. Data from the EM61-MK2 and the GPS will be recorded on the EM61-MK2 data logger. These data streams will be recorded in a single file, eliminating the need for synchronization between the EM61-MK2 data logger clock and the GPS clock as well as eliminating the effects of clock drift between the instruments. In the case of the fiducial survey, lines will be started as the cart is pulled over one end line of the grid and ended as it is pulled over the opposite end line.

3.3.8.4. The raw data files will be preprocessed to interpolate EM61-MK2 data points between the GPS positions recorded every second or to interpolate the fiducial data points between the start and end lines of the grid. The exported data will include position information, data from each of the four channels for the EM61-MK2 (four bottom coil time gates), other equipment status information, and the data acquisition time stamp.

3.3.8.5. These data files will then be imported into the Geosoft Oasis Montaj™ (Oasis) geophysical data processing environment. Once in Oasis, the coordinates for the data will be translated to the project coordinate system, the four channels will be leveled using a median statistics filter, and the four leveled bottom coil channels will be summed to produce a total channel.

3.3.8.6. The QC data for each survey, collected as described in Subchapter 3.4.13, will be evaluated for compliance with the requirements specified in Subchapter 3.3. Any spikes present in the data will be manually edited or removed. The geophysical processor then will evaluate the results of the latency test to determine the instrument latency correction necessary for the data set. This corrects for delays that occur in the electronics of the EM61-MK2 and in the processing of the data on the data recording computer. The latency correction will be computed by determining the latency value that corrects the position to overlap the anomaly due to the latency test item when the sensor travels over it in different directions. Typically this value is between 0.2 and 0.4 seconds.

3.3.8.7. Once this value is determined, it will be applied to the whole data set, and the total channel will be gridded and displayed. The displayed values will be evaluated

against the information in the field notes to determine if they are consistent and whether or not the data meet expected data quality standards. Various EM61-MK2 channels or combinations of channels (3rd time gate only, total, average, etc.) may be gridded to determine which approach most accurately identifies the seeded items while producing a low false positive rate.

3.3.8.8. The processor will then automatically make anomaly selections on the data using the Geosoft UX-Detect™ Blakely algorithm. A low threshold will be used to ensure that all anomalies are selected. The anomalies will be prioritized by the peak magnitude. Additional analysis of the data will be performed to determine the following information for each anomaly chosen:

- Anomaly Power – Calculated using and Oasis Montaj Geosoft Executable (GX) developed by Parsons, the power integrates the instrument responses observed within a user-defined radius of the selected anomaly location;
- Decay Constant - Calculated using an Oasis GX developed by Parsons, the decay constant can differentiate between MEC anomalies and cultural items or small arms ammunition;
- Anomaly Width - Calculated using an Oasis GX developed by Parsons, the anomaly width is related to the depth and size of an item and can be used to differentiate between small, shallow cultural items or small arms ammunition and deeper items; and
- Anomaly Size – Modeled using the UX-Analyze add-on to Oasis, the anomaly size can be used to differentiate between larger MEC items and smaller cultural items or small arms ammunition. This software can also refine the item coordinates based on modeling of the dataset.

3.3.8.9. Results of the advanced processing described above will be evaluated to determine which pieces of information may be effective in differentiating an anomaly caused by MEC/MD from an anomaly caused by some other type of debris or geophysical noise. A range of acceptable values will be calculated for each of the advanced processing categories determined to be effective for differentiation purposes, and anomalies with values outside any of the ranges will be eliminated from consideration. The remaining anomaly selections will then be merged so that closely spaced anomaly selections (peaks within 2.5 feet of one another) will be consolidated to a single pick. The anomaly selections and the data will then be evaluated by the geophysical processor to ensure that the remaining anomaly selections are valid. Anomaly selections around surface features identified in the field notes will be removed. The processor can also add or delete any other anomaly selections the processor feels necessary.

3.3.9 G-858 Magnetic Surveys

3.3.9.1. Magnetic surveys will also be performed over the GPO grid using a G-858 magnetometer. The G858 magnetometer uses two cesium vapor sensors, each with a miniature atomic absorption unit from which a signal proportional to the intensity of the

ambient magnetic field is derived. For this project, the G858 will be used as a gradiometer with the two sensors mounted on an aluminum pole and separated vertically by a distance of 1.5 feet. The height at which the sensors will be carried above the ground surface will be determined using the height optimization test described in Subsection 3.4.13.6. Geophysical operators will carefully monitor the instrument readings during data acquisition and evaluate the downloaded data. The sensitivity of the G858 magnetometer sensors ranges from 0.01 to 0.05nT, and data can be acquired as fast as twenty times per second.

3.3.9.2. The survey and processing procedures for the G-858 surveys will be similar to those used for the EM61 MK2 surveys. As with the EM, the G-858 will be carried over the GPO grid twice, once using GPS navigation and once using fiducial navigation. Both surveys will be conducted using 0.6m line spacing, with the data logger set to record data at a rate of 15 Hz and GPS data at a rate of 1 Hz. The only significant difference in data collection will be the location of the GPS sensor, which will be carried on a backpack worn by the operator rather than mounted above the sensor as was the case with the EM61 MK2. The difference between the location of the G-858 sensors and the GPS sensor will be accounted for during processing.

3.3.9.3. All G-858 data processing will essentially be the same as the EM61 MK2 processing with the exception of the data channel to be gridded. In the case of the G-858, the gradient between the upper and lower sensors will be gridded and used for target picking. Depending on the results, the total field measured by the lower sensor may also be evaluated. Finally, the analytic signal for the chosen data channel will be calculated and evaluated both for target picking purposes and for use in determining the anomaly power for detected items. The anomaly power will be assessed for its potential use in differentiating between anomalies caused by small debris/geophysical noise and MEC/MD items.

3.3.10 Handheld Metal Detector Surveys

3.3.10.1 Analog surveys require operators using Schonstedt handheld metal detectors to identify anomalies in the field based on the audible output to the analog sensor. As they are identified, the anomaly locations will be marked with survey pin flags. For the GPO, locations of anomalies detected by the Schonstedt will be identified and recorded using the RTK GPS system. The Schonstedt magnetometer (or other equivalent metal detector) will be tested at the GPO to determine the applicability of these instruments to Mag and Dig surveys and other uses for the field investigation.

3.3.10.2 The Schonstedt magnetometer is a hand-held unit that employs two flux-gate sensors aligned and mounted a fixed distance apart to detect changes in the earth's ambient magnetic field caused by ferrous metal. The Schonstedt magnetometer responds with an audio output and a meter deflection when either sensor is exposed to a disturbance of the earth's ambient magnetic field associated with a ferrous metal target and/or the presence of a permanent field associated with a ferrous metal target. In most

cases, it will be a combination of both circumstances. Schonstedt magnetometers, which are highly portable, will also be used during UXO avoidance activities.

3.3.10.3 Mag and dig survey operations will be performed by UXO technicians or sweep personnel. The mag and dig survey will be conducted in lanes across the grid at 1.0m intervals. Using the Schonstedt magnetometer, the UXO technician will start in the southwest corner of the GPO grid and proceed in a straight line toward the northwest or southeast corner of the grid, surveying a 1.0m wide path. Traffic cones will be set on a measuring tape along each boundary at 1.0m intervals to help keep lanes straight and properly spaced. Locations of confirmed anomalies will be marked in the field with survey pin flags. Those pin flags will then be revisited with an RTK GPS system to record the coordinates on a data logger.

3.3.10.4 Upon reaching the far grid boundary of the GPO grid, the UXO technician or sweep personnel will reposition to the next lane and repeat the process back toward the starting boundary of the survey grid. This process will be repeated until the entire GPO grid is surveyed. After the handheld metal detector survey is completed, the pin flags will be removed.

3.3.11 Instrument Standardization

Instrument standardization procedures are described in Subchapter 3.4.13.

3.3.12 Data Management

Data management procedures for the geophysical survey data are presented in Subchapter 3.4.18.

3.3.13 Health and Safety

Project personnel and public health and safety are of paramount importance to the conduct of this work. Specific details of the health and safety program for the former Pinecastle Jeep Range RI/FS (including the GPO effort) are presented in the Accident Prevention Plan, Appendix D, of the project Work Plan.

3.3.14 Quality Control

Quality control procedures for the GPO as outlined in Attachment B of DID OE005-05.01 and in Subsection 3.4.19 of this WP will be implemented.

3.3.15 Anomaly Avoidance

Anomaly avoidance will be based on analysis of the background data collected during the site preparation phase. Paint marks will be placed at the locations of found anomalies. During seeding operations, locations of pre-existing anomalies will be reacquired prior to digging in these areas. Before any digging is performed for placement of a test munition, a quick anomaly search will be conducted using a Schonstedt magnetometer to further ensure the area is clear.

3.3.16 Anomaly Reacquisition

Verification of reacquisition techniques will also be performed at the prove-out grid. The reacquisition team will be provided with the list of anomaly locations from both an EM61 MK2 and a G-858 survey. The RTK GPS will be used in conjunction with each geophysical instrument to reacquire the anomalies identified in their respective surveys. The reacquired anomaly locations will then be surveyed using the GPS. The locations of the reacquired targets will be evaluated to verify that reacquisition techniques and teams are capable of locating these targets within a 1m radius of the actual target location.

3.3.17 Data Evaluation

3.3.17.1. The anomaly selections obtained for both the EM61 MK2, the G-858, and the Schonstedt will be analyzed by comparing them to the known test munition locations. Several criteria will be evaluated for each data set. The criteria will include:

- Percentage of test munitions detected;
- Percentage of false positives (N/A for Schonstedt);
- Optimal threshold level for each method that results in the maximum number of buried targets detected and minimizes the number of false positives (N/A for Schonstedt);
- Effectiveness of the proposed advanced processing analyses to differentiate between test munitions and debris/noise picks (N/A for Schonstedt);
- Average distance between the anomaly selection location and actual target (test munition) location; and
- Average distance between the reacquired anomaly location and actual target (test munition) location (N/A for Schonstedt).

3.3.17.2 Primary and secondary Data Quality Objectives will also be developed from the prove-out data for the EM-61 and G858. Table 3.4 lists proposed primary and secondary DQOs that will be confirmed or refined based on the results of the GPO.

Table 3.4 Proposed GPO DQO's

DQO	Measure	Method of Measurement
Background Noise	Standard Deviation < 4.0 mV on the total channel for EM61-MK2. Standard Deviation < 2.0 nT/ft for the G-858 gradient	Calculate the standard deviation of background data in a polygon selected to not include anomalies.
Repeatability	1. PM standard test item responses within 20% of AM responses for raw total channel. 2. Repeat line anomaly amplitudes within 20% of original amplitudes and peaks within 20cm of original location	1. Subtract the background values from the response and compare AM and PM results. 2. Visual inspection of the two lines superimposed on one another.

Table 3.4 Proposed GPO DQO's		
DQO	**Measure**	**Method of Measurement**
GPS Accuracy	GPS positions accurate to within 0.3 meters.	The distance between the crossing point of GPS accuracy test track lines and the known point location will be calculated.
Instrument Latency	No zig-zag or chevron effects.	Visual examination of anomaly shape in grid data. Latency test for transect data.
Sampling Density	No more than 5% of the data points will have distance between sequential points greater than 0.2m	Calculate percentage of sequential data points separated by more than 0.2 meters
Data Acquisition Speed	No more than 3% of the velocity values between points will be greater than 3.2 mph.	Calculate velocity by dividing the distance between sequential points by the time difference between these points and calculate percentage of velocity values greater than 3 mph for the dataset.
Data Coverage	Maximum data gap size of 0.4 square meters and total of all data gaps not to exceed 0.1% of total survey area.	Footprint coverage map will be created using an instrument footprint of 0.6m. This map should contain no blank areas larger than 0.4 square meters.
Anomaly Selection	Select all anomalies meeting the anomaly selection criteria that are not caused by a known source.	Visual examination of the survey area for anomalies meeting selection criteria.
Reacquisition	Final location of 95% of targets after reacquisition is within 1m of the actual item location.	Record offset during excavation from reacquired point to actual item.
Test Munition Detection	Selected location of test munitions is horizontally within 1m of munition.	Compare test munition coordinates with selected anomaly coordinates.
Dig Results	Reinvestigate anomalies with dig results that are not consistent with survey data.	Reinvestigation criteria will be determined using the results of the GPO.

3.3.17.3. A geophysical detection system will not be used for site surveys until it is deemed capable of meeting the DQOs or until the project team (USACE and Parsons) agrees on the reasoning behind a DQO not being met and establishes an appropriate revised DQO. If DQOs were not met due to operator error or incorrect survey parameters, the GPO will be resurveyed to confirm that DQOs can be achieved.

3.3.18 False Positives

The project false positive rate (percentage of anomalies confirmed during reacquisition resulting in no detectable metallic material recovered during excavations), will be monitored. The project goal is to achieve a rate below 15 percent. Should this

rate be exceeded, re-evaluation of the data, detection methods being used, and overall project QC will be performed.

3.3.19 GPO Letter Report

Processed GPO data will be transferred to the USACE within one day of collection. As data collection for the RI/FS project is scheduled to begin immediately following the collection and processing of the GPO data, the Parsons site geophysicist will work closely with the USACE geophysicist to ensure USACE agrees with the equipment, procedures, and DQOs established for the project. All collected data will be subject to USACE's agreement with the procedures used to collect the data. Due to the expedited schedule for this project, the submittal of the GPO letter report may occur after the start of geophysical data collection at the former Pinecastle Jeep Range.

3.4 GEOPHYSICAL INVESTIGATION PLAN

This subsection provides details of the approach, methods, and operational procedures for the geophysical surveying, geophysical anomaly reacquisition, and associated data processing for the former Pinecastle Jeep Range.

3.4.1 Introduction

3.4.1.1. The EM61-MK2 time domain electromagnetic sensor will be the primary instrument used to collect geophysical data at the former Pinecastle Jeep Range. To minimize the impact to conservation areas at the site, the G-858 magnetometer will be used and only the minimal path needed to cross the area will be cleared. The survey techniques used with either instrument are fairly similar; therefore, the techniques discussed in this WP are applicable for both instruments except where expressly stated otherwise.

3.4.1.2. In the residential areas and other areas where complete coverage is needed, the EM61-MK2 will be operated over the entire area. Generally, this means the instrument operator will pull the wheeled instrument while carrying the GPS to record the position. Where the sky is obscured by buildings or trees, a small grid will be established to record the geophysical data. As the EM61-MK2 approaches buildings and other structures, the interference from the structures will begin to mask the signals from the buried items that are the subjects of the survey. The intervening zone will be covered using handheld metal detectors.

3.4.1.3. In undeveloped areas and conservation areas, geophysical data will be collected along transects. In most areas, transects will be spaced approximately 250 feet apart. The spacing of these transects is based on the EM 1110-1-4009, Military Munitions Response Actions – a guidance document developed through research of numerous ranges and statistical computations, and from experience on conducting investigations on hundreds of ranges nationwide. The spacing selected for this site provides coverage that is within the guidelines for a range of this size. If additional data are needed, transects will be added between the existing transects in the area of interest.

The additional transect reduces the space between transects to 125 feet. In areas where the sky is open to GPS satellites, geophysical data will be collected in conjunction with the GPS. Where tree cover obscures the sky, transects will be marked with stakes that will provide a fiducial reference for the position of the geophysical data. The locations of the stakes will be measured and recorded by a PLS. To allow the geophysical instruments to pass through brushy and wooded areas, the transects will be cleared of vegetation to a width to accommodate the instrument being used. For vegetated upland areas, a 3-foot (1-meter) path will be cleared to allow passage of the EM61-Mk2. To minimize the impact to conservation areas, the G-858 magnetometer will be used and only the minimum path needed to cross the area with the instrument will be cleared.

3.4.1.4. Where initial DGM results in undeveloped areas identify MEC, grids may be established to further characterize the nature and extent of the MEC. The grids will be 50 ft by 50 ft and will be completely covered by DGM using the EM61-Mk2. The grids will be established by surveying the grid corners and clearing the intervening area of brush and low branches. Trees larger than 3 inches in diameter will not be cut down. The placement of the grids will be established based on concurrence between Parsons and the USAESCH.

3.4.2 Geophysical Data Quality Objectives

3.4.2.1. The primary geophysical DQOs are to detect the various types of ordnance present at the site and to report their horizontal position within 1m of the item location. The DQOs listed in Table 3.4 will also be used for this project, unless changed based on the results of the GPO. It should be noted that the horizontal location DQO may not be applicable for the sources of some transect anomalies, as it is possible that a large metallic object could be detected on a transect passing more than 1m from the object.

3.4.2.2. In addition to these DQOs, one of the objectives of the geophysical investigation is to minimize false positives (FP). False positives are defined as anomalies selected for intrusive investigation that result in no source items being identified. One of the performance goals for this project is to achieve a FP rate below 15 percent. If the FP rate exceeds 15 percent the project geophysicist will conduct a root cause analysis to determine the cause of the high number of FPs.

3.4.3 Location of Investigation Areas

The former Pinecastle Jeep Range has been divided into eight investigation areas for the purpose of this RI. Each of the investigation areas is discussed in detail in Subchapter 3.7. The investigation areas A through H are presented on Figure 3.1.

3.4.4 Anticipated MEC Types

Various MEC types are either known to have been used, possibly used, or have been found at the former Pinecastle Jeep Range and are presented in Table 1.1.

3.4.5 Depths Anticipated

3.4.5.1. The TCRA in progress at the former Pinecastle Jeep Range has recovered MD and MEC at depths ranging from 2 to 48 inches below ground surface (bgs). This excludes burial pits containing MEC that have been as deep as 16 feet bgs. The depths of the recovered MEC and MD range from 6 inches bgs to 48 inches bgs and consist of 20mm projectiles, 37mm projectiles, 20-lb and 23-lb fragmentation bombs, and 2.36- and 5-inch rockets. It is anticipated that during the RI activities, MEC and MD will be recovered at similar depths.

3.4.5.2. The 20mm projectiles encountered to date at the site consist of solid steel and have no explosive components. It should be noted that 20mm projectiles are extremely difficult to detect with any type of geophysical instrument at any depth and that it may not be possible to detect these munitions reliably to a depth of 9 inches. Six 20mm projectiles will be buried in the GPO grid, three at 9 inches and three at 6 inches. The capabilities of the EM61 MK2 and G-858 to detect these munitions at various depths will be evaluated following the GPO, and expectations regarding their detection during the RI/FS will be discussed with USACE.

3.4.6 Geology and Soil

The former Pinecastle Jeep Range is located in the central Floridian Section of the Coastal Plain physiographic province. The site area is located entirely within the Central or Mid-peninsular Zone, which is characterized by a series of ridges and valleys that parallel both the Atlantic coastline and the longitudinal axis of the peninsula (USACE, 1997). The site soils are nearly level to gently sloping, very poorly drained to moderately well drained in the urban areas. Sandy soils are predominant throughout the area of the site. The majority of the site is underlain by soils which typically have a surface layer of fine, black sand approximately four inches thick. Below this to approximately 17 inches is gray fine sand. The upper subsoil to a depth of 22 inches is black, fine sand, with lower subsoil to 27 inches dark brown fine sand (USACE, 1997). A detailed description of the geology and site soils is presented in Chapter 1.

3.4.7 Groundwater Conditions

Information related to the average depth to the surficial aquifer in the study area was not available in the historical documents reviewed. It is anticipated that the depth to groundwater in the area is relatively shallow and likely ranges from near surface to approximately 10 feet bgs.

3.4.8 Vegetation

The vegetation across the site consists of manicured lawns in the residential areas, open pasture land, moderate grassland areas and underbrush in the wetland areas, and areas of heavy underbrush and forest.

3.4.9 Geophysical Conditions

The sandy soils located throughout the investigation area are expected to provide a low noise environment for the EM61-MK2 and the G-858 magnetometer. Brush clearing will be required in many of the investigation areas to facilitate geophysical operations. For vegetated upland areas, a 3-foot path will be cleared to allow passage of the EM61-MK2. In conservation areas, the G-858 magnetometer will be used and only the minimum path needed to cross the area with the instrument will be cleared. Where grids are established, the intervening area of brush and low branches will be cleared. Trees larger than 3 inches in diameter will not be cleared.

3.4.10 Site Utilities

A significant amount of underground utilities are expected to be present in the residential investigation areas. Parsons will contact the utility location services prior to the start of any intrusive activities. The progress of the intrusive activities and the status of the utility clearance will be monitored closely to insure that properties are available for investigation. It is important that utilities not be cleared too far in advance to avoid the inadvertent removal of marking flags or the disappearance of paint markings identifying utility locations. Underground utilities are not expected to be an issue for the majority of the undeveloped areas.

3.4.11 Man-Made Features

The site has many residences and other man-made features which will obstruct data collection and cause elevated sensor responses. The geophysical data collection teams will map all relevant man-made features to provide the data processor with the information they need to avoid selecting anomalies caused by visible metal items.

3.4.12 Site-Specific Dynamic Events

Dynamic events such as rain, lightning, and solar flares may affect geophysical data collection. Procedures for geophysical survey operations when these events occur are described below.

3.4.12.1 Rain

The EM61-MK2 and G-858 are relatively water resistant. Additional measures will be taken by the survey teams (such as covering connections with plastic sheeting) to reduce the possibility of moisture influencing the instrument's electronics. When possible, survey teams will operate the instruments under very light rain conditions (drizzling). If the rain persists and the team determines there is a potential for an impact to the data quality or that moisture could be getting into the instruments, field operations will cease and the Site Geophysicist and SM will be notified. Operations will continue after the rain has ceased or has reduced to a drizzle.

3.4.12.2 Site Conditions

If footing for the operators becomes difficult because of wet terrain or vegetation, operations will cease until the area is deemed safe by the SSHO. The determination to stop will be made by the SSHO and the project team will be immediately notified.

3.4.12.3 Lightning

3.4.12.3.1 Lightning is a hazard with respect to all field activities. Lightning strikes, even at distant locations, may cause extremely high local earth currents. Effects of remote lightning strikes are multiplied by their proximity to conducting elements such as those found in buildings, fences, railroads, bridges, streams, and underground cables or conduits.

3.4.12.3.2 Any visible lightning in the area will be considered a safety hazard and survey activities will be stopped until all lightning activity has ceased within 5 miles in accordance with EP 385-1-95a. Site personnel and equipment will be moved to a safe area. The determination of the presence of lightning can be made by any site personnel, who will then immediately contact the SSHO, who will in turn stop all geophysical operations until the lightning has ceased or moved far enough away that it does not present a hazard. The geophysical data processors will review the dig list and remove anomalies that appear to be caused by lightning and will note the removal in the project database.

3.4.12.4 Solar Flares

Solar flares generally do not affect the EM61-MK2 or G-858 sensors.

3.4.13 Instrument Standardization

3.4.13.1. To assure the quality of the mapped geophysical data, several tests will be performed with the selected geophysical instrument. These tests, the objective of each test, and the acceptance criteria are described below.

3.4.13.2. A six-line test will be conducted to evaluate the repeatability and positional accuracy of the response amplitude of a ferrous object. The operator will walk back and forth over a known point six times. The first two passes will be with no spike object present; passes three through six will incorporate the test object at the known point; the fifth pass will be walked slowly; and the sixth will be walked quickly. The positions of the anomalies from the six passes will be evaluated to ensure the data are being located accurately.

3.4.13.3. A static test will be conducted with each instrument at the beginning and end of each day it is used. This test will involve collecting background data with the instrument in a static (stationary) mode for three minutes, collecting data with a test item for one minute, and removing the test item and collecting data for one minute. The static test will be repeated at the end of the day and the response (test item value minus

background value) will be compared with the test conducted prior to the survey. The range of the background readings recorded by the instrument during the 3-minute static tests should not exceed the following values for the EM61 data channels: Ch1 - +/-3.5 milliVolts (mV); Ch2 - +/-3.0mV; Ch3 - +/-2.5mV, and Ch4 - +/-2.0mV. The range of values should not exceed +/-1 nT for the total magnetic field measured by the two G-858 sensors. For both instruments the pre- and post-survey responses should be within 20 percent of one another.

3.4.13.4. A personnel and equipment noise check will also be performed each day. For this test, the operator will move his/her body in relation to the sensor(s) to ensure there are no metallic items on the operator that will interfere with the measurements. The operator will also shake the instrument cables to ensure that poor connectors and cables will not introduce noise into the data. The range of the readings recorded by the instrument during each test should not exceed 3mV on channel 3 or 3nT/foot for the magnetic gradient.

3.4.13.5. A GPS/Latency test will be performed each day by walking the instrument over a known point in orthogonal directions and over a stationary test item in opposite directions while collecting data. Application of the correct latency value should result in identical locations for the two peaks over the test item and in a crossing point for the orthogonal lines within 0.3m of the location of the known point.

3.4.13.6. A height optimization test will also be performed for both instruments. For the height optimization test, the operator will carry the instrument over three buried 37mm projectiles with the sensor(s) at different heights above the ground surface. The EM-61 will be pulled using the typical wheel configuration and at half the normal height using smaller wheels. The G-858 will be carried at heights of 6 inches, 9 inches, and 12 inches. The signal-to-noise ratios for each line will then be compared to determine which sensor height results in the highest signal–to-noise ratio. This height will be used throughout the project.

3.4.13.7. Finally, a G-858 specific test, the azimuth test, will be performed at the start of the project using that instrument. For this test, the operator will keep the sensors stationary and rotate around them through 360 degrees to determine if dropouts are more likely in any particular direction based on the sensors' positions relative to the earth's magnetic field. If dropouts are noted in any particular orientation, magnetic transect lines will be walked so as to avoid this orientation to the extent possible.

3.4.13.8. The tests described above will be performed either at the beginning of the project or at the beginning and end of each day that surveys are conducted. In addition to these tests, instrument standardization will be evaluated in each survey grid by collecting repeat lines. One line from the each grid will be recollected at the completion of that grid. Comparison of this line with the original line should result in anomaly peak amplitudes within 20 percent of one another and within 20cm of the original locations. In order to test the repeatability of transect surveys; a test line will be set up at a convenient location for daily testing. The test line will be 100 feet in length and it will be surveyed at the beginning and end of each day that either an EM-61 or G858 is used for surveying

a transect. Three test items (not necessarily munitions or simulants) will be buried along the line to test response and location repeatability. The acceptance criteria for the test line will be the same as the acceptance criteria for grid repeat lines.

3.4.13.9 Schonstedt magnetometers will be tested daily at either the prove-out grid or a smaller test grid set up a more convenient location. As long as the operator is able to detect seed items buried in the grid, the equipment will be considered to be in working order.

3.4.14 Geophysical Surveys

3.4.14.1 Equipment

- **EM61-MK2 -** The EM61-MK2 is a high-resolution time-domain metal detector that can be used to detect both ferrous and non-ferrous targets. It consists of two 0.5m x 1m coils, a bottom transmitter/receiver coil positioned either 20 or 40cm above the ground and a top receiver coil 30cm higher. The configuration used for the RI/FS (wheels or skids) will be determined using the height optimization test described in Subsection 3.4.13.6. During operation, the bottom coil transmits a pulsed primary magnetic field, which induces eddy currents in nearby metallic objects. The induced eddy currents decay with time and produce a secondary magnetic field. The instrument measures this secondary magnetic field. The EM61-MK2 can be set to record data in two different ways, 1) at three different time gates on the bottom coil and one time gate on the top coil, or 2) at four different time gates on the bottom coil. The instrument will be set to record all four bottom coil time gates for the RI/FS
- **G-858 Magnetometer -** The G858 magnetometer uses two cesium vapor sensors, each with a miniature atomic absorption unit from which a signal proportional to the intensity of the ambient magnetic field is derived. For this project, the G858 will be used as a gradiometer with the two sensors mounted on an aluminum pole and separated vertically by a distance of 1.5 feet. The height the bottom sensor will be carried above the ground surface will be determined using the height optimization test described in Subchapter 3.4.13.6. To ensure the proper sensor height during the magnetometer surveys, a piece of flagging will be tied to the magnetometer pole next to the bottom sensor. The flagging will hang so that it touches the ground when the magnetometer is at the height determined during the optimization test. To the extent possible in a swamp, the operator will carry the instrument with the flagging just touching the ground.
- **Schonstedt Magnetometer -** The Schonstedt magnetometer is a hand-held unit that employs two flux-gate sensors aligned and mounted a fixed distance apart to detect changes in the earth's ambient magnetic field caused by ferrous metal. The Schonstedt magnetometer responds with an audio output and a meter deflection when either sensor is exposed to a disturbance of the earth's ambient magnetic field associated with a ferrous metal target and/or

the presence of a permanent field associated with a ferrous metal target. In most cases, it will be a combination of both circumstances. Schonstedt magnetometers, which are highly portable, will also be used during UXO avoidance activities. Alternative handheld metal detectors may be used in areas with strong cultural interference (such as around buildings).

- **RTK GPS -** The Leica 1200 and Trimble 5800 (or equivalent) combine a rover unit typically capable of sub-meter positional accuracy with a base station placed at a known point such as a survey monument. The base station calculates the difference between the location data it is receiving from satellites overhead and the location of the known point and broadcasts a correction to the rover in real time. Correcting the rover positions based on the data transmitted from the base station enhances the accuracy from sub-meter to sub-centimeter. The rover will collect positional measurements at a rate of 1 Hz and transmit them to the EM61-MK2 or G-858 data logger.

3.4.15 Geophysical Data Processing

3.4.15.1. Geophysical data will be transferred to the data processing computer. The processor will use either Magmap2000™ (G-858) or DAT61MK2/Trackmaker (EM61 MK2) to merge the positioning and geophysical sensor data and assign positions for each data point. These located data points will be exported to an ASCII format file, which will then be imported into the Geosoft Oasis Montaj geophysical data processing environment. Once in Oasis, the coordinates for the data will be translated to the project coordinate system, and the data channel(s) selected after the GPO will be leveled using a median statistics filter.

3.4.15.2. The QC tests listed in Subchapter 3.4 will be evaluated for compliance with the DQOs listed in Table 3.4. Any spikes present in the data will be manually edited or removed. The data processor will review the GPS quality channel, if applicable, and line paths for inaccurate positions. If the GPS quality is not RTK fixed (4) and the path deviates from a straight line the data processor will either interpolate the positions between known points or designate the data for recollection. The geophysical processor then will evaluate the results of the latency test to determine the instrument latency correction necessary for the data set. This corrects for delays that occur in the electronics of the EM61-MK2 and in the processing of the data on the data recording computer. The latency correction will be computed by determining the latency value that corrects the position to overlap the anomaly due to the latency test item when the sensor travels over it in different directions. Typically this value is between 0.2 and 0.4 seconds.

3.4.15.3. Once this value is determined, it will be applied to the whole data set, and the data channel selected after the GPO will be gridded and displayed. The displayed values will be evaluated against the information in the field notes to determine if they are consistent and whether or not the data meet expected data quality standards.

3.4.16 Anomaly Selection and Decision Criteria

3.4.16.1. The processor will automatically make anomaly selections on the data using the Geosoft UX-Detect™ Blakely algorithm and the anomaly selection threshold determined from the GPO. For each selected anomaly, advanced processing parameters may be calculated depending on the results of the GPO. Possible advance processing parameters for the EM61 MK2 include the decay constant, size, power, and half-width. The only potential parameter that may be calculated for G-858 anomalies is the power. Any advanced processing data will be calculated using an Oasis Montaj GX developed by Parsons or the UX-Analyze add-on to Oasis.

3.4.16.2. Closely spaced anomalies that appear to be caused by the same source will be merged to a single peak. The merged target will be moved, if deemed necessary by the data processor, to the center of the anomaly with two peaks. The grid value and any advanced processing information for the larger anomaly will be used for the merged anomaly. The anomalies will be prioritized by the peak magnitude. The final dig list will be compiled based on these parameters and the anomaly selection process identified in the GPO report.

3.4.17 Anomaly Reacquisition

3.4.17.1. Anomaly reacquisition will be performed by the excavation teams. The following steps will be performed to re-acquire the location of the selected anomalies:

- A geophysical reacquisition team will use an RTK GPS system or measuring tapes to determine the location of the anomaly. The ground will be marked at the measured location of the suspected anomaly.
- Once the coordinates of an anomaly are found, a sweep will be conducted within a 1m radius of the anomaly location with the instrument initially used for the digital geophysical survey, and a static reading will be collected over the anomaly peak where possible. It is possible that the sources of anomalies picked on transect lines may be farther than 1m from the picked location. Any response detected within 1m of a picked transect anomaly will be traced to the peak, regardless of distance from the picked location.

3.4.17.2. If the anomaly is detected using the survey instrument, the peak response and offset distance from the originally selected location will be noted by the excavation team and recorded on the dig sheet.

3.4.18 Data Management

3.4.18.1. Survey data collected in the field will be stored electronically on field laptop or personal computers. Raw field data will be backed up onto electronic media and kept separate from those containing data from the day-to-day operations. Processed data files will be stored in ASCII format with names reflecting the area where the data were collected. The file extension will be "*xyz.*"

3.4.18.2. Raw field data also will be transmitted on CD to the USAESCH within a reasonable time after it has been acquired. The format of the processed field data will be column-delineated ASCII files in the format X, Y, V1, V2, V3, V4 where X = easting coordinate, Y = northing coordinate, V1, V2, *etc*. = time gate/sensor data. The data will be in the project coordinate system. No comment or survey line identification will be provided in the data files transmitted to USACE, but a header will be included to identify the type of data included in each column. The file names will reflect the area where the data were collected. PDF format files will be transmitted with the deliverable data files explaining all processing that was performed on the data and detailing any data issues identified by the geophysical field personnel. Documentation of DQO results with values and pass/fail for each day/dataset will be submitted with the data submittal. A CD that includes all data maps produced and the associated reports shall be delivered with each copy of the report.

3.4.19 Quality Control

The Geophysical Quality Control process will involve data processing and DQO review and anomaly resolution reviews.

3.4.20 Data Processing and DQO Review

The site geophysicist will record the QC test results and data processing parameters in the project database. Documentation of DQO results with values and pass/fail for each day/dataset will be submitted with the data submittal. The project geophysicist will review all the data generated during the RI/FS project and will be responsible for ensuring that DQOs are met and appropriately documented.

3.4.21 Anomaly Resolution

3.4.21.1. To review the results of the anomaly reacquisition work the site geophysicist will compare the original Channel 3 (EM61 MK2) or magnetic gradient (G-858) peak anomaly responses with the reacquired anomaly response for Channel 3 or magnetic gradient. Unless there is a reasonable explanation the site geophysicist will reinvestigate anomalies if:

- the reacquired response is less than 80 percent of the original response, or
- the reacquisition team detects no anomaly above the initial selection threshold for an anomaly with an original response above 10mV on Channel 3 or 10nT/foot.

3.4.21.2. To review the results of the excavation work the site geophysicist will compare the excavation results and recorded post-excavation responses. Unless there is a reasonable explanation the site geophysicist will reinvestigate anomalies if:

- the post excavation response is above the initial anomaly selection threshold
- the items that were removed can not reasonably be expected to produce the initially recorded anomaly.

3.4.22 QC of Intrusive Investigation

The UXOQCS will inspect 10 percent of the dig locations in each grid using the same instrument used by the intrusive team to determine whether or not the removal was effective. The discovery of any MEC or MEC-like item (similar in size and mass to the items listed in Table 3.2 or Subsection 3.4.4) will constitute a failure of the property or grid being investigated. The results of the QC inspection, either passing or failing, will be recorded in the QC log. For any grid that fails a QC inspection, the root cause will be evaluated, and the appropriate corrective action will be implemented.

3.4.23 Final Reports and Maps

3.4.23.1. All final mapping will be generated using GIS and provided to the USAESCH in Environmental Systems Research Institute ArcView digital design files on a CD-ROM. All data characteristics (e.g., file naming and relationships, level structures, colors, line styles, weights) will be compiled in the design files in accordance with the surveying and mapping requirements of the Tri-Service Spatial Data Standards. Site maps plotted from these design files will be provided on reproducible drawings. The size of these drawings will be based on the information to be displayed.

3.4.23.2. The location, identification, and coordinates of the control points will be plotted on the reproducible maps (the surveyors-control points will be provided to the USAESCH in digital format). Each map will include grid orientation to true north and magnetic north, with the differences between them shown in minutes and seconds. Grid lines or tick marks in feet and at systematic intervals will be shown with their grid values on the edges of the map. A legend showing the standard National Geodetic Survey symbols used for the mapping, a map index showing the site in relationship to all other sites within the boundary lines of the project area, a border, and a standard USAESCH title block also will be shown on each map.

3.5 GEOSPATIAL INFORMATION AND ELECTRONIC SUBMITTALS

3.5.1 GIS Data Formats and Projection

3.5.1.1. The GIS data format to be used for the RI/FS is primarily the Environmental Systems Research Institute (ESRI) shapefile format. Raster GIS data will be stored in TIFF image files with associated world files (.tfw extension). GIS data will be submitted to the USAESCH in ESRI shapefile format, and map files will be delivered in ArcGIS .mxd files. Tabular data will be maintained in a Microsoft Access master database at the Parsons Norcross office. Parsons will incorporate any previously collected archival data from the site into the GIS database.

3.5.1.2. The projection for the GIS data will be Universal Transverse Mercator (UTM) Zone 17, NAD83. Projection information will be stored with each of the GIS data files. Any data received from outside sources will be projected to this UTM.

3.5.2 Final Reports and Maps

All final mapping will be generated using the GIS on a personal computer (PC) and provided to USAESCH in ESRI ArcView shapefiles on CD-ROM. The shapefiles will conform to the Computer-Aided Design and Drafting (CADD)/GIS Technology Center spatial data standards for facilities, infrastructure, and environment (SDSFIE). Site maps plotted from these design files will be provided on reproducible drawings. The size of these drawings will be based on the information to be displayed.

3.6 INTRUSIVE INVESTIGATION

3.6.1 General Methodology

Intrusive investigations will be performed in accordance with procedures outlined in the U.S. Army's EP 110-1-18, *Ordnance and Explosives Response*, and the OSHA requirements for excavations in 29 CFR 1926 Subpart P. MEC disposal operations will be performed in accordance with EP 385-1-95a, *Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations,* TM 60A-1-1-31, *EOD Disposal Procedures*. The SSHP developed for the Pinecastle Jeep Range RI/FS (Attachment 1 of Appendix D) will be followed at all times, as will procedures outlined in DoD 6055-9-STD, *Ammunition and Explosives Safety Standards*.

3.6.2 Accountability and Records Management for MEC

3.6.2.1. Individual grid sheets will be maintained or a Trimble GEO XH handheld GPS, or equivalent, will be used to record the data. Data collection will account for all materials (UXO/MEC and non-MEC) encountered during the surface and subsurface searches. These data entries will be made indicating amount, identification, condition, depth, and disposition. An entry will be made for material potentially presenting an explosive hazard (MPPEH), indicating the general types of materials encountered and pounds per grid.

3.6.2.2. An account of all recovered UXO/MEC items will be maintained in the project database. Each piece of recovered ordnance will be given a unique database ID number, and the item will be tracked from discovery to final disposition listing location, dates and disposition. The UXOQCS is responsible for the tracking and maintenance of all ordnance recovered during the project.

3.6.3 Personnel Qualifications

3.6.3.1. UXO teams will consist of qualified personnel approved by the USAESCH. Non-UXO qualified personnel will not perform any excavation nor handle UXO/MEC. All project personnel will complete the OSHA 40-hour training course for hazardous waste site workers as required by the specific task. Additional site specific training, in accordance with 29 CFR 1910.120, EM 385-1-1 (*USACE Safety and Health Requirements Manual*), ER 385-1-92 (*Safety and Occupational Health Document Requirements for Hazardous, Toxic, and Radioactive Waste and Ordnance and Explosive Waste Activities*) and this WP will be provided to all personnel upon their initial mobilization. A medical surveillance program will be in place for each member of the field personnel, with the most recent exam for each member having occurred within the last 12 months.

3.6.3.2. All UXO personnel will meet the requirements set forth in DDESB TP 18, *Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel*. All UXO personnel, regardless of their labor category must be a graduate of one of the following recognized schools:

- U.S. Army Bomb Disposal School, Aberdeen Proving Ground, Maryland.
- U.S. Naval EOD School.
- EOD Assistance Course, Redstone, AL; EOD Assistance Course, Eglin AFB, FL; or a DoD-certified equivalent course.

3.6.3.3. The following subsections detail individual UXO personnel qualifications.

3.6.3.1 UXO Safety Officer

The UXO Safety Officer (UXOSO) will have the following skills/knowledge:

- The ability to identify fuzing, necessary precautions, and fuze condition; *i.e.*, armed, functioned, or armed and functioning; how this condition can or will affect the munitions payload should other forces be applied.
- The ability to recognize munitions/ordnance types and to determine the hazards and make risk assessments. This includes identifying potential fillers, including those in extremely deteriorated condition; *e.g.,* high explosives, fragmentation, white phosphorus, and chemical warfare material (CWM). Must also be able to determine if munitions can be moved before destroying or if the munitions must be blown in place (BIP); fragmentation radius; and, in the case of CWM the potential down-wind hazard along with the engineering controls to mitigate risk.
- The UXOSO will have the same minimum prerequisites as the UXO Technician III. In addition, the UXOSO will also have the specific training, knowledge and experience necessary to implement the Parsons SSHP and verify compliance with applicable safety and health requirements.

3.6.3.2 Senior UXO Supervisor (SUXOS)

3.6.3.2.1. The SUXOS will have at least 10 years combined active duty in military EOD and contractor UXO experience, including at least 10 years in supervisory EOD and UXO positions. This individual will have experience with and/or specialized training in the type of MEC expected to be encountered.

3.6.3.2.2. As the most senior UXO qualified individual onsite, the SUXOS directly supervises all daily MEC activities. This individual is responsible for the successful performance of field teams, early detection and identification of potential problem areas, and instituting corrective measures. The SUXOS will execute instructions from the Parsons Site Manager; document site conditions; photographically document operations; prepare project reports; and identify efforts to accomplish the SOW. The SUXOS reports to the Parsons Site Manager and PM, though the role of Site Manager may also be performed by the SUXOS.

3.6.3.3 UXO Technician III

This individual supervises a UXO team. This individual will have experience in MEC clearance operations and supervising personnel. The UXO Technician III will have at least 8 years combined active duty experience in military EOD and contractor UXO positions.

3.6.3.4 UXO Technician II

The UXO Technician II may be a UXO Technician I with at least 5 years combined military EOD or contractor UXO experience.

3.6.3.5 UXO Technician I

The UXO Technician I will not perform UXO procedures without the direct supervision of a fully qualified UXO Technician II (or above). A UXO Technician I may become a UXO Technician II once they have at least 5 years combined military EOD and contractor UXO experience.

3.6.3.6 UXO Quality Control Specialist

The UXOQCS will have experience in UXO/MEC clearance operations and supervising personnel. This individual will have at least 8 years combined active duty military EOD and contractor UXO/MEC experience. The UXOQCS will have the required quality control training, including at least 2 years experience providing QC on similar projects. The role of UXOQCS may also be performed by the UXOSO.

3.6.4 Brush and Vegetation Clearance

3.6.4.1. Parsons will remove vegetation only as needed from the work sites to enable the teams to traverse the transects or grids without interference. The Site Manager or his designee identifies the areas that require vegetation removal and identifies the wetland

and conservation lands that require brush removal to be at a minimum to allow passage of personnel single file. Brush teams will work with a UXO escort accomplish manual brush cutting. Care will be taken not to harm any protected or endangered flora to include routing around the area rather than proceeding through it. See Chapter 7 for more information on protected species and sensitive environments.

3.6.4.2. Brush cutting with handheld equipment is necessary when terrain or environmental concerns make mechanical vegetation removal undesirable or impossible. Manual brush teams working under the direction of the Site Manager accomplish vegetation removal. Each brush crew (normally consisting of up to four laborers), has a UXO Specialist for MEC avoidance purposes. A magnetic locator is used to aid in searching the vegetation for surface MEC prior to cutting or removing brush. The amount of brush removal required depends on the terrain and the remaining efforts to be performed. Any surface MEC encountered by the brush team is marked with a red pin flag and left in place and notification to the SUXOS is made.

3.6.4.3. Brush is cut to a level that enables reliable MEC detection without disturbing or destroying the root structure. The preferred distance from ground level is 6 inches for both manual and mechanical brush cutting.

3.6.4.4. Mechanical vegetation removal is accomplished where environmental concerns and terrain permits. A brush team comprised of the equipment operator and a UXO specialist, who assist in MEC avoidance, conduct the operation under the supervision of a brush removal foreman.

3.6.5 MEC Excavation Locations

Any MEC encountered during field work activities will be dealt with according to the procedures outlined in this section of the work plan. Subsurface MEC operations will be performed on selected anomalies within these areas. The Site Geophysicist will be responsible for selecting the anomalies that will be reacquired according to the procedures outlined below. The locations of successfully reacquired anomalies will be provided to the intrusive teams for excavation.

3.6.6 MEC Intrusive Procedures

3.6.6.1. The investigation of geophysical anomalies will be conducted by two 5-man investigation/demolition teams each consisting of one UXO Technician III, three or more UXO Technician IIs, and one or two UXO Technician Is. The UXO team personnel excavating an anomaly (as selected by the Parsons Site Geophysicist) will initially remove either the top layer of sod in lawn areas, or an approximate 6-inch layer of soil in undeveloped areas at the location of the anomaly. The sod and soil in property owner's lawns will be placed on plastic sheeting to eliminate any dirt being left on the grass. Soil in all other areas will be placed to the side of the excavation without plastic sheeting. Excavation will initially be to the side of the anomaly using hand tools. A visual and electronic search of the excavation will then be made. This process will be repeated until the audible signal from the Schonstedt magnetic locator (or equivalent instrument)

indicates the object is close to the surface of the excavation. Once this determination is made, additional soil will be removed by hand until the anomaly is located. Excavations greater than 4 feet in depth will be considered a confined space and not be made without prior approval of the USACE Safety Specialist.

3.6.6.2. Once an anomaly is identified and any necessary MEC operations are completed, the excavation will be filled in and tamped to the approximate consistency of the surrounding soil with the sod if applicable replaced on top of the excavation. The excavation site will be restored as close to its original condition as possible.

3.6.7 Munitions with the Greatest Fragmentation Distance

Information concerning the munitions with the greatest fragmentation distance (MGFD) for each investigation area at the former Pinecastle Jeep Range is presented in the Explosives Siting Plan, which was submitted as a separate document.

3.6.8 Minimum Separation Distances

Information concerning the minimum separation distance (MSD) established for each investigation area at the former Pinecastle Jeep Range is presented in the Explosives Siting Plan, which was submitted as a separate document.

3.6.9 MEC Identification

Any suspected or known MEC encountered during excavation will be clearly marked and its position noted on the anomaly dig sheet or Trimble GEO XH and other appropriate site maps. The UXO Supervisor (UXO Technician III) will evaluate the item found and immediately report the condition of the item to the SUXOS and UXOSO. No UXO will be moved without positive identification of the item and evaluation of its condition. No UXO identified will be moved for destruction without the USAESCH OE Safety Office and onsite Safety Officer's concurrence.

3.6.10 MEC Removal

3.6.10.1. If the excavated anomaly is considered to be suspected UXO, it will be uncovered sufficiently to obtain a positive identification of the item to include its fuzing.

3.6.10.2. Unfuzed MEC may be moved for consolidation with an item which can not be moved in order to reduce the number of demolition shoots required. A determination on disposal will be made by the SUXOS and UXOSO for each occurrence.

3.6.10.3. Fuzed UXO will not be moved. If the UXO cannot be safely BIP under the existing conditions, the Parsons PM and the USACE Safety Specialist will be notified and a determination made as to how to safely resolve the issue.

3.6.10.4. If the identified UXO is found within an ecologically or historically sensitive area, the protection of this area will be considered in the above decisions. In

this case, the Parsons PM and USACE will review options with site personnel to minimize impact to the potentially sensitive areas.

3.6.11 MEC Storage

3.6.11.1. Any MEC recovered during this project will be disposed of on site. No MEC will be stored.

3.6.11.2. Munitions debris and range-related debris will be stored in separate containers until verified by the USACE Safety Specialist and certified by the SUXOS in accordance with EM 1110-1-4009, *Engineering and Design - Military Munitions Response Actions***.** After inspection, MD and range related debris will be stored in a secured area within locked containers to prevent materials from being added that may not have been through the inspection process.

3.6.12 MEC Disposal

3.6.12.1 General Procedures

3.6.12.1.1. During disposal of MEC and related material, safety is the primary concern. The most obvious requirements are to protect personnel, the public, and the environment from fire, blast, noise, fragmentation, and toxic releases. Planned detonation of explosives requires more stringent safety distance requirements than those for ordnance in storage, and will be conducted in accordance with the requirements outlined in the data contained in the appropriate Fragmentation Data Review Form and DoD 6055.09-STD.

3.6.12.1.2. The field team will employ a non-electric (shock tube) initiating system for control & safety.

3.6.12.1.3. All personnel directly or indirectly engaged in MEC operations will be thoroughly trained and capable of recognizing hazardous explosive components. All personnel are required to read, become familiar with, and adhere to the requirements contained in this section to ensure that all general safety regulations and safe work practices are observed at all times. Absence of a written safety requirement does not indicate that safeguards are not required.

3.6.12.1.4. All personnel engaged in MEC demolition activities will follow these procedures. However, situations may warrant additional safety measures, such as fire trucks, medical personnel, and protective clothing. The UXOSO has the overall responsibility to comply with the minimum requirements listed below and has the authority to upgrade as the situation dictates.

3.6.12.1.5. Demolition operations will not begin at a work site until all non-essential personnel are outside of the MSD established for the ordnance and net explosives weight (NEW) being detonated. UXO that cannot be moved (e.g., fuzed or hazardous items) must be BIP. The Site Manager will utilize the appropriate engineering controls

whenever it is necessary to BIP items near structures that could be damaged by the detonation. To the greatest extent possible, all items will be disposed of in situ.

3.6.12.1.6. Disposal will be under the direct control of an experienced and trained UXO Technician III charged with the responsibility for all demolition activities The UXOSO will be responsible for training all personnel regarding the nature of the materials handled, the hazards involved, and the precautions necessary, and will also be present during all disposal operations. The SUXOS will ensure that the appropriate local authorities are notified prior to any on-site demolitions.

3.6.12.1.7. Data regarding type, size, depth, condition, location, etc. of UXO/MEC located during the field investigation will be recorded.

3.6.12.2 MEC

UXO will be detonated the day they are found, if possible. If an UXO item cannot be detonated on the day it is found, 24-hour security will be provided until the item(s) can be detonated. All demolition/disposal operations will be conducted in accordance with the Demolition SOP (Appendix J).

3.6.12.2.1 Evacuation and Site Control

Evacuations will be conducted in accordance with the Evacuation Plan provided in Appendix K.

- Control of and access to the demolition site will be maintained during demolition operations. All personnel who are not essential to demolition operations shall either evacuate to a safe area, or act as guards to block access roads entering the demolition area to ensure that non-authorized personnel do not violate the MSD. The SUXOS will assure the area is clear of unauthorized personnel and equipment prior to permitting attachment of the initiation device to the demolition charge.
- An observer shall be stationed at a location where there is a good view of the air approaches to the demolition site. It will be the responsibility of the observer and the road guards to notify the SUXOS to suspend firing if any aircraft, vehicle, or personnel are sighted approaching the demolition site.
- A minimum of two UXO-qualified personnel, a UXO Tech III and a UXO Tech II will conduct demolition operations. The UXOSO will be responsible for overall safety during demolition operations.
- The fire department will be alerted to stand by during demolition operations. In the unlikely event of a fire or unplanned explosion, site personnel, if safe to do so, will attempt to extinguish the fire. If unable to do so, they will notify the fire department and evacuate the area.
- Prevailing weather condition information will be obtained from a reliable source such as the National Weather Service; these data will be logged before each on-site detonation. Demolition charges will not be primed or

connected for electrical firing during the approach or presence of a thunderstorm. Other weather conditions (high winds, temperature inversions, low altitude clouds, or cloud coverage of more than 50 percent) may adversely impact planned demolition operations. The UXOSO will consider these conditions when determining whether or not to conduct demolition operations. If weather conditions preclude the disposal by BIP, UXO personnel will secure the item(s) with sandbags and cover and properly mark the area until favorable conditions allow the demolition to be performed.

- Personnel will remain at the site as long as the possibility of fire exists as the result of a demolition operation.

3.6.12.2.2 BIP Procedures

- The UXOSO will coordinate with USAESCH upon mobilization to facilitate detonation reporting procedures.
- The demolition team, the SUXOS, and the UXOSO will evaluate the UXO and either detonate it in place or – with both the USAESCH OE Safety Office and the onsite Safety Officer's concurrence – relocate the ordnance item in order to consolidate it. Detonations will occur only after all non-essential personnel have left the area, road guards are posted, and required personnel are notified. Prior to conducting the demolition, the SUXOS will check the area and available drawings to determine if there are any underground or overhead utilities that may be affected by a detonation. A soil sample will be collected prior to and after the BIP (See Section E.6.3, Appendix E).
- UXO team personnel not involved in the disposal operation will act as perimeter guards, as directed by the UXOSO and/or SUXOS.

3.6.12.2.3 Operations in Populated/Sensitive Areas

- Evacuation of the public during demolition of a UXO item is a last resort if engineering controls are not adequate. If, due to UXO-related activities, an evacuation is deemed necessary, Parsons will notify USACE so USACE can plan and execute the evacuations. All personnel will be evacuated to a safe location (to be determined by the UXOSO). Parsons will apply the USAESCH-approved MSDs, and will establish and control these boundaries as necessary. It may be necessary to augment project personnel with local law enforcement personnel to accomplish this task.
- Demolition operations will be conducted only after all personnel protective measures are completed and reported to the SUXOS and UXOSO.
- Property protective measures will be taken, such as but not limited to, sandbagging, tamping with earth, and barricading. For demolition operations that take place around sensitive areas, Parsons will coordinate with USACE and/or the onsite USACE Safety Specialist for engineering support to ensure the proper engineering controls are in place before

detonation. The preferred engineering control will be the placement of sandbags to control fragmentation and noise.

- Evacuees will only be permitted to re-enter the area after the demolition area is inspected and the "all clear" is given by the UXOSO.

3.6.12.2.4 Material Potentially Presenting an Explosive Hazard

3.6.12.2.4.1. A detailed account of all MPPEH encountered during the investigation will be maintained. A log entry will be made for MPPEH indicating the general types of materials encountered and the weight (in pounds) found in the project areas. Irems found to present an explosives hazard will be handled as stated for MEC in the subsection above.

3.6.12.2.4.2. Inert munitions debris, range-related debris, and MPPEH may be stored in the same general area, but will be stored in separate containers until verified by the USACE Safety Specialist and certified by the SUXOS that the materials are inert and, if required, vented. After inspection, MPPEH will be stored in a secured area within locked containers to prevent materials from being added that may not have been through the inspection process.

3.6.12.2.4.3. MPPEH inspection, certification, verification and disposition will be performed in accordance with the procedures outlined in EM 1110-1-4009, Engineering and Design - Military Munitions Response Actions, Chapter 14, Corps of Engineers Contractors MPPEH Inspection, Certification, and Final Disposition Procedures

3.6.12.2.5 Other

If any MEC-related items not addressed in the previous subsections on MEC disposal are recovered during the investigation, the Site Manager will inform the USACE Safety Specialist, and the Parsons and USAESCH PMs so appropriate measures can be discussed, developed, and implemented for dealing with the items.

3.6.13 Disposal Alternatives

On-site disposal will be the most practical option for the RI/FS. For this reason, a discussion of other disposal options is not included.

3.7 MUNITIONS CONSTITUENT SAMPLING

3.7.1. MC sampling will be conducted to determine if releases of MC from munitions at the former Pinecastle Jeep Range have occurred that pose a hazard to human health and the environment. As an initial approach, environmental soil samples will be collected and analyzed from the following locations:

1. Where MEC and selected MD is found during the RI.
2. Where detonations are used to destroy munitions during the RI.

3. Where MEC and selected MD was found during the TCRA and by private contractors.
4. Where detonations were conduced to destroy munitions by the TCRA and by the private contractors.
5. Locations identified based on the results of the SI and historical data as described below in the area-by-area approach.

3.7.2. If no MEC or selected MD is found in an area, sampling will not be required for that area. One soil sample will be collected for clusters and for each isolated instance of MEC and selected MD, not for every item found.

3.7.3. Laboratory analyses will be the same as those conducted for the SI. These analyses include: Explosives – Method SW8330A, Metals – Methods SW6010B, SW6020, and SW7471A, and Perchlorate (water samples only) – Method SW6850. Analytical results will be compared to screening levels established by Florida Soil Cleanup Target Levels (Residential and Leaching) and USEPA Region 9 Preliminary Remediation Goals (PRGs). Additional details regarding the MC sampling program at the former Pinecastle Jeep Range are presented in the SAP located in Appendix E.

3.7.4. Based on the results of this initial phase of sampling, additional environmental samples may be added to determine the nature and extent of MC. These additional samples may include soil, surface water, sediment, and ground water samples. If a release of MC is identified that exceeds the screening levels, additional sampling will be required to determine the nature and extent of the contamination. In addition to explosives and metals, any groundwater samples will be analyzed for perchlorate.

3.8 AREA-BY-AREA APPROACH

For the purpose of the RI, the former Pinecastle Jeep Range has been divided into eight areas – Areas A through H (Figure 3.1). The description, history, and investigative approach for each area is discussed in the following paragraphs.

3.8.1 Area A – Description and History

3.8.1.1. Area A consists of approximately 382 acres, which includes Odyssey Middle School, residential areas, roads, undeveloped uplands, and conservation areas (Figure 3.2). Some of the residential areas and the Odyssey Middle School parcel were covered by the TCRA, so no further characterization for MEC is needed in those areas; however, MC sampling will be conducted as described below. Military ranges and demonstration areas within Area A include:

- Northern part of the Jeep Track as well as the associated machinegun range fans (.30-cal and .50-cal) (Range Complex No. 1)
- Areas within the bombing ranges (Range Complex No. 2)
- Northwest edge of the Air-to-Ground Rocket Range

- Northern half of the Chemical Demonstration Range

3.8.1.2. The TCRA at Odyssey Middle School and Tivoli Gardens found a variety of munitions debris, some inert munitions, and MEC. As of February 29, 2008, the following munitions contained high explosives (HE):

- 37mm projectile (1 found)
- 2.36" rockets (2 found)
- 23-lb fragmentation bombs (31 found, 30 in one pit)
- M48 Fuze from a 20-lb bomb (1 found)
- Inert munitions and munitions debris that could be identified included:
- 75mm, 76mm, 90mm, and 105mm armor-piercing (AP) rounds
- Smoke grenade (inert)
- Rifle grenade (inert)
- Rifle grenade flare body (debris)
- 2.36" rockets (practice and rocket debris)
- 60mm and 81mm mortars (debris)
- 40mm flare (debris)
- 3.5" and 4.5" ATG (inert)
- 20mm projectiles (solid shot, non-explosive)
- 2.25" and 5" rockets (debris)
- 4-lb, 6-lb, and 10-lb incendiary bombs (debris)
- M75, 100-lb practice bomb (inert, with red dye)
- 23-lb practice bomb (debris)
- M48, 20-lb practice bomb (inert)

3.8.1.3. Near the school, disposal pits were found that contained a variety of the munitions debris and inert munitions listed above. The origin of the pits has not been confirmed but may have been created during one of the range clearances that occurred.

3.8.1.1 Area A Investigation Approach

3.8.1.1.1 Residential Areas

3.8.1.1.1.1. The residential areas remaining to be covered in Area A are the eastern part of Central Park, southeastern part of Newport, Lee Vista Square, and the parcels in Avon not covered by private contractors (Figure 3.2). Some commercial parcels on the northwest corner of Lee Vista Boulevard and Econlockhatchee Trail will also be covered.

All other residential areas and Odyssey Middle School were covered by the TCRA and by clearances conducted by private contractors.

3.8.1.1.1.2. DGM in the residential areas will be conducted using a type of geophysical instrument approved through the GPO. The objective of the DGM is complete coverage of the residential areas with the exception of structures, pavement, and ponds. Areas covered by the TCRA and by private contractors will also be excluded unless approved by the USAESCH. Also, the geophysical DGM instruments will be used as close to buildings and structures as possible without interference from the buildings and structures masking the signal from the ground. Areas between the limit of DGM and the buildings and structures will be covered using Mag and Dig procedures as described below. The minimum anomaly target in Area A will be anomalies consistent with a 37 mm cartridge (as demonstrated in the GPO).

3.8.1.1.1.3. Anomalies identified from DGM will be reacquired using the same type of instrument used for the original mapping. All anomalies suspected of being potential MEC using the DGM will be excavated in the residential areas. As anomalies are identified by the operator, pin flags will be placed. 100% of the anomalies from Mag and Dig will be excavated to identify the sources of the anomalies. Mag and Dig will be conducted using a handheld (non-recording) metal detector. The operators will use these instruments near the buildings and other structures that interfered with the DGM.

3.8.1.1.2 Conservation and Undeveloped Upland Areas

3.8.1.1.2.1. Geophysical data will be conducted along transects through the undeveloped areas (Figure 3.2). Transects will be spaced approximately 250 feet apart. If munitions debris or MEC if found in these areas during the excavation of anomalies, additional transects will be added in those areas between the existing transects (approximately 125 transect spacing). DGM will be located as follows:

- The conservation area between Odyssey Middle School and the southwestern corner of Tivoli Gardens forms a narrow neck. A path extends through the neck in the conservation area near the southern edge of Area A. The path will be covered using DGM or Mag and Dig. Also, starting from the path and moving north, a set of five east-west trending transects will be mapped using DGM. The five transects will be spaced 125 feet apart. East-west transects will also be placed with a 250-foot spacing through the remaining northern portion that are wetlands.

- Transects will be spaced 125 feet apart within the small wetland within the arch of the boot-shaped area at the southern end of the Tivoli Gardens development.

- Transects will be spaced 250 feet apart across the wetland between Tivoli Gardens and Lee Vista Square.

- Transects will be spaced 250 feet apart through the wetland between the Central Park and Avon developments on the northwestern side of Lee Vista Boulevard.

- Transects will be spaced 250 feet apart through the undeveloped upland areas. These areas are south and southeast of Lee Vista Square and west of Crowntree Lakes Apartments.

- Transects will be placed along both edges of the Lee Vista Boulevard right-of-way through undeveloped upland portions of Area A.

3.8.1.1.2.2. The minimum anomaly target in Area A will be anomalies consistent with a 37mm projectile (as demonstrated in the GPO). Anomalies will be selected to characterize the area with a minimum of 20% of the anomalies selected for excavation with the exception of the path between the school and Tivoli Gardens for which all of the anomalies will be selected.

3.8.1.1.2.3. A portion of the anomalies suspected of being potential MEC will be excavated in the conservation and undeveloped areas. The selected anomalies from DGM and 100% of the anomalies from Mag and Dig will be excavated to identify the sources of the anomalies. Mag and Dig will be conducted using a handheld (non-recording) metal detector. As anomalies are identified by the operator, pin flags will be placed. Anomalies identified from DGM will be reacquired using the same type of instrument used for the original mapping.

3.8.1.1.3 MC Sampling

As previously described, MC soil sampling will be conducted at locations where MEC and selected MD are found and where munitions were destroyed during this and previous investigations. At Area A, known soil sample locations include:

- Odyssey School pit locations in southeastern area of school grounds.
- Six locations within the Tivoli Gardens development.
- Soil samples will be collected in the conservation area northwest of Lee Vista Boulevard. These samples will be collected adjacent to and surrounding the sample from the SI (PJR-TR-SS-02-01) that detected nitroglycerin, an explosives compound. Two samples will be collected at the location of the original sample – one shallow (0 to 2 inches) and one at a depth of one foot. The other samples will be shallow (0 to 2 inches) and will be arrayed around the original sample to determine lateral extent. If surface water is present at these locations, surface water and sediment samples will be collected. The samples will be analyzed for nitroglycerin only.

The proposed soil sample locations for Area A are presented on Figure 3.2. Samples will be added in areas where MEC and munitions debris are found.

3.8.2 Area B – Description and History

3.8.2.1. Area B consists of approximately 81 acres, which includes residential areas, roads, a community park, and conservation areas (Figure 3.3). Some of the residential areas were covered by the TCRA and by private contractors, so no further characterization for MEC is needed in those areas; however, MC sampling will be conducted as described below. Area B is outside the boundary of the Pinecastle Jeep Range property; however, the area is within the bombing range circles established based on target locations.

3.8.2.2. The TCRA in the eastern part of the Warwick development has not found any MEC or MD to date; however, a private contractor clearing the western part of the Warwick development encountered two inert (practice) fragmentation bombs.

3.8.2.1 Area B Investigation Approach

3.8.2.1.1 Residential Areas

3.8.2.1.1.1. In Area B, the residential areas remaining to be covered are the western part of the Central Park development and Newport development. The Resident's Club parcel will be investigated in it's entirety at the request of the PDT. All other residential areas were covered by the TCRA and by clearances conducted by private contractors (Warwick and Lennar developments).

3.8.2.1.1.2. Geophysical mapping in the residential areas will be conducted using a type of geophysical instrument approved through the GPO. The objective of the DGM is complete coverage of the residential areas with the exception of structures, pavement, and ponds. Areas covered by the TCRA and by private contractors will also be excluded unless approved by the USAESCH. Also, the geophysical instruments will be used as close to buildings and structures as possible without interference from the buildings and structures masking the signal from the ground. Areas between the limit of DGM and the buildings and structures will be covered using Mag and Dig as described below. If MEC is found, the area of investigation will be expanded in a 200-foot by 200-foot grid from the MEC and beyond the boundary of Area B, if necessary. The entire parcel of the community park, including parts of the parcel outside Area B, will be covered by DGM. The minimum anomaly target in Area B will be anomalies consistent with a 4-lb incendiary bomb (as demonstrated in the GPO).

3.8.2.1.1.3. Anomalies identified from DGM will be reacquired using the same type of instrument used for the original mapping. All anomalies suspected of being potential MEC using the DGM will be excavated in the residential areas. As anomalies are identified by the operator, pin flags will be placed. 100% of the anomalies from Mag and Dig will be excavated to identify the sources of the anomalies. Mag and Dig will be conducted using a handheld (non-recording) metal detector. The operators will use these instruments near the buildings and other structures that interfered with the DGM.

3.8.2.1.2 Conservation Areas

3.8.2.1.2.1. Geophysical data will be collected along transects through the conservation areas in Area B. There are three separate conservation areas – one north of Lee Vista Boulevard, one south of Lee Vista Boulevard, and one small area at the southern end of the Warwick development on the boarder with Area E. For the areas on either side of Lee Vista Boulevard, two transects will be spaced approximately 125 feet apart. The transects will extend to the boundary of Area B. The proposed transect locations for Area B are presented on Figure 3.3. The minimum anomaly target in Area B will be anomalies consistent with a 4-lb incendiary bomb (as demonstrated in the GPO). Anomalies will be selected to characterize the area with a minimum of 20% of the anomalies selected for excavation.

3.8.2.1.2.2. A portion of the anomalies suspected of being potential MEC will be excavated in the conservation and undeveloped areas. The selected anomalies from DGM and 100% of the anomalies from Mag and Dig will be excavated to identify the sources of the anomalies. Mag and Dig will be conducted using a handheld (non-recording) metal detector. As anomalies are identified by the operator, pin flags will be placed. Anomalies identified from DGM will be reacquired using the same type of instrument used for the original mapping.

3.8.2.1.3 MC Sampling

3.8.2.1.3.1 As previously described, the initial MC soil sampling will be conducted at locations where MEC and selected MD are found and where munitions were destroyed during this and previous investigations. At Area B, known soil sample locations include

- Along the western edge of the Warwick development at the edge of the conservation areas (5 samples).
- At the southern tip of the Warwick development where the landscaped area meets the conservation area (1 sample).

The proposed soil sampling locations are presented on Figure 3.3.

3.8.2.1.3.2 One surface water and one sediment sample will be collected from the northern shore of the pond in the Warwick development.

3.8.3 Area C – Description and History

Area C consists of approximately 761 acres, which includes residential areas, roads, undeveloped areas, and conservation areas (Figure 3.4). Some of the residential areas were cleared by private contractors, so no further characterization for MEC is needed in those areas; however, MC sampling will be conducted as described below. The southeastern portion of Area C is within the safety fan for the .30 caliber machinegun range. No explosive munitions are anticipated to be associated with the machinegun range. However, the southeastern most corner of Area C is within the Air to Ground Rocket Range. To date, no UXO or MD has been found in Area C.

3.8.3.1 Area C Investigation Approach

3.8.3.1.1 Residential Areas

3.8.3.1.1.1. In Area C, residential areas that have not been cleared by private contractors will be mapped using DGM. Developments to be included are Tivoli Woods and Tivoli Village. The Hidden Oaks Elementary School property is also included.

3.8.3.1.1.2. Geophysical mapping in the residential areas will be conducted using a type of geophysical instrument approved through the GPO. The objective of the DGM is complete coverage of the residential areas with the exception of structures, pavement, and ponds. Areas covered by private contractors will also be excluded unless approved by the USAESCH. Also, the geophysical instruments will be used as close to buildings and structures as possible without interference from the buildings and structures masking the signal from the ground. Areas between the limit of DGM and the buildings and structures will be covered using Mag and Dig as described below. A dirt road in the northwestern portion of Area C will be also be completely mapped. If MEC is found, the area of investigation will be expanded in a 200-foot by 200-foot grid from the MEC and beyond the boundary of Area C, if necessary. The minimum anomaly target in Area C will be anomalies consistent with a 4-lb incendiary bomb (as demonstrated in the GPO).

3.8.3.1.1.3. To characterize Area C, 20% of the anomalies consistent with potential MEC will be excavated in the residential areas. The anomalies identified from DGM will be reacquired using the same type of instrument used for the original mapping. As anomalies are identified by the operator, pin flags will be placed. 100% of the anomalies from Mag and Dig will be excavated to identify the sources of the anomalies. Mag and Dig will be conducted using a handheld (non-recording) metal detector. The operators will use these instruments near the buildings and other structures that interfered with the DGM. All of the anomalies will be excavated along the small dirt road. If MEC is found, additional anomalies up to 100% may be excavated in the residential areas.

3.8.3.1.2 Upland Areas

3.8.3.1.2.1 Geophysical data will be collected along transects through the undeveloped upland areas (Figure 3.4). Transects will be spaced approximately 250 feet apart. If munitions debris or MEC is found in these areas during the excavation of anomalies, additional transects will be added in those areas between the existing transects (approximately 125 foot transect spacing). Also if MEC is found, small grids (50 ft by 50 ft) will also be established and geophysically mapped. The minimum anomaly target in Area C will be anomalies consistent with a 4-lb incendiary bomb (as demonstrated in the GPO). Anomalies will be selected to characterize the area with a minimum of 20% of the anomalies selected for excavation with the exception of the dirt road for which all of the anomalies will be selected. If grids are established as a result of finding MEC, all anomalies consistent with the 4-lb incendiary or larger will be excavated.

3.8.3.1.2.2. A portion of the anomalies suspected of being potential MEC will be excavated in the undeveloped areas. The selected anomalies from DGM and 100% of the anomalies from Mag and Dig will be excavated to identify the sources of the anomalies.

Mag and Dig will be conducted using a handheld (non-recording) metal detector. As anomalies are identified by the operator, pin flags will be placed. Anomalies identified from DGM will be reacquired using the same type of instrument used for the original mapping.

3.8.3.1.3 MC Sampling

As previously described, the initial MC soil sampling will be conducted at locations where MEC and selected MD are found and where munitions were destroyed during this and previous investigations.

3.8.4 Area D – Description and History

Area D consists of approximately 607 acres, which includes residential areas, roads, undeveloped areas, and conservation areas (Figure 3.5). The southern parts of Area D are within the safety fan for the .30 caliber machinegun range and within the Air to Ground Rocket Range. To date, no UXO or MD has been found in Area D.

3.8.4.1 Area D Investigation Approach

3.8.4.1.1 Residential Areas

3.8.4.1.1.1. In Area D, residential areas that have not been cleared by private contractors will be mapped using DGM. Geophysical mapping in the residential areas will be conducted using a type of geophysical instrument approved through the GPO. The objective of the DGM is complete coverage of the residential areas with the exception of structures, pavement, and ponds. Areas covered by private contractors will also be excluded unless approved by the USAESCH. Also, the geophysical instruments will be used as close to buildings and structures as possible without interference from the buildings and structures masking the signal from the ground. Areas between the limit of DGM and the buildings and structures will be covered using Mag and Dig as described below. If MEC is found, the area of investigation will be expanded using a 200-foot by 200-foot grid from the MEC and beyond the boundary of Area D, if necessary. The minimum anomaly target in Area D will be anomalies consistent with a 4-lb incendiary bomb (as demonstrated in the GPO).

3.8.4.1.1.2. To characterize Area D, 20% of the anomalies consistent with potential MEC will be excavated in the residential areas. The anomalies identified from DGM will be reacquired using the same type of instrument used for the original mapping. As anomalies are identified by the operator, pin flags will be placed. 100% of the anomalies from Mag and Dig will be excavated to identify the sources of the anomalies. Mag and Dig will be conducted using a handheld (non-recording) metal detector. The operators will use these instruments near the buildings and other structures that interfered with the DGM. If MEC is found, additional anomalies up to 100% may be excavated in the residential areas.

3.8.4.1.2 Undeveloped Upland Areas

3.8.4.1.2.1. Geophysical data will be collected along transects through the undeveloped upland areas (Figure 3.5). Transects will be spaced approximately 250 feet apart. If munitions debris or MEC if found in these areas during the excavation of anomalies, additional transects will be added in those areas between the existing transects (approximately 125 foot transect spacing). Also if MEC is found, small grids (50 ft by 50 ft) will also be established and geophysically mapped. The minimum anomaly target in Area D will be anomalies consistent with a 4-lb incendiary bomb (as demonstrated in the GPO). If grids are established as a result of finding MEC, all anomalies consistent with the 4-lb incendiary or larger will be excavated.

3.8.4.1.2.2. A portion of the anomalies suspected of being potential MEC will be excavated in the undeveloped areas. The selected anomalies from DGM and 100% of the anomalies from Mag and Dig will be excavated to identify the sources of the anomalies. Mag and Dig will be conducted using a handheld (non-recording) metal detector. As anomalies are identified by the operator, pin flags will be placed. Anomalies identified from DGM will be reacquired using the same type of instrument used for the original mapping.

3.8.4.1.3 MC Sampling

As previously described, the initial MC soil sampling will be conducted at locations where MEC and selected MD are found and where munitions were destroyed during this and previous investigations.

3.8.5 Area E – Description and History

3.8.5.1. Area E consists of approximately 1,583 acres, which includes undeveloped areas and conservation areas (Figure 3.6). No residential areas exist within Area E. The area includes firing points for the small arms ranges and many of the bombing targets. The following ranges and demonstration areas are within Area E:

- Southern part of the Jeep Track as well as the associated machinegun range fans (.30-cal and .50-cal) (Range Complex No. 1)
- Small arms ranges including target berms (3 ranges at the southwestern edge of Area E and a machinegun range south of the Jeep Track).
- Bombing range including many of the target areas (Range Complex No. 2)
- Western 1/3 of the Air-to-Ground Rocket Range
- Southern half of the Chemical Demonstration Range

3.8.5.2. The TCRA at the Mockingbird property, which is in the northern part of Area E, found a variety of munitions debris, some inert munitions, and MEC. As of February 29, 2008, the following munitions and MD were found during the TCRA in Area E:

- 2.36” rockets
- 60mm and 81mm mortars
- 20mm projectiles (solid shot, non-explosive)
- 6-lb incendiary bombs
- M38, 100-lb practice bomb (sand-filled)
- M48, 20-lb practice bomb
- 250-lb and 500-lb bomb cases

3.8.5.3. A landfill was operated in the southwestern portion of Area E during the 1960s and 1970s. Review of aerial photographs from 1948 shows no evidence of the landfill indicating that it postdates the DoD operation at Pinecastle Jeep Range.

3.8.5.1 Area E Investigation Approach

3.8.5.1.1 Undeveloped Upland Areas

3.8.5.1.1.1. Geophysical data will be collected along transects through the undeveloped upland areas. Transects will be spaced approximately 125 feet apart. Transects will also be placed along the backstop berms in the small arms ranges. The proposed transect locations are presented on Figure 3.6. If MEC is found, small grids (50 ft by 50 ft) may also be established and geophysically mapped to further characterize the area. Conservation areas will not be covered by the transects, unless MEC is found to either side. If MEC is found, the need for placing transects through the conservation areas will be reevaluated. The minimum anomaly target in Area E will be anomalies consistent with a 37mm projectile (as demonstrated in the GPO). If grids are established as a result of finding MEC, all anomalies within the grid will be excavated.

3.8.5.1.1.2. To characterize Area E, a portion of the anomalies suspected of being potential MEC will be excavated in the undeveloped areas. The selected anomalies from DGM will be excavated to identify the sources of the anomalies. Anomalies identified from DGM will be reacquired using the same type of instrument used for the original mapping.

3.8.5.1.2 MC Sampling

3.8.5.1.2.1. As previously described, the initial MC soil sampling will be conducted at locations where MEC and selected MD are found and where munitions were destroyed during this and previous investigations. MC soil samples will be collected from each of the berms in the small arms ranges in Area E (9 samples are assumed). The proposed soil sampling locations for Area E are presented on Figure 3.6.

3.8.5.1.2.2. Soil samples will be collected at the two locations where nitroglycerin was detected during the SI. These samples will be collected adjacent to and surrounding the SI samples (PJR-TR-SS-02-03 and PJR-TR-SS-02-04) that detected nitroglycerin, an explosives compound. Two samples will be collected at the location of the original

sample – one shallow (0 to 2 inches) and one at a depth of one foot. The other samples will be shallow (0 to 2 inches) and will be arrayed around the original sample to determine lateral extent. If surface water is present at these locations, surface water and sediment samples will be collected. The samples will be analyzed for nitroglycerin only.

3.8.6 Area F – Description and History

3.8.6.1. Area F consists of approximately 6,781 acres consisting of landfills, isolated residences, undeveloped areas, and conservation areas (Figure 3.7). The following ranges and demonstration areas are within Area E:

- Machinegun ranges (.30 and .50 caliber) (Range Complex No. 1).
- Eastern portion of the bombing range (Range Complex No. 2)
- Eastern portion of the Air-to-Ground Rocket Range

3.8.6.1.2. The TCRA did not cover any of Area F. Orange County operates landfill cells in a large portion of Area F.

3.8.6.1 Area F Investigation Approach

3.8.6.1.1 Landfill and Undeveloped Upland Areas

3.8.6.1.1.1. Geophysical data will be collected along transects through the undeveloped areas. In the landfill areas, the transects will be limited to future borrow areas and landfill expansion area – the existing landfill cells will not be investigated. The proposed transect locations are presented on Figure 3.7. Transects will be spaced approximately 250 feet apart. If munitions debris or MEC is found in these areas during the excavation of anomalies, additional transects will be added in those areas between the existing transects (approximately 125 foot transect spacing). Also if MEC is found, small grids (50 ft by 50 ft) will also be established and geophysically mapped to further characterize the area. A transect will be placed along the dirt road that crosses through the southern portion of Area F. Conservation areas will not be covered by the transects unless MEC is found to either side, with two exceptions – transects will be spaced 250 feet apart through the circular wetlands in the northern part of the landfill area, and in the narrow wetland southwest of the landfill expansion near the corner of Area F. If MEC is found, the need for placing transects through the conservation areas will be reevaluated. The minimum anomaly target in Area F will be anomalies consistent with a 4-lb incendiary bomb (as demonstrated in the GPO). If grids are established as a result of finding MEC, all anomalies consistent with the 4-lb incendiary bomb or larger will be excavated.

3.8.6.1.1.2. To characterize Area F, a portion of the anomalies suspected of being potential MEC will be excavated in the undeveloped areas. The selected anomalies from DGM will be excavated to identify the sources of the anomalies. Anomalies identified from DGM will be reacquired using the same type of instrument used for the original mapping.

3.8.6.1.2 MC Sampling

As previously described, the initial MC soil sampling will be conducted at locations where MEC and selected MD are found and where munitions were destroyed during this and previous investigations.

3.8.7 Area G – Description and History

Area G consists of approximately 3,300 acres consisting of undeveloped areas and conservation areas (Figure 3.8). Only the southern portion of the .50 caliber machinegun range extends into Area G.

3.8.7.1 Area G Investigation Approach

3.8.7.1.1 Undeveloped Areas

3.8.7.1.1.1. Geophysical data will be collected along transects through the undeveloped areas (Figure 3.8). Transects will be spaced approximately 250 feet apart. If munitions debris or MEC if found in these areas during the excavation of anomalies, additional transects will be added in those areas between the existing transects (approximately 125 foot transect spacing). Also if MEC is found, small grids (50 ft by 50 ft) will be established and geophysically mapped to further characterize the area. Conservation areas will not be covered by the transects unless MEC is found to either side. If MEC is found, the need for placing transects through the conservation areas will be reevaluated. The minimum anomaly target in Area G will be anomalies consistent with a 4-lb incendiary bomb (as demonstrated in the GPO). If grids are established as a result of finding MEC, all anomalies consistent with the 4-lb incendiary bomb or larger will be excavated.

3.8.7.1.1.2. To characterize Area G, a portion of the anomalies suspected of being potential MEC will be excavated in the undeveloped areas. The selected anomalies from DGM will be excavated to identify the sources of the anomalies. Anomalies identified from DGM will be reacquired using the same type of instrument used for the original mapping.

3.8.7.1.2 MC Sampling

As previously described, the initial MC soil sampling will be conducted at locations where MEC and selected MD are found and where munitions were destroyed during this investigation.

3.8.8 Area H – Description and History

Area H consists of approximately 925 acres including undeveloped areas and conservation areas (Figure 3.9). A new development is planned for the north and south sides of the existing section of Lee Vista Boulevard. Also, Lee Vista Boulevard is being extended to the northeast. Area H includes some of the bombing targets, part of the Air to Ground Rocket Range, and is completely covered by small arms ranges (including the .50 caliber machinegun ranges).

3.8.8.1 Area H Investigation Approach

3.8.8.1.1 Undeveloped Areas

3.8.8.1.1.1. Geophysical data will be collected along transects through the undeveloped areas. Transects will be spaced approximately 250 feet apart and oriented approximately north-south. At least one transect will be placed to cross the small residential parcels in the northeast corner of Area H. The proposed transect locations for Area H are presented on Figure 3.9. If munitions debris or MEC if found in these areas during the excavation of anomalies, additional transects will be added in those areas between the existing transects (approximately 125 foot transect spacing). Also if MEC is found, small grids (50 ft by 50 ft) will be established and geophysically mapped to further characterize the area. Conservation areas will not be covered by transects unless MEC is found to either side. If MEC is found, the need for placing transects through the conservation areas will be reevaluated. The minimum anomaly target in Area H will be anomalies consistent with a 4-lb incendiary bomb (as demonstrated in the GPO). If grids are established as a result of finding MEC, all anomalies consistent with the 4-lb incendiary bomb or larger will be excavated.

3.8.8.1.1.2. To characterize Area H, a portion of the anomalies suspected of being potential MEC will be excavated in the undeveloped areas. The selected anomalies from DGM will be excavated to identify the sources of the anomalies. Anomalies identified from DGM will be reacquired using the same type of instrument used for the original mapping.

3.8.8.1.2 MC Sampling

As described above, the initial MC soil sampling will be conducted at locations where MEC and selected MD are found and where munitions were destroyed during this investigation.

3.9 INVESTIGATION DERIVED WASTE PLAN

3.9.1 Introduction

3.9.1.1. This IDW Plan has been developed for the management of IDW by Parsons during the RI/FS at the former Pinecastle Jeep Range. Minimal IDW is expected to be generated during the course of this project. IDW that could be generated includes, but is not limited to, the following:

- Used sampling equipment and personal protective equipment (PPE);
- Soil;
- Sediment;
- Groundwater; and
- Decontamination water.

3.8.1.2. All disposal operations will be conducted in accordance with the IDW Plan.

3.9.2 Used Sampling Equipment and Personal Protective Equipment

Most equipment required in support of the sampling activities for the RI/FS will be dedicated to a single use and disposable. Therefore, minimal decontamination of sampling equipment will be required. Disposable sampling equipment may include bowls, spades, and scoops; used sampling equipment and PPE (gloves used for sampling) will be treated as solid waste. All items will be bagged and disposed properly prior to the field team leaving the site.

3.9.3 Soil

3.9.3.1. If it is determined that groundwater monitoring wells will be installed during the RI/FS, soil IDW will be generated during the well installation process. Soil cuttings generated during the advancement of the borehole will be containerized in 55-gallon drums. Each drum of containerized soil will be labeled with the appropriate boring number, transferred to a designated staging area, and stored on pallets. Soil samples will be collected from the drummed soil IDW to profile the soil for disposal. Contaminated soil will be disposed off-site at an appropriate waste disposal facility. Depending on the detected concentrations of contaminants, some drums may require additional waste profiling, as required by the disposal facility.

3.9.3.2. Soil IDW is not anticipated during the collection of grab samples for the RI/FS. Excess soil remaining after sample collection will be returned to the sampling location to restore the site to its original condition. The coordinates of all sampling locations will be recorded.

3.9.4 Sediment

Sediment IDW is not anticipated during the collection of sediment grab samples for the RI/FS. Excess sediment will be returned to the sampling location. The coordinates of all sampling locations will be recorded.

3.9.5 Groundwater

If groundwater monitoring wells are installed during the RI/FS, IDW in the form of development water and purge water will be generated. Development water and purge water will be containerized in 55-gallon drums. The drums will be transported to the drum staging area pending waste disposal characterization.

3.9.6 Decontamination Water

Decontamination water will be generated during the decontamination of the drilling equipment. Water will be contained in a decontamination pad constructed by the drilling subcontractor and pumped into 55-gallon drums. The drums will be transported to the drum staging area pending waste disposal characterization.

3.10 RISK CHARACTERIZATION AND ANALYSIS

This subsection outlines the approach to determining the need for a risk assessment at this site and will provide simple guidelines for conducting a risk assessment if it is determined to be necessary. Any risk assessment will be conducted in accordance with USEPA's Risk Assessment Guidance (USEPA 2001) and EM 200-1-4.

3.10.1 Evaluating Risk Associated with MC or HTRW

3.10.1.1 First, analytical data will be evaluated to determine if there is evidence of a release of contaminants at the site. In general, the detection of metals significantly above background levels or other chemicals above regulatory limits would be a good indication that a release has occurred. If naturally occurring chemicals (i.e. metals) are not found at concentrations significantly different from background, and the remaining analyzed chemicals are not detected in environmental media, then it will be determined that a release has not occurred and a risk assessment will not be conducted.

3.10.1.2 If evaluation of the data indicates that a release has likely occurred, a risk assessment will be conducted in a stepwise approach moving from a relatively simple screening level risk assessment to a more complex deterministic baseline risk assessment, as needed. After a release has been determined, Parsons will develop the conceptual site model to evaluate the potential exposure pathways at the site. If complete exposure pathways are identified matching those used to calculate the Florida Department of Environmental Protection (FDEP) soil or water Cleanup Target Levels (FAC 62-77) or USEPA Region 9 Preliminary Remediation Goals (residential soil or tap water), then representative concentrations of each chemical contaminant found above background levels will be compared to the MSSLs to determine the potential for a human health risk. Background levels for chemicals not naturally occurring are considered above detection levels. Representative concentrations may be either the maximum detected concentration, or a statistically-derived 95% Upper Confidence Limit, depending on the numbers of samples and the sample locations. If representative concentrations are not exceeded, the risk assessment process will then be considered complete.

3.10.1.3 Finally, if MSSLs are exceeded, plans must be developed for a baseline risk assessment. The baseline risk assessment will follow standard USEPA risk assessment guidance, such as the various Risk Assessment Guidance for Superfund (RAGS) documents. Should a baseline risk assessment be required at this site, a separate assumptions document will be prepared as a basis for planning the baseline risk assessment. The assumptions document will outline the exact procedure to be followed for the risk assessment, including all exposure assumptions to be used in determining the risk. Stakeholder agreement on the assumptions document should be obtained prior to completion of the risk assessment.

3.10.2 Evaluating Risk Associated with MEC

The standard approach to risk assessment for MEC is the Ordnance and Explosives Risk Impact Assessment (OERIA) method conducted in accordance with the current

guidance provided by USAESCH. If no MEC is identified at the site during the RI, no OERIA will be necessary. Otherwise, Parsons will perform a risk characterization for the sites using the OERIA, which provides a qualitative assessment of the potential risks associated with remnant MEC at a site by analyzing site-specific conditions and human issues that affect the likelihood that a MEC accident will occur. The OERIA process involves three steps:

1. Identifying the assessment factors associated with potential MEC risk at the site;
2. Conducting a baseline risk assessment; and
3. Applying the risk assessment results in the evaluation of munitions response alternatives.

3.11 ANALYSIS OF INSTITUTIONAL CONTROLS

3.11.1 Institutional Analysis

Using the same criteria discussed in Subchapter 3.9 regarding the need for a risk assessment or an OERIA, site data will be reviewed by USAESCH and Parsons to determine if an analysis of land use controls is needed for the sites being evaluated. If deemed necessary, an institutional analysis will be conducted as part of the investigation process. If warranted by the results of that analysis, a recommendation will be made regarding the need for a Land Use Control Implementation Plan to be prepared as a part of the remedial design phase. This analysis will be carried out according to EP 1110 1 24, Establishing and Maintaining Land Use Controls for Munitions Response to Munitions and Explosives of Concern Projects and according to DID MR-100.

3.11.2 Feasibility Study (FS)

3.11.2.1 During the FS, remedial technologies and their associated containment or disposal requirements are identified, pre-screened, and then combined into alternatives. The specific technology alternatives to be considered will be identified after the remedial investigation. In accordance with ER 200-3-1, evaluation of alternatives will consider the following at a minimum:

- "No action" alternative.
- Alternative that reduces or eliminates the toxicity, mobility, or volume of waste.
- Alternative that considers land use controls.

3.11.2.2 Alternatives identified in the FS are initially screened for effectiveness, cost, and implementability. The initial screening is preliminary and is not equivalent to the detailed analysis conducted later. At this stage, costs are order-of-magnitude and include remedial action operations and long term management as appropriate. Factors such as safety, constructability, potential opposition from the public, compatability with planned uses, and availability of resources may be considered in evaluating

implementability. Demonstrated effectiveness of the technologies and predictable adverse environmental impacts should be considered at this stage. The FS will include the calculations, assumptions, and references supporting the evaluations. The initial screened will be presented to the state regulators so they can identify state ARARs.

3.11.2.3 Following the initial screening, detailed analysis of the remaining alternatives will be conducted. The alternatives are compared to criteria provided in Section 300.430(e)(9)(iii) of the NCP and presented in the FS report. Threshold criteria are requirements that must be met or waived to be eligible for selection. Primary balancing criteria are those that form the basis for comparison among alternatives that meet the threshold criteria. Modifying criteria are criteria considered in remedy selection. Although permanent solutions are preferred, they are not required by CERCLA.

3.11.2.4 Based on the results of the comparison of alternatives, a response alternative will be recommended for all areas of the site. The alternative evaluation process and selection will be described in the RI/FS report. Based on the final RI/FS report, the Proposed Plan will be written and presented for public review.

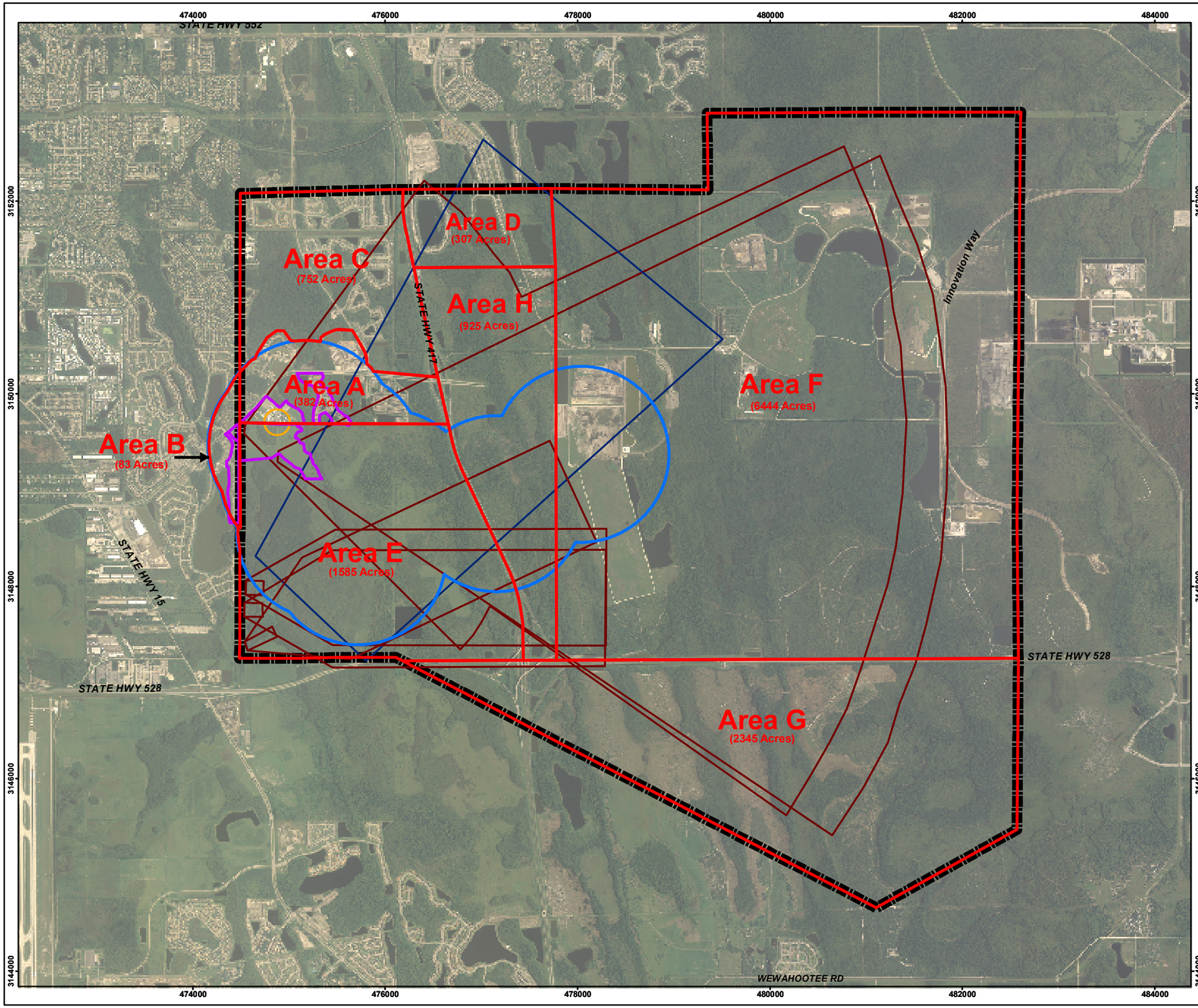
3.12 PREPARATION OF A RECURRING REVIEW PLAN

A Recurring Review Plan will be prepared as a part of the RI and will be included as an appendix to the RI/FS Report. The Decision Document will state the requirements for the recurring review, the review cycle, and the proposed funding for the recurring review. The Recurring Review Plan will be prepared in accordance with EP 75-1-4, *Recurring Reviews on Ordnance and Explosive (OE) Response Actions* (USACE, 2003) and DID MR-110.

Figure 3.1

Investigation Areas A through H
Pinecastle Jeep Range

Orange County
Orlando, Florida



Legend

- Area Boundary
- TCRA Area Boundary
- Chemical Demonstration Range
- Air-to-Ground Rocket Range
- Range Complex No.1
- Bombing Range
- FUDS Boundary

Site Location in Florida

N

Image Source: 2007 Orthophotos
Projection: UTM Zone 17 NAD83, Units in Meters

1,000 500 0 1,000 Meters

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	**Investigation Areas A through H Pinecastle Jeep Range**		
DRAWN BY: BT			
CHECKED BY: GH	SCALE: As Shown	PROJECT NUMBER: 746163.03004	
SUBMITTED BY: MS	DATE: May 2008	PAGE NUMBER: 3-54	
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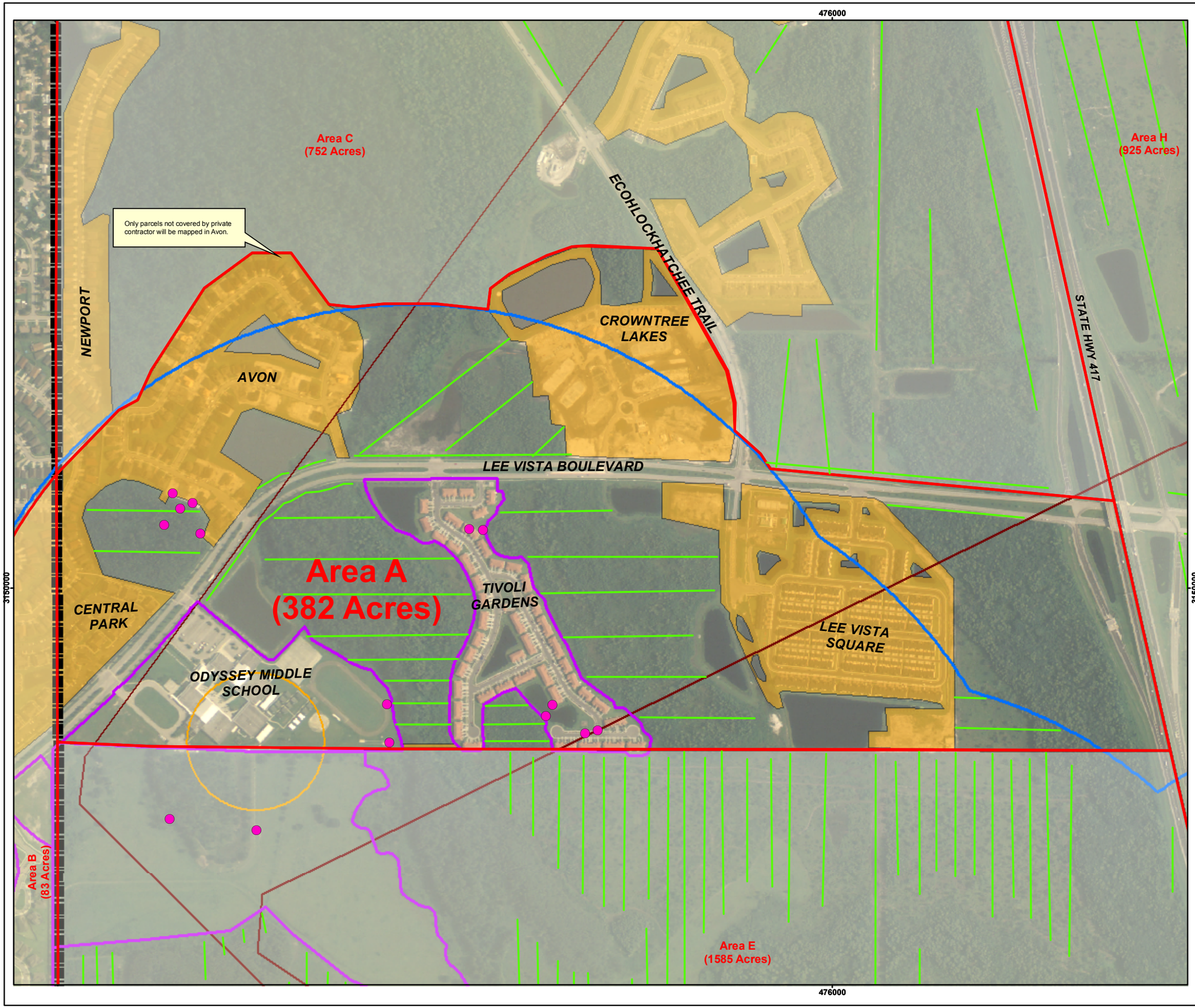

Figure 3.2

Area A
Pinecastle Jeep Range

Orange County
Orlando, Florida

Legend

- Proposed Soil Sample Location
- Area Boundary
- TCRA Area Boundary
- Chemical Demonstration Range
- Range Complex No.1
- Bombing Range
- FUDS Boundary
- Geophysical Transect
- Digital Geophysical Mapping/Mag & Dig

Note: Additional samples will be added in areas where MEC and MD are found.

Site Location in Florida

N

Image: 2007 Orthophotos
Projection: UTM Zone 17 NAD83, Units in Meters

150 75 0 150 Meters

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	Pinecastle Jeep Range	
DRAWN BY: BT		
CHECKED BY: GH	SCALE: As Shown	PROJECT NUMBER: 746163.03004
SUBMITTED BY: MS	DATE: May 2008	PAGE NUMBER: 3-55
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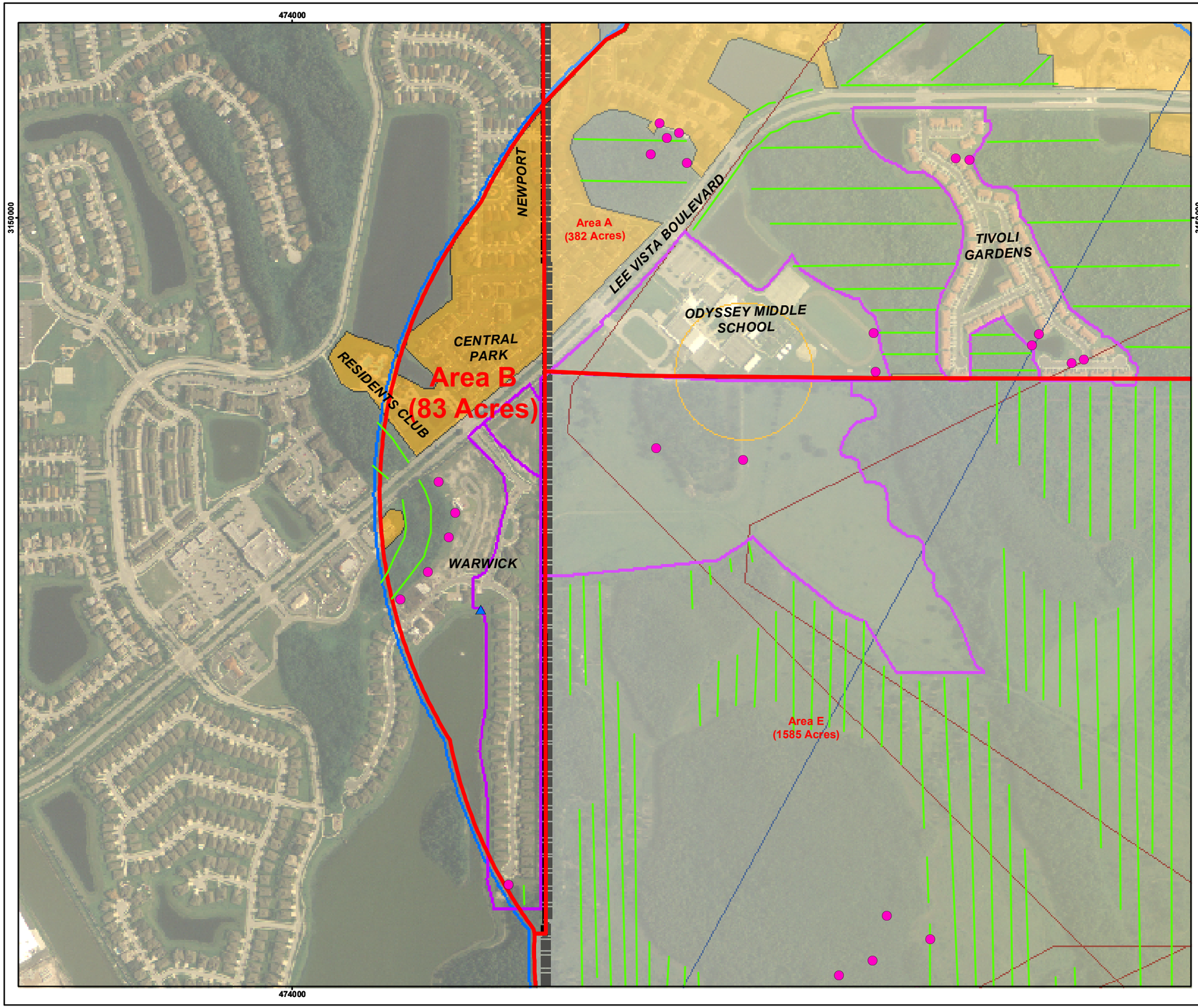

Figure 3.3

Area B
Pinecastle Jeep Range

Orange County
Orlando, Florida

Legend

- Proposed Sediment/Surface Water Sample Location
- Proposed Soil Sample Location
- Area Boundary
- TCRA Area Boundary
- Chemical Demonstration Range
- Air-to-Ground Rocket Range
- Range Complex No.1
- Bombing Range
- FUDS Boundary
- Geophysical Transect
- Digital Geophysical Mapping/Mag & Dig

Note: Additional samples will be added in areas where MEC and MD are found.

Site Location in Florida

N

Image Source: 2007 Orthophotos
Projection: UTM Zone 17 NAD83, Units in Meters

150 75 0 150 Meters

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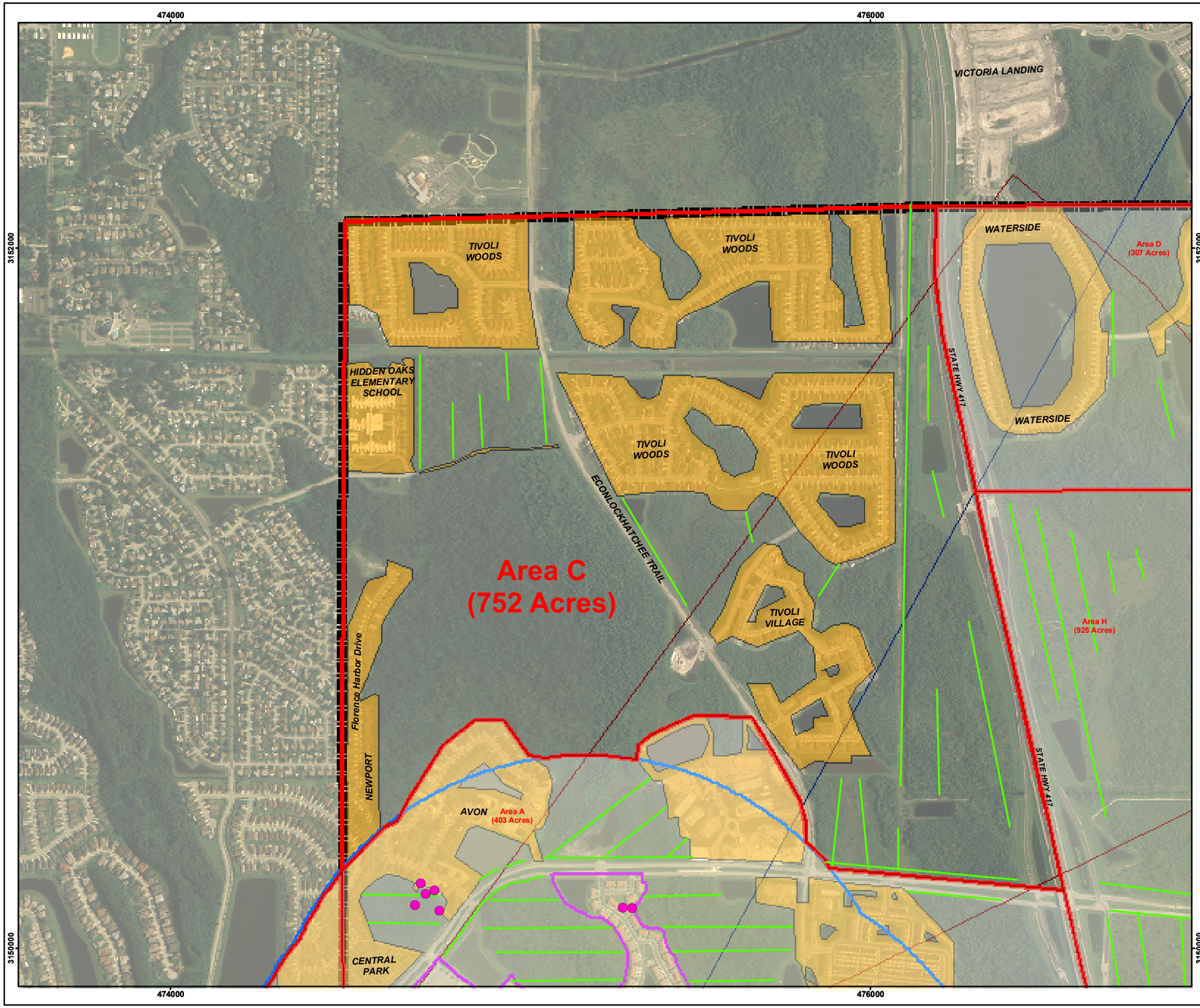
CHECKED BY: GH	DATE: May 2008	PAGE NUMBER: 3-56	
SUBMITTED BY: MS	FILE: X:\GIS\Site_inspections_ne\Maps\Pinecastle_FL\Fig3_3.mxd		

Figure 3.4

Area C
Pinecastle Jeep Range

Orange County
Orlando, Florida



Legend

- Proposed Soil Sample Location
- Area Boundary
- TCRA Area Boundary
- Chemical Demonstration Range
- Air-to-Ground Rocket Range
- Range Complex No.1
- Bombing Range
- FUDS Boundary
- Geophysical Transect
- Digital Geophysical Mapping/Mag & Dig

Note: Additional samples will be added in areas where MEC and MD are found.

Site Location in Florida

N

Image Source: 2007 Orthophotos
Projection: UTM Zone 17 NAD83, Units in Meters

150 75 0 150 Meters

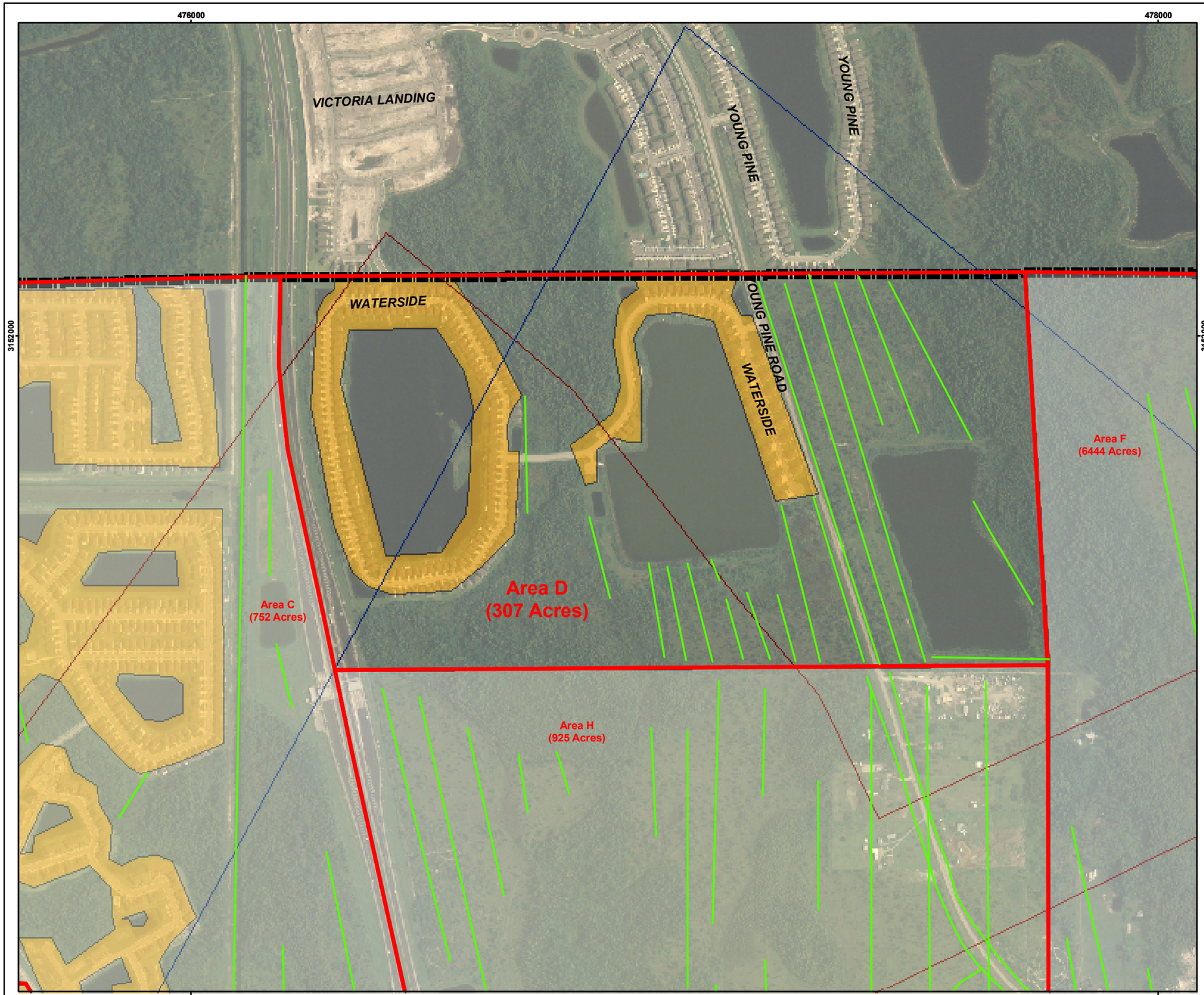
PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	**Pinecastle Jeep Range**		
DRAWN BY: BT			
CHECKED BY: GH	SCALE: As Shown	PROJECT NUMBER: 746163.03004	
SUBMITTED BY: MS	DATE: May 2008	PAGE NUMBER: 3-57	
	FILE: X:\GIS\Site_inspections_ne\Maps\Pinecastle_FL\Fig3_4.mxd		

Figure 3.5

Area D
Pinecastle Jeep Range

Orange County
Orlando, Florida



Legend

- Area Boundary
- TCRA Area Boundary
- Chemical Demonstration Range
- Air-to-Ground Rocket Range
- Range Complex No.1
- Bombing Range
- FUDS Boundary
- Geophysical Transect
- Digital Geophysical Mapping/Mag & Dig

Note: Additional samples will be added in areas where MEC and MD are found.

Site Location in Florida

N

Image Source: 2007 Orthophotos
Projection: UTM Zone 17 NAD83, Units in Meters

150 75 0 150 Meters

PARSONS

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DESIGNED BY: BT	Pinecastle Jeep Range
DRAWN BY: BT	
CHECKED BY: GH	SCALE: As Shown; PROJECT NUMBER: 746163.03004
SUBMITTED BY: MS	DATE: May 2008; PAGE NUMBER: 3-58
	FILE: X:\GIS\Site_inspections_ne\Maps\Pinecastle_FL\Fig3_5.mxd

Figure 3.6

Area E
Pinecastle Jeep Range

Orange County
Orlando, Florida

Legend

- Proposed Soil Sample Location
- Area Boundary
- TCRA Area Boundary
- Chemical Demonstration Range
- Air-to-Ground Rocket Range
- Range Complex No.1
- Bombing Range
- FUDS Boundary
- Geophysical Transect
- Brunetti Landfill
- Digital Geophysical Mapping/Mag & Dig

Note: Additional samples will be added in areas where MEC and MD are found.

Site Location in Florida

N

Image Source: 2007 Orthophotos
Projection: UTM Zone 17 NAD83, Units in Meters

300 150 0 300 Meters

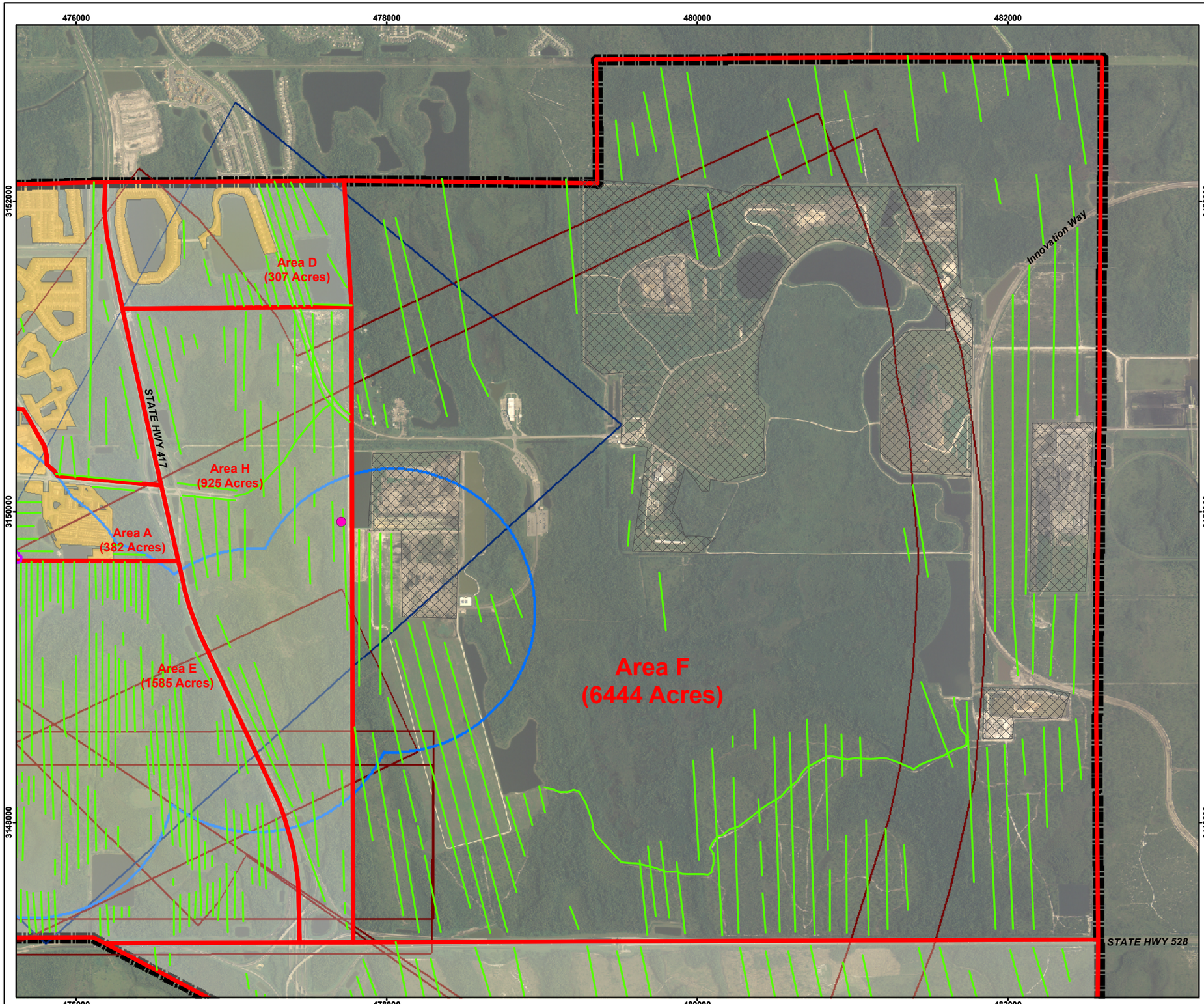
PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	**Pinecastle Jeep Range**	
DRAWN BY: BT		
CHECKED BY: GH	SCALE: As Shown	PROJECT NUMBER: 746163.03004
SUBMITTED BY: MS	DATE: May 2008	PAGE NUMBER: 3-59
	FILE: X:\GIS\Site_inspections_ne\Maps\Pinecastle_FL\Fig3_6.mxd	

Figure 3.7

Area F
Pinecastle Jeep Range

Orange County
Orlando, Florida



Legend

- Proposed Soil Sample Location
- Area Boundary
- TCRA Area Boundary
- Chemical Demonstration Range
- Air-to-Ground Rocket Range
- Range Complex No.1
- Bombing Range
- FUDS Boundary
- Geophysical Transect
- Landfill
- Digital Geophysical Mapping/Mag & Dig

Note: Additional samples will be added in areas where MEC and MD are found.

Site Location in Florida

N

Image Source: 2007 Orthophotos
Projection: UTM Zone 17 NAD83, Units in Meters

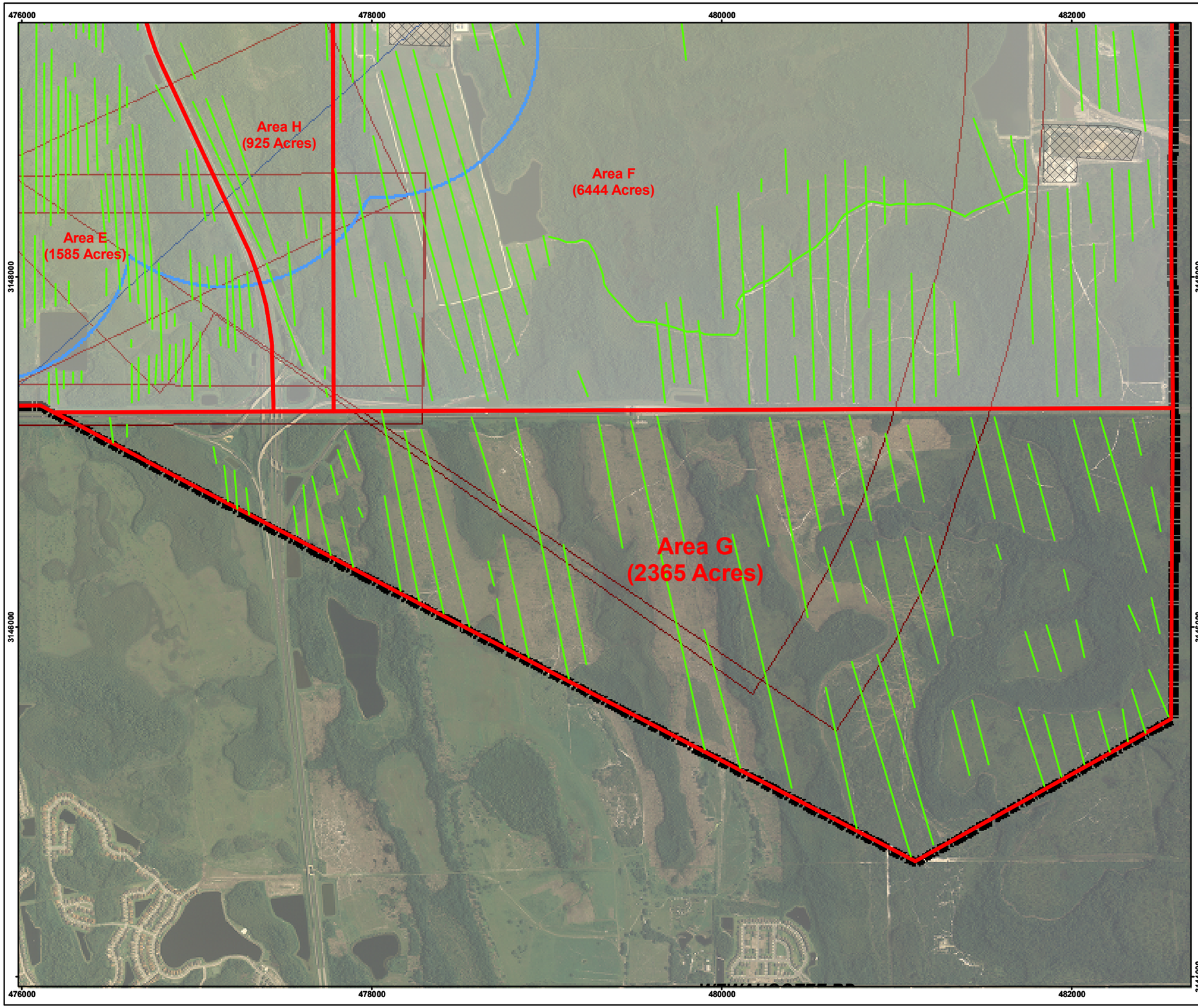
500 250 0 500 Meters

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	**Pinecastle Jeep Range**	
DRAWN BY: BT	SCALE: As Shown	PROJECT NUMBER: 746163.03004
CHECKED BY: GH	DATE: May 2008	PAGE NUMBER: 3-60
SUBMITTED BY: MS	FILE: X:\GIS\Site_inspections_ne\Maps\Pinecastle_FL\Fig3_7.mxd	

Figure 3.8

Area G
Pinecastle Jeep Range



Legend

- Area Boundary
- TCRA Area Boundary
- Chemical Demonstration Range
- Air-to-Ground Rocket Range
- Range Complex No.1
- Bombing Range
- FUDS Boundary
- Geophysical Transect
- Landfill

Note: Additional samples will be added in areas where MEC and MD are found.

Site Location in Florida

N

Image Source: 2007 Orthophotos
Projection: UTM Zone 17 NAD83, Units in Meters

350 175 0 350 Meters

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	**Pinecastle Jeep Range**		
DRAWN BY: BT			
CHECKED BY: GH	SCALE: As Shown	PROJECT NUMBER: 746163.03004	
SUBMITTED BY: MS	DATE: May 2008	PAGE NUMBER: 3-61	
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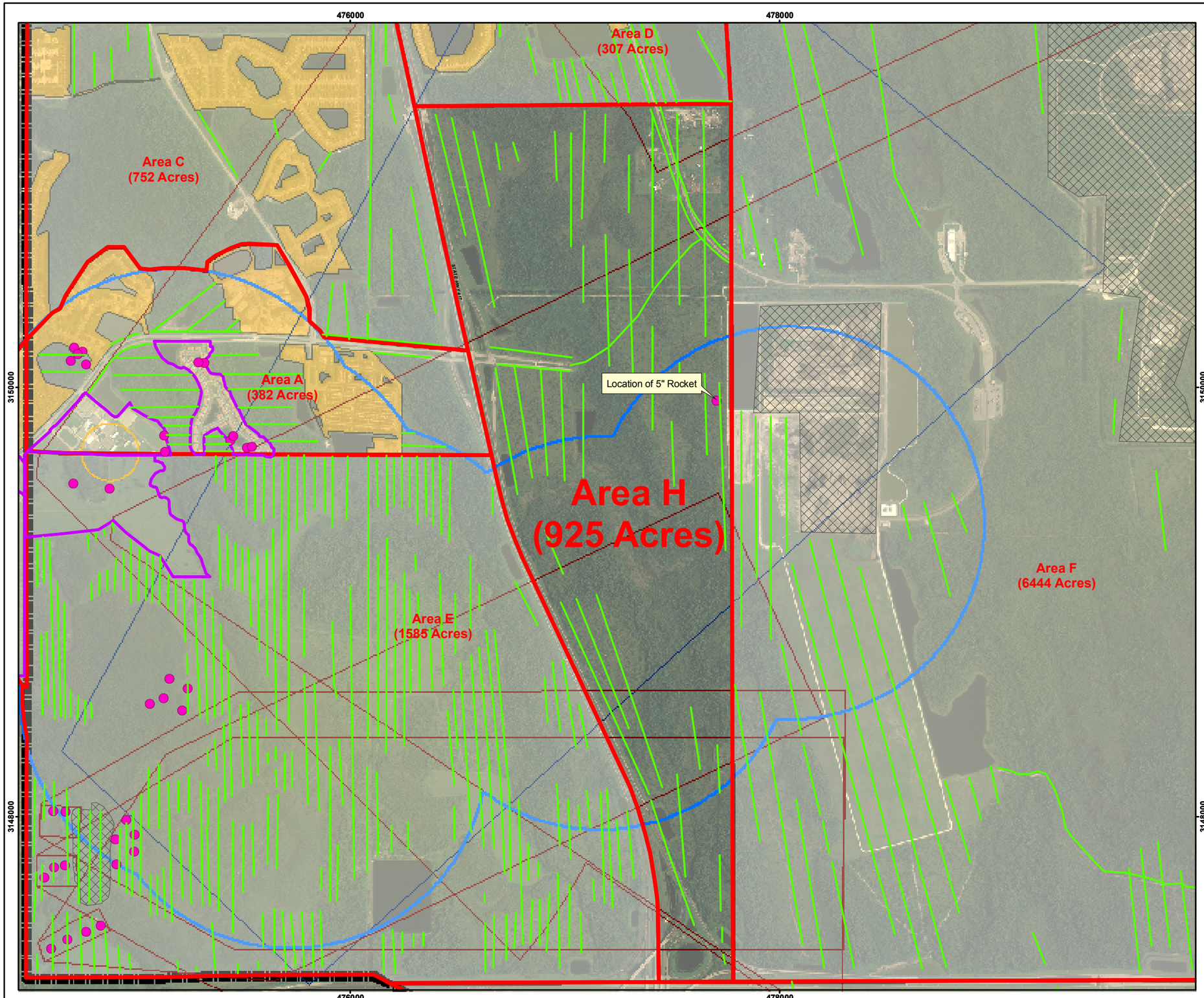
Figure 3.9

Area H
Pinecastle Jeep Range

Orange County
Orlando, Florida



Legend

- Proposed Soil Sample Location
- Area Boundary
- TCRA Area Boundary
- Chemical Demonstration Range
- Air-to-Ground Rocket Range
- Range Complex No.1
- Bombing Range
- FUDS Boundary
- Geophysical Transect
- Landfill
- Digital Geophysical Mapping/Mag & Dig

Note: Additional samples will be added in areas where MEC and MD are found.

Site Location in Florida

N

Image Source: 2007 Orthophotos
Projection: UTM Zone 17 NAD83, Units in Meters

400 200 0 400 Meters

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	**Pinecastle Jeep Range**	
DRAWN BY: BT	SCALE: As Shown	PROJECT NUMBER: 746163.03004
CHECKED BY: GH	DATE: May 2008	PAGE NUMBER: 3-62
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CHAPTER 4
QUALITY CONTROL PLAN

4.1 GENERAL

This Quality Control Plan (QCP) provides procedures for controlling and measuring the quality of work throughout the execution of the tasks required by the PWS. This QCP includes the policies, responsibilities, documentation, and training requirements for maintaining the highest standards. The QCP applies to all work performed by Parsons and its subcontractors.

4.2 CORPORATE POLICY

4.2.1. Parsons recognizes that the USACE is responsible for quality assurance (QA); however, Parsons also has a QA process that starts with top management's commitment and involvement. The process provides a permanent and workable system that allows each employee to understand the job performance expected. The Parsons QA and improvement process ensures that every employee is supported by the actions, procedures, tools, and training required to do a job according to the requirements. By promoting teamwork and by focusing attention on the solutions, the quality of work can be increased and assured throughout the project.

Parsons Corporation Quality Policy

We are committed to providing quality services and products. We will, as a corporation and as individuals, meet the mutually agreed-to requirements the first time and strive for continuous improvement of our work processes.

4.2.2. The Parsons' QA Policy is based on the work and concepts of several recognized authorities on quality management in the United States, especially Mr. Philip Crosby, Dr. W.E. Deming, and Dr. J.M. Juran. These three experts each have different methods of addressing and resolving problems. Parsons has taken unique portions of their concepts and has tailored them to corporate work processes. As a result, Parsons has placed a greater emphasis on the actual elements pertaining to work processes, project requirements, and lessons learned from past performances. These concepts have been developed into a systematic and practical approach for improving quality.

4.2.3. Generally, Parsons' QA Policy relies on four fundamentals, termed the "absolutes of quality." They answer these questions:

- What is quality? *Conformance to Requirements*.

- How do we achieve it? *Prevention*.
- What is our performance standard? *Zero Defects*.
- How can we measure quality? *Cost of Doing Things Wrong*.

4.3 REQUIREMENTS

The Parsons QC Plan for the Pinecastle Jeep Range RI/FS has been written to encourage positive communication throughout the Parsons project team. It is also intended to foster clear communication between Parsons, USAESCH, and CESAJ. Honest and effective communication among the project team requires that all parties clearly understand the project requirements. This QCP dictates the methods and procedures that will be used during this project, addressing personnel, equipment testing and calibration, QC inspection and surveillances, and data reduction and reporting. All QC reports and documents will be kept on site and accessible for government inspection upon request. The QCP has been prepared in accordance with DID MR-005-11.

4.4 QC OBJECTIVES

4.4.1. The QC procedures described in this section will be used for all fieldwork performed during the RI/FS. These procedures were designed to manage, control, and document performance of work efforts. This section of the QCP will achieve the following objectives:

- Identify QC procedures and responsibilities for the RI/FS;
- Ensure CESAJ, USAESCH, and Parsons notifications are performed as required by the PWS;
- Document the quality of work efforts via audits/surveillances and independent staff reviews of deliverables;
- Ensure the development of an appropriate ordnance accountability ledger and appropriate MEC chain of custody and disposal;
- Ensure data integrity through implementation of data management QC procedures;
- Ensure data precision through implementation of field equipment maintenance and use procedures; and
- Outline an inspection system.

4.4.2 The QC procedures and reporting for the chemical data quality management are discussed in the SAP (Appendix E) and are written in accordance with ER 1110-1-263.

4.5 RESPONSIBILITIES

4.5.1 Above all, project quality is the responsibility of the entire project team. The team's comprehension of this QCP is of primary significance for quality objectives to be accomplished; thus, the training and indoctrination of the key personnel in the quality objectives will be conducted. The project organization is headed by the PM; the single focal point for successful accomplishment of all phases of the project. The PM is given full authority and responsibility for project execution and the PM is supported by direct line managers with functions and responsibilities outlined below.

4.5.2 The PM approves the QCP, implements procedures, and has direct responsibility for day-to-day operations of the project. The PM's responsibilities related to QC include, but are not limited to:

- Implementation of all applicable Parsons policies and procedures;
- Identifies the qualifications and selects project staff, subcontractors, and suppliers;
- Timely submission of all contract deliverables; and
- Analyzing QC failures with the QC Manager and the appropriate QC person and implementing corrective actions.

4.5.3 The Project QC Manager communicates with the PM on all project-related QC matters. The Project QC Manager, as a management representative, has the following authorities and responsibilities:

- Ensure that the QCP has been established, maintained, and implemented;
- Establishing guidelines to assist in the development of program, project, site, and task-specific QC policies and procedures;
- Initiate, recommend, approve, and provide solutions to the quality problems identified in the QCP during system audits or surveillances;
- Conducting periodic surveillances/inspections of the project and submitting reports to the Parsons Sector Manager with copies to the PM; and
- Reporting the adequacy, status, and effectiveness of ongoing projects to the Parsons Sector Manager.

4.5.4 The UXOQCS reports to the Project QC Manager on quality matters, is the key QC person onsite, and has responsibility for overall quality of work performed on site. The responsibilities include, but are not limited to:

- Develop QC procedures to implement the QCP;
- Verify implementation of corrective actions;
- Initiate actions to identify and prevent the occurrence of nonconformances relating to the services and QCP;

- Authority to stop nonconforming work;
- Ensure that QC procedures are being followed and are appropriate in demonstrating data validity sufficient to meet DQOs;
- Recommending actions to be taken in the event of QC failures, both to the PM and the Project QC Manager;
- Reporting non-compliance with QC criteria to the PM and Project QC Manager;
- Authority to suspend project activities when a condition adverse to quality is identified and notify the PM and senior personnel responsible for clearance activities when such action is required;
- Conducting daily QC audits or surveillances and inspections; and
- Conducting weekly and monthly QC Compliance Inspections.

4.6 FIELD QC PROCEDURES

The QC procedures for field operations include QC for the intrusive operations, geophysical data collection, GIS procedures, and environmental sampling.

4.6.1 Instrument and Equipment Testing

Instruments and equipment used to gather and generate data will be tested with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specifications. Testing, repair, or replacement records will be maintained by the SM and are subject to audit/surveillance by the UXOQCS and Project QC Manager. Testing records of the field instrumentation will be filed with the Parsons PM after the fieldwork is completed. A list of instruments and equipment that are subject to QC checks and review include data gathering instruments and all equipment that have an impact on project safety:

- GPS instruments;
- Geophysical instruments;
- Vehicles and machinery; and
- Other equipment.

4.6.2 GPS QC

A GPS unit will be used for locating the data collected during the digital geophysical surveys, reacquiring the anomalies picked in the geophysical data, documenting the sampling locations and excavation extents, and documenting any other locations of interest observed during the project. An "out of the box" inventory and inspection of the equipment will be performed (e.g., batteries including back up, data logger, data card, cables, etc.). As part of the ongoing QC procedures, positioning equipment will be checked for proper operation by placing the system's antenna over a known point and

recording the calculated location at the beginning and end of each day. GPS units used during the digital geophysical surveys will be checked using a moving test described in Chapter 3. Accuracy standards are based on type of GPS receiver and applicable real-time corrections. The following standards will be met in order to consider the units operating correctly:

- Uncorrected Course Acquisition Code receivers – six meters (*i.e.* Garmin or Delorme handhelds in uncorrected mode);
- Wide Area Augmentation System (WAAS) corrected handheld receivers – three meters (*i.e.* Garmin or Delorme handhelds with WAAS enabled);
- Space Base Augmentation System (SBAS) or Beacon corrected "one meter" receivers – one meter (*i.e.* Trimble Pro-XRS or Geo-XT with beacon corrections);
- Uncorrected Dual Channel Carrier Phase receivers – two and-a-half meters (*i.e.* Trimble 5700 RTK or NAVCOM SF-2040G in uncorrected mode); and
- Real Time Corrected Dual Channel Carrier Phase receivers – one-half foot (*i.e.* Trimble 5700 in RTK mode or NAVCOM SF-2040G when receiving StarFire corrections) for a stationary test, or one foot for a moving test.

4.6.3 Digital Geophysical Mapping Instruments

Each digital geophysical instrument to be used in data collection on site will first be sent over the GPO grid established for the project. Results of the GPO surveys will be interpreted by the site geophysicist and anomaly selection will be made in the same manner they would be made for production data. Results of the seed item detections/misses will be compared to the results of the original GPO. It will be ensured that each piece of equipment detects the same items detected in the original GPO, or the instrument/survey methods will be examined to determine why a specific item was not detected. Results of each GPO survey will also be compared to the DQOs established for the project. Equipment collecting data that does not comply with the DQOs will not be used for collection during the project. Geophysical equipment will be tested on a daily basis as well. A number of tests and procedures associated with daily instrument QC are outlined in Chapter 3.

4.6.4 Analog Instrument QC

An "out of the box" inventory and inspection of the equipment will be performed (*e.g.*, batteries including back up, end probe, sensitivity adjustment device, *etc*.) upon arrival at each site. The analog instrument, such as the Schonstedt, will be checked at the start of each day by operating the instrument over a test plot seeded with metallic test items. At the start of each day, each operator will also be checked for interfering metallic items by scanning with the instrument. The battery will be checked and the instrument will be shaken to check for loose parts and bad electrical connections. The performance of these tests will be documented in field books or on standard forms.

4.6.5 GIS QC Procedures

4.6.5.1. The accuracy of the geographic analysis is equivalent to the accuracy of the underlying data being analyzed. Certain guidelines are necessary to ensure data quality after it has been entered into the system. The QC guidelines presented in this chapter pertain to GIS data loaded into the GIS system.

4.6.5.2. Potential data problems include source data errors, data entry errors that can be corrected, data editing errors that can be corrected, data corruption errors that can be prevented, and user errors that can be anticipated.

4.6.5.3. **Geometric Accuracy.** After the coordinate information for reconnaissance waypoints are verified, the geometric accuracy of the geographic features will be checked. When this is detected, the source data will be examined and the correct location and place points will be determined in the GIS data set to represent identifiable elements of the feature such as corners or intersections. Original files will be backed up prior to making edits to prevent errors from occurring during the editing process.

4.6.5.4. **Geographic Accuracy**. One of the strengths of GIS is the accuracy in which geographic phenomena can be mapped. However, this strength can become a weakness if the overall spatial accuracy of the data is not clearly indicated. A statement of the accuracy of the spatial data will be included with documentation of the graphic files. The GIS coverage will be evaluated to determine if the geographic features are graphically correct. If they are not in accordance with the data dictionary, they will be corrected.

4.6.5.5. **Data Loss and File Corruption.** There are several programs that manipulate the various files used by the GIS and relational database. Due to hard disk limitations, Random Access Memory limitations, or human error, these programs occasionally crash, and the files being manipulated by these programs are corrupted, among other problems. To prevent data loss, these files will be backed up daily, and stored in a separate physical location from the primary storage device.

4.6.5.6. **Schema QC.** The database values are the other part of the data structure that requires QC. The database is generally treated as a single file with unique properties. QC procedures will be developed by the GIS operator to ensure that the data contained therein is accurate and usable. Before editing any database tables, the tables will be unloaded for backing up the schema. Another safeguard is to use a reference file of how data entry is performed.

4.6.5.7. The GIS operator will develop and use a checklist of standard QC steps. For example, another approach to correcting errors is to run a program that edits the ASCII data export file.

4.6.6 Chemical Data Quality Management Plan

The QCP procedures for the Chemical Data Quality Management Plan are discussed in the SAP (Appendix E).

4.6.7 Preventive Maintenance

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendation and written procedures developed by the operators. Extra batteries and spare equipment that requires frequent replacing will be kept on site.

4.6.7.1 Maintenance Procedures

Measurement equipment utilized on-site (*e.g.*, magnetometers, monitors, geophysical mapping equipment, *etc*.) will be checked daily for operational reliability. Equipment such as vehicles, backhoes, bulldozers, and chipping/grubbing equipment, will have before-, during-, and after-operation maintenance performed in accordance with the equipment operating manual. The manufacturer's written maintenance schedule will be followed to minimize the downtime of the measurement system. It will be the operator's responsibility to adhere to this maintenance schedule and to arrange any necessary and prompt service as required. At a minimum, equipment used daily will be cleaned at the end of each workday and kept in good operating condition. Qualified personnel shall perform service to the equipment, instruments, tools, etc. In the absence of any manufacturers recommended maintenance criteria, a maintenance procedure will be developed by the operator based upon experience and previous use of the equipment.

4.6.7.2 Maintenance Records

Logs shall be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the geophysical equipment operators or UXO technicians when this equipment is used at the site. The Parsons QC Manager may audit or conduct surveillance of these records to verify complete adherence to these procedures.

4.6.8 Field Data Management QC

The SM is the onsite field data manager and will be responsible for tabulating all data collected or produced by intrusive teams and placing the data under the custody and control of the project data management system. The UXOQCS will be responsible for checking the tabulated data produced by the intrusive teams. All data is required to be checked by a knowledgeable person other than the originator.

4.6.9 Equipment Checkout and Receiving Inspections

4.6.9.1. Equipment pre-operation checklists will be audited by the UXOQCS and recorded in the daily log. If equipment field checks indicate that any piece of equipment is not operating correctly and field repair cannot be made, the equipment will be tagged and removed from service. The SM will be notified and a request for replacement equipment will be expedited. Replacement equipment will meet the same specifications for accuracy and sensitivity as the equipment removed from service.

4.6.9.2. When Contractor Acquired Property (CAP) or Government Furnished Property (GFP) is received, it will be examined to detect damage in transit, for completeness, and to insure that the equipment is adequate to perform its intended task. Receiving inspections will also include a function test if applicable. CAP and GFP are considered government property. Inventories of CAP and GFP will be performed by the individuals designated by the SM. The checkout of equipment varies depending on the types and models of equipment. Equipment operators must perform inspections and daily checks when equipment is in use, and when first received. Forms for Heavy Equipment Daily Inspection, Direct Reading Instrument Log, and Vehicle Inspection are provided in Appendix F. The UXOQCS will review the forms prepared by others to verify the inspections were performed and that the equipment is in compliance.

4.7 QC INSPECTION SYSTEM

QC inspections will be conducted on an as-needed basis and on a regular schedule depending on the type of inspection and the activities being conducted. For instance, the UXOQCS will verify that equipment checks, calibrations, and safety checks have been conducted and properly documented. These inspections will be documented in the QC log. The Safety/Quality Compliance Checklist provides pass/fail criteria for audits/surveillances. A summary of the inspections and results will be provided to the SM for inclusion in the Daily Status Report. QC inspection will also be conducted for all documents and reports. The Project QC Manager or a senior staff member will conduct a review. Table 4.1 shows the responsibility and schedule for QC inspection activities.

4.8 NONCONFORMING ITEMS OR ACTIVITIES AND CORRECTIVE ACTIONS

4.8.1 Identification

Nonconformances or QC failures are the non-fulfillment of project requirements. The severity and nature of the QC failure will determine the appropriate response. Simple, one-time occurrences will be corrected immediately as they are identified. Circumstances that prevent a work process from conforming to the contract requirements will be promptly identified, documented, investigated, and corrected appropriately. All project personnel have the responsibility, as part of their normal work duties, to promptly identify and report conditions adverse to quality. The status of nonconformance reports

will be maintained in a log, and progress of their resolutions will be documented and reviewed monthly to ensure prompt attention to their conclusion.

4.8.2 Resolution, Corrective Action, and Verification

The appropriate level of management is responsible for evaluating the cause of a Nonconformance Report (NCR) and will recommend solutions for correcting the deficiency identified. Actions and technical justifications for an action proposed to resolve the corrective action will be reviewed and approved by personnel responsible for the technical aspect of the work. The QC organization will be responsible for verifying implementation of corrective action, monitoring the effectiveness of preventive action, and reporting any findings to the Parsons QC Manager.

4.8.3 Material and Item Nonconformance

4.8.3.1 The Project QC Manager ensures that the following requirements are implemented:

- Items that do not conform to prescribed technical and/or quality requirements are tagged or otherwise identified, and documented. If the problems persist, they are to be reported as nonconformances. The documentation will include the following information:
    - Identification of the noncompliant activity, material, or item;
    - Identification of the technical and quality requirement(s) with which the activity, material, or item is not in compliance;
    - Identification of the current status of the activity, material, or item (*i.e.* whether the item is on hold or whether its use is conditional);
    - Names and dates of the individual(s) identifying the nonconformance;
    - Identification of the individual(s) or organization(s) responsible for resolution;
    - Indication of the severity of the noncompliance (finding, nonconformance); and
    - Indication regarding the continuance or stoppage of work associated with each noncompliant activity, material, or item.

4.8.3.2 The status of noncompliant activities, materials, and items and the progress of their resolution are documented and routinely reviewed to ensure prompt attention to conclusion.

Table 4.1
Schedule of QC Activities

Activity	Responsibility	As Needed	Weekly	Monthly	Quarterly	Annual
QC Surveillances and Inspections	UXOQCS / Project QC Manager				X	
QC Activity Log	UXOQCS	X				
QC Compliance Inspections	UXOQCS		X	X		
Review Corrective Actions and Lessons Learned	UXOQCS		X			
Corrective Actions	UXOQCS	X				
Approval of solutions to Quality Problems	Project QC Manager	X				
QC Review of Work Plans and Reports	Senior Staff / Project QC Manager	X				
Analysis of QC Failures	Project QC Manager / PM	X				
QC Report	Project QC Manager				X	
Surveillances / Reporting on Overall QC Program	Project QC Manager					X

4.8.4 Review and Disposition of Nonconformance

The review is conducted by the PM, Project QC Manager, and UXOQCS (if applicable) to ensure that:

- The responsibility for review and disposition of nonconformance is defined;
- Nonconforming materials and items are reviewed in accordance with procedures. Nonconformance can be evaluated according to four criteria:
  - Reworked to meet the original requirements;
  - Accepted with or without repair;
  - Re-graded for alternative applications; and
  - Rejected or scrapped.
- Repaired or reworked materials and items are re-inspected; and
- Each document used to identify and correct nonconforming conditions allows for the evaluation and approval of proposed actions by the appropriate authority.

4.8.5 Trend and Root Cause Analysis

4.8.5.1 The trend analysis of QC audits/surveillances, subcontractor/supplier surveillance reports, and nonconformance will include the following information:

- Total number of audit/surveillance findings and observations, surveillance reports, and NCRs for each area of the QCP;
- A summary of the root causes for the nonconformance consolidated for each area of the QCP; and
- Trends that are developing or that have developed.

4.8.5.2 UXOQCS will verify the implementation of any preventive actions resulting from the trend analysis. The QC Manager is responsible for evaluating – on a semiannual basis – all nonconformance reports affecting quality and will recommend solutions, as well as steps, for verifying their implementation.

4.8.6 Lessons Learned

4.8.6.1 Opportunities to share lessons learned with the entire project team include monthly telecoms to discuss issues and concerns, as well as quarterly internal project review meetings. The Parsons lessons learned process is an open system that encourages all employees to contribute lessons learned to a central knowledge database. The lessons learned system has three distinct steps: collection, analysis, and implementation. Employees can submit lessons learned using the online Lesson Learned Collection Form at:

https://project1.parsons.com/LessonsLearned/LessonMgr.aspx?Mode=add

4.8.6.2 After submittal, the lessons will be reviewed by QC managers and individual knowledgable in the lessons learned. These individuals analyze the lessons and may suggest changes to processes or procedures or other preventative action. Implementation requires a benefit analysis, review of existing procedures. The Parsons PM is responsible for implementing changes that are deemed appropriate.

4.9 AUDITS AND SURVEILLANCES

4.9.1 Audit/Surveillance Execution

The QC Manager will perform an audit or surveillance of the project activities at least once for every three months of field activities. A pre-audit/surveillance briefing and a post-audit/surveillance briefing will be conducted to inform key management personnel or to confirm results of the audit/surveillance, including concerns and findings. Daily briefings may be conducted, as needed, to inform of the progress of the audit/surveillance and potential findings or concerns.

4.9.2 Audit Reporting

4.9.2.1 The audit/surveillance results will include the following information:

- Synopsis of the audit/surveillance results;
- Description of nonconformity (identified as findings and observations); and
- Completed audit/surveillance checklist and documentation (objective evidence) supporting the discovery of the nonconformity.

4.9.2.2 Conditions determined to be in nonconformance with the contract, procedure, or other specified requirements, are identified as findings. Conditions in compliance when first identified, but could lead to nonconformance if left uncorrected, are identified as observations. Formal responses are required for findings only. Corrective action is required for both findings and observations.

4.9.3 Review, Approval, and Verification of Recommended Action Response

The recommended corrective action proposed in response to the nonconformity will be reviewed and approved by the Project QC Manager. Justification for rejection of the response will be documented by the Project QC Manager. The Project QC Manager will report the implementation of corrective action to close out the audit nonconformity.

4.10 FIELD OPERATIONS DOCUMENTATION

4.10.1 Daily Field Activity Records

Field activities will be documented using standardized forms and logbooks. Forms included in Appendix F include the Daily Status Report, Safety Inspection Form, Daily QC Log, and Safety Audit Form. Field activity logbooks will be maintained daily, if applicable, and all entries will be recorded in ink. All personnel will use bound and

numbered field logbooks with consecutively numbered pages. The following logs will be maintained.

4.10.1.1 Daily Activity Log

- Date and recorder of field information;
- Start and end time of work activities including breaks, lunch, and down times;
- Visitors;
- Weather conditions;
- Relevant events;
- Important phone calls;
- Changes from approved or planned work instructions; and
- Signature of the Parsons SM.

4.10.1.2 Safety Log

- Date and recorder of log;
- Tailgate safety briefing (time conducted and by whom);
- Weather conditions;
- Significant site events relating to safety;
- Accidents;
- Stop work due to safety;
- Safety audits; and
- Signature of the Parsons SM indicating concurrence.

4.10.1.3 Training Log

- Date and recorder of log;
- Nature of training (personnel will complete the Site-Specific Training Form);
- Visitor training; and
- Signature of both the Parsons SM and the SSHO indicating concurrence.

4.10.1.4 QC Activity Log

- Date and recorder of log;
- Ordnance accountability;
- Equipment testing;
- Equipment monitoring results;
- QC audits;

- Nonconformance reports; and
- Signature of the Parsons SM indicating concurrence.

4.10.1.5 Explosives Usage Record

- Date and recorder of log;
- Assigned identification number;
- Type, condition, and location;
- Disposition; and
- Signature of the Parsons SM indicating concurrence.

4.10.2 Photographic Records

Digital photographic records of significant site activities will be maintained by site personnel. Photographic records will be used to supplement information recorded in the daily activity logs, including photographs of equipment prior to use, and the condition of site locations prior, during, and after any activity. Photographs will be taken of all identifiable MEC and representative samples of munitions debris and cultural debris.

4.10.3 Working Maps

Working maps of the site will be used to track the progress of field activities. As anomalies are reacquired and excavated, the assigned technician will note the progress on the map.

4.10.4 Dig Sheets

A written record will be kept of each anomaly excavated and the results of intrusive excavations. The dig sheets contain unique identification numbers for the anomalies and contain information on the locations and status of anomalies. Examples of dig sheets can be found in Appendix F (Forms).

4.10.5 Records of Inert Ordnance Items

Any munitions debris must be inspected and certified inert, chains of custody maintained, and final disposition conducted and documented in accordance with procedures outlined in EM 1110-1-4009 *Engineering and Design - Military Munitions Response Actions* (15 June 2007) Chapter 14 . The SUXOS will inspect and certify that the munitions debris is free of explosives and explosive residues (venting will be accomplished as required). The onsite USAESCH Safety Specialist will review and verify the documentation. The certificate will be on a DD Form 1348-1A and will state the following:

"This certifies and verifies that the material listed has been 100 percent inspected and to the best of our knowledge and belief, are free of explosive or related materials."

SUXOS:_____ Date:_____

USAESCH Safety Specialist (verification):_____ Date _____

4.10.6 Field Office and Communications

Field QC procedures will include establishing site office entry requirements and communication protocols. A site office will be established. The site office will have electric power and communications lines for phone and fax. All official visitors will report to the site office to sign in. No official visitors will be allowed to visit any portion of the site without an escort. All internal communications will be by use of a two-way radio or cell phone. All official external communications shall be via cellular telephone or landline from the site office or field site.

4.11 QC REPORTS

4.11.1 During the project, the Project QC Manager will prepare at least one QC report for every three months of fieldwork to discuss:

- The periodic assessment and measurement of data accuracy, precision, and completeness; and
- Significant quality assurance problems and corrective actions taken.

4.11.2 In addition, the Parsons PM will receive periodic updates concerning QC in the field or with the GIS. A final report prepared upon completion of the RI/FS will include a separate data assessment report summarizing data quality information and all QC documents.

4.12 TRAINING

4.12.1 General

Qualifications and training of all project personnel shall comply with the requirements specified in Chapter 5 of the APP (Appendix D). The UXOQCS will verify that the required training has been conducted and audit the training documentation for compliance.

4.12.2 Training Requirements

4.12.2.1 Personnel and subcontractors assigned to perform activities affecting quality and safety are required to review this plan. Additional training in the QC requirements and responsibilities from this plan will be included in the classroom training

at the start of the intrusive investigation. Updates may be provided during daily safety briefings.

4.12.2.2 Implementing the training program specified in Chapter 5 of the APP (Appendix D) will ensure that project personnel:

- Understand the safety conditions and requirements of the work task;
- Understand project goals and objectives;
- Possess adequate knowledge of the processes and procedures needed to conduct assigned tasks;
- Have working knowledge of the tools to be used;
- Possess an understanding of DQOs for the work process;
- Know the consequences of inadequate quality levels;
- Are provided training for continued maintenance of job proficiency; and
- Are aware of the quality improvement and empowerment responsibilities.

4.12.2.3 All visitors shall be required to go through a safety training and orientation to the general and specific hazard requirements.

4.12.2.4 Training records including certifications will be maintained as project records. Documentation of their review by the UXOQCS or Project QC Manager will be maintained in accordance with requirements in this QCP.

CHAPTER 5
EXPLOSIVES MANAGEMENT PLAN

This plan outlines the explosives management procedures Parsons will use to perform the RI/FS at the former Pinecastle Jeep Range, Orange County, Florida. The procedures listed herein are in accordance with Parsons, USACE, and DoD policies.

5.1 ACQUISITION

Parsons and USA Environmental have BATF permits to purchase and use explosives (Figure 5.1). This permit will be available for inspection. Parsons will store explosives in either a portable BATF Type 2 explosives storage magazine with an attached separate detonator magazine or two separate portable BATF magazines to comply with explosive compatibility requirements (i.e. bulk explosives, initiating explosives). Primary responsibility, accountability and use of the explosives will remain with USA unless custody is transferred to the Government or another contractor with a current BATF explosive license.

5.1.1 Description and Estimated Quantities

Based on usage and demand, the quantity in stock may fluctuate but at no time will storage quantities exceed 50 pounds Net Explosive Weight (NEW). Parsons/USA will procure initial quantities as listed below:

- Jet Perforators
- Electric Blasting Caps
- 80 gr./ft Detonating cord
- Cast Boosters 3.1.2

5.1.2 Acquisition Source

Parsons/USA will purchase all explosives from local commercial explosives distributors whenever possible to preclude any delivery delays which may be associated with out of state sources. Austin Powder located in Anthony, Florida will be the primary source for all demolition material.

5.1.3 Initial Receipt

The initial shipment of explosives will be by commercial carrier, with the explosives placed in the magazines, which will be located on Orange County Landfill property. The explosive supplier is responsible for all permits and documentation required by federal, state, and local regulations.

5.1.4 Procedures for Receipt of Explosives

Upon receipt, the type, quantity, and lot number of each explosive item will be checked against the manifest and recorded on the Magazine Data Card (Figure 5.2). The original receipt documents and a duplicate magazine data card will be maintained on file by the site supervisor.

The Magazine Data Card will remain in the magazine with the explosive items and be annotated and updated upon each issue and receipt.

5.2 STORAGE

Parsons/USA will store explosives in a portable BATF Type 2 explosives storage magazine with an attached separate detonator magazine to comply with explosive compatibility requirements (i.e. bulk explosives, initiating explosives), or in two separate magazines. The magazine(s) will be installed and maintained to comply with all applicable storage and distance requirements as described in Chapter 9 of DoD 6055.09-STD, *DoD Ammunition and Explosives Safety Standards*. The magazines will be placed in a remote area away from structures and grounded in accordance with Chapter 11 of EM 1110-1-4009, *Ordnance and Explosive Response*.

5.2.1 Establishment of Storage Facilities

Parsons/USA will comply with BATF, federal, state, and installation storage and compatibility criteria and procedures when siting explosives storage magazines, which includes:

- Use of portable approved BATF Type 2 structures;
- Locate, install, and maintain the magazine(s) to comply with the magazine criteria and quantity distance requirements established in BATF Regulation ATFP 5400.7 and DoD 6055.09-STD.
- Install sufficient magazines or a type of magazine with an attached separate detonator magazine to comply with explosive compatibility requirements, (i.e., bulk explosives, initiating explosives); and
- Compliance with National Fire Protection Association Lightning Protection Code 780.

5.2.2 Physical Security of Storage Facilities

The magazines are locked with two high security padlocks that meet ATFP 5400.7 Section 55.208 (a) an enclosed, gated chain link fence will be used, which will be IAW Parsons ESAT SOP. The keys for the storage magazine will be given to the SUXOS who is responsible for controlling access to the magazines. The magazine storage area (MSA) will be inspected each workday by the UXOSO and demolition team leader to ensure the integrity of the magazine(s).

5.3 TRANSPORTATION

Transportation of demolition material from the distributor to the MSA and any transport within the RI/FS project site, will comply with all federal, state, and installation regulations. In as much as possible transport of demolition material will be kept to secondary roads in an effort to avoid any high volume traffic roadways.

5.3.1 Procedures for Transportation from Storage to Disposal Location

Transportation of explosives will be IAW the Parsons Explosives Storage and Transportation SOP (ESAT) found in (Appendix J). In addition a daily Vehicle Inspection Form (Figure 5.3) will be used to document vehicle inspection. For transportation of demolition material Parsons will comply with the following:

- Initiating explosives, such as blasting caps, will remain separated from other explosives at all times. Blasting caps may be transported in the same vehicle (in a separate cargo

compartment) as long as they are in an IME-22 container and secured away from other explosive items.

- Compatibility requirements will be observed;
- Only UXO Technicians III and above may be issued and transport explosive materials;
- Operators transporting explosives will have a valid drivers license;
- Drivers will comply with posted speed limits but will not exceed a safe and reasonable speed for conditions. Vehicles transporting explosives off-road will not exceed 25 MPH; and
- Personnel will not ride in the cargo compartment of a vehicle transporting explosives.

5.3.2 Explosive Transportation Vehicle Requirements

Explosives will be transported in vehicles having a cargo compartment that is separated from the vehicle operator. The load shall be braced and, except when within closed cargo compartments, covered with a fire-resistant tarpaulin or in an appropriate shipping container. Minimum vehicle requirements include:

- Vehicles transporting explosives or will be inspected daily using the Explosive Vehicle Inspection form (Figure 5.3);
- Vehicle will be placarded in accordance with Parsons ESAT SOP;
- Vehicle engine will not be running when loading or unloading explosives;
- Vehicle will be chocked to prevent movement while loading and unloading;
- Beds of vehicles will have either a plastic bed liner, dunnage, or sand bags to protect the explosives from contact with the metal bed and fittings; and
- Vehicles transporting explosives will have a first aid kit, two 10 BC-rated (or higher) fire extinguishers, three bi-directional emergency reflective triangles, and a means of communication with the UXOSO.

5.4 RECEIPT PROCEDURES

The SUXOS will strictly control access to all explosives. All receipts, issues, turn-ins, and inventories of explosives will be properly documented and verified, through physical count, by the UXOQCS and demolition team leader.

5.4.1 Records Management and Accountability

All original explosive records will be forwarded to the Parsons office located in Norcross, GA for archiving in accordance with BATF regulations and requirements. Copies of all records will be maintained on site by the site SUXOS and will be available for inspection by authorized agencies. Explosive items will be tracked by their respective lot number until the item is expended or transferred to Government control and accountability, or returned to the distributor.

5.4.2 Authorized Individuals

Parsons/USA is required to provide explosives distributors with documentation of individuals authorized to request and receive explosives. The individuals authorized to receive and issue explosives are the SUXOS, UXOSO and the demolition team leader. The SUXOS will designate in writing the individuals who are authorized to transport and use explosives.

5.4.3 Certification

The SUXOS and UXO Technician III team leader performing demolition will sign and date the explosives usage form (Figure 5.4) certifying that the explosives were used for their intended purpose.

5.4.4 Procedures for Reconciling Receipt Documents

The SUXOS will reconcile the delivery shipping documentation with the requested amounts ordered and received. Any shortages or overages will be reported to the Parsons PM who will contact the explosives distributor and reconcile any differences. In addition, he will notify the USACE PM.

5.5 INVENTORY PROCEDURES

Explosives will be inventoried at least weekly by the SUXOS, UXOQCS and the demolition team leader. Complete inventories will also be conducted after any issues/turn-ins of demolition material.

5.5.1 Storage Facility Physical Inventory Procedures

5.5.1.1 All receipt of explosives will be properly documented and verified, through physical count, by the SUXOS, UXOQCS and demolition team leader. On receipt, the type, quantity, and lot number of each explosive item is recorded on the Magazine Data Card (Figure 5.2).

5.5.1.2 The SUXOS will review all requests for explosives from the individual operating sites and only sufficient explosives for the day's operations will be requested and issued. Issues of explosives will be recorded on Explosives Usage Records (Figure 5.4) and deducted from the Magazine Data Card(s) and annotated in the daily journal. This procedure will ensure that the issued explosives are accounted for while they are in the possession of individual users. The end user of explosives shall certify on the Explosives Usage Record that the explosives were used for their intended purpose. Entries made on the Explosives Usage Records and Magazine Data Cards will be verified through physical count by the demolition team leader when drawing or turning-in the explosives and verified by the UXOQCS.

5.5.1.3 At the end of each disposal operation the UXOQCS and the demolition team leader will reconcile the entries on each Explosives Usage Record, and will turn these records over to the SUXOS. The record of ordnance items destroyed with the explosives consumed will be kept in the SUXOS daily log.

5.5.1.4 Entries made on the Explosives Usage Records and Magazine Data Cards will be verified through physical count by the demolition team leader when drawing or turning-in the explosives and the UXOQCS will verify the record.

5.5.2 Procedures for Reconciling Inventory Discrepancies

The SUXOS, UXOQCS and demolition team leader will be responsible for performing a weekly inventory of the explosives within the magazine(s). If there is a discrepancy between the inventory and the volume of explosives within the magazine, then they will review the Magazine Data Card and Explosives Usage Record to see if the inventory records are current. If the records review does not reconcile the discrepancy then it will be reported to the USACE PM, Contracting Officer and Parsons PM for investigation.

5.5.3 Reporting Loss or Theft of Explosive Materials

If it is confirmed that explosives are missing, then the Parsons PM will contact the Contracting Officer immediately by telephone and in writing within 24 hours. In addition the Parsons PM will notify BATF and immediately begin an investigation.

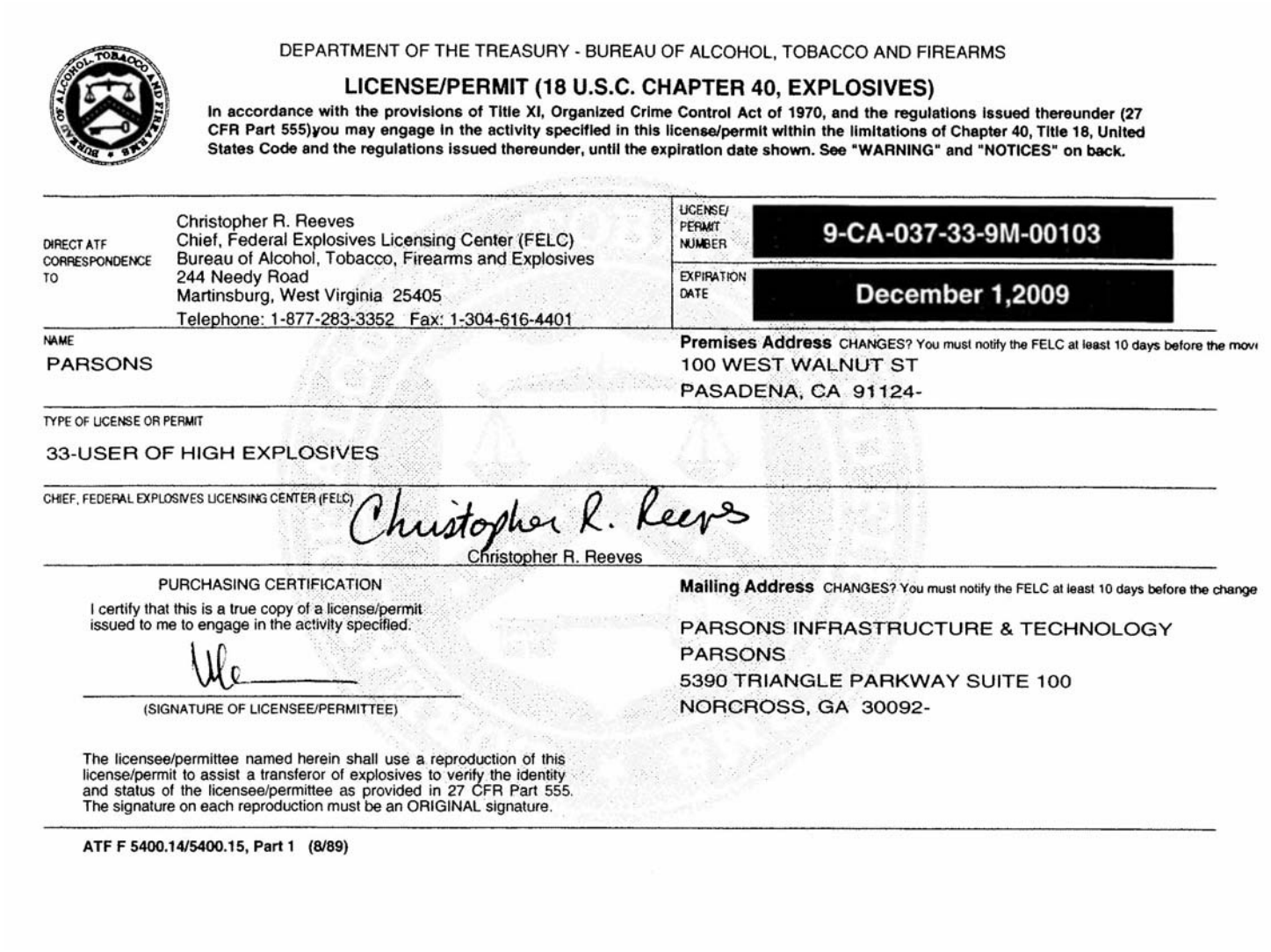
5.5.4 Procedures for Return to Storage of Explosives Not Expended

Explosives that were issued for use, but were not expended will be returned daily to the magazines, at the completion of disposal operations. The demolition team leader will return the unused explosives to the storage magazine and record the items on the Magazine Data Card and Explosives Use Record.

5.6 DISPOSAL OF REMAINING EXPLOSIVES

BATF requires an accounting of all explosives purchased and used, therefore at project completion all unused explosives will either be disposed of by detonation or custody and accountability will be transferred to an incoming contractor, a Government agency, or returned to the distributor.

Figure 5.1: Parsons BATF License



DEPARTMENT OF THE TREASURY - BUREAU OF ALCOHOL, TOBACCO AND FIREARMS

LICENSE/PERMIT (18 U.S.C. CHAPTER 40, EXPLOSIVES)

In accordance with the provisions of Title XI, Organized Crime Control Act of 1970, and the regulations issued thereunder (27 CFR Part 555)you may engage in the activity specified in this license/permit within the limitations of Chapter 40, Title 18, United States Code and the regulations issued thereunder, until the expiration date shown. See "WARNING" and "NOTICES" on back.

DIRECT ATF CORRESPONDENCE TO
Christopher R. Reeves
Chief, Federal Explosives Licensing Center (FELC)
Bureau of Alcohol, Tobacco, Firearms and Explosives
244 Needy Road
Martinsburg, West Virginia 25405
Telephone: 1-877-283-3352 Fax: 1-304-616-4401

LICENSE/PERMIT NUMBER: 9-CA-037-33-9M-00103

EXPIRATION DATE: December 1,2009

NAME
PARSONS

Premises Address CHANGES? You must notify the FELC at least 10 days before the move
100 WEST WALNUT ST
PASADENA, CA 91124-

TYPE OF LICENSE OR PERMIT
33-USER OF HIGH EXPLOSIVES

CHIEF, FEDERAL EXPLOSIVES LICENSING CENTER (FELC)
Christopher R. Reeves
Christopher R. Reeves

PURCHASING CERTIFICATION

I certify that this is a true copy of a license/permit issued to me to engage in the activity specified.

(SIGNATURE OF LICENSEE/PERMITTEE)

Mailing Address CHANGES? You must notify the FELC at least 10 days before the change
PARSONS INFRASTRUCTURE & TECHNOLOGY
PARSONS
5390 TRIANGLE PARKWAY SUITE 100
NORCROSS, GA 30092-

The licensee/permittee named herein shall use a reproduction of this license/permit to assist a transferor of explosives to verify the identity and status of the licensee/permittee as provided in 27 CFR Part 555. The signature on each reproduction must be an ORIGINAL signature.

ATF F 5400.14/5400.15, Part 1 (8/89)

Figure 5.2: Magazine Data Card

Magazine Data Card

Nomenclature:

Lot Number: **Unit:**

Date	Name	Number Received	Number Issued	Balance	Checker's Initials

The signatures in each section of this document indicate that the items listed were in fact issued/expended, or returned to storage and that all quantities listed were verified through a physical count.

Figure 5.3: Vehicle Inspection

Explosive Carrier Inspection Form

This form must be filled out for any vehicle carrying explosives, prior to loading and is for use on other than public roads. If traveling on any public road, use DD Form 626.

DRIVERS NAME:	**COMPANY: Parsons/USA**
TYPE OF VEHICLE:	**LICENSE PLATE:**
INSPECTION DATE/TIME:	**INSPECTOR:**

ITEM INSPECTED:	**PASS**	**FAIL**	**REMARKS**
HORN			
STEERING SYSTEM			
WIPERS			
MIRRORS			
FIRE EXTINGUISHERS (10 ABC, 2 EACH)			
REFLECTORS			
EMERGENCY FLASHERS			
LIGHTS			
ELECTRIC WIRING			
FUEL SYSTEM			
EXHAUST SYSTEM			
BRAKE SYSTEM			
SUSPENSION			
CARGO SPACE			
TIRES, WHEELS, RIMS			
TAILGATE			
TARPAULIN			

INSPECTION RESULTS (circle one): **ACCEPTED** **REJECTED**

REMARKS:

DRIVERS SIGNATURE/DATE:			**INSPECTORS SIGNATURE/DATE:**

Figure 5.4: Explosives Usage Record

Explosives Usage Record *Contract Number:*

Team Number: Date: Project Name:

Team Leader: Work Areas & Grid Numbers:

Explosives Issued Signature Of Team Leader:

Item	Quantity	Lot Number	Checkers Initials

Explosives Expended Signature Of Team Leader

Item	Quantity	Lot Number	Checkers Initials

Explosives Returned Signature Of SUXOS:

Item	Quantity	Lot Number	Checkers Initials

The signatures in each section of this document indicate that the items listed in that section were in fact issued, expended, or returned to storage and that the quantities listed were verified through a physical count.

CHAPTER 6
EXPLOSIVES SITING PLAN

The Explosives Siting Plan was submitted as a separate document. Therefore, this chapter serves as a placeholder only.

CHAPTER 7
ENVIRONMENTAL PROTECTION PLAN

7.1 INTRODUCTION

7.1.1 This EPP has been prepared for the RI/FS at the Pinecastle Jeep Range in accordance with DID MR-005-12 and the PWS. Procedures for avoiding, minimizing, and mitigating potential impacts to environmental and cultural resources during site field activities are described below.

7.1.2 The following sources were consulted for identifying environmental and cultural resources at the Pinecastle Jeep Range site:

1. Topographic Map – U.S. Geological Survey (USGS)
2. Wetlands Online Mapper – National Wetlands Inventory (NWI), U.S. Fish and Wildlife Service (USFWS)
3. Threatened and Endangered Species System (TESS) – Endangered Species Program, U.S. Fish and Wildlife Service
4. National Wildlife Refuge System (NWRS) – USFWS
5. Florida Endangered and Threatened Species – Florida Fish and Wildlife Conservation Commission (FWC)
6. Florida Fish and Wildlife Conservation Commission (FWC)
7. Florida Department of Agriculture and Consumer Services (DOACS)
8. Florida Natural Areas Inventory (FNAI) – Orange County
9. National Register Information System (NRIS) – National Register of Historic Places (NRHP), National Park Service (NPS)
10. List of National Historic Landmarks (NHL) – National Historic Landmarks Program, NPS
11. List of National Heritage Areas (NHA) – National Heritage Areas Program, NPS
12. Florida State Historic Preservation Office (FL SHPO) – Florida Office of Cultural and Historical Programs (OCHP)
13. National Oceanic and Atmospheric Administration (NOAA) - Coastal Zone Management Program (CZMP)
14. September 1997 ASR Findings for Pinecastle Jeep Range, Orlando, Florida
15. Orange County Water Atlas website, http://www.orange.wateratlas.usf.edu/

7.2 THREATENED AND ENDANGERED SPECIES

7.2.1 The state of Florida supports 112 federally-listed Threatened and Endangered (T&E) species consisting of 57 animals and 55 plants. Seventeen of these federally-listed species are known to exist in Orange County. These species include two reptiles, six birds, and 10 plants. Florida also recognizes some species not on the federal list as being either endangered, threatened, or species of special concern. Listed species which are known to occur in Orange County are shown on Table 7.1. In addition, it should be noted that the former Pinecastle Jeep Range lies close to the border of Osceola County, which may contain additional species of special concern.

7.2.2 Parsons will ensure that the site visit team is versed in identifying and avoiding these species and if any are observed, care will be taken to not disturb them or their immediate habitat. Parsons will provide this species awareness training in our daily tailgate safety meetings.

7.2.3 Gopher tortoises are known to live within the boundary of former Pinecastle Jeep Range. Field teams will be briefed concerning these reptiles and will follow a standard procedure to avoid adversely affecting them (see Appendix J, Gopher Tortoise SOP).

7.3 WETLANDS

7.3.1 The USFWS Wetlands Online Mapper, through the NWI, was used to identify wetlands within the Pinecastle Jeep Range. Wetlands data for the entire site was available. Wetlands are found in all areas of the site. Some of the wetlands are seasonal and some are semi-permanently flooded. There are three main types of wetlands onsite. These wetlands are shown in Figure 7.1. The main wetland types are:

- PFO3C – Palustrine, forested, broad-leaved evergreen, seasonally flooded
- PSS1F – Palustrine, scrub/shrub, broad-leaved deciduous, semi-permanently flooded
- PEM1F – Palustrine, emergent, persistent, semi-permanently flooded

7.3.2 Orange County has jurisdiction over the wetlands on the former Pinecastle Jeep Range. The field team will coordinate with the Orange County Department of Environmental Protection (OCDEP) to maintain compliance when working within wetlands and conservation areas. The contact for the OCDEP is:

Elizabeth R. Johnson, CEP, PWS
Environmental Programs Administrator, Natural Resource Management
Orange County Environmental Protection Division
800 Mercy Drive, Suite 4, Orlando Florida 32808

7.3.3 Information on conservation lands, which consist primarily of wetlands, was obtained from the Florida Natural Areas Inventory. The locations of wetlands will be used when conducting the vegetation clearing needed for the geophysical survey and intrusive investigation of anomalies. The locations of the conservation lands will be uploaded to the field GPS units for use by the field teams in avoiding those areas. Only specific locations within conservation lands will receive only the minimum clearing

needed for a person carrying a G-858 magnetometer or handheld metal detector to pass (narrow path, single-file).

7.4 CULTURAL AND ARCHEOLOGICAL RESOURCES

7.4.1 According to the NRHP, the NHL Program, the NHA Program, there are no known cultural resources within the boundaries of the Pinecastle Jeep Range site. According to the SHPO Division of Historical Resources, there are eight previously recorded archeological sites and one standing structure within the site boundaries. However, after review of the SHPO archeological site map there appears to be only four archeological areas on site and the standing structure was not identified on the SHPO map.

7.4.2 During the RI/FS effort care will be taken to not impact any known archeological areas or archeological remnants discovered during soil sampling. If an archeological remnant is discovered or suspected during the RI/FS effort, soil sampling will cease in that area and the proper agency will be notified.

7.5 WATER RESOURCES

7.5.1 The Floridan Aquifer is the principal aquifer supplying most of the water used in the region. Information obtained from wells near the site indicate that the Upper Floridan Aquifer is approximately 340 feet thick, with the top of the aquifer at approximately 48 feet below mean sea level (MSL). The configuration of the top of the aquifer is highly variable due to erosion and dissolution in the limestones that form its upper surface. The regional direction of groundwater movement in the overlying water-table aquifer is from east to west.

7.5.2 A shallow aquifer which overlies the limestones and dolomites of the Floridan Aquifer is also common in the region. Water from this aquifer is primarily used for small domestic supplies.

7.5.3 The surface water features of the site include the Little Econlockhatchee River and the Econlockhatchee River. The Little Econlockhatchee River, a tributary of the Econlockhatchee River, flows from south to north along the west part of the study area. The Econlockhatchee River flows from south to north along the east boundary of the area. The Little Econlockhatchee River drains approximately two-thirds of the site's surface runoff. The balance of the site drains toward the Econlockhatchee River.

7.6 COASTAL ZONES

The Pinecastle Jeep Range is not within a coastal zone.

7.7 TREES AND SHRUBS

The field activities will include limited brush clearing using a combination of mechanized equipment and hand tools to provide access to operate and maneuver field equipment, to perform geophysical mapping, and to investigate geophysical anomalies. The brush clearing activities will involve the removal of perennial species and trees up to three inches in diameter. Clearing in the mapped wetlands will be limited to cutting

lower branches and saplings sufficient to allow the passage of one-person geophysical instrument. The path will be deflected around trees. Standing water (more than a few inches) will not be entered for safety reasons. The details concerning brush clearing techniques are included in Chapter 3 of this Work Plan.

7.8 WASTE DISPOSAL SITES

Waste materials generated by site operations, such as trash and general debris, will be collected and removed from the site and placed in appropriate trash receptacles for disposal by an authorized waste contractor. In general, excess soil generated during anomaly excavation and sampling will be returned to the original location and the location restored as near as possible to natural condition. Disposable sampling equipment and other garbage generated will be disposed of offsite. The reader is referred to Chapter 3 of this Work Plan for information on waste disposal.

7.9 IMPACT MITIGATION MEASURES

Various measures will be used to mitigate the environmental impacts. The following general measures will be taken during onsite activities:

1. Site-specific training will be given on awareness of T&E species indigenous to the area and proper avoidance procedures.
2. Damage to the native wildlife habitat will be minimized to the greatest extent possible. Areas that have been disturbed as a result of field activities will be restored to the greatest extent practicable to the previously existing condition.
3. Excavated soil from intrusive anomaly investigations will be placed adjacent to the anomaly location and if contamination is not suspected, returned to its original location. The area of soil exposed during excavation activities will be kept to a minimum and soil piles will be covered with plastic/tarp to minimize soil run-off.
4. Excavations will be restored by backfilling with the displaced soil or clean fill brought to the site. Backfilling will be accomplished using mechanized equipment and manually with shovels and rakes in smaller areas.
5. No burning activities will take place during this project. Parsons will monitor for excessive dust levels during intrusive operations that involve heavy equipment.
6. Emissions sources will consist of any heavy equipment used on site, site vehicles, and generators. Vehicles and equipment will be in good working order and will meet applicable vehicle emissions requirements.
7. Temporary facilities or storage areas will be installed during the project to minimize impacts.
8. Fueling for heavy equipment will be performed onsite. If a leak of fuel or other fluid such as hydraulic or transmission fluid occurs in the field, the following should be implemented:
    - Promptly berm the area with soil so that the fuel or fluid does not spread along the ground surface.

- Apply oil-absorbing material such as sawdust or kitty litter to the spill.
- Report the spill to the SM and follow instructions for clean up. It is anticipated that this will involve digging up and drumming contaminated soil followed by its disposal.

Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Florida Black Bear 	*Ursus americanus floridanus*	None	Threatened
Sherman's Fox Squirrel 	*Sciurus niger shermani*	None	Special Concern

Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Florida Mouse 	*Podomys floridanus*	None	Special Concern
Audobon's Crested Caracara 	*Polyborus plancus audubinii*	Threatened	Threatened

Table 7.1
Federally and State Listed Species in Orange County, Florida

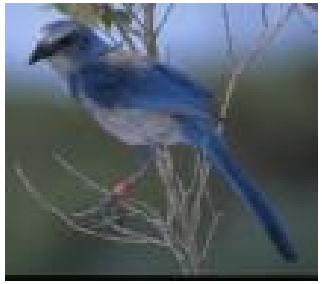
Common Name	Scientific Name	Federal Status	State Status
Florida Scrub-jay 	*Aphelocoma coerulescens*	Threatened	Threatened

Table 7.1
Federally and State Listed Species in Orange County, Florida

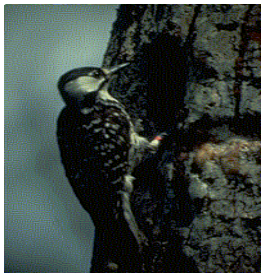
Common Name	Scientific Name	Federal Status	State Status
Red-cockaded woodpecker 	*Picoides borealis*	Endangered	Special Concern
Everglade Snail Kite 	*Rostrhamus sociabilis plumbeus*	Endangered	Endangered

Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Wood stork 	*Mycteria americana*	Endangered	Endangered
Limpkin 	*Aramus guarauna*	None	Special Concern

Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Snowy Egret 	*Egretta thula*	None	Special Concern
Little Blue Heron 	*Egretta caerulea*	None	Special Concern

Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Tricolored Heron 	*Egretta tricolor*	None	Special Concern
White Ibis 	*Eudocimus albus*	None	Special Concern

Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Florida Sandhill Crane 	*Grus Canadensis pratensis*	None	Threatened
Rosate Spoonbill 	*Platalea ajaja*	None	Special Concern

Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Florida Burrowing Owl 	*Athene cunicularia floridana*	None	Special Concern

Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Bald Eagle 	*Haliaeetus leucocephalus*	Threatened	Threatened
American Alligator 	*Alligator mississippiensis*	None	Special Concern

Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Gopher Tortoise 	*Gopherus polyphemus*	None	Special Concern
Short-tailed snake 	*Stilosoma extenuatum*	None	Special Concern

Table 7.1
Federally and State Listed Species in Orange County, Florida

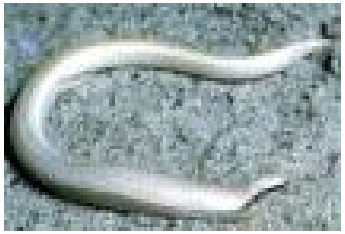
Common Name	Scientific Name	Federal Status	State Status
Eastern indigo snake 	*Dymarchon corais couperi*	Threatened	Threatened
Sand Skink 	*Neoseps reynoldsi*	Threatened	Threatened

Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Gopher Frog 	*Rana capito*	None	Special Concern
Florida Bonamia 	*Bonamia grandiflora*	Threatened	Endangered

Table 7.1
Federally and State Listed Species in Orange County, Florida

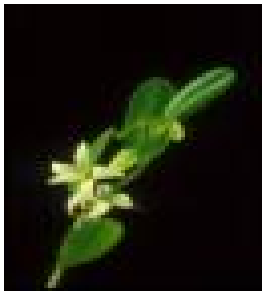
Common Name	Scientific Name	Federal Status	State Status
Beautiful Pawpaw 	*Deeringothamnus pulchellus*	Endangered	Endangered
Scrub Buckwheat 	*Erogonum longifolium var. gnaphalifolium*	Threatened	Endangered

Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Scrub Lupine 	*Lupinus aridorum*	Endangered	Endangered
Britton's Beargrass 	*Nolina brittoniana*	Endangered	Endangered

Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Paper-like Nailwort 	*Paronychia chartacea ssp. chartacea*	Threatened	Endangered
Lewton's Polygala 	*Polygala lewtonii*	Endangered	Endangered

Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Small's Jointweed 	*Polygonella myriophylla*	Endangered	Endangered
Scrub Plum 	*Prunus geniculata*	Endangered	Endangered

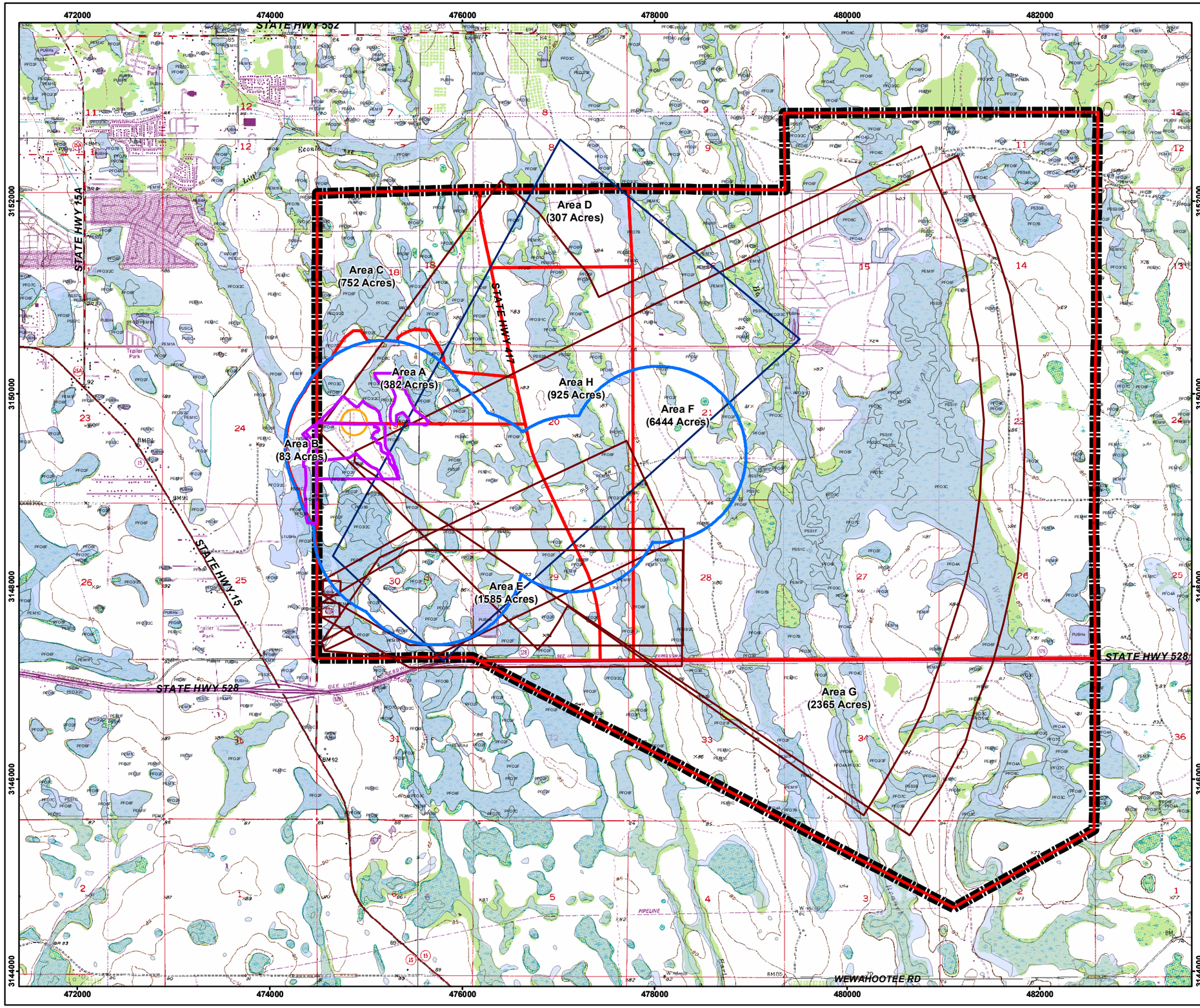
Table 7.1
Federally and State Listed Species in Orange County, Florida

Common Name	Scientific Name	Federal Status	State Status
Clasping Wareae 	*Warea amplexifolia*	Endangered	Endangered

Figure 7.1

Wetlands
Pinecastle Jeep Range

Orange County
Orlando, Florida



Legend

- TCRA Area Boundary
- Chemical Demonstration Range
- Air-to-Ground Rocket Range
- Range Complex No.1
- Bombing Range
- FUDS Boundary
- Wetland (Obtained from U.S. Fish & Wildlife Service)

Predominant Wetland Types:

PFO3C - Palustrine, forested, broad-leaved evergreen, seasonally flooded
PSS1F - Palustrine, scrub/shrub, broad-leaved deciduous, semipermanently flooded
PEM1F - Palustrine, emergent, persistent, semipermanently flooded

Site Location in Florida

N

Image: USGS 7.5' Topo Quadrangles, 1980
Projection: UTM Zone 17 NAD83, Units in Meters

1,000 500 0 1,000 Meters

PARSONS

U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	**Pinecastle Jeep Range**		
DRAWN BY: BT			
CHECKED BY: GH	SCALE: As Shown	PROJECT NUMBER: 746163.03004	
SUBMITTED BY: MS	DATE: May 2008	PAGE NUMBER: 7-24	
	FILE: X:\GIS\Site_inspections_ne\Maps\Pinecastle_FL\Fig7_1.mxd		

CHAPTER 8
PROPERTY MANAGEMENT PLAN

8.1 DESCRIPTION

This property management plan provides detailed information on the types, quantities, and sources of equipment and materials that will be required to perform field and office operations on this project. Field operations include all activities to be performed to complete the fieldwork. Office operations include all tasks performed in support of project management and the implementation of project work in the field through completion consistent with the requirements of the performance work statement (Appendix A). The types of equipment recommended, selected, and proposed for this work are those that have been tested and proven in the industry and, therefore, are reliable to use in performing the various activities associated with this project. The quantities proposed are needed to help perform the work in a timely and cost effective manner as dictated by the project schedule.

8.2 FIELD EQUIPMENT

8.2.1 Metal Detectors

For the area being investigated intrusively, a Geonics EM61-Mk2 metal detector or a Geometrics G-858 magnetometer will be used to reacquire anomaly locations and to ensure either anomaly removal or "no contact" at each location. The Schonstedt GA-52Cx or Mk 26 handheld metal detectors will be used by the down range team to help pinpoint any metallic debris during excavation operations.

8.2.2 Transportation and Construction Equipment

Various types of transportation and construction equipment will be required during field operations. Vehicles required for on-road service during the project may include standard automobiles, four-wheel drive vehicles, pickup trucks, and ¾-ton and ½-ton trucks. Construction equipment that may be used during the fieldwork to excavate or perform other site related work includes, but is not limited to, rubber-tired backhoes.

8.2.3 Safety Gear

The presence of MEC is suspected at Pinecastle Jeep Range. Depending on job assignment and mission on-site, the appropriate levels of PPE, including but not limited to boots, gloves, hardhats, and safety glasses, will be used. Personnel will typically conduct their operations in Level D PPE consisting of standard work clothes with long pants, safety boots (as needed), hard hats (when overhead hazard is present), and safety glasses (as needed). Personnel working away from active field investigations will not be

required to wear safety boots or hard hats. In accordance with EM 385-1-1, site personnel are required to arrive on site with the proper PPE.

8.2.4 Equipment for the Handling and Disposal of Scrap

To enable proper handling of scrap encountered or recovered during the intrusive fieldwork, special equipment and materials are required. Drums and containers may be used for temporary storage of munitions debris, as well as for off-site transportation and disposal.

8.2.5 Communication Equipment

Communications equipment to be used includes hand held two-way radios and cellular phones.

8.3 OFFICE EQUIPMENT

The majority of the office equipment to be used on this project is located in the Parsons Norcross Office. Most of the equipment (for example, CADD or GIS workstations, computers, printers, plotters, etc.) is owned by Parsons, and the charges to the project will be as proposed for this delivery order. However, some items – such as field computers, scanners, and printers – will be rented or purchased for fieldwork.

8.4 VENDORS AND ASSOCIATED COSTS

Parsons may provide some equipment, but most equipment will be rented or leased from vendors with proven records of furnishing well-maintained, reliable, and updated equipment that can be used to successfully complete the field and office operations. General cost estimates on the types, quantities, and sources of equipment proposed for the former Pinecastle Jeep Range RI/FS are summarized in Table 8.1

8.5 PROCUREMENT PROCEDURES

Equipment will be leased or rented, and consumables and supplies will be purchased in a procurement process in strict conformance with the Federal Acquisition Regulation (FAR) and Defense Federal Acquisition Regulation (DFAR). There are no known instances where purchase of equipment on behalf of the government will be required on this project. Parsons will follow standard procurement procedures for all purchases.

8.6 LEASED AND RENTED VEHICLES

The leased vehicles will be selected using the comparison of rate quotes from commercial vendors. The number of vehicles will be determined by one vehicle for approximately four employees working on-site. The type of vehicles used will be determined by the site's physical conditions, such as terrain, weather conditions, and distances between the living quarters, the site office, and the fieldwork area. Any exceptions will be justified by Parsons and approved by the contracting officer.

8.7 CONSUMABLE SUPPLIES AND PERSONAL PROPERTY

Parsons disclosed accounting practices prescribe that all materials and supplies required for the performance of the contract and task order will be direct charged to that order, and such materials and supplies are not included in the basis for overhead computation. The only exception is limited to home office supplies and equipment such as letterhead, pens, pencils, standard personal computers, office furnishings, etc. Field office supplies are typically direct charged to the project and not included in the overhead computation.

8.8 PROPERTY STORAGE PLAN

The site office will be used to store purchased items being used for the RI/FS. If needed, an off-site storage unit will be rented.

8.9 ULTIMATE DISPOSAL PLAN

Non-consumable items purchased on time and material tasks will be reassigned to other government projects at the end of the project.

8.10 PROPERTY TRACKING PLAN

An inventory list will be maintained by Parsons for the non-consumable items purchased on time and materials tasks for Pinecastle Jeep Range RI/FS. When applicable, the serial number, model or manufacturer, date purchased, present location of item, cost, current status (functional, need of repair, needs batteries, etc.), and a description of the item are recorded on the inventory list.

8.11 LOSS NOTIFICATION

For all non-consumable items purchased on the inventory for the Pinecastle Jeep Range RI/FS, Parsons will notify USAESCH if the item is lost or stolen.

Table 8.1
List of Equipment

Office/Field Operations	Equipment Type (or equivalent)	Number of Units	Anticipated Source	Status
Communication during fieldwork	Motorola HT-1000 radios	8	Vendor	Rent
Communication during fieldwork	Cellular phone	TBD	Local vendor	Rent
Interpretation of field data and information processing	Field computers, printer, scanner	2	Vendor	Rent
Excavation / site set-up	Rubber-tired backhoe	1	Vendor	Lease
Geophysical instrument	Schonstedt magnetic locator (GA-52Cx)	8	Vendor	Rent
Geophysical instrument	Mk 26	8	Vendor	Rent
Geophysical instrument	Geonics EM61 metal detector	4	Vendor	Rent
Geophysical instrument	Geometrics G-858 magnetometer	2	Vendor	Rent
Transportation of personnel and field equipment	SUV	6	Hertz/ Enterprise	Lease
Transportation of personnel and field equipment	Vehicle – pickup 4 X 2	2	Enterprise /Ford	Lease
Site office	Warehouse/Office	1	Vendor	Lease
Sanitation	Sanitary units (toilets)	3	Vendor	Rent
Handling and disposal of MEC	Donor explosives (consumable)	1	Vendor	Purchase
Intrusive fieldwork	Handtools (consumable)	1	Vendor	Purchase
Office processing of data and development of maps	GIS workstation	1	Parsons	Own
Office processing of data and development of maps and graphics	CADD/graphics workstation	1	Parsons	Own
Office processing of data and development of maps and graphics	Workstation plotter	1	Parsons	Own
Photo documentation of fieldwork	Camera (consumable)	4	Parsons	Purchase

(TBD) To be determined

CHAPTER 9
INTERIM HOLDING FACILITY SITING PLAN

This site is not suspected to contain CWM; consequently, the Interim Holding Facility Siting Plan is not applicable to this project. Therefore, this chapter serves as a placeholder only. In the event that CWM is encountered, an Interim Holding Facility Siting Plan will be prepared and inserted in Chapter 9.

CHAPTER 10
PHYSICAL SECURITY PLAN FOR RCWM

Recovered chemical warfare materiel (RCWM) is not anticipated at Pinecastle Jeep Range; consequently, the Physical Security Plan for RCWM is not applicable. Therefore, this chapter serves as a placeholder only. In the event that CWM is encountered, a physical security plan will be prepared and inserted in Chapter 10.

CHAPTER 11
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