FORA ESCA REMEDIATION PROGRAM

DRAFT FINAL

Group 1

Remedial Investigation / Feasibility Study Work Plan

Volume 2 - Sampling and Analysis Plan

Parker Flats Munitions Response Area
Phase II

Former Fort Ord
Monterey County, California

November 13, 2008

Prepared for:

FORT ORD REUSE AUTHORITY

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ACRONYMS AND ABBREVIATIONS

AAR	After-Action Report
ACGIH	American Conference of Governmental Industrial Hygienists
ACM	asbestos-containing material
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
AOC	Administrative Order on Consent
AR	Army Regulation
Army	United States Department of the Army
ASTM	American Society for Testing and Materials
ATF	Bureau of Alcohol, Tobacco, Firearms, and Explosives
ATV	all-terrain vehicle
BADT	Best Available and Appropriate Detection Technology
BO	biological opinion
BRAC	Base Realignment and Closure
Cal-OSHA	California Occupational Safety and Health Administration
CCR	California Code of Regulations
CDL	Commercial Driver's License
CDR	Covenant Deferral Request
CEHNC	Corps of Engineers - Huntsville Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHOMP	Community Hospital of the Monterey Peninsula
CIH	certified industrial hygienist
cm	centimeter
CMV	commercial motor vehicle
CPR	cardiopulmonary resuscitation
CSHP	Corporate Safety and Health Program
CSM	Conceptual Site Model
CSP	Community Safety Plan
CSUMB	California State University Monterey Bay
CTS	California Tiger Salamander
CWM	Chemical Warfare Material
DA PAM	Department of the Army Pamphlet
DDESB	Department of Defense Explosives Safety Board
DGM	digital geophysical mapping
DHS	Department of Health Services
DI	deionized
DID	Data Item Description

DMM	discarded military munitions
DOD	U.S. Department of Defense
DOT	U.S. Department of Transportation
DQO	data quality objective
DTSC	Department of Toxic Substances Control
EDDs	electronic data deliverables
EM	electromagnetic
EOD	Explosives Ordnance Disposal
EPA	United States Environmental Protection Agency
EPP	Environmental Protection Plan
ESCA	Environmental Services Cooperative Agreement
ESCA RP Team	Environmental Services Cooperative Agreement Remediation Program Team
ESL	Explosives Storage Location
EZ	exclusion zone
FAA	Federal Aviation Administration
FD	Fire Department
FFE	free from explosives
FGCC	Federal Geodetic Control Committee
FLD	field operating procedure
FORA	Fort Ord Reuse Authority
ft	foot or feet
FVF	field variance form
FWS	U.S. Fish and Wildlife Service
G1 SAP	Group 1 Sampling and Analysis Plan
Geosoft	Geosoft® Oasis Montaj (Version 6.0 or above)
GIP	Geophysical Investigation Plan
GIS	Geographic Information System
GPS	Global Positioning System
GTP	geophysical test plot
GX	Geosoft eXecutable
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBV	Hepatitis B Virus
HC	hexachloroethane
HEPA	high efficiency particulate air
HMP	Habitat Management Plan
HPS	Hantavirus Pulmonary Syndrome
HTW	Hazardous and Toxic Waste
I & T	Inspection and Test Plan
IAW	in accordance with

IDLH	immediately dangerous to life or health
IDW	investigation-derived waste
ISD	insufficient data
km	kilometers
lbs	pounds
LBP	lead-based paint
LCS	laboratory control samples
LFR	LFR Inc.
m	meter
M&TE	measuring and test equipment
Mag	magnetic
MBUAPCD	Monterey Bay Unified Air Pollution Control District
MC	munitions constituents
MCV	Muerto Canyon Virus
MD	munitions debris
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
$\mu g/m^3$	micrograms per cubic meter
mm	millimeter
MMRP	Military Munitions Response Program
mph	miles per hour
MPPEH	material potentially presenting an explosive hazard
MQOs	measurement quality objectives
MRA	Munitions Response Area
MRS	Munitions Response Site
MS	matrix spike
MSD	minimum separation distance
MSDS	material safety data sheet
mV	millivolt
NAD	North American Datum
NCR	nonconformance report
NESHAP	National Emission Standards for Hazardous Air Pollutants
NEW	net explosive weight
NIOSH	National Institute for Occupational Safety and Health
NPL	National Priorities List
NRMA	natural resources management area
NS	not specified
nT/ft	nanoteslas per feet
NTCRA	Non-Time-Critical Removal Action

ODDS	Ordnance Detection and Discrimination Study
OE	Ordnance and Explosives
OESAP	OE Sampling and Analysis Plan
OJT	on-the-job training
OSHA	Occupational Safety and Health Administration
OSIC	On Scene Incident Commander
PCBs	polychlorinated biphenyls
Pd	probability of detection
PDA	personal digital assistant
PDOP	positional dilution of precision
PDS	personnel decontamination station
PEL	permissible exposure limit
PHSM	Project Health and Safety Manager
PM	Project Manager
POM	Presidio of Monterey
PPE	personal protective equipment
PVC	polyvinyl chloride
PWP	Programmatic Work Plan
QA	quality assurance
QAPP	Quality Assurance Project Plan
QASP	Quality Assurance Surveillance Plan
QC	quality control
QCM	Quality Control Manager
QCP	Quality Control Plan
RAWS	remote automated weather station
RCWM	Recovered Chemical Warfare Material
RI	remedial investigation
RI/FS	Remedial Investigation and Feasibility Study
RMSF	Rocky Mountain Spotted Fever
ROD	Record of Decision
RPM	Remediation Project Manager
RQA	Residential Quality Assurance
RTK	real-time kinematic
SAP	Sampling and Analysis Plan
SCBA	self-contained breathing apparatus
SCRM	site closure, restoration, and monitoring
SDS	Spatial Data Standards
SEDR	Summary of Existing Data Report
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan

SSWP	Site-Specific Work Plan
SUXOS	Senior UXO Supervisor
SWP	safe work practice
TCRA	Time-Critical Removal Action
TDEM	time-domain electromagnetic
TDMD	time-domain metal detector
TEU	Technical Escort Unit
TIP	Technical Information Paper
TLV	threshold limit value
TNT	trinitrotoluene
UPS	uninterruptible power supply
USA	Underground Service Alert
USACE	United States Army Corps of Engineers
USACE EM	United States Army Corps of Engineers Engineering Manual
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
Westcliffe	Westcliffe Engineers, Inc.
WESTON	Weston Solutions, Inc.
WP	white phosphorous

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GLOSSARY

Anomaly
Any item that is seen as a subsurface irregularity after geophysical investigation. This irregularity should deviate from the expected subsurface ferrous and non-ferrous material at a site (i.e., pipes, power lines, etc.).

Anomaly Avoidance
Techniques employed by unexploded ordnance (UXO) personnel at sites with known or suspected munitions and explosives of concern (MEC) to avoid any potential surface MEC and any subsurface anomalies. This usually occurs at mixed hazard sites when hazardous, toxic, and radioactive waste investigations must occur prior to execution of an MEC removal action. Intrusive anomaly investigation is not authorized during ordnance avoidance operations.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980
CERCLA authorizes federal action to respond to the release or threatened release of hazardous substances into the environment or a release or threatened release of a pollutant or contaminant into the environment that may present an imminent or substantial danger to public health or welfare.

Construction Support
Assistance provided by DOD Explosives Ordnance Disposal or UXO qualified personnel and/or by personnel trained and qualified for operations involving chemical agent, regardless of configuration, during intrusive construction activities on property known or suspected to contain UXO, other munitions that may have experienced abnormal environments (e.g., DMM), munitions constituents in high enough concentrations to pose an explosive hazard, or chemical agent, regardless of configuration, to ensure the safety of personnel or resources from any potential explosive or chemical agent hazards.

Covenant Deferral Request
A letter along with a supporting information package known as a Covenant Deferral Request (CDR) is assembled by the Federal landholding to formally request deferral of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) covenant until all remediation has been accomplished prior to transfer. U.S. Environmental Protection Agency (EPA) requires that the information is: 1) of sufficient quality and quantity to support the request for deferral of the CERCLA Covenant; and 2) that it provides a basis for EPA to make its determination. This information is submitted to EPA in the form of a CDR.

Deferral period
The period of time that the CERCLA covenant warranting that all remedial action is complete before transfer, is deferred through the Early Transfer Authority.

Discarded Military Munitions (DMM)
Military munitions that have been abandoned without proper disposal or removed from

storage in a military magazine or other storage area for the purpose of disposal. The term does not include UXO, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations. (10 U.S.C. 2710(e)(2))

Early Transfers

The transfer by deed of federal property by U.S. Department of Defense (DOD) to a nonfederal entity before all remedial actions on the property have been taken. Section 120 (h)(3)(C) of the CERCLA allows Federal agencies to transfer property before all necessary cleanup actions have been taken. This provision, known as early transfer authority, authorizes the deferral of the CERCLA covenant when the findings required by the statute can be made and the response action assurances required by the statute are given. The Governor of the state where the property is located must concur with the deferral request for property not listed on the National Priorities List (NPL). For NPL property, the deferral must be provided by the EPA with the concurrence of the Governor. Upon approval to defer the covenant, DOD may proceed with the early transfer.

ESCA RP Team

LFR Inc., Weston Solutions, Inc., and Westcliffe Engineers Inc.

Exclusion Zone

A safety zone established around an MEC work area. Only essential project personnel and authorized, escorted visitors are allowed within the exclusion zone. Examples of exclusion zones are safety zones around MEC intrusive activities and safety zones where MEC is intentionally detonated.

Feasibility Study (FS)

The primary objective of the FS is “to ensure appropriate remedial alternatives are being developed and evaluated and an appropriate remedy selected” (NCP 40 CFR 300.430(e)).

Geophysical Reacquisition

Geophysical Reacquisition involves utilizing both a positioning method (i.e., Global Positioning System [GPS], ultrasonic, or tape from corners) and geophysical instruments to reacquire and pinpoint anomaly locations selected by the geophysical processors. The geophysical instruments include the original instrument used for the digital survey of the grid and the analog instrument being utilized by the UXO teams for intrusive activities. The intended result of this method is to pinpoint the location where the intrusive teams will find the subsurface item causing the anomaly.

Intrusive Activity

An activity that involves or results in the penetration of the ground surface at an area known or suspected to contain MEC. Intrusive activities can be of an investigative or removal action nature.

mag and dig

Utilizing hand held geophysical instruments to detect anomalies and immediately investigating the anomalies (without using collection of digital data and post processing to

determine which anomalies to dig) by manual digging or with the assistance of heavy equipment

Material Potentially Presenting an Explosive Hazard (MPPEH)
Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DOD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

Military Munitions
All Ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives, and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, other than non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed. (10 U.S.C. 101(e)(4)(A through C)).

Military Munitions Response Program
Department of Defense-established program that manages the environmental, health and safety issues presented by munitions of explosives concern.

Minimum Separation Distance (MSD)
MSD is the distance at which personnel in the open must be from an intentional or unintentional detonation.

Munition with the Greatest Fragmentation Distance (MGFD)
The munition with the greatest fragment distance that is reasonably expected (based on research or characterization) to be encountered in any particular area.

Munitions and Explosives of Concern (MEC)
This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) UXO, as defined in 10 U.S.C. 101(e)(5)(A) through (C); (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or (C)

Munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC)
Any materials originating from UXO, DMM, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions (10 U.S.C. 2710)(e)(3).

Munitions Debris (MD)
Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

Munitions Response Area (MRA)
Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites.

Munitions Response Site (MRS)
A discrete location within an MRA that is known to require a munitions response.

Ordnance and Explosives (OE)
See MEC.

Quality Assurance (QA)
An integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed to meet project requirements.

Quality Control (QC)
The overall system of operational techniques and activities that measures the attributes and performance of a process, item, or service against defined standards that are used to fulfill requirements for quality.

Record of Decision (ROD)
A ROD is the document used to record the remedial action decision made at a National Priorities List property. The ROD will be maintained in the project Administrative Record and project file.

Remedial Investigation (RI)
The RI is intended to “adequately characterize the site for the purpose of developing and evaluating an effective remedial alternative” (NCP, 40 CFR 300.430(d)). In addition, the RI provides information to assess the risks to human health, safety, and the environment that were identified during risk screening in the site investigation.

Remedial Actions
Those actions consistent with a permanent remedy taken instead of or in addition to removal actions in the event of a release or threatened release of a hazardous substance into the

environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health, welfare, or the environment. The term includes but is not limited to such actions at the location of the release as storage; confinement; perimeter protection using dikes, trenches, or ditches; clay cover; neutralization; cleanup of released hazardous substances and associated contaminated materials; recycling or reuse; diversion; destruction; segregation of reactive wastes; dredging or excavations; repair or replacement of leaking containers; collection of leachate and runoff; on-site treatment or incineration; provision of alternative water supplies; and any monitoring reasonably required to assure that such actions protect the public health, welfare, and the environment. The term includes the costs of permanent relocation of residents and businesses and community facilities where the President of the United States determines that, alone or in combination with other measures, such relocation is more cost-effective and environmentally preferable to the transportation, storage, treatment, destruction, or secure disposition off site of hazardous substances, or may otherwise be necessary to protect the public health or welfare. The term includes off-site transport and off-site storage, treatment, destruction, or secure disposition of hazardous substances and associated contaminated materials.

Response Action

Action taken instead of or in addition to a removal action to prevent or minimize the release of MEC so that it does not cause substantial danger to present or future public health or welfare or the environment.

Unexploded Ordnance (UXO)

Military munitions that (A) have been primed, fuzed, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material; and (C) remain unexploded either by malfunction, design, or any other cause. (10 U.S.C. 101(e)(5)(A) through (C))

UXO Technicians

Personnel who are qualified for and filling Department of Labor, Service Contract Act, Directory of Occupations, contractor positions of UXO Technician I, UXO Technician II, and UXO Technician III.

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1.0 INTRODUCTION

1.1 General

This Group 1 Sampling and Analysis Plan (G1 SAP) describes the procedures, methods, and resources that will be used to conduct the field activities associated with the munitions and explosives of concern (MEC) remedial investigation (RI) in the Phase II portion of the Parker Flats Munitions Response Area (MRA) at the former Fort Ord in Monterey County, California ("the Parker Flats MRA Phase II"). Additionally, this G1 SAP outlines the process, procedures, and success criteria for the Residential Quality Assurance (RQA) Pilot Study to be executed in test areas located within the California State University Monterey Bay (CSUMB) Off-Campus MRA (formerly referred to as the CSUMB MRA) and Seaside MRA.

As contracted by the Fort Ord Reuse Authority (FORA), this work will be performed by LFR Inc. (LFR), Weston Solutions, Inc. (WESTON), Westcliffe Engineers Inc. (Westcliffe), collectively referred to as the Environmental Services Cooperative Agreement Remediation Program Team ("the ESCA RP Team"), and their subcontractors. The work defined in this G1 SAP will be referred to as the Parker Flats MRA Phase II RI.

1.2 Regulatory History

On March 31, 2007, the United States Department of the Army (Army) and FORA entered into an Environmental Services Cooperative Agreement (ESCA) thereby allowing the Army to transfer approximately 3,340 acres of property to FORA as an Economic Development Conveyance. In accordance with the ESCA, FORA is responsible for addressing all response actions for the property except for those responsibilities retained by the Army. To accomplish this effort, FORA entered into an agreement with LFR, teamed with WESTON and Westcliffe, to assist in the completion of the MEC remediation activities on the 3,340 acres in accordance with the ESCA and an Administrative Order on Consent (AOC).

The AOC was entered into voluntarily by FORA, the United States Environmental Protection Agency (EPA) Region 9, the Department of Toxic Substances Control (DTSC), and the United States Department of Justice Environment and Natural Resources Division on December 20, 2006 (EPA Region 9 CERCLA Docket No. R9-2007-03). The AOC was issued under the authority vested in the President of the United States by Sections 104, 106, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. §§ 9604, 9606, and 9622.

FORA, through the ESCA RP Team, will complete the Army's munitions response actions in a program hereinafter identified as the FORA ESCA Remediation Program ("the FORA ESCA RP").

1.3 Site Location

The Parker Flats MRA is located in the central portion of the former Fort Ord, bordered by the California State University Monterey Bay (CSUMB) Off-Campus MRA (formerly referred to as the CSUMB MRA) and the County North MRA (formerly referred to as the Development North MRA) to the north, the Interim Action Ranges MRA to the south, additional CSUMB campus property to the west, and additional former Fort Ord property to the east and southeast. The Parker Flats MRA is contained within the jurisdictional boundaries of the City of Seaside and the County of Monterey. Figure 1-1 displays where the Parker Flats MRA is located in the former Fort Ord.

The Parker Flats MRA Phase II consists of approximately 482 acres and includes all or portions of Munitions Response Sites (MRSs) MRS-04A, MRS-27A (portion), MRS-27B (portion), MRS-27C, MRS-44 EDC, MRS-44 PBC, and MRS-15 MOCO.02, and additional land that is not part of a designated MRS. Some areas of the Parker Flats MRA Phase II do not require additional RI, as discussed in Section 2.0 of this G1 SAP.

1.4 Purpose and Scope

The purpose of this G1 SAP is to define the procedures, methods, and resources that will be used to complete the Parker Flats MRA Phase II RI. The objective of this RI is to fill data gaps in order to complete the evaluation of the nature and extent of potential MEC before conducting a risk assessment as part of the remedial investigation/feasibility study (RI/FS) for Group 1 (i.e., Seaside MRA and Parker Flats MRA Phase II). A final remedy will be selected based on the RI/FS and will be documented in a Record of Decision (ROD) prepared by the Army.

Additionally, this G1 SAP outlines the process, procedures, and success criteria for the RQA Pilot Study to be executed in test areas located within the CSUMB Off-Campus and Seaside MRAs.

1.5 Document Structure

This G1 SAP is presented in numbered sections, tables, and figures, and includes lettered appendices. Tables and figures, as referenced in the sections, are numbered to correspond with the section in which they are presented in the G1 SAP.

2.0 TECHNICAL MANAGEMENT PLAN

This section summarizes the tasks that will be performed to conduct the MEC investigation at the Parker Flats MRA Phase II in order to meet the project scope and objectives.

Based on the Conceptual Site Model (CSM) presented in the Summary of Existing Data Report (SEDR; ESCA RP Team 2008), data exist from previous munitions response actions conducted by the Army, which provide an overall indication of the nature and extent of the MEC contained within the Parker Flats MRA Phase II; however, the nature and extent of MEC contamination within the Phase II areas have not been fully defined. The following actions are required to support the refinement of the CSM for the Parker Flats MRA Phase II and analysis of risk for inclusion in the RI/FS report:

- Collection of additional data to fill the data gaps identified in the SEDR
- Collection of data, sufficient to support the MEC investigation, in areas of the Parker Flats MRA Phase II where limited data is available

The collection of additional data is not required in MRS-15 MOCO.02, MRS-44 PBC, and MRS-04A because removal actions have been completed by the Army in these areas, as shown on Figure 2-1.

2.1 Parker Flats MRA Phase II Investigation Areas

The Parker Flats MRA (Phase I and Phase II areas) encompasses approximately 1,180 acres and fully contains United States Army Corps of Engineers (USACE) property transfer parcels E18.1.1, E18.1.2, E18.1.3, E18.4, E19a.1, E19a.2, E19a.5, E20c.2, E21b.3, L20.18, L23.2, and L32.1, and portions of USACE property transfer parcels E19a.3 and E19a.4 (Figure 2-2). The remaining portions of USACE property transfer parcels E19a.3 and E19a.4 are contained in the County North MRA (formerly referred to as the Development North MRA).

The Parker Flats MRA Phase II consists of approximately 482 acres, of which approximately 426 acres will be investigated for the presence of MEC by the ESCA RP Team under this G1 SAP and approximately 56 acres have previously been the subject of removal actions completed by the Army (Figure 2-1). Table 2-1 summarizes the parcel numbers, acreages, and associated MRSs by future land use for the Parker Flats MRA Phase II.

As indicated in Table 2-1, parcels E21b.3, L23.2, and L32.1 and portions of parcels E18.1.3, E18.4, E19a.1, and L20.18 will not be investigated as part of this G1 SAP because these parcels were previously investigated by the Army and the associated removal actions were considered to be adequately completed (ESCA RP Team 2008).

The Parker Flats MRA Phase II RI includes parcels designated for three different categories of future land use: habitat reserve, nonresidential, and residential (Table 2-1 and Figure 2-3). Maps presenting more detailed views of the Parker Flats MRA Phase II investigation areas are presented in Appendix A.

2.1.1 Identification of Munitions Response Sites - Parker Flats MRA Phase II

The Parker Flats MRA Phase II RI areas are illustrated on Figure 2-1. These investigation areas were identified through historical records and previous work performed in the Parker Flats MRA, including site investigations, sampling investigations, and removal actions, as presented in the SEDR (ESCA RP Team 2008). A summary of the MEC removed during the previous site investigations and removal actions at the Parker Flats MRA Phase II is provided in Appendix B. Details regarding the investigations at the Parker Flats MRA Phase I can be found in the "Final Track 2 Munitions Response Remedial Investigation/Feasibility Study, Parker Flats Munitions Response Area, Former Fort Ord, California" (MACTEC 2006).

2.2 Field Investigation Plan

This section summarizes the field investigation strategy for the Parker Flats MRA Phase II RI. The processes and procedures used, as well as the results of the Phase II RI, will be detailed in a G1 RI/FS report, together with recommended follow-on actions, if determined to be necessary.

2.2.1 Parker Flats MRA Phase II Remedial Investigation

The investigation areas include property designated for future residential, nonresidential, or habitat reserve. Improved roads will not be intrusively investigated. Digital geophysical mapping (DGM) investigations, using the Best Available and Appropriate Detection Technology (BADT) will be performed in residential and nonresidential development areas. The investigation of residential and nonresidential development areas will entail 100 percent DGM investigations to the depth of detection. Areas that are not suitable for DGM (e.g., dense oak woodland where data collection is not possible) will be investigated using analog detection.

Investigation of habitat reserve areas will be conducted using two separate investigation methods. The accessible areas, specifically trails and open areas adjacent to the trails (including a buffer extending a maximum of 5 feet off the trail), will be investigated by performing 100 percent DGM or investigated using the BADT similar to the residential and nonresidential development areas. The investigation of trails will entail 100 percent DGM to the depth of detection. Accessible portions of the remaining habitat reserve areas will be investigated using analog instrument-aided surface and near-surface (within 3 inches) methods.

The purpose of the surface sweep in the accessible habitat reserve areas will be to identify and remove anomalies that are on or near the surface (within 3 inches). Surface and near-surface finds (MEC and MD) will be fully documented and reviewed by the ESCA RP Team in consultation with the regulatory agencies during the investigation. If the ESCA RP Team in consultation with the regulatory agencies determine that significant near-surface MEC (either high concentration or high-risk unexploded ordnance [UXO]) has been discovered during the investigation, a field variance may be developed to change the investigation approach to include a focused intrusive investigation to ascertain the limits of the condition.

The processes and procedures used, as well as the results of the RI, will be detailed in the G1 RI/FS report, together with recommended follow-on actions, if determined to be necessary.

2.2.2 Identification of Data Needs / Investigation Objective

The intent of the Parker Flats MRA Phase II RI is to provide sufficient data needed to support the development of a risk assessment with no further data gaps. As such, a high level of data collection effort is incorporated into the RI fieldwork approach, while considering the future reuses of the MRA. The overall investigation approach for the Parker Flats MRA Phase II is described in Section 2.3 of this G1 SAP. The field investigation is designed to address the data needs, as defined in Section 5.0 of the SEDR (ESCA RP Team 2008).

2.3 Site Activities

DGM surveys will be performed in future residential and nonresidential development areas within the Parker Flats MRA Phase II, except in MRS-44PBC, MRS-04A, and MRS-15MOCO.02, where removal actions have been completed by the Army, and in areas where the terrain and other site conditions are not suitable for DGM. Trails within the habitat reserve area will also be investigated using DGM. The objectives of the surveys are to detect, record, investigate, and remove anomalies that may be MEC. Figure 2-1 displays the portions of the Parker Flats MRA Phase II that are the subject of this G1 SAP.

The following are the major activities that will be implemented to accomplish the overall objectives previously described:

- Site Preparation (Section 2.3.1)
  - Preparatory Inspection (Section 2.3.1.1)
  - Boundary Surveys (Section 2.3.1.2)
    - Investigation area boundaries
    - California tiger salamander (CTS) habitat boundaries
    - Roads, trails, and open spaces
  - Vegetation Cutting and Removal (Section 2.3.1.3)
  - Building and Structure Demolition (Section 2.3.1.4)
  - Surface Debris Removal (Section 2.3.1.5)
  - Geophysical Test Plot (Section 2.3.1.6)
- DGM Surveys (Section 2.3.2)
- Processing of Geophysical Data and Dig List Preparation (Section 2.3.3)
- Digital Geophysical Anomaly Reacquisition (Section 2.3.4)
- Excavation of Anomaly Targets (Section 2.3.5)
- Analog Magnetometer Searches (Section 2.3.6)
- Analog Instrument-Aided Surface and Near-Surface Investigation (Section 2.3.7)

  - Habitat reserve areas not including roads and trails
- Quality Control (Section 2.3.8)
- Quality Assurance (Section 2.3.9)
- Site Restoration (Section 2.3.10)
- Reporting (Section 2.3.11)

The site activities that will be implemented to accomplish the investigation objective are described in the following subsections, and the sequence of these activities is represented graphically on Figure 2-4.

2.3.1 Site Preparation

The following activities will be conducted to prepare the Phase II areas in advance of the investigation activities:

- Preparatory inspection (Section 2.3.1.1)
- Boundary surveys, including staking activities (Section 2.3.1.2)
- Vegetation cutting and removal (Section 2.3.1.3)
- Demolition and removal of aboveground structures, buildings, and concrete pads/foundations (Section 2.3.1.4)
- Surface debris removal (Section 2.3.1.5)
- Geophysical test plot (Section 2.3.1.6)

2.3.1.1 Preparatory Inspection

A preparatory inspection of the Parker Flats MRA Phase II will be performed before any operations begin. Some boundary survey work may need to be conducted prior to the formal preparatory inspection to assist in delineation of the areas to be inspected.

The purpose of this inspection is to determine what site preparatory measures are needed. This preparatory inspection is also used to identify any environmentally sensitive areas, degree of vegetation present, metallic munitions debris (MD) and scrap levels or other material that would interfere with geophysical survey operations, and restoration requirements. The persons attending this inspection will be the Remediation Project Manager (RPM), Senior UXO Supervisor (SUXOS), UXO Safety Officer (UXOSO), UXO Quality Control Specialist (UXOQCS), and Field Biologist. This inspection will be documented by the UXOQCS.

2.3.1.2 Boundary Surveys

Once the preparatory inspection is completed and before brush-cutting activities are begun, boundaries will be established for the Phase II investigation areas with survey markers. The

boundary stakes will assist the brush-cutting crews to guide the extent of brush-cutting activities. The boundaries will be staked in the field based on the coordinates as reported in the Army's Geographic Information System (GIS) and associated databases. In all cases, the surveyor will be accompanied by a UXO Technician II who will provide escort in the MRA. In addition, the UXO Technician II will check the area using a Schonstedt GA52Cx before any intrusive activities are conducted, such as placing survey stakes.

The surveyors will also survey and stake the extent of the following: habitat reserve area and CTS habitat boundaries (Figure 2-5); 5-foot offsets from the edges of the roads and trails in the habitat reserve area (Figure 2-6); and any areas that will not be investigated, such as MRS-04A, because these areas will not be surveyed using DGM (Figure 2-1). The stakes will serve as a guide for field DGM activities.

Within DGM investigation areas, operational areas (e.g., 100-foot by 100-foot grids) will be established as needed and staked by a surveyor. These markers will also provide a frame of reference during DGM investigations.

All survey work on the MRA will be based on monuments established in the field. The coordinate system to be used for control points and other survey activities is North American Datum (NAD) 83 California State Plane Zone IV U.S. survey feet.

2.3.1.3 Vegetation Cutting and Removal

Vegetation will be cut and vegetation debris will be removed from the work areas to facilitate conducting the analog or DGM surveys. Figure 2-7 shows the general vegetation communities by type within the Parker Flats MRA. Vegetation will be cut to the extent possible while preserving trees; however, the limbs of the trees will be trimmed to maximize DGM surveys. Subcontracted brush removal teams (normally consisting of five laborers) will work with a UXO Technician II and conduct vegetation removals utilizing manual brush cutting and mechanical vegetation removal equipment. Vegetation cutting activities will be conducted in accordance with the Standard Operating Procedure (SOP) for Vegetation Cutting presented in Appendix D.

Manual brush-cutting will be conducted under the direction of the SUXOS and in coordination with the Field Biologist. Each brush removal team (normally consisting of five laborers) will have a UXO Technician II as an escort for MEC avoidance purposes. UXO Technician personnel assisted by analog instruments will survey accessible portions of the work areas ahead of the brush-cutting crews to identify MEC items that may be present on the surface or within the vegetation. A magnetometer is used to aid in searching the vegetation for surface MEC before cutting brush. The amount of brush cutting required depends on the terrain and the amount of access required for conducting work and maintaining safety. Any surface MEC encountered by the brush removal team will be marked with a red pin flag by a UXO Technician. The MEC items will be left in place and the SUXOS will be notified to coordinate the safe removal of the MEC item.

Manual brush-cutting will be conducted using power chippers, powered weed cutters, chainsaws, and a variety of hand tools. Each brush removal team will have a leader or foreman who will ensure that personnel engaged in brush-cutting activities are wearing personal protective equipment (PPE) and accessories appropriate for the equipment being operated (e.g., chainsaw chaps).

Mechanical vegetation cutting will be conducted where environmental concerns and terrain permit. Mechanical brush removal may be accomplished using a Bobcat, with a rotary brush-clearing machine or a large-scale removal machine once it has been approved for use.

Vegetation activities will be conducted with oversight by the ESCA RP Team Field Biologist in accordance with the Habitat Management Plan (HMP; USACE 1997) and Section 12 of this G1 SAP.

Once cut, the brush piles will be removed from the work areas to avoid interference with DGM and instrument-aided surface survey activities.

2.3.1.4 Building and Structure Demolition Activities

Building and structure demolition activities may occur simultaneously with brush-cutting activities, as deemed appropriate and feasible. Appendix C presents the buildings and structures that are scheduled to be demolished. The structures and buildings will be removed only from the areas designated for future residential reuse to allow DGM survey of the ground surface. The buildings and structures will be demolished using the appropriate heavy equipment, such as excavators and bulldozers. The debris material will be removed from the MRA to minimize DGM interference. The uncovered areas beneath and around the structures will undergo a DGM investigation to depth using BADT. One building scheduled for demolition is a field latrine located in the RQA Pilot Study area and will be investigated prior to demolition in accordance with the SOP for Latrine Clearance presented in Appendix D of this G1 SAP.

2.3.1.5 Surface Debris Removal

In coordination with brush cutting and building demolition activities, surface debris will be removed from the investigation areas before DGM survey activities are begun. The purpose of this activity will be to identify and remove surface metal debris and verify that no MEC-related items remain on the ground surface. This effort will optimize the DGM survey and minimize selecting anomalies related to miscellaneous surface debris.

Debris piles consisting of trash and miscellaneous waste, such as concrete, wood, and metal, that have been certified as clear of MEC items by the SUXOS will be removed from investigation areas, as necessary, and properly disposed of off-site in accordance with applicable requirements.

Ground surface sweeps will be conducted to remove metallic surface debris that may interfere with DGM surveys. These surface debris removal activities will be performed under the direct

supervision of a UXO Technician. The UXO Technician will assemble the survey personnel into a sweep line and direct their movement across the investigation area. Personnel will be spaced approximately 5 feet apart and proceed in a systematic manner across an area. Personnel will remove surface metal debris and place it into a roll-off bin or other acceptable container for subsequent disposal and/or recycling, as deemed appropriate. If an MEC item is encountered, the SUXOS will be notified to coordinate the removal of the item in accordance with the proper handling procedures. Completed areas will be documented using stakes and/or Global Positioning System (GPS) coordinates to ensure that the entire area proposed to be surveyed using DGM is covered.

2.3.1.6 Geophysical Test Plot

The geophysical test plot previously established in the Seaside MRA may be used to show that geophysical instruments are functioning properly. This is appropriate because the types of MEC found in the Parker Flats MRA are consistent with the types found in the Seaside MRA, and the high-power transmission line that crosses portions of the Seaside MRA also crosses portions of the Parker Flats MRA Phase II. The geophysical test plot is discussed in Section 5.15.3 of this G1 SAP.

2.3.2 Digital Geophysical Mapping Surveys

Following removal of the obstructions that prevent effective geophysical surveys, a DGM survey will be performed within the investigation areas that are designated for future residential and nonresidential development (Figure 2-3). In addition, the roads and trails, including the 5-foot offset areas, within the proposed habitat reserve area will be surveyed using DGM (Figure 2-6).

The objective of the geophysical survey is to accurately locate and record the locations of geophysical anomalies that potentially represent MEC in the subsurface. The geophysical survey will be conducted in accordance with Section 5 of this G1 SAP, the results of the Seaside MRA geophysical test plot, and lessons learned from previous removal actions at the MRA.

Based on previous munitions actions at the former Fort Ord, three geophysical instruments represent BADT for this investigation (two digital and one analog), which use two different geophysical methods (time-domain electromagnetic [TDEM] and magnetic [Mag]). Instrument descriptions can be found in Section 5.15.1 of this G1 SAP. The two digital geophysical instruments that will be used are the Geonics EM61-MK2 time-domain metal detector (TDMD) and the Geometrics G-858/822 digital magnetometer; both digital geophysical instruments record data.

2.3.3 Processing of Geophysical Data and Dig List Preparation

Processing of the geophysical data involves two steps: the preprocessing phase and the Geosoft® Oasis Montaj (Version 6.0 or above; Geosoft) analysis phase. Procedures that will

be used for processing geophysical data are detailed in Section 5.18.3 and the Quality Assurance Project Plan (QAPP) presented in Appendix E of this G1 SAP.

Following the evaluation of geophysical data, the Project Geophysicist will prepare target lists with suspect anomaly locations for reacquisition. Anomaly reacquisition is covered in the next section.

2.3.4 Digital Geophysical Anomaly Reacquisition

After DGM data are processed, anomaly targets will be reacquired for excavation. Reacquisition teams will use GPS survey instruments to flag the anomaly location. A nonmetallic flag marked with the anomaly identification number will be placed at the anomaly coordinates. The reacquisition teams will then use the original survey instrument to locate the peak response from the anomaly and mark it on the ground in accordance with Section 5 and Appendix E of this G1 SAP.

2.3.5 Excavation of Anomaly Targets

Selected subsurface anomalies will be excavated, recorded, and removed or detonated in-place utilizing the procedures summarized in the following subsection. UXO Teams for the excavation of anomaly targets are normally composed of a UXO Team Leader and up to six UXO Technicians. UXO Teams will perform all intrusive operations and operate under the direct supervision of a SUXOS. A UXOSO will closely monitor the safety of the UXO Teams in accordance with the QAPP presented in Appendix E.

The Department of Defense Explosives Safety Board (DDESB) Technical Paper No. 18, "Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel," dated December 20, 2005 (DDESB 2005), identifies the various UXO-related positions and outlines their duties and responsibilities. Based on this technical paper, only personnel qualified as UXO Technician II (at a minimum) will escort personnel who are not directly involved in UXO-related operations (e.g., personnel performing environmental monitoring), but have activities to perform within exclusion areas.

2.3.5.1 Excavation of Digitally Reacquired Anomalies

The UXO teams will be provided with the appropriate digital forms to record relevant data related to their intrusive investigation and digital information to excavate the anomaly targets. Annotations will be recorded for MEC and MD that can be positively identified. Annotations will include site name, instrument used, easting and northing coordinates (in local NAD 1983 State Plane Coordinates, California Zone IV, U.S. survey feet), grid number, instrument response and units, source type of response, description, weight, depth, and subsequent actions taken.

If the anomaly yields a non-military munitions item or fragments or pieces of MEC items that are not intact and cannot be positively identified, then the approximate total weight and depth

of the item(s) will be recorded, but the type of MEC item(s), the distance and direction from the flag, and the inclination and declination of MEC item(s) will not be recorded.

If the anomaly is an MEC item or MD that can be identified, the type of MEC, approximate weight, distance and direction from the flag, and inclination and declination of the MEC will be recorded in accordance with the QAPP presented in Appendix E of this G1 SAP.

The MEC items located will be initially classified as materials potentially presenting an explosive hazard (MPPEH) until the items are fully inspected and can be identified as MEC, MD, or metal scrap. MD and metal scrap will be transported from the investigation area and stored until it can be disposed of by a foundry and/or recycler, where it will be processed through a smelter, shredder, or furnace prior to resale or release. Prior to leaving the MRA, the MD and metal scrap will be inspected by a SUXOS and a UXOQCS to verify that it is free from explosives (FFE). The MD will be shredded and recycled at an authorized recycler.

Near-surface anomalies are those subsurface anomalies that are within 3 inches of the surface and can be excavated using hand tools. Throughout the excavation, the UXO Technician will use a magnetometer to check and verify the location of the anomaly. If work must be performed at a location where rodent infestation is evident, PPE should be worn in accordance with the SOP for Hantavirus Exposure Protection presented in Appendix D of this G1 SAP.

Some anomalies are more deeply buried and require excavation using heavy equipment (i.e., backhoe). Excavations using heavy equipment will be conducted in accordance with the SOP for Backhoe/Excavator Operators presented in Appendix D of this G1 SAP. Prior to the arrival of the heavy equipment, the UXO Team Leader will ensure that a cleared entrance and egress path is available for the heavy equipment. Once at the work area, the heavy equipment will be used to excavate the earth overburden adjacent to the suspect anomaly. A UXO Technician will remove the final 1 foot of overburden using hand tools.

If MEC are encountered that are suspected of containing unknown filler, MEC disposition will be conducted in accordance with the SOP for MEC with Unknown Filler presented in Appendix D of this G1 SAP.

2.3.6 Analog Magnetometer Searches

Schonstedt magnetometer sweeps (i.e., “mag and dig”) are particularly effective in areas where vegetation and terrain limit the use of larger digital systems. “Mag and dig” approaches will also be used when there is insufficient difference between MEC at the work area and other metallic fragments and debris.

The UXO Team Leader will direct personnel to establish individual search lanes approximately 3 feet wide and to begin searching each lane using a Schonstedt Model GA-52/CX magnetometer. UXO Technicians will start at one end of each lane and move forward toward the opposing base line. During the forward movement, the technician will move the magnetometer back and forth from one side of the lane to the other. Both forward

movement and the swing of the magnetometer are performed at a pace that ensures that the entire lane is searched and that the instrument is able to appropriately respond to subsurface anomalies. Whenever a subsurface anomaly or metallic surface object is encountered, the technician will halt and investigate the anomaly. Throughout this operation, the UXO Team Leader will closely monitor individual performance to ensure that these procedures are being performed with due diligence and attention to detail in accordance with the QAPP presented in Appendix E of this G1 SAP.

Near-surface anomalies are those subsurface anomalies that are within 3 inches of the surface and can be excavated using hand tools. Throughout the excavation, the UXO Technician will use a magnetometer to check and verify the location of the anomaly. If work must be performed at a location where rodent infestation is evident PPE, should be worn in accordance with the SOP for Hantavirus Exposure Protection presented in Appendix D of this G1 SAP.

Some anomalies are more deeply buried and require excavation using heavy equipment (i.e., backhoe). Excavations using heavy equipment will be conducted in accordance with the SOP for Backhoe/Excavator Operators presented in Appendix D of this G1 SAP. Prior to the arrival of the heavy equipment, the UXO Team Leader will ensure that a cleared entrance and egress path is available for the heavy equipment. Once at the work area, the heavy equipment will be used to excavate the earth overburden from the suspect anomaly. The distance to the anomaly will be checked with a hand-held magnetometer during the excavation. A UXO Technician will remove the final 1 foot of overburden using hand tools.

If MEC are encountered that are suspected of containing unknown filler, MEC disposition will be conducted in accordance with the SOP for MEC with Unknown Filler presented in Appendix D of this G1 SAP.

2.3.7 Analog Instrument-Aided Surface and Near-Surface Investigation of Habitat Areas

Habitat reserve areas that are not highly accessible, such as areas outside the known trails and roads (Figure 2-6), will be investigated using analog instrument-aided surface and near-surface investigation methods. This investigation will be conducted using methods similar to those described in Section 2.3.1.5 for surface debris removal activities, with the exception that this task will be assisted by analog instruments. The purpose of this investigation will be to verify that MEC hazards are not present at the surface or near surface (within 3 inches of the surface). Therefore, before this task is begun, the vegetation will be cut as described in Section 2.3.1.3 in this G1 SAP.

Any MEC items encountered on the surface will be immediately reported to the SUXOS, surveyed with a GPS unit for documentation purposes, and handled in accordance with the proper handling procedures. If an anomaly is detected using analog instruments, the UXO Technician will investigate the anomaly to a depth of 3 inches. If the anomaly cannot be located within the top 3 inches of soil surface, the soil will be replaced and the location will be flagged and surveyed using a GPS instrument, if coverage is available. In the event that GPS coverage is not available, the anomaly will be marked on the grid map and the

coordinates will be manually entered. The SUXOS will summarize a list of anomalies that could not be fully investigated and/or areas where MEC was found that require additional investigation. Surface and near-surface finds (MEC and MD) will be fully documented and reviewed by the ESCA RP Team in consultation with the regulatory agencies during the investigation. If the ESCA RP Team in consultation with the regulatory agencies determine that significant near-surface MEC (either high concentration or high-risk UXO) has been discovered during the investigation, a field variance will be developed to change the investigation approach to include a focused intrusive investigation to ascertain the limits of the condition.

If MEC are encountered that are suspected of containing unknown filler, MEC disposition will be conducted in accordance with the SOP for MEC with Unknown Filler presented in Appendix D of this G1 SAP.

2.3.8 Quality Control

Quality control (QC) is addressed in Sections 5 and 11 of this G1 SAP and in the QAPP presented in Appendix E of this G1 SAP. Section 11 is the Quality Control Plan (QCP), which establishes and describes the general quality requirements for the program and the QAPP addresses quality related to geophysical investigation. The QCP applies to all work performed by the ESCA RP Team and their subcontractors. Section 5 of this G1 SAP is the Geophysical Investigation Plan, which includes a description of QC procedures specific to geophysical operations.

2.3.9 Quality Assurance

WESTON will implement a Quality Assurance (QA) Program for the Parker Flats MRA Phase II RI. It is WESTON'S policy to apply sound and cost-effective QA principles to all of its activities. This assists in ensuring the proper execution of work, the management of liability, and the maintenance of WESTON'S professional reputation for excellence. The WESTON QA Program is an integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement used to ensure that processes and services are of the type and quality needed to meet the project requirements. This includes assessment of QC procedures, to ensure that they are functioning and that all contract/regulatory requirements have been met. QA of the MEC removal action project includes periodic surveillance/audit activities performed by competent personnel from appropriate disciplines (e.g., engineers, UXO qualified personnel, geophysicists), review of project documents/status, observation of field operations for compliance with plans and procedures, seeding of geophysical investigation areas and sifting operations to ensure recovery, and analog investigations of portions of removal action areas where the entire removal process has been completed, and QC processes. The established project quality policies and procedures are applicable to all participating project personnel and subcontractors and are applicable to all site activities affecting quality including, but not limited to, MEC investigation and removal operations, demolition operations, handling of demolition materials, geophysical operations, and data management.

FORA will provide independent QA of MEC RI processes and products with the intent of verifying the quality of MEC removal action work performed by WESTON. The FORA Quality Assurance Surveillance Plan (QASP) will be updated to include actions for the Parker Flats MRA Phase II (FORA 2008). The updated QASP will be provided to the regulatory agencies for review and approval prior to starting MEC RI activities related to the G1 SAP.

2.3.10 Site Restoration

The ESCA RP Team will implement restoration measures as identified in Section 12 of this G1 SAP.

2.3.11 Reporting

The description of field activities, operations, and results will be presented in the G1 RI/FS report.

2.4 Residential Quality Assurance Pilot Study

The regulatory agencies have expressed concern regarding the residual risk that remains after MEC removals have taken place, particularly in areas that are designated for future residential use (i.e., unrestricted land use), because MEC removal actions may not successfully acquire and recover all MEC at a site. In an effort to assuage regulatory concerns, a QA process was developed that will help the regulators to become satisfied with the acceptability of a parcel, where MEC removal was conducted, for residential use (and other sensitive uses). The relevance and usefulness of this QA process will be tested in an RQA Pilot Study. The work plan for the RQA Pilot Study is presented in Appendix F of this G1 SAP.

2.5 Community Safety Plan

A Community Safety Plan (CSP) is being developed and will be implemented when necessary to ensure the safety of the community.

2.6 Organization and Anticipated Schedule

The ESCA RP Team's organizational chart is presented on Figure 2-8. Reporting and communications lines and field teams (including UXO Teams, geophysical teams, etc.) are identified on this figure. The anticipated schedule for site activities related to the Parker Flats MRA Phase II is presented in Appendix G. Resumes of key personnel responsible for implementing the work presented in this G1 SAP are provided in Appendix H.

2.7 Army-Retained Conditions

The ESCA and the AOC identify certain Army-retained conditions for which the Army assumes responsibility. If these conditions are encountered during field operations, FORA is required to notify the Army of their presence in accordance with the guidelines set forth in

the ESCA and the Army assumes responsibility. Included in the Army-retained conditions are:

- Radiological material
- Chemical or biological warfare agents
- Natural resource injuries or damages occurring as a result of contamination releases that have occurred due to Army ownership or activities on the MRA except to the extent such injuries are a direct result of FORA's activities on the MRA
- Unknown uninsured conditions, which include the management and cleanup of non-MEC-related hazardous and toxic wastes above insurance parameters
- Perchlorate contamination in soil or groundwater

Recognition of these types of conditions in the field may include, but are not limited to:

- oily, shiny, or saturated soil or free product
- soil with strong chemical odor
- discovery of objects of environmental concern such as underground storage tanks and associated piping, buried drums, etc.
- discovery of suspected debris of environmental concern (i.e., buried refuse, asbestos-containing pipes, and Transite™)
- other conditions that vary materially from those documented during previous investigations
- discovery of areas containing high concentrations of spent ammunition
- discovery of bulk explosives

The field personnel involved in fieldwork activities will be briefed on the recognition of these types of conditions in the field and will be instructed to be on the alert for these conditions and to promptly report such conditions to the site manager, if encountered.

If a suspected Army-retained condition is encountered during the field investigation activities, the following procedures will be followed:

1. All MEC field activities that may potentially disturb the "suspected" condition will be immediately stopped.
2. If there is no immediate danger to personnel, an appropriate exclusion zone will be designated with a marker and/or a barricade will be erected around the suspect area to prevent further soil disturbance in this area.
3. If an emergency situation requiring medical attention, containment assistance, or other emergency assistance arises, the emergency procedures specified in the Site Safety and Health Plan (SSHP) provided as Appendix J will be followed.

4. The site manager for the contractor or subcontractor will immediately notify the appropriate ESCA RP Team representative. The ESCA RP Team representative will notify the Army immediately, and FORA and the appropriate regulatory agencies within 24 hours.

3.0 EXPLOSIVES MANAGEMENT PLAN

3.1 Introduction

The purpose of the Explosives Management Plan is to provide the minimum procedures and safety and health requirements applicable to the acquisition, storage, accountability, and transportation of demolition material and MEC.

3.2 Regulatory References

Procedures and information contained in this Explosives Management Plan of the G1 SAP were obtained from the following references:

- USACE - Huntsville Center (CEHNC) Safety Concepts and Basic Considerations for UXO
- Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) P-5400.7, ATF-Explosives Law and Regulations
- USACE Engineering Manual (USACE EM) 385-1-1, Safety and Health Requirements Manual
- U.S. Department of Defense (DOD) 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives
- DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards
- Department of the Army Pamphlet (DA PAM) 385-64, Ammunition and Explosives Safety Standards
- Army Regulation (AR) 385-64, Ammunition and Explosives Safety Standards
- AR 385-10, The Army Safety Program
- AR 385-16, System Safety Engineering and Management
- USACE EM 1110-1-4009, Ordnance and Explosives Response

3.3 Responsibilities

3.3.1 SUXOS

The SUXOS is responsible for determining the specific site requirements for licensing, permitting, and placarding. Additionally, the SUXOS is responsible for acquiring the initial quantity and type of demolition material and approving all subsequent requests for demolition material.

3.3.2 UXOQCS

The UXOQCS is responsible for inspecting and auditing the entire operation and reporting any findings to the SUXOS and UXOSO. These inspections will include the acquisition procedure, documentation, storage, and transport.

3.3.3 UXOSO

The UXOSO is responsible for ensuring the handling, storage, transport, and use of demolition material in accordance with the approved work plan, SOPs, and federal and state regulations.

3.3.4 Vehicle Driver

The vehicle driver will at a minimum be a qualified UXO Technician II and have a valid driver's license. This is to ensure that the driver is both experienced with and knowledgeable of demolition material. For additional transportation requirements, see Section 3.9.

3.4 Explosives Acquisition

Acquisitions will be made by the SUXOS in a timely manner. The initial acquisition must be in place prior to beginning intrusive activities, and all subsequent shipments must be on-site to ensure there is no break in operations. Before demolition materials are ordered, the Purchase/Receipt Authorization List (Figure 3-1) must be completed and forwarded to the explosives distributor(s), along with a copy of WESTON'S ATF License.

3.5 Explosives Receipt

Only those individuals named on the authorization list may sign for explosives from the shipper. To ensure that the quantity shipped is the same as the quantity listed on the shipping documents, the UXOSO will inventory the shipment before signing for it. If the UXOSO is unavailable, a designee from the Purchase/Receipt Authorization List will inventory the shipment before signing for the shipment.

In the event that the lock to the storage facility shows signs of tampering or break-in, do not enter the magazine or touch the broken lock/door. Refer to Section 3.9.6, Loss, Theft, and Unauthorized Use of Explosives.

3.5.1 Receipt Discrepancies

Upon receipt of each shipment, the type, quantity, and lot number of each item will be checked against the manifest and entered on the Magazine Data Card (Figure 3-2). In the event there is a discrepancy between the amount shipped and the amount received, the UXOSO will immediately contact the explosives supplier and inform the supplier of the discrepancy. If there is a discrepancy, do not accept the shipment. It is then the responsibility

of the supplier to rectify the situation and inform WESTON of the results. If the discrepancy cannot be resolved within 24 hours, notify the RPM, Local Law Enforcement Agency, and ATF.

3.6 Storage

WESTON has the right to use the existing Type 1 explosives storage magazines located at the former Fort Ord Explosives Storage Location (ESL). WESTON will use the existing former government explosives storage magazines for explosives storage and comply with local storage and compatibility criteria and procedures when using government facilities. Section 4.0 of this G1 SAP presents specific criteria for siting of the explosives storage magazines within the existing ESL. WESTON will ensure that explosives storage magazines are in compliance with the following security requirements.

3.7 Security

The ESL is a fenced and locked facility. No additional security is required.

3.7.1 Exterior Construction

The exterior and doors are to be of not less than ¼-inch steel and lined with at least 2 inches of hardwood. Magazines with top openings will have lids with water-resistant seals, or which overlap the sides by at least 1 inch when in a closed position.

3.7.2 Hinges and Hasps

Hinges and hasps will be attached to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps will be installed so they cannot be removed when the doors are closed and locked.

3.7.3 Locks

Each door will be equipped with appropriate padlocks fastened in separate hasps and staples. Padlocks must have at least five tumblers or five blades, and a case-hardened shackle of at least 3/8-inch diameter. Padlocks will be protected with not less than ¼-inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples.

3.7.4 Signage/Placarding

ATF and DOD require that all magazines be appropriately posted for content hazard class, fire fighting hazard, and an emergency notification list. Magazines will be placarded in accordance with DOD 4145.26-M and DA PAM 385-64. In most instances, this will require a Fire Division Class 1 for the recovered MEC magazines. The proposed storage configuration for demolition material will require a Fire Division Class 1. If in doubt and unable to obtain

guidance from a reputable source, label the contents with the next highest hazard. In the event there are two fire division or hazard class items in the same magazine, the higher hazard division/class placard should be used.

3.7.5 Lightning Protection

Appropriate lightning protection will be installed in accordance with USACE EM 1110-1-4009, Chapter 11.

3.7.6 Emergency Notification List

An emergency notification list containing the names, telephone numbers, and local addresses of the individuals to be notified in the event of an emergency will be posted on the outside and inside of the magazine door. These individuals should be the same individuals authorized to sign for explosives.

3.7.7 Compatibility

Explosives compatibility will be maintained in accordance with DA PAM 385-64. Table 3-1 lists the various storage compatibility groups, and Table 3-2 is the storage compatibility chart. In certain instances, it may be necessary to store incompatible items in the same magazine. If this should occur, a waiver will be requested, and the incompatible items will be physically separated by a barricade, such as sandbags, within the magazine. This situation should be an interim occurrence and avoided if possible.

3.7.8 Key Control

Magazines will remain locked except when receipts and issues are being made. Keys will be kept by the UXOSO and the UXOQCS.

3.7.9 Inspection

At the start of each workday, a physical check will be made of the magazine storage area to ensure that security has not been compromised. Per ATF regulations, physical inspections of magazines will be conducted weekly.

3.8 Inventory

Upon receipt and verification of explosives demolition material, the Magazine Data Card will be filled out and kept in the magazine on top of the listed item. A duplicate copy will be maintained by the UXOQCS.

3.8.1 Usage Inventory

Following each occurrence of a receipt or issue of explosive material, the UXOSO will conduct a joint inventory in conjunction with the Demolition Supervisor (an experienced UXO Team Leader designated by the SUXOS) drawing out or returning the explosives. Only those items issued/returned will be inventoried. The two sets of Magazine Data Cards will be appropriately annotated.

3.8.2 Monthly Inventory

On a monthly basis, the SUXOS and the UXOQCS will conduct an inventory and record results on the two sets of Magazine Data Cards.

3.8.3 Discrepancies

In the event there is a discrepancy during any inventory, the items will be recounted a minimum of two additional times. If a discrepancy still exists, the RPM and ATF will be notified. A written report will be prepared and submitted within 24 hours of the discovery.

3.8.4 Procedures for Return to Storage of Explosives Not Expended

Explosives that were issued for use but were not needed will be returned daily to the magazines at the completion of disposal operations. The Demolition Supervisor will return the unused explosives to the storage magazine and revise the Magazine Data Card (Figure 3-2) and Explosives Usage Form (Figure 3-3).

3.8.5 Disposal of Remaining Explosives

WESTON is required by ATF to account for all explosives purchased and used. Following completion of work in the Parker Flats MRA Phase II, all unused explosives will be retained for usage in subsequent MRAs. Explosives remaining upon completion of all MRAs related to the ESCA will be returned to the supplier.

3.9 Transportation

Transportation of explosives or MEC will comply with all federal, state, and local regulations. Permits are not required under CERCLA for on-site transportation of explosives or MEC. Off-site transportation of explosives or MEC will not be done until coordination and approval has been received from the RPM and FORA.

3.9.1 General Highway Transport

The following data are sufficient to meet the requirements for explosives transport.

3.9.1.1 Commercial Motor Vehicle Definition and Requirements

Commercial motor vehicle (CMV) means a motor vehicle, or a combination of motor vehicles, used in commerce to transport passengers or property if the motor vehicle includes one or more of the following in accordance with 49 Code of Federal Regulations (CFR) 49 Part 383.5:

- Has a gross combination weight rating of 11,794 kilograms or more (26,001 pounds or more), inclusive with a towed unit with a gross vehicle weight rating of more than 4,536 kilograms (10,000 pounds)
- Has a gross vehicle weight rating of 11,794 kilograms or more (26,001 pounds or more)
- Is designed to transport 16 or more passengers including the driver
- Is of any size and is used in the transportation of materials found to be hazardous for the purpose of the Hazardous Materials Transportation Act, and which requires the motor vehicle to be placarded under the Hazardous Materials Regulations (49 CFR Part 172, subpart E)

3.9.2 On-Site Transportation

Transportation of explosives and MEC on-site will comply with the following:

- Vehicles will be inspected per occurrence and will be properly placarded.
- Explosives will be transported in closed vehicles whenever possible. When using an open vehicle, explosives will be covered with a flame-resistant tarpaulin (except when loading/unloading) or transported in an approved container.
- Vehicle engine will not be running and wheel chocks and brakes will be set when loading/unloading explosives.
- Beds of vehicles will have dunnage, plastic bed liner, or sandbags to protect the explosives from contact with the metal bed and fittings.
- Vehicles transporting explosives will have a first aid kit, two 10-ABC-rated fire extinguishers, and communication capabilities.
- Initiating explosives, such as detonators, will remain separated from other high explosives during loading, unloading, and while on vehicles.
- Compatibility requirements will be observed.
- Operators transporting explosives will have a valid driver's 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 miles per hour (mph).

3.9.3 Off-Site Transportation over Public Highways

3.9.3.1 DOT Certificate of Registration

As long as only 1.4 explosives or less than 55 pounds net explosive weight (NEW) of 1.1, 1.2, or 1.3 explosives are transported by personnel, DOT certificates of registration are not required for individuals involved in the transportation of demolition materials.

3.9.3.2 Commercial Driver's License Requirements

As long as site personnel are not using vehicles that weigh more than 26,000 pounds and are not transporting any materials that must be placarded under the DOT Hazardous Materials Regulations (i.e., they are only transporting 1.4 explosives), then the vehicle being used need not be classified as a CMV and the operator of the vehicle need not have a CDL. This is the typical situation for site personnel because they usually transport relatively small quantities of 1.4 demolition materials. However, if a CDL is required, the RPM will ensure that the requisite licenses/permits are obtained.

3.9.3.3 Mixed Packaging Requirements

Explosives of compatibility Group S may be packed with explosives of all other explosives compatibility groups except A and L. To determine the compatibility of the materials typically transported by site personnel, refer to the material safety data sheets (MSDSs). A current listing of all MSDSs is maintained by the UXOSO.

3.9.4 General Placarding Requirements

If placarding is required, it will be done according to 49 CFR 172.504. The placard requirements as identified in 49 CFR 172.504 and listed below will apply to explosives transportation, if applicable:

- Subparagraph (a) - Except as otherwise provided, each bulk packaging, freight container, unit load device, transport vehicle, or rail car containing any quantity of a hazardous material must be placarded on each side and each end with the type of placards specified in Tables 1 and 2, in accordance with other requirements and exceptions [see Tables 3-3 and 3-4 of this G1 SAP].
- Subparagraph (c) - Exceptions for less than 454 kg (1,001 pounds). Except for bulk packaging and hazardous materials subject to § 172.505, when hazardous materials covered by Table 2 of this section [see Table 3-4 of this G1 SAP] are transported by highway or rail, placards are not required on:
    1. A transport vehicle or freight container which contains less than 454 kg (1,001 pounds) aggregate gross weight of hazardous materials covered by Table 2 [see Table 3-4 of this G1 SAP] of paragraph (e) of this section; or

2. A rail car loaded with transport vehicles or freight containers, none of which is required to be placarded.

- The exceptions provided in subparagraph (c) above do not prohibit the display of placards in the manner prescribed in this subpart, if not otherwise prohibited (see § 172.502), on transport vehicles for freight containers that are not required to be placarded.

3.9.5 Documentation

Any time explosives are being transported, completed copies of documents described below will be in the vehicle.

Instructions for Motor Vehicle Owners - Emergency Response Information

Only those items that are being transported will be entered on the form shown on Figure 3-4 with the applicable quantity/units and weight columns completed. The NEW limitations of 55 pounds will not be exceeded. All required data will be entered on the front, and the Guide 50 block will be checked on the back of the form.

Explosives Purchase/Receipt/Transport Authorization List

This list, shown on Figure 3-1, will be completed to ensure that the pertinent data for all personnel transporting explosives are included on the form. As with the other required forms, this form will be part of the transport paperwork. Only the route shown will be used unless there is an emergency or the route is blocked. Any deviation from the planned route will be reported to and coordinated with the RPM.

Motor Vehicle Inspection Checklist

The checklist, shown on Figure 3-5, will be completed before any explosives are placed in the vehicle and will accompany the shipment.

ATF Permit/License

A copy of the current ATF license will be maintained in the FORA ESCA RP field office.

3.9.6 Loss, Theft, and Unauthorized Use of Explosives

If, during an inspection of the explosives magazine, it is determined that forced entry has occurred, personnel will follow these rules:

- Do not enter the magazine.
- Do not handle or disturb items within the immediate vicinity.
- Secure the magazine by posting a guard to prevent further access.

- Immediately notify the following individuals:
  - LFR Program Manager
  - WESTON UXOSO
  - WESTON RPM
  - WESTON UXO Service Line Leader
  - WESTON UXO Technical Manager
  - Local authorities as directed
  - ATF
- Do not allow entry into the magazine by others until law enforcement personnel arrive.
- Immediately upon request of Law Enforcement Personnel, perform physical inventory and reconcile on-hand explosives with Magazine Data Cards.
- Assist above individuals and agencies as needed.

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4.0 EXPLOSIVES SITING PLAN

This Explosives Siting Plan outlines the procedures that will be used to perform MEC identification, treatment operations, and explosives storage at the former Fort Ord and describes the safety criteria to be employed. Appendix I includes the Explosives Siting Plan for the Parker Flats MRA Phase II.

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5.0 GEOPHYSICAL INVESTIGATION PLAN

Section 5.0 details the Geophysical Investigation Plan (GIP) that will be performed for the Parker Flats MRA Phase II RI.

5.1 Objectives

The objective of the GIP is to accurately locate and record the locations of geophysical anomalies that potentially represent MEC in the subsurface.

5.2 Specific Areas to be Investigated

Figure 2-1 shows the areas to be investigated in the Parker Flats MRA Phase II.

5.3 Anticipated MEC Types

MEC recovered during previous investigations and removal actions in the Parker Flats MRA Phase II are listed in Appendix B.

5.4 Anticipated Penetration Depths

The majority of the MEC recovered from the Parker Flats MRA Phase II were non-penetrating items.

5.5 Topography

The terrain of the Parker Flats MRA Phase II is variable, consisting of rolling hills with moderate to steep slopes (2 to 15 percent slopes) and elevations ranging from approximately 280 to 490 feet mean sea level (msl).

5.6 Vegetation

The vegetation communities in the Parker Flats MRA Phase II consist of coastal live oak woodland, coastal scrub, and maritime chaparral (Figure 2-7).

5.7 Geologic Conditions

The former Fort Ord is located within the Coast Ranges Geomorphic Province, which consists of northwest-trending mountain ranges, broad basins, and elongated valleys generally paralleling the major geologic structures.

The geology of the former Fort Ord generally reflects this transitional condition. Older, consolidated rocks are characteristically exposed in the mountains near the southern base

boundary but are buried under a northward-thickening sequence of younger, unconsolidated alluvial fan and fluvial sediments in the valleys and lowlands to the north. In the coastal lowlands, these younger sediments commonly interfinger with marine deposits. The former Fort Ord and the adjacent areas are underlain, from depth to ground surface, by one or more of the following older, consolidated units: Mesozoic granite and metamorphic rocks; Miocene marine sedimentary rocks of the Monterey Formation; and upper Miocene to lower Pliocene marine sandstone of the Santa Margarita Formation (and possibly the Pancho Rico and/or Purisima Formations).

Locally, these units are overlain and obscured by geologically younger sediments, including: Pliocene-Pleistocene alluvial fan, lake, and fluvial deposits of the Paso Robles Formation; Pleistocene eolian and fluvial sands of the Aromas Sand; Pleistocene to Holocene valley fill deposits consisting of poorly consolidated gravel, sand, silt, and clay; Pleistocene and Holocene dune sands; recent beach sand and alluvium.

5.8 Soil Conditions

The surface soils are characterized as eolian (sand dune) and terrace (river deposits), which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. The primary soil type present in the MRA is Oceano Loamy Sand with 2 to 15 percent slopes with smaller areas of Arnold-Santa Ynez Complex and Baywood Sand.

5.9 Groundwater Conditions

Depth to groundwater is likely to be more than 100 feet below ground surface. Layers of perched groundwater may be present.

5.10 Geophysical Conditions

Geophysical conditions in the area may be affected by vegetation and terrain, which may limit access of certain instruments and positioning systems.

5.11 Site Utilities

An overhead high-tension power line crosses through the Parker Flats MRA Phase II. The power lines and metal towers that support the power lines extend across the entire MRA in a northeast to southwest direction (Figure 2-1).

In addition, overhead telephone and electrical lines and an underground water line cross the southwestern portion of the MRA along or near Eucalyptus Road. Several utilities (water, storm drain, natural gas, telephone, sewer, and electrical) also extend into the MRA in the northwestern portion of the MRA along the boundary with CSUMB. These site utilities are shown on the figures presented in the Building Demolition and Removal Plan presented in Appendix C of this G1 SAP.

5.12 Dynamic Events Potentially Affecting Geophysical Investigations

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

Rain

The effect of rain on geophysical operations is primarily dependent on the instrument, the technology being utilized, and the physical site conditions (terrain and vegetation). Most of the instruments commercially available are relatively water resistant. Additional measures will be taken by the geophysical teams (such as covering connections with plastic sheeting) to reduce the possibility of moisture affecting the instrument's electronics. When possible, geophysical teams will operate the instruments under very light rain conditions (drizzling). If the rain persists and the geophysical team leader determines that there is a potential for an impact to the data quality or that moisture could be getting into the instrument, field operations will cease and the Project Geophysicist will be notified. Operations will continue when the rain has ceased or has reduced to a drizzle.

At sites where footing for the operators becomes difficult because of wet terrain or vegetation, operations will cease until the area is deemed safe by the UXOSO. The determination to stop will be made by the leader of the various field operations or the UXOSO and the Project Geophysicist will be notified.

Lightning

Because all geophysical instruments can serve as conduits for lightning, any observed lightning in the area will be considered a safety hazard and survey activities will be stopped until all lightning activity has ceased. Site personnel and equipment will be taken to a safe area. The determination of the presence of lightning can be made by any site personnel, who will then immediately contact the UXOSO. The UXOSO will make the determination as to when geophysical operations are stopped and when they can resume.

Solar Flares

Solar flares are sun-generated atmospheric phenomena, typically occurring in the afternoon. Solar flares may temporarily generate sufficient high-magnitude magnetic noise so as to make magnetometers, often gradiometers, GPS navigation, and occasionally electromagnetic sensors unusable for the duration of the event. Solar flares are typically readily observable by the instrument operators throughout the area as rapidly fluctuating signal readings with no apparent cultural or survey source. The Project Geophysicist will be alert to solar flares and temporarily cease data collection until static testing shows a cessation of the solar activity. The Project Geophysicist will log the time intervals when solar flare activity is observed to help determine whether any data have been affected.

5.13 Overall Site Accessibility and Impediments

The investigation areas are located in open land, and there are no fences, gates, or barricades that restrict access to the property.

5.14 Potential Worker Hazards

No additional hazards are known to be present at the investigation areas. Appendix J of the G1 SAP presents the Site Safety and Health Plan (SSHP), which contains a site-specific hazard analysis.

5.15 Geophysical Investigation Methods

This section summarizes the equipment and methods that will be used to perform the geophysical investigations.

5.15.1 Geophysical Instruments and Selection Criteria

Five geophysical instruments (three digital and two analog), which use two different geophysical methods (TDEM and magnetometry), may be used in the investigation. The three digital geophysical instruments that may be used are the data recording Geonics® EM61-MK2 (0.5-meter [m] by 1-m coils) TDMD, the Geometrics® G-858/822 digital magnetometer, and the Foerster magnetometer; all digital geophysical instruments record data. The two analog instruments that will be used are the Schonstedt® GA-52/Cx magnetic gradiometer and White's All Metals detector, which will be used for "mag and dig" operations, as necessary.

The selection of these geophysical instruments was based on three factors: the site-specific information summarized in the previous sections, the results of the Ordnance Detection and Discrimination Study (ODDS; Parsons 2002), and experience with previous geophysical surveys at the former Fort Ord. The ODDS Receiver Operating Characteristic curves for the various field trial sites indicate that several instruments would be best for the ordnance and conditions anticipated at the Parker Flats MRA Phase II areas. Therefore, the reasons for selecting these five geophysical instruments are as follows:

1. Some of the MEC items that were found in previous investigations at the former Fort Ord were large items that had penetration depths greater than 24 inches. During the ODDS, the EM61-MK2 and G-858/822 were determined to be the best tools in detecting larger items at greater depths. The majority of the MEC recovered from the Parker Flats MRA Phase II were non-penetrating items (Table 5-1); therefore, any remaining MEC items are generally expected to be shallower than 24 inches and potentially easier to detect when using this instrumentation.
2. The anticipated types of MEC do not include any items that are completely nonferrous; therefore, either electromagnetic or magnetic techniques can be used. Electromagnetic

techniques are preferable because they will help detect ordnance that contains nonferrous components (e.g., grenade fuzes and signal illuminations [slap flares]).

3. The EM61-MK2, G-858/822, Foerster, Schonstedt, and White's All Metals detector are durable and rugged enough to be used in the field, and they are commercially available.
4. The Foerster offers superior field ability compared to the G-858/822. Prior to its selection for use at the Parker Flats MRA Phase II, the instrument will have to demonstrate detection characteristics similar to or better than the G-858/822 and be certified through a prove-out process that will include demonstration on a FORA ESCA RP geophysical test plot.

Several models of the EM61 were evaluated during the selection process. The 0.5-m by 1-m EM61-MK2 was determined to have a greater ability to detect the smaller and shallower items than the standard 1-m by 1-m EM61. Furthermore, the results of the ODDS seeded test proved that the 0.5-m by 1-m EM61-MK2 could still detect the larger, deeper items that the handheld EM61 could not detect.

Between the 0.5-m by 1-m EM61-MK2 and the G-858, the 0.5-m by 1-m EM61-MK2 was selected as the primary digital geophysical instrument for the following reasons:

1. It is easier to maintain a constant height above the surface with the 0.5-m by 1-m EM61-MK2 than with the G-858 digital magnetometer.
2. It is easier to attach GPS rovers to the center point of the 0.5-m by 1-m EM61-MK2 than it is to attach them to a G-858.
3. The 0.5-m by 1-m EM61-MK2 is less sensitive to nearby structural interferences (e.g., fences, buildings, and power lines) than the G-858.
4. Data are not affected by survey direction.
5. Data "dropouts" are far less frequent with the 0.5-m by 1-m EM61-MK2 data than with the G-858 data.
6. The 0.5-m by 1-m EM61-MK2 detects both ferrous and nonferrous metal objects.

The 0.5-m by 1-m EM61-MK2 will primarily be used with 2-foot line spacing and with the 1-m edge of the instrument oriented perpendicular to the direction of travel. However, the G-858 may be used where difficult terrain may prohibit the use of a man-towed or all-terrain-vehicle- (ATV-) towed EM61-MK2 unit. Schonstedt GA-52/Cx magnetometers will be used to perform "mag and dig" surveys in areas that cannot be surveyed using the digital techniques. The locations of any MEC items that are located by using this method will be recorded with a GPS (or other survey method if the item is located under vegetation canopy). The Schonstedt GA-52/Cx magnetometers will also be used during analog QC surveys.

5.15.2 Geophysical Investigation Performance Goals

This section describes the performance goals for geophysical work. Data quality objectives (DQOs) are defined in the QAPP presented in Appendix E of this G1 SAP.

5.15.2.1 MEC Detection

The performance goal for Parker Flats MRA Phase II geophysical investigations will be to detect all items in the subsurface that can be detected given the particular instrument and the site-specific conditions (terrain, vegetation, cultural). There will be no "data gaps" between survey lines unless previously mutually agreed upon by the ESCA RP Team and the Regulators or resulting from unmovable obstacles. Section 5.17 addresses the maximum allowable distance between sequential survey lines.

5.15.2.2 Performance Goal Modification

Data gaps will remain in the vicinity of inaccessible areas, such as high-power transmission towers, areas containing buried utilities (active and inactive), power poles, and large-diameter trees. A small data gap may also be created when the instrument is operated on a slope. This may result in the RTK GPS head reporting an incorrect position relative to the true survey instrument position. The DQO for DGM survey spacing will specify allowable deviations from the expected survey spacing and under what conditions they are allowed.

5.15.2.3 False Positives

"False Positives" result when an anomaly is detected at a given location, declared as a significant anomaly to be intrusively investigated or otherwise posted to a "dig sheet," and no basis for the anomaly is found by the UXO team. False positives can be a result of low-threshold selection of anomalies (i.e., conservative anomaly picking), spikes in the data not successfully removed during processing, instrument jolts resulting from terrain, and heterogeneities in the subsurface. False positives are unavoidable and do not affect the data quality in terms of removing MEC items from the subsurface. The performance goal with respect to false positives is to minimize their occurrences while maintaining the same MEC identification rates. The Project Geophysicists will use professional judgment to minimize the possibility that potentially dangerous MEC items are left in the subsurface. In this regard, he or she will tend to err on the conservative side by selecting anomalies having amplitudes close to the range of background "noise," but which have the potential to be associated with MEC.

5.15.2.4 False Negatives

A false negative is defined for this project as a location where a buried metallic item is found, which was within the detection capability of the geophysical survey instrument but the location of which was not selected for intrusive investigation. False negatives can be a result of instrument failure, operator error, or data processing error. The performance goal with respect to false negatives is to have zero occurrences over the course of the project. False negatives are often difficult to identify. Typically, a false negative will be found during the reacquisition phase, where a reacquisition team notices an anomalous response from their equipment at a location that was not previously identified. Other means of finding false negatives include returning to the site and resurveying the area (such as during a QC check), or excavating the area and exposing the soil for visual inspection.

5.15.3 Geophysical Test Plot

The geophysical test plot previously established in the Seaside MRA may be used to show that geophysical instruments are functioning properly. This is appropriate because the types of MEC found in the Parker Flats MRA are consistent with the types found in the Seaside MRA. The ESCA RP Team may also establish a new geophysical test plot in the Parker Flats MRA.

5.15.3.1 Geophysical Test Plot Reporting

Initial test plot results will be discussed between the Project Geophysicist and the QC Geophysicist. A memorandum describing the design and initial results of the test plot will be submitted to the Project Team before geophysical operations are begun. Feedback will be included in the test plot memorandum. The test plot memorandum will include the following:

- As-built drawing of the test plot including depth and orientation of seeded items
- Representative photographs of the seed items
- Color plots of the DGM data
- Target dig lists showing comprehensive results
- Summary of the test plot results

5.15.4 Geophysical Navigation Methods

Two navigational methods will be used for site surveys: GPS and local (fiducial-based) navigation. These methods are described below.

5.15.4.1 Global Positioning System

The GPS consists of 24 DOD satellites that travel approximately 11,000 miles above the earth's surface and complete full orbits twice a day. The satellites broadcast radio wavelengths containing data that are collected by GPS receivers. A computer and the proper software allow GPS receivers to determine extremely accurate positions on earth.

5.15.4.2 Global Positioning Procedures

Real-time kinematic (RTK) GPS will be used for a portion of the geophysical survey to acquire real-time coordinates to geo-reference data points. The RTK base station will be set up each day by the geophysical teams before beginning survey activities (unless a permanent base station provided by the survey subcontractor is available). The setup includes placing a Trimble 5700 (or comparable) GPS base station receiver at the established control point monument and then performing instrument function checks to ensure that radio signal communications have been established. The base station will be operated from an automobile battery for extended power throughout the day. Each rover receiver will then be taken to a

QC positioning location with known coordinates, and the accuracy of the GPS reading will be determined and recorded in the field records.

GPS data will be collected by each GPS rover receiver and will be recorded digitally over the course of each survey. Geophysical data will be collected in data recorders. Positional data will be streamed directly to the geophysical data recorders. The data collected in the data loggers will be downloaded to laptop computers on an "as needed basis" throughout the course of the survey day. At the end of the day, the data will be transferred to the geophysicists for geophysical processing. GPS data will provide accurate data positioning information when combined with the geophysical data. The GPS procedures that will be used are described in the QAPP presented in Appendix E of this G1 SAP under the SOP for Navigation System Setup and Operation of Global Positioning System – Real-Time Kinematic.

5.15.4.3 Line and Fiducial Procedures

For "line and fiducial" DGM surveying (using local grid coordinates), geo-referencing the geophysical data will be accomplished using information recorded on a personal digital assistant (PDA; e.g., start and end of line stations, lane spacing, and fiducial mark intervals) and information digitally recorded in each geophysical survey data file. The geodetic coordinates of the grid corners will be used to geo-reference the geophysical data collected without the GPS (i.e., translation from local grid system to California State Plane Zone IV U.S. survey foot).

5.15.4.4 General Procedures

General procedures for carrying out the geophysical and GPS (if used) surveys are contained in the SOPs presented in the QAPP under Appendix E of this G1 SAP. The SOPs include:

- Navigation System Setup and Operation of Global Positioning System – Real-Time Kinematic
- Operational Use of the EM61-MK2 Single Unit and Operational Use of the EM61-MK2 Towed Array
- Quality Control Procedures and Geophysical Data Processing

The following is a general list of procedures for carrying out the geophysical and GPS (if used) surveys.

1. Set up survey area as necessary using survey tapes and traffic cones for navigational guidance.
2. If not using GPS, set up fiducial markers across survey area at a maximum of 50-foot intervals.
3. Set up the instruments as described in their accompanying manuals.

4. If using GPS, mount the rover antenna centered near the instrument operator using either a fixed mount or backpack. If using a fixed mount, accurately measure the horizontal distance between the center of the GPS rover antenna and the center of the geophysical sensor.
5. Activate the geophysical and GPS rover units.
6. Synchronize instrument clocks (if necessary).
7. If not using GPS, place standard metal item (10-inch metal nail or comparable) within the survey area (e.g., 0,25 and 100,75 foot local coordinates of a grid block) after clearing locations for anomalies with the survey instrument.
8. Perform instrument and QC checks as defined in Section 5.21 of this G1 SAP.
9. Utilize instrument manuals as necessary to set up data recorders for surveys.
10. Perform geophysical surveys as defined in this G1 SAP, ensuring that survey spacing, lag bars, and test spikes are used as described in the QAPP. Follow instrument manual instructions specific to the instruments in use.
11. One member of each geophysical team will be responsible for maintaining the field forms on the PDA. Fill out field forms specified for data collection in this G1 SAP and record the following information in the field forms:
    - Location (Test Area ID)
    - Serial numbers of GPS rover unit (if used) and geophysical instrumentation
    - QC performed
    - Instrument offset times (if GPS used and logged separately from geophysical sensor data)
    - Accurate locations of standard metal stakes
    - Time survey started
    - Time survey completed
    - Names of team members
    - Weather conditions
    - Survey directions
    - Sketch of surveyed area and survey path (include north arrow and approximate scale)
    - Sketch locations of surface features in survey area (i.e., roads, utility poles, sewer covers, etc.)
    - Data collection rate (i.e., 10 samples per second or 1 sample per 0.67 foot)
    - Survey stake identifications (place on sketch)
    - Any instrument peculiarities noted
    - File names
12. End of the day:

- All equipment is returned to storage and the batteries are placed on charge
- The PDA is synced and field form pages are photocopied and placed in the appropriate backup folder or digital field forms are downloaded
- The data files are given to the geophysical data processing center

5.15.4.5 GPS / Geophysical Instrument Synchronization

If the GPS and geophysical instruments are not directly linked, at the start of each day the internal clocks of the geophysical equipment will be synchronized with the GPS system's internal clock. If during the day a difference is noted between the clocks in the geophysical equipment and GPS equipment, then the difference will be recorded on the field forms. Because the clocks in the GPS systems are more accurate than the clocks in the geophysical equipment, during the data processing phase, geophysicists will correct the discrepancy between the time-stamped GPS data and time-stamped geophysical data.

5.15.4.6 Geophysical Mapping Procedures

Geophysicists will use local navigation methodologies or tracking systems such as GPS or ultrasonic positioning systems to record the location of data acquired. Vegetation and terrain conditions will limit the areas where GPS can be used. A combination of positioning systems and local navigation methodologies may be used to successfully complete the geophysical mapping. All navigation data will be translated to NAD 83 California State Plane, Zone IV,U.S. survey foot.

5.15.4.7 Local Navigation Methodology (Line and Fiducial)

Local navigation methodologies include the use of surveyor's tapes (or graduated static ropes), range markers (traffic cones or high visibility tripods), information recorded on the field forms (start and end of line stations, lane spacing, fiducial mark intervals, etc.), and information digitally recorded in each DGM survey data file. The geodetic coordinates of the grid corners are used to geo-reference the geophysical data after the data have been collected. Surveyor's tapes (or graduated static ropes) will be laid out in east-west or north-south directions as the terrain allows. Range markers are then placed along the line to be surveyed and provide the geophysical operator with a navigation aid allowing him or her to traverse the line in linear manner. Fiducial data markers will be inserted manually by the operator at intervals not to exceed 50 feet. In areas of rough terrain or thick vegetation, smaller intervals will be used. These markers will be used to accurately locate each data measurement point during the post-processing stages.

The field forms' recorded information and fiducial marks are used to correct the geophysical data to either compress or expand the recorded measurement locations for each line so that they cover the actual distance traveled. This operation is required to compensate for variations in the terrain along the survey line, which affects the rotation of the instrument's wheels, or to compensate for the walking speed of the operator, depending on the instrument selected. The survey data are then rotated and translated from the local coordinate system in

which they were collected (where the southwestern corner of the grid surveyed was assigned a coordinate of 0E, 0N) to the NAD 83 California State Plane U.S. survey feet coordinate system.

5.15.5 Establishing Geophysical Reference Data Points Using GPS

Semi-permanent first-order coordinate control points will be established in the vicinity. A secondary semi-permanent point may be established in the vicinity of Parker Flats MRA Phase II investigation area that would be used to verify the day-to-day operation of the GPS instruments.

This network of control points will be used for all GPS operations for this project unless other established points are identified and verified for accuracy.

5.15.6 Electromagnetic Surveys

Electromagnetic (EM) surveys will be performed using the two methods that are detailed in the QAPP and associated SOPs presented as Appendix E of this G1 SAP. The SOPs include:

- Operational Use of the EM61-MK2 Single Unit and Operational Use of the EM61-MK2 Towed Array

5.15.6.1 Link GPS and EM61-MK2 Data

The first method of EM61-MK2 data collection will be to link the EM61-MK2 data with the GPS data. A GPS antenna will be attached to the EM61-MK2 directly above the center of the instrument using a tripod. The RTK GPS will be used to collect geo-referenced positions that will be streamed directly into the geophysical instrument data collection system. The manufacturer's specified accuracy for the RTK GPS positioning systems is centimeters.

For a towed-array system utilizing multiple EM61-MK2 units on an ATV, the operator will observe the navigation/satellite data being collected in real time, using Maglog Software on a field computer. The software is programmed with an automatic default that will notify the operator via voice command in the rare event that satellite lock is lost. In this instance, the operator will cease data collection until the system regains the appropriate satellites and positional dilution of precision (PDOP).

GPS data will be collected at 1-second intervals, while EM61-MK2 data points will be collected approximately 10 times per second. With an operator speed of approximately 2.5 mph, this data collection yields a sample interval of approximately one sample per 0.3 foot traveled.

The QC methods that will be used to document navigational and positioning accuracy for the streamed GPS and EM61-MK2 data (to determine the temporal latency effects inherent to the equipment) will either be a "lag" bar or a "clover" survey over a standard spike. The lag bar method consists of placing a 5-foot piece of steel rebar on the ground outside the survey grid,

and passing over it in two passes, at the beginning and end of each day. The data is adjusted until the high amplitude response from each pass associated with the bar lies in a straight line. The clover method consists of passing over a standard spike in a clover-type fashion, and crossing several times over the spike, at both the beginning and end of the day. When the data are processed, the data processor adjusts the data so that all of the high amplitude peaks associated with the spike are in approximately the same location.

5.15.6.2 Local Grid Coordinate System with EM61-MK2

The second method of data collection is to use a local grid coordinate system and collect parallel paths of data through each grid, recording data in an Allegro CX data logger. Typically, this data collection method will be used in survey areas where RTK GPS positioning is unavailable. Data points will be collected at 10 readings per second. All of the surveys will begin in the southwestern corner of an area that will be surveyed; the southwestern corner will be assigned a local coordinate of (0,0). The operator will then begin the data collection process by starting the instrument with the Allegro CX and walking in a straight line toward the northwestern corner (or southeastern corner depending on survey direction) of the survey area. Survey tapes, marked ropes, and traffic cones will be laid down at 25-foot intervals, perpendicular to the direction of travel to help the operator walk in a straight path. Also, as the EM61-MK2 wheels cross the survey tapes or ropes, a fiducial mark will be inserted into the data using a manual marker switch attached to the Allegro CX. These points will be used later to adjust the survey data positioning.

At the opposite edge of the survey area, the operator will stop the data collection process as the EM61-MK2 wheels cross the end line. The operator will then turn around, face the opposite edge of the survey area, move 2 feet east (or north—depending on survey direction) of the centerline of the last lane, input the new direction, start inputting coordinate information into the Allegro CX, and begin surveying a new path. This process will be repeated until the entire grid has been covered. The second geophysical team member will record survey information on a PDA or field form.

When a tree, gully, or other obstruction is encountered, the operator will pause the instrument, insert the position coordinate along the traverse line into the Allegro CX, and restart the survey on the opposite side of the obstruction, inputting the new start location into the Allegro CX. The second geophysical team member will record the approximate obstruction location and the start and stop points of data collection on the field survey form. These data gaps will be logged in the database and investigated using a Schonstedt magnetometer to perform a “mag and dig” operation during intrusive investigations.

Generally, up to five 100-foot by 100-foot grids will be linked for the individual surveys. This reduces the number of times across the site that operators need to stop at line ends and input data into the Allegro CXs.

5.15.6.3 Link GPS and G-858/822 Data

The first method of G-858/822 data collection will be to link the G-858/822 data directly with the GPS data. A GPS rover will be attached to the G-858/822 3 feet behind the sensors, mounted by a polyvinyl chloride (PVC) bracket. The GPS data will be collected at 1-second intervals, whereas G-858/822 data points are collected at 10 times per second (approximately one sample per 0.3 foot traveled). Data positioning for the geophysical points collected between the 1-second intervals of GPS data points will be interpolated by the Geometrics MagMap2000 software. Lag bars or clovers will be used in the same manner as during the EM61/GPS surveys.

To avoid potential interference with data collection, G-858/822 operators will wear as little ferrous material as possible, and they will remove all nonessential metallic objects from their person. The personnel collecting G-858/822 field data will not wear steel-toed and/or steel-shanked boots.

Diurnal corrections will be made to the G-858/822 data using total field data collected with either a Geometrics G-856 or a separate G-858/822. Consideration will be given to setting up the base station magnetometer in areas that are free of cultural interferences. Where traveled roads exist near grids, the base station magnetometer will be set up at least 200 feet from the road. The base station magnetometer will be programmed to record magnetic data once every 20 seconds.

5.15.6.4 Local Grid Coordinate System with G-858/822

This method is the same as the process described in Section 5.15.6.2 for the EM61-MK2 local grid coordinate system survey.

5.16 Personnel Supporting Geophysical Operations

The following personnel will perform geophysical surveys:

1. Project Geophysicist
2. QC Geophysicist
3. Geophysical Team
4. Reacquisition Team
5. Geophysical Data Processing Personnel

5.17 Data Resolution and Data Density

Geophysical Teams will utilize the optimal survey lane widths and sampling rates outlined in the QAPP for each instrument from the ODDS. Any variation from the parameters will be tested on the ODDS plots or in a site-specific test plot to validate that the detection capabilities are equal to or better than those achieved using the ODDS parameters.

While geophysical teams will attempt to collect data at the optimal survey lane width, deviations from these lanes cannot be avoided. For lane widths (line spacing) of 2 feet, the maximum allowable distance between sequential survey lines will be 2.5 feet. For areas that have had 100 percent analog removals completed prior to performing digital geophysical mapping, it is not necessary to collect additional data to fill in data gaps if at least 98 percent of the accessible portion of the grid is within 2 feet of a data point.

The sampling rates and survey speed will be selected to achieve sufficient along-line data density. The total length of all segments along data transects that are more than 0.5 foot from a data point will not exceed 2 percent of the total transect length for a grid-block.

5.18 Geophysical Data Processing and Records Management

Geophysical data collected in the field will be processed and managed by geophysical data processors. Processing procedures vary depending on the technology/instrument selected for use at a particular site. Detailed processing steps will be developed prior to beginning fieldwork. The following subsections summarize the field records management and processing steps performed.

5.18.1 Field Records Management

Paper and digital field records (field data forms, field note copies, PDA) will be maintained in the on-site project office. All records will be filed such that they can be found using the date they were created and the team who created them. Paper field forms will also be scanned for digital delivery. The preferred method of field data form and field notes storage is on PDA.

5.18.2 Field Data Storage

All geophysical data collected in the field will be stored electronically on field laptop computers and PDAs. Data from the surveys will be downloaded from data loggers at regular intervals to ensure that the work performed will not be interrupted by a lack of storage capacity in the loggers.

5.18.3 Processing of Geophysical Data

Processing of the geophysical data involves two steps, the preprocessing phase, and the Geosoft analysis phase. Procedures that will be used for processing geophysical data are detailed in Appendix E of this G1 SAP under the SOP for Quality Control Procedures and Geophysical Data Processing.

During the preprocessing phase, geophysicists compare the data collected to the field notes to verify the geometry of a grid and the location of the surveyed grid corner stakes. In some cases, the geophysicist will use this opportunity to adjust the survey lines to the actual distance traveled. The geophysicists will also review the data at this phase to verify that there are no data gaps in the data set. Additionally, the field notes will be reviewed to determine if

there is any interference such as trees, structures, fences, or metal scrap that might affect the data. Such information will be entered into the project database during this phase.

Any data collected with RTK GPS systems will be checked to ensure that RTK quality was maintained for the entire survey.

Following the preprocessing phase, the Project Geophysicist will conduct analysis of the geophysical data using Geosoft. This software consists of a graphical user interface, a high-volume database, and a cross-section of built-in data import, processing, analysis, visualization, mapping, and integration capabilities. The Geosoft platform allows a processor to edit maps interactively, apply dynamic linking to maps, and track the map creation process. Visual data links are used to connect data in the spreadsheet, profile, and map views. Data processing is achieved through the application of Geosoft executable functions, which control all aspects of the data processing sequence and environment.

During the Geosoft processing phase, non-GPS data will be translated from local grid coordinates into NAD83 California State Plane Zone IV U.S. survey feet coordinates. Data corrections and filtering will then be performed on all of the data as necessary. As discussed previously, filtering and corrections will depend on the type of instrument used for the survey. Some examples of filtering and corrections are:

- Heading corrections (compensating for slight variations in magnetic gradient with direction of travel)
- Time corrections – Latency (compensating for time stamp delays in the data recorders)
- Sensor offset corrections
- Diurnal corrections (adjusting for daily fluctuations in magnetic field)
- Leveling of the data to a common baseline
- Low-pass filtering to reduce high-frequency noise
- Non-linear filtering (removes data spikes and data “drop-outs”)

After all processing steps are completed, raw data and filtered/processed data will be viewed in profile form over top of one another to clearly see the effect the filtering and processing had on the original data. After processing is complete, gridding and contouring of the data will be performed in preparation for anomaly selections.

Database entries will be performed for both preprocessing and for Geosoft analysis; the database provides real-time tracking of all data sets from the raw to final dig sheets. The database details all stages of the processing methodology. This includes such information as the leveling procedure, heading corrections, filters used, dates that the data were inspected by the QC Geophysicist, dates that the data were processed, the data coordinate system, the data file names, and any other information pertinent to the processing of the data file.

5.19 Data Delivery

No later than five workdays after collection, the Project Geophysicist will furnish each day's raw data and, no later than eight workdays after collection, processed data will be transmitted to the QC Geophysicist for inspection. All data will be processed into ASCII file format. Each ASCII file format data field will be separated by a space. Each ASCII file of processed data will contain a header describing the type of data, grids covered in the file, when collected, where collected, data column descriptions, data collection interval, and line spacing for each file. Corrections such as for navigation, instrument bias, and diurnal magnetic shift will be applied, and any additional processing will also be included in the header.

Separate geophysical data files will be provided for grid blocks. The data will be presented in delineated fields as x1, y1, x2, y2, and z where x1 and y1 are in NAD 1983 State Plane Coordinates, California Zone IV, U.S. survey feet and x2 and y2 are the local Cartesian grid coordinates referenced to the southwestern corner of each local grid block (or 0, 0). The z column(s) will be the instrument reading(s) and the number of columns present will be instrumentation-dependent. Local Cartesian coordinates will only be included when the survey navigation method uses local coordinates.

5.20 Methodology for Selecting Target Anomalies

Only trained processors working under the oversight of the Project Geophysicist are responsible for evaluating the geophysical data and preparing "dig lists" with anomaly target "picks." The methodology for selecting anomalies is detailed in Appendix E of this G1 SAP under the SOP for Quality Control Procedures and Geophysical Data Processing.

In order to thoroughly review data during the anomaly target picking process, the geophysical teams utilize the following as ways of viewing the data and making anomaly selections:

- Data tables (raw, processed/filtered)
- Sensor data profiles
- Color contours of sensor responses
- Overlay of data profiles on contour maps

5.21 Instrument Checks

The quality of geophysical data sets is dependent on the operational capabilities of the equipment used. By manufacturer's design, these instruments are calibrated at the time of manufacture and do not require field calibration. To ensure that equipment is fully capable and will perform in accordance with the manufacturer's specifications, geophysical teams will perform daily QC and standardization checks. Following these checks, any equipment that is found unsuitable will be immediately removed from service. These checks will provide QC data indicating the proper functionality of the instruments. The instrument QC and

standardization checks are detailed in Appendix E of this G1 SAP under the SOP for Quality Control Procedures and Geophysical Data Processing.

5.21.1 Positioning Equipment Checks

Positioning equipment will be checked for proper operation by placing the system's GPS antenna over a known point and recording the calculated location. For GPS units using RTK corrections from a dedicated base station, the position repeatability standard will be ± 0.5 foot. A plum bob may be used to line up the antenna receiver over the known survey point. The repeatability standard for real-time code-corrected GPS systems is 3 feet. When code-corrected GPS units are used, the PDOP (a unit-less measure of how good the geometry is between the satellite receiver and the satellites being used to calculate a position) threshold will be set at no more than 5. This PDOP setting will ensure that positions recorded are accurate to within ±3 feet. The positioning equipment checks are detailed in Appendix E of this G1 SAP under the SOP for Quality Control Procedures and Geophysical Data Processing.

5.21.2 Daily Geophysical Quality Control Checks and Standardization Tests

The daily instrument QC checks will involve four tests: a static background test, a static spike test, cable shake test, and a latency test. The daily instrument checks are detailed in Appendix E of this G1 SAP under the SOP for Quality Control Procedures and Geophysical Data Processing.

- Static Background Test – the operator collects data for a period of 3 minutes over a background area. The purpose is to identify any variations in the collected signal. The amplitude should remain constant within +/- 2.5 millivolts (mV) for EM surveys and 3 nanoteslas per feet (nT/ft) for Mag surveys.
- Static Spike Test – the operator collects data for a period of 3 minutes over a spike object (usually a 2-inch pipe or 2-inch trailer ball or other designated object). The purpose is to identify any variations in the collected signal. The amplitude should remain constant within +/- 2.5 mV for EM surveys and 3 nT/ft for Mag surveys.
- Cable Shake Test – will be performed once per day prior to data acquisition. One team member will move the instrument cables to test for shorts and broken pin-outs, shaking the cable starting on one end and proceeding to the other. The second team member will look for data spikes in the instrument response during the cable shake test. If the cable shake test results in instrument responses above the background noise level, the faulty cables or connectors will be replaced prior to data collection. The test will not last longer than 30 seconds. For these tests, the instrument will remain static and the operator will remain outside of the field of the sensor.
- Latency Test – performed at a minimum before and after surveying each block (area) at power up and power down cycles. This test is similar to the QC tests performed at the beginning and end of the day except they are an abbreviated 1 minute test. The operators will identify two marked background areas outside the survey boundaries and perform a one-minute static and static spike test. These two locations will remain in the same

location until the block of grids has been completely surveyed and then the process is repeated before moving to a separate location. Standardization test data will be reviewed immediately following the test by the geophysical team as well as later by the data processors. A QC problem will be indicated by a change of +/- 2.5 mV for EM surveys and 3 nT/ft for Mag surveys on the static object and +/- 20 percent or more of the response when operated over the standard object. If a QC problem is indicated, the Project Geophysicist will immediately be notified and a determination will be made concerning the operability of the instrument. If the cause cannot be determined by the Project Geophysicist in the field, the unit will be removed from the field. If the instrument is found to be malfunctioning, it will be removed from service and replaced or repaired.

5.22 Reacquisition of Anomalies

Using selected anomaly pick lists, reacquisition teams will navigate to the selected anomalies using RTK equipment and mark anomaly excavation points. The reacquisition team will then locate peak responses of the anomaly using survey equipment. If a peak response is not located, the flag will be placed at the navigated location, and the anomaly will be noted as an unsuccessful reacquisition. The procedures for reacquiring anomalies are detailed in the QAPP (Appendix E) under the SOP for Anomaly Reacquisition and Excavation Procedure.

5.23 Dig Sheet Development

The following describes how dig sheets are developed and requirements for ground truth of the pick list. Once a grouping of anomaly targets has been reacquired, dig sheet information will be developed by the geophysical data processors and given in digital form to the SUXOS for transfer to the intrusive investigation teams. All successfully reacquired anomalies and at least 10 percent of unsuccessfully reacquired anomalies will be investigated. The dig sheets will be provided to the reacquisition and UXO Teams in digital format and will contain at a minimum:

- Project Site
- Grid Identification
- Unique Anomaly Identification
- Predicted Anomaly Eastings and Northings in NAD 1983 State Plane Coordinates, California Zone IV, U.S. survey feet
- Maximum Amplitude of Anomaly Signal (where applicable)
- Blank spaces for: Distance and Direction to Contact from Marked Location, Depth to Item, Description of Item, Weight of Item, General Orientation of Item

5.24 Feedback Process (Comparison of Dig Sheet Predictions with Ground Truth)

After dig sheets have been filled out and returned to the SUXOS by the UXO teams, the Project Geophysicist and SUXOS will review the results of the intrusive investigation. An assessment will be made as to whether the item(s) found was sufficient to produce the amplitude or type of anomaly in the data. If it is determined that the item was likely not the entire source of the anomaly, the anomaly will be reinvestigated using the instrument utilized during the initial survey. Anomalies of this type will be tracked separately in the database in the event that future analysis is required.

5.25 Geophysical QC Surveys

After completion of the initial geophysical survey, reacquisition, and excavation of anomalies, geophysical QC surveys will be conducted in all grids where digital geophysical data were collected. These surveys will consist of:

QC-1: Analog verification of anomaly removal at 100% of the anomalies selected for excavation.

QC-2: Digital resurveying of an area greater than or equal to 16% of the DGM investigation areas.

QC-3: Analog resurveying of at least 10% of each 100-ft by 100-ft grid.

QC-1 Digitally Check Excavations

QC of the excavated anomalies will be performed after the intrusive work is completed at the anomaly location. The area within at least a 3-foot radius of each excavated anomaly location will be checked with the original type of survey equipment (i.e., EM61-MK2) to ensure that the anomaly has been satisfactorily investigated.

The maximum amplitude responses in the area will be recorded and checked against the original anomaly amplitudes. If the source of the anomaly does not appear to have been removed, the intrusive operation at that location will be considered as “failed” and the location will require reinvestigation by the UXO team.

The following procedures should be followed when performing the QC-1 post-excavation check:

- Scan the area within at least a 3-foot radius of the flag with a digital geophysical instrument used in the initial survey.
- Monitor the instrument response looking for the anomalies. If an anomaly is located, record the peak response and the distance and direction from the flag on the PDA (even if the anomaly peak is more than 3 feet from the flag). Do not move the flag. If no anomaly is located, record this in the PDA.
- Record pertinent comments about the excavation location in the PDA.

- Remove all flags in the grid except for those with remaining anomalies.

If there are a large number of anomalies in a particular grid (over 100), the Project Geophysicists will have the option to have the entire grid resurveyed, as opposed to checking each anomaly location. This will be done to reduce the amount of time spent on QC of the grid. The QC Geophysicist will compare results of the QC survey with the original survey results to determine whether the sources of the anomalies were removed during the intrusive operations.

Excavation locations with significant anomalies remaining after completion of intrusive activities will be reinvestigated unless the source of the anomaly was intentionally left in place. If the pin flag marking the excavation location cannot be found, the RTK GPS should be used to relocate the excavation location and replace the missing flag. If large numbers of flags are missing, all remaining flags in a grid may be completed before replacing the missing flags. The comment field on the PDA form should be used to note all replaced flags.

QC-2 Geophysical Resurveying

QC surveys will be performed after intrusive operations have been completed. Digital resurveying of an area greater than or equal to 16 percent of each 100-ft by 100-ft grid or partial grid located within DGM investigation areas will be performed. The 16 percent of the total area will be selected by the Project Geophysicist and will be spatially representative of the Parker Flats MRA Phase II investigation area and of the survey methods used (EM61-MK2 and G-858/822). These data will be processed and compared against the original survey data for that area to ensure that all anomalies selected for excavation have been removed. If the data show that there are remaining anomalies, the anomalies will be reacquired and investigated.

A failure will be constituted by the discovery of an UXO or UXO-like item, or five re-acquirable anomalies as a result of the QC survey, sufficient in size to represent a 37-millimeter (mm) projectile or larger military munitions item, or the discovery during the QC process of five non-selected anomalies that should have been selected during the initial survey within a single 100-ft by 100-ft grid. If there is a failure, a root cause analysis will be conducted to determine the cause of the failure. A corrective action applicable to the root cause will be determined and implemented. Depending on the root cause of the failure, additional areas may be re-surveyed. QC-2 issues will be resolved prior to proceeding to the QC-3 Analog Instrument QC Survey.

QC-3 Analog Instrument QC Surveys

At least 10% QC will be performed, using the analog or “mag and flag” instrument determined to be most effective from the ODDS for all grids investigated using DGM. The instrument typically used for this type of QC survey at the former Fort Ord has been the Schonstedt 52/Cx. The discovery of any UXO or UXO-like item sufficient in size to represent a 37-mm projectile or larger military munitions item will constitute a failure of the 100-ft by 100-ft grid or partial grid being investigated. If there is a failure, a root cause analysis will be

conducted to determine the cause of the failure. A corrective action applicable to the root cause will be determined and implemented. Corrective action may include additional QC surveys.

5.26 Seeding Program

Seed items will be used to measure instrument detection capability. Known seed items will be used as a navigation QC check during data processing. Blind seed items will be used by QC and QA personnel to ensure the investigation is meeting the DQOs. The following sections discuss the seeding program.

5.26.1 Known QC Items

QC items will be used during the production geophysical data collection to quantify positional accuracy of each data set. The QC items will consist of 6-inch rebar spikes or equivalent inserted vertically.

The digital anomaly response from the QC item will be identified during data processing and analysis. Each seed item will be reviewed to quantify positional accuracy by measuring the anomaly target location to the actual geo-referenced location of the rebar spike recorded during the grid survey. The measured offset will be logged for each data set in the geophysical processing form spreadsheet. Offset distance between the anomaly target selection and the actual seed location will not exceed the reacquisition metric. One seed item per DGM data set is anticipated as part of the seeding program.

5.26.2 Blind Seed Items

Blind seed items will be placed within areas planned for investigation. The project UXOQCS in consultation with the RPM and Project QA Representative will determine the locations of the seed items.

All seeds will be located using a survey grade GPS or equivalent within DGM grids. The blind seeds will consist of inert MEC items or equivalent buried no greater than the depth interval at which a 100 percent probability of detection was determined for the geophysical instrumentation to be used in that area. The location of the seed items will not be known to the on-site project personnel. QC and QA personnel will review the DGM data against the seed locations. The blind seeds will be detected within the reacquisition metric of the seed survey location.

Blind seed items will also be placed in near-surface investigation area grids as a quality indicator. The UXOQCS will seed the MD items in randomly selected grids. The location of the seed items will be recorded in the QC log based on X/Y position and grid ID. The seed item location will be revisited by the UXOQCS during re-collection surveys in each seeded grid to ensure that the seed item was detected and removed by the UXO Teams.

5.27 Reporting and Maps

The following maps and information, at a minimum, will be included in the G1 RI/FS report:

- Description of work performed and procedures/methods employed to perform the work. This will include target listings generated from digital geophysical interpretations and the results of the intrusive investigations of those targets.
- Color maps representing the data collected.
- Copies of field data and final data.
- Copies of individual target lists and maps/drawings for each grid.
- A summary of QC check results.
- A description of problems encountered and how they were resolved.

5.28 Preparation of Geophysical Maps

Maps prepared by geophysical staff from the data for the geophysical investigations will include color contour maps of the geophysical data, QC color contour maps, and traverse line maps.

The color contour maps allow a complete presentation of the processed geophysical data across the entire area investigated. The QC color contour maps display the same information for areas where the 10 percent QC surveys have been performed with digital equipment. The traverse line maps show the coverage of the geophysical instruments over the area.

The color contour maps of the processed geophysical data will also be divided into smaller grid sets and presented as an 8½- by 11-inch series. This large-scale map series will include both color contour geophysical data and the QC color contour geophysical data. These maps will be provided in digital format only.

6.0 SITE SAFETY AND HEALTH PLAN

The purpose of this SSHP is to establish general guidelines and procedures to ensure protection of ESCA RP Team and subcontractor personnel and the public while performing operations at the former Fort Ord. Appendix J includes the SSHP for the Parker Flats MRA Phase II. The SSHP assigns responsibilities, establishes procedures, and develops contingencies that may arise while operations are performed.

The provisions of this SSHP are mandatory for all on-site activities undertaken by the ESCA RP Team and its subcontractors. All site activities will comply with applicable federal and California requirements. As site conditions change, this plan may need to be modified. Such modifications will be submitted as SSHP addenda and will be numbered sequentially. All SSHP addenda must be reviewed and approved by the Project Health and Safety Officer. All ESCA RP Team personnel and subcontractors must read and understand this SSHP and sign the Plan Acceptance Form prior to the start of work at the site.

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7.0 LOCATION SURVEYS AND MAPPING PLAN

7.1 General

This plan describes the tools and methodologies used for the efficient and accurate completion of surveying, mapping, and GIS operations. The plan is divided into three sections, which are outlined as follows. The first section focuses on surveying and discusses the methodology and equipment to be used and the accuracy requirements to be met to locate and record spatial coordinates. The second section identifies the various hardware, software, data, personnel, and methods required to implement a fully functioning GIS. The final section discusses the necessary equipment, data, and structure for database design and information management.

The Army has requested that FORA provide final MEC and MD finds, geophysical operations, and MEC demolition activity data. FORA and the Army are working together to identify the data needs to be provided in an agreed upon format. Data transfer from FORA to the Army will occur following the release of the associated final report.

7.2 Survey Locations

7.2.1 Control Points

All work on the site is based on established monumentation, satellite-based RTK GPS, and/or post-processing using established base stations of GPS-surveyed coordinates. The coordinate system to be used for control points and other survey activities is NAD 83 California State Plane Zone IV U.S. survey feet. All control points used for base lines meet the standards established by the Federal Geodetic Control Committee (FGCC) for Third Order, Class 1 survey and published in the "Classification, Standards of Accuracy and General Specifications of Geodetic Control Surveys" (September 1984) and "Specifications to Support Classification, Standards of Accuracy, and General Specifications of Geodetic Control Surveys" (1980). All control points recovered and/or established at the site will be stored in the local GIS spatial database in order to be available for mapping applications. Any surveyed coordinates will be recorded and a database of all points will be provided at the completion of the project.

Scanned copies of all field books will be maintained and presented in a final report. As maps are developed based on field data, the maps will be included in generated reports. An example of such a report is the SEDR, which details much of the available map data collected to date (ESCA RP Team 2008).

7.2.1.1 Monument Caps

Any caps developed for new monuments will be stamped in consecutive order. The following is an example of consecutive monument cap identification:

ORD-1-2008 ORD-2-2008 ORD-3-2008

The dies for stamping the numeric and alphabetic figures into the caps shall be 1/8-inch to 3/16-inch in size. All coordinates and elevations shall be depicted to the nearest one-thousandth of a meter (0.001 m) and one-hundredth of a foot (0.01 ft).

7.2.1.2 Mapping

The location, identification, coordinates, and elevations of all control points recovered and/or established at the MRA and the corners of all areas cleared of MEC will be incorporated into the electronic spatial database for use on any relevant site map.

7.2.1.3 Description Card

A Description Card for each established control point, if any, will be provided to FORA and the Army. The Description Cards include the following information:

- A north arrow
- A sketch of each monument with its location relative to reference marks, buildings, roads, railroads, towers, etc.
- A detailed, typed description telling how to locate the monument from an easily identifiable point
- A sketch showing how to locate the monument
- The monument's name or number
- The final adjusted coordinates and elevations in meters (to the closest 0.001 m) and feet (to the closest 0.01 ft)

The Description Cards are 5 by 8 inches and describe one monument per card. If any damaged monuments are found, they will be clearly identified and reported to FORA and the Army.

7.2.2 MRS Boundaries

Boundaries for MRSs on former Fort Ord have been previously identified and placed into digital format. Before RI activities begin in the Parker Flats MRA Phase II, the boundary of the area will be loaded into RTK-GPS receivers, which will then be used to survey and stake the boundary. In areas where terrain or vegetation precludes the use of RTK-GPS, standard surveying methods will be used. This boundary will serve as the limit of RI.

7.2.3 Operating Grids

A grid system, referred to as the Former Fort Ord Master Grid System, has been established for the Fort Ord Military Munitions Response Program (MMRP). These grids measure 100

feet by 100 feet. An example of this grid layout as applied to the Parker Flats MRA Phase II is shown in a series of maps presented in Appendix A. Corner points for these grids will be loaded into RTK-GPS receivers for identification in the field. In areas where terrain or vegetation precludes the use of RTK GPS, standard surveying methods will be used.

7.2.4 MEC Items Encountered

Spatial location of MEC items encountered will be surveyed in one of two ways. The first method employs GPS technology to mark the location of the MEC item, where deemed appropriate based on vegetation cover, terrain, and other factors. The second method is the standard MEC item location method, using x and y distances from the southwestern corner of the search grid.

7.2.5 Other Items as Required

Throughout the course of the project, it is anticipated that the location of other items or features, such as roads, firebreaks, fences, power lines, etc., will need to be determined. The location of these items will be acquired with RTK-GPS technology where possible, and with standard surveying procedures where terrain and/or vegetation preclude such acquisition. In the event of MEC removal activities along firebreaks or roads, clearance grids will be designed and located using the above-mentioned survey methods.

Lower accuracy GPS methods, including systems that have sub-meter accuracy (with decimeter accuracy after post-processing), will also be used as appropriate. Instances where these systems will be used include performing biological field surveys.

7.2.6 Safety

UXO technicians serving as safety escorts will accompany all survey, mapping crews, or other field personnel. The escorts will perform visual surface surveys (conducted en route) and magnetometer surveys at the location of any new monuments or markers. No excavation of any kind will be initiated until the area has been verified as safe by the UXO technician. Additional information on safety is provided in Section 6 of this G1 SAP.

7.2.7 Equipment

Equipment used in surveying activities on the project will include, but not be limited to, RTK-GPS base station and rover(s), mapping grade GPS rovers, and total station surveys. In most cases, the survey equipment to be used will be RTK GPS.

7.2.8 Accuracy

Survey accuracy will be dependent upon the equipment and methods used for a specific survey. The RTK-GPS technology can achieve sub-centimeter accuracy. Mapping grade

GPS, with differential correction, can achieve sub-meter accuracy. Total station surveys can also achieve sub-centimeter accuracy.

7.2.9 Quality Control

The GIS Manager will be responsible for QC and validation of the survey data. Survey data received from the field will be checked against existing surveys for accuracy and completeness. The data will also be checked to ensure that labeling is correct and follows the project standard set for the features surveyed. All survey data (excluding geophysical data collection) will be stored in a geospatial database with proper data validation metadata.

7.3 Graphical Information System

7.3.1 GIS Hardware

The GIS hardware for the project will consist of the following:

- Server
- GIS workstations
- Large-format color inkjet plotter

All of the GIS data, map files, metadata, and user manuals will be stored on the main server, with a tape backup system and an uninterruptible power supply (UPS) to ensure maximum data integrity. The GIS workstation will be a high-end computer with a large monitor. The inkjet plotter will be capable of high-speed plotting of E size (34 inch by 44 inch) maps.

7.3.2 Software

The following software will be used specifically for the project GIS:

- ESRI ArcView TM (with appropriate extensions)
- ESRI ArclnfoTM (with appropriate extensions)
- Trimble GPS data processing software

Maps generated for the project will be created and stored in version 9 of ArcView™. Vector GIS data will be created, modified, and analyzed using ArcView™ and its extensions and ArcInfo™. Raster GIS data processing will be performed using ArcView™. GPS data will be post-processed using Trimble software.

7.3.3 File Formats and Requirements

GIS vector data for the project will be stored in a geodatabase. Additional data will be stored in SQL Server 2005. Raster files such as orthophotography and geophysical color maps will

be stored as TIFF (.tif) files with .tfw world files defining the geospatial location and resolution of the image.

7.3.4 Metadata Requirements

Metadata for each coverage and shape file is generated using the metadata generator in the ArcInfo™ ArcCatalog module. This software creates an .xml file, which will be available for viewing in ArcCatalog or in any web browser. FGDC metadata will be maintained for all final GIS data files and will be included with the data when it is distributed. Additional metadata will be developed as an additional report describing each of the spatial tables in the geospatial database that is received from the Army and any new data developed as part of the investigation.

7.3.5 GIS Data Directory Structure

The GIS data directory structure will generally follow the directory tree depicted below:

- .../Fort_Ord/GIS
  - GIS Project (location of ArcView .apr and Arclnfo .mxd map files)
  - Graphics (location of logos, raster images, and plot files)
  - Coverage (location of all final vector GIS data files)
  - Working Files (location of vector GIS data files that are not finalized)

The directory structure under Coverage is based on the USACE Spatial Data Standards (SDS).

7.3.6 Data Distribution

Updates made to the primary coverages and shape files will be provided to FORA and the Army as requested. Additionally, updates to these files received from the Army will be incorporated into the project GIS upon receipt. Data transfer between the ESCA RP Team and the Army will be accomplished electronically, with the method dependent upon the size and format of the data.

7.3.7 General Map Requirements

Maps will be created in a variety of sizes (e.g., 8.5 x 11 inches, 11 x 17, 22 x 34, 34 x 44, 36 x 36) depending upon the cartographic requirements to present the chosen data. Each sheet/set will have a size/type standard border, revision block, title block, complete index sheet layout (if set), scale bar, legend, north arrow, date, and path and name of the map document (.apr or .mxd). This variety of sizes and layouts will be used to best present and describe the data and/or analysis included.

7.3.8 Documentation

The project GIS documentation will consist of two documents. The first document is a GIS Users Manual. This manual will be designed to provide new users with appropriate, detailed information to enable them to quickly and easily use the project GIS. The second document is a list containing pertinent information about map documents such as date of creation, map title, author, etc. This will enable subsequent users to identify and print the appropriate map when a map request is received.

7.3.8.1 GIS Users Manual

The GIS Users Manual includes the GIS directory structure, SOPs, programming scripts and code, and pointers to reference material. It shows examples of how GIS tasks are completed. Additionally, there is a section addressing solutions to common problems that have been solved by the GIS staff.

7.3.8.2 GIS Project Tracking

GIS projects (e.g., .apr and .mxd files) used for maps will be tracked in a list. The name of the project file, requestor, creator, date of creation, most recent date of modification, and map content will be tracked. This will facilitate the modification and update of maps at a later date, possibly by other users.

7.3.9 Staffing

The project GIS staff will consist of a GIS Manager and GIS analyst(s). The number of analysts required by the project may vary with workload, with a minimum of one analyst on staff and on-site at all times. Auxiliary GIS Analysts will be available at LFR's Emeryville and Santa Maria offices.

7.3.9.1 GIS Manager

The GIS Manager (also the Database Manager) is responsible for high-level management of the overall GIS and database program. A person with a broad knowledge of GIS applications, capabilities, and overall system requirements fills this position. Specific duties include the day-to-day management responsibilities of GIS projects, staff, and budget. The GIS Manager coordinates project GIS needs with the Project Manager (PM), RPM, Geophysicists, and other project staff as necessary. The GIS Manager will coordinate with the Army and other USACE personnel, as necessary. The GIS/Database Manager provides high-level oversight of the development of the database structure and applications.

7.3.9.1 GIS Analyst

The GIS Analyst performs the day-to-day GIS tasks for the project. The analyst position is filled by a person with specific hands-on experience using the project GIS software. Duties

include creating and modifying GIS data layers; creating maps for field use, presentations, and final reports; and integrating the MMRP database with the GIS.

7.3.10 Quality Control

Procedures for QC of GIS data will be implemented. The GIS Manager will oversee spatial accuracy of new GIS data, which will be checked against known locations using existing survey data and/or digital orthophotography. Additionally, a comparison of the ArcCatalog metadata and the GIS data file will be made to ensure that the metadata are correct.

7.4 Database Management

7.4.1 Hardware

Database management hardware consists of the following:

- Server
- Workstations

The database and related files are stored on the server and are related to the GIS data files. As discussed in the GIS section, the server will have a tape backup system and a UPS. The operating system of the server will be Windows 2003™, which provides a high level of security for the database. Database management will be accomplished on workstations having adequate RAM and processor speeds to handle the database tasks.

7.4.2 Software

The following software will be used for database management:

- MicrosoftTM SQL Server 2005
- MicrosoftTM Office Professional 2003 (including Microsoft Access)
- MicrosoftTM Visual Basic
- MicrosoftTM InterDev
- Crystal Reports

7.4.3 Structure and Design

The structure and design of the database will be accomplished in coordination with Army personnel, if necessary. The database will have two main components, MMRP and Geophysical, which are detailed below.

7.4.3.1 MMRP Database

The MMRP database will provide a common repository for data collected from removal efforts. The MMRP database will be maintained on a computer system that provides for control over data access. This database shall be used to catalogue removal actions in an organized manner so that reporting and querying will be possible. The database will be updated periodically with information gathered during this project as coordinated with the Army.

7.4.3.2 Geophysical Database

The information management team will design a geophysical database for tracking fieldwork and reporting data. This will be designed in cooperation with the Project Geophysicist to meet overall program and site-specific geophysical objectives such as reporting geophysical team information, anomaly picks, dig sheet production, geophysical file index, and project analysis. The database will be designed with forms for categories such as geophysical processing data. Reports and analysis will be created with queries that allow users to access and analyze data from multiple tables and multiple records.

7.4.4 Data Capture Methods

The ESCA RP Team will capture field data digitally with hand-held computers. These units will be capable of downloading the data to the appropriate database with minimum user assistance. This method of data capture will greatly reduce the number of potential errors that normally occur during the transcription and data entry process. This method will also reduce the time between data capture in the field and inclusion in the database.

7.4.5 Data Distribution

Updates made to the database will be provided to the Army as requested. As with the GIS updates, data transfer between the ESCA RP Team, FORA, and the Army will be accomplished electronically, with the method dependent upon the size and format of the data.

7.4.6 Staffing

Primary staffing of database activities will consist of the Database Manager, who also manages the GIS system. Data will be entered into the system by various personnel who work on the project.

The Database Manager will oversee and coordinate database activities on the project. The Database Manager will have significant database experience and will perform routine database functions such as user management, table creation and modification, query development, form creation, and report design. The Database Manager will oversee all database modification activities.

7.4.7 Database User Administration

The Database Manager will be responsible for the administration of database user accounts. Each user will be given the appropriate level of permissions within the database such that only authorized personnel can make changes to database values. Read-only permissions will be assigned to users who need to review the data, but who are not authorized to make changes.

7.4.8 Database Backup Routines

Database backup routines will be established. These routines will be set up for daily and weekly backups. These backups will be used to restore data to the database in the event of database corruption or other events requiring restoration of the data. The Database Manager will be responsible for these backups. A log of database backups will be generated and maintained.

7.4.9 Database Users Manual

The database user's manual includes database SOPs, programming scripts and code, and pointers to reference material. It contains a diagram of the database schema and descriptions of each of the tables and columns. Copies of standard forms, reports, queries, and views are included in this manual. The manual also contains instructions for administration, maintenance, and backup of the database. Additionally, there is a section addressing solutions to common problems that have been solved by the database staff.

7.4.10 Digital Image Catalog

A digital image catalog will be created, which will contain information about digital images acquired in the course of the project. These images include photographs taken to document fieldwork activities, wildlife sightings, MEC items, and other events or items of interest. The image catalog documents the image name, date taken, subject matter, site or location, direction, photographer, and miscellaneous comments. The purpose of this catalog is to easily identify digital images that could potentially be used by the ESCA RP Team in documents or presentations. The digital image catalog will be updated on a regular basis.

7.4.11 Quality Control

QC of data will be performed in all data acquisition, data processing, data analysis, and data reporting stages. The Database Manager will be fully responsible for performing and documenting database QC. It should be noted that these are the fundamental QC steps for information management, and that individual project sites and scopes may specify additional QC requirements.

The ESCA RP Team will perform QC of the data and will include checks and reviews of the digital data deliverables. Specific checks will include data completeness, quality, and format

checks, which will be entered in the database QC log. QC checks will be applied to each step of data processing, from data entry on. Overall, these QC checks will help ensure that all grid surveys and their included grids are entered properly, headers are attached to data files, and scanned field forms are included with their corresponding data files. If at any point during this process the data are found to be deficient, the ESCA RP Team will take corrective actions regarding the data in question. Automated checking procedures and other timesaving/quality assuring measures may be developed throughout the course of this program.

8.0 COST MANAGEMENT PLAN

Cost management and reporting will be conducted in accordance with the ESCA grant requirements and the Remediation Services Agreement between FORA and the ESCA RP Team.

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9.0 PROPERTY MANAGEMENT PLAN

Government property is not anticipated to be utilized during this project.

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10.0 SAMPLING AND ANALYSIS PLAN

This document in its entirety constitutes the SAP for this G1 RI. The sampling and analysis procedures as applicable to building demolition and removal are provided in Appendix C. The sampling and analysis procedures as applicable to disposal of investigation-derived wastes are provided in Section 13 of this G1 SAP.

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11.0 QUALITY CONTROL PLAN

11.1 Introduction

The QCP as presented in this section establishes and describes the quality requirements for the contractor services contract for the FORA ESCA RP. The QCP applies to all work performed by the ESCA RP Team and their subcontractors. Site-specific additions to this QCP are included in Section 5 of this G1 SAP.

LFR and WESTON have each assigned a Quality Control Manager (QCM) to the project. The QCMs will ensure that this QCP provides an independent capability to ensure and verify that the quality objectives comply with prescribed criteria through surveillance, audits, and various document reviews.

Above all, project quality is the responsibility of the entire ESCA RP Team. The team's comprehension of and adherence to this QCP is of primary significance for quality objectives to be accomplished; thus, training and indoctrination of the key personnel in the quality objectives will be conducted. The authorities and responsibilities of the key personnel are provided in Section 11.2.2 of this QCP. All UXOQC personnel reporting directly to the UXO QC Manager have the authority to identify deficiencies and propose and approve solutions. All UXOQC personnel have stop-work authority for all QC issues.

The organization structure ensures that quality is achieved and maintained by those personnel responsible for performing the work and that verification of quality is performed by personnel other than those who performed the work.

The original issue and the subsequent revisions to the QCP require approval of the LFR PM and the RPM. The adequacy and effective implementation of this program will be assessed semiannually by a management assessment team appointed by the PM and RPM.

11.2 Organization

11.2.1 General

Organizational responsibilities of FORA ESCA RP personnel are described in this section. An organization chart defining the lines of authority and responsibilities is provided on Figure 2-8.

11.2.2 Authority and Responsibility

The program organization is headed by the PM who is the single focal point for successful accomplishment of all phases and aspects of the FORA ESCA RP. The PM approves the QCP, implements procedures, and has direct responsibility for day-to-day operations of the

program. The MEC and geophysical aspects of the program are headed by the RPM. The PM and RPM responsibilities related to QC include, but are not limited to:

- Implementation of all applicable policies and procedures;
- Timely submission of all reporting requirements as outlined in this G1 SAP; and
- Analyzing QC failures with the QCM and field managers and ensuring that corrective actions have been appropriately implemented.

For purposes of this G1 SAP, the QCMs will report to the LFR and WESTON Corporate QA representatives, and will interact with the PM and the RPM, respectively. The QCMs, as management representatives, have the following authorities and responsibilities:

- Ensuring that the QCP has been established, maintained, and implemented for the FORA ESCA RP;
- Establishing guidelines to assist in the development of program, project, site, and task specific QC policies and procedures;
- Initiating, recommending, approving, or providing solutions to the quality problems identified in QCP during system audits;
- Conducting periodic audits/inspections of the projects and sites and submitting reports to the Corporate QA Manager with copies to the PM or RPM, as appropriate; and
- Reporting the adequacy, status, and effectiveness of ongoing projects to the Corporate QA Manager.

All UXOQC personnel report to the WESTON QCM and WESTON UXO QC Manager on quality matters. On-site QC personnel have the responsibility for overall quality of work performed on-site. Responsibilities include, but are not limited to:

- Developing QC procedures to implement the QC Plan;
- Verifying implementation of corrective actions;
- Initiating actions to identify and prevent the occurrence of nonconformance relating to the services and QCP;
- Authority to stop nonconforming work;
- Periodically coordinating with EPA and DTSC QA representatives;
- Coordinating with the QCM to ensure that QC procedures are being followed and are appropriate in demonstrating data validity sufficient to meet DQOs;
- Recommending to the QCM the actions to be taken in the event of QC failures;
- Reporting noncompliance with QC criteria to the RPM and QCM;
- Any UXOQC person has the authority to suspend project activities when a condition adverse to quality is identified. The RPM and senior personnel responsible for clearance activities will be notified when such action is required;

- Conducting inspections of the MEC database;
- Preparing and submitting a daily QC report for Senior UXO Technical Manager review and record (this report is submitted by close of business the following day); and
- Conducting daily QC audits/inspection.

The QC Geophysicist reports to the QCM and is responsible for the quality of geophysical data. Responsibilities include, but are not limited to:

- Reviewing and implementing the geophysical portion of the project QCP;
- Performing checks and reviews of all raw and processed digital data;
- Performing periodic audits of geophysical teams;
- Conducting inspections of digital geophysical database;
- Monitoring transfer of raw and processed geophysical data deliverables;
- Monitoring geophysical prove-out tests and results;
- Managing geophysical data;
- Recommending actions to be taken in the event of geophysical data QC nonconformance;
- Authority to initiate, recommend, and provide solutions to quality problems; and
- Authority to recommend suspension of project activities when a condition adverse to quality is identified.

Additionally, UXOQC personnel are responsible for the following:

- Daily auditing of MEC and geophysical databases, and
- Reviewing procedures and personnel qualifications.

11.2.3 Personnel Selection, Indoctrination, and Training

Key personnel designated by the PM and RPM and those requiring licenses, certification, or other forms of qualifications necessary to perform their work will be selected and evaluated periodically or on each change of task assignment by program management. This evaluation process is to ensure that credentials are current to perform the pre-established job description.

Project personnel performing functions that affect quality will receive, prior to assuming duty, indoctrination and training conducted in accordance with Section 11.11 of the QCP.

The job description, indoctrination, training, and certification will be maintained in the project files in accordance with Section 11.11 of the QCP.

11.2.4 Evaluation of QCP Implementation

LFR and WESTON Corporate QA representatives have the authority and responsibility to verify that the QCP has been implemented on the FORA ESCA RP. The LFR and WESTON Corporate QA representative will perform a scheduled, semiannual audit of the program activities and periodic surveillance in the manner described in Section 11.10 of the QCP. The results of these audits and surveillances are reported to the PM, RPM, and the LFR and WESTON QCMs, to provide a formal assessment of the QC program implementation.

11.3 Quality Program

11.3.1 Preparation, Review, and Acceptance of QCP

The QCP is prepared by the QCM and is reviewed and approved by the PM and RPM. After completion of the management review, the QCP will be submitted to FORA and the regulatory agencies for review and acceptance before any operational activity is started. Revisions to the QCP will be reviewed and approved in the same manner as the original issue.

11.3.2 Preparation, Review, and Approval of Project Procedures

The project procedures will be reviewed by the QCM, relevant individuals and departments, and the PM and RPM, and will be approved by the PM. Periodic changes to the procedures can be issued as field variance forms (FVFs). The FVF changes will be incorporated into the operating procedures. Each relevant supervisor/manager receiving the FVF will review the requirements with his/her staff on a weekly basis. At each update of the procedure manual, the PM or RPM will initiate a training program to indoctrinate the FORA ESCA RP staff to the requirements of the procedure update. The structure of project procedures is shown in Table 11-1.

11.3.3 Control of QCP and Project Procedures

Controlled copies of the QCP and the project procedures will be distributed to key project personnel.

11.3.4 Geophysical Survey QC

Geophysical Survey QC is an appropriate evaluation performed by WESTON for contractually defined products to assure that those products fully meet the prescribed requirements and comply with applicable laws, regulations, and sound technical practices.

The QC Geophysicist will be fully responsible for overseeing and documenting all QC performed with respect to the DGM surveys.

The basic QC steps for all digital and analog geophysical survey work on the FORA ESCA RP, along with the parties responsible for performing the QC, are presented in Table 11-2. Section 5 and the QAPP (Appendix E) of this G1 SAP contain detailed information regarding QC of geophysical survey work.

QC of the field data will be performed by WESTON before it is delivered to LFR, FORA, regulatory agencies, or any other stakeholder, and will include checks and reviews of the digital data deliverable. Specific checks will include data completeness, quality, and format checks. WESTON will confirm that the data have been reviewed by WESTON personnel. Data that have not undergone QC checks will not be delivered to any stakeholder unless by mutual agreement.

If at any point during this process the data are found to be deficient, WESTON will take corrective action regarding the data in question.

Geophysical instrumentation utilized for QC of geophysical surveys will be similar in detection/discrimination ability to that used for the main data acquisition. Thus, if an EM61-MK2 is used in the main survey, an EM61-MK2 will be used for QC.

11.3.4.1 Geophysical Definable Work Elements and Measurement Metrics

To support project DQOs, individual measurement quality objectives (MQOs) will be implemented to document that the procedures and acquired data can achieve the performance goals. MQOs include the implementation of a geophysical test plot (GTP), instrument standardization protocols, and set data collection parameters with pass/fail metrics to monitor and evaluate the geophysical results. MQOs needed to achieve the required DQOs are listed below. QC measurement metrics will be verified during the GTP prior to further data collection.

- Equipment Warm-Up: Geophysical sensors will be allowed to warm up for a minimum of 5 minutes prior to data collection. Noise levels will be monitored after the 5-minute warm-up period to confirm the sensor has stabilized and is ready for use. Warm-up procedures will be performed after each time the sensor or instrument is shut down and restarted.
- Background Noise: An MQO for background noise will be established based on site-specific and deployment-system-specific performance demonstrated during the GTP. Data which has been determined to be anomaly free will be windowed and statistically evaluated by calculating the mean and standard deviation. It is anticipated that the MQO for the TDEM instruments will be +/- 2 mV and +/- 2.5 nT for magnetic instruments. Also includes static background and static response tests.
- Mean Speed: Maintain mean speed < 3 miles per hour (mph). The speed will be evaluated based on sensor orientation and bounce in terms of the amount of noise introduced into the data and along line sample spacing. The speed will be tested for the proper data density along track.
- Along Track Sampling: < 0.5 foot between data points.

- Across Track Sampling: The across track line spacing shall not exceed 3 feet, excluding data gaps due to trees or other obstacles that preclude the survey platform from providing complete coverage. This metric is intended to control data gaps associated with inconsistent track plots that are not associated with trees or other obstructions. To achieve this MQO, the surveys will be run at a 2.5-foot spacing; 95% of the data within a dataset must achieve 2.5 feet; and 5% of the data may be between 2.5 feet and 3.0 feet to account for rough terrain.
- Latency Correction: No visible chevron effects in the data or color plots. The use of appropriate color scaling will be maintained throughout the project.
- Data Leveling: Consistent parameters and processing methods will be used for all channels within each dataset. Consistent processing routines will be used for all datasets throughout the project.
- Anomaly Selection: All anomalies meeting the anomaly picking criteria will be selected. This will be verified by the Project Geophysicist. The anomaly selection process for each dataset will be verified.
- Positioning Delta: The delta will not exceed +/- 2 feet. This MQO is specific to the reported positions of the state-plane coordinates for each data point in the final version of the geophysical data. The interpreted and actual locations of items will be reviewed on the dig list.
- Known Location QC Items: Ground flush rebar hubs will be established at grid corner locations for use as known location items. All known QC locations must be detected to within 20 cm of their known locations.
- Reacquisition: Reacquisition of target anomalies must be successful to within 20 cm of their interpreted location. Additionally, 95% of all anomalies must lie within a 1-meter radius of their original surface location as marked on the dig sheet.
- False Positives: False positives will be kept to a minimum. This will be achieved by careful data collection activities (i.e., stable, fluid motion) and thorough data processing techniques. 100% of false positives (No Contacts) must be resolved by the geophysicist. False positives will be identified in the dig list.

The specific design procedures related to these QC MQOs are discussed in detail in the QAPP present as Appendix E of this G1 SAP.

11.3.5 Geophysical Survey Quality Assurance

QA is an appropriate management review by a WESTON Senior Geophysicist of the overall effectiveness of the QC program, processes, and compliance. The QA procedures are the process by which WESTON fulfills its responsibility to be certain that QC is functioning and that the desired specific product (job result) is realized.

FORA will provide independent QA of RI processes and products with the intent of verifying the quality of RI work performed by WESTON. The FORA QASP will be updated to include proposed actions for the Parker Flats MRA (FORA 2008). The QASP will be provided to the

regulatory agencies for review and approval prior to initiation of MEC RI activities related to the G1 SAP.

11.4 Document Control

11.4.1 General

A Document Control Log will be maintained for all the documents listed in Table 11-3.

11.4.2 Document Distribution and Retrieval

The most current revisions of documents that prescribe technical, management, and quality requirements are internally and externally distributed to personnel identified in the procedures. These personnel are responsible for the document's implementation and verification of its implementation.

The obsolete documents that prescribe obsolete technical and quality requirements will be clearly marked as obsolete and returned to the FORA ESCA RP Document Control Log upon receipt of any revised document. The recipient must also immediately conduct a page change for all affected documents by inserting the revised document in place of the obsolete one.

The FORA ESCA RP Document Control Log must track all changes and ensure that all obsolete documents have been received from the appropriate personnel. Additionally, UXOQC will conduct random surveillance of documents in the field and for field office use to validate that the most current documents are in place and being implemented.

11.4.3 Field Records Management

Records (field data forms, field note copies, and PDA files) will be maintained in the on-site project office. All records will be stored such that they can be found using the date they were created, the team that created them, and a grid identification number. Field forms used prior to the implementation of the PDA system will also be scanned for digital delivery.

11.4.4 Field Data Storage

Electronic data collected in the field will be stored in PDAs and synchronized daily. Data from the geophysical surveys will be downloaded from data loggers at regular intervals to ensure that the work performed will not be interrupted by a lack of storage capacity in the loggers.

Section 5 of this G1 SAP contains more details on Data Management QC.

11.5 Inspection and Test Control

The Inspection and Test Control Plan (I & T Plan) is integrated into this G1 SAP as described in the following subsections.

11.5.1 Inspection and Test Plan

The I & T Plan will be developed for each definable feature of work (e.g., mapping, geophysical investigation, explosives siting, etc.) to be performed. The ESCA RP Team will not release for use any item or system until all of the activities specified in the I & T Plan have been satisfactorily completed and the associated documentation has been completed.

The I & T Plan will include a list of items and the frequency and type of inspections and tests to be performed. Where an item or activity fails to pass any inspection or test, it will be identified as a nonconforming item (Section 11.7 of this G1 SAP) and corrective actions will be taken. The I & T Plan will identify all inspections and tests necessary to assure compliance with the design document requirements. The four phases of inspection are as follows:

1. **Preparatory:** includes activities performed prior to beginning the work on each definable feature of work. Workers are brought together and the procedures that will be used to accomplish a feature of work are reviewed along with the associated quality and safety standards.
2. **Initial:** includes activities performed at the beginning of each definable feature of work. Initial work products are reviewed to ensure compliance with the phase's quality requirements.
3. **Follow-up:** Includes daily checks to ensure continuing compliance with contract and regulatory requirements.
4. **Final:** Includes a QA test.

11.5.2 Final Inspection and Tests

QC personnel will ensure that all final inspection and tests have been conducted in accordance with the I & T Plan. Product(s) will not be released for service prior to completion of all activities specified in the I & T Plan and before the associated documentation is available and authorized. If an unverified product must be released for immediate use prior to acceptance, the product will be identified in a place where it can be recalled and replaced in the event a nonconformance is identified. If a nonconforming product is uncovered, it will be controlled in a manner specified in Section 11.7 of the QCP.

11.5.3 Records

QC personnel will document results of inspections and tests to include the following information:

- identity of the item or activity
- date of inspection
- identification of measuring and testing equipment used
- acceptance criteria
- results and indication of acceptability
- identity of the Quality Inspector

The I & T records providing evidence that the work has been inspected and/or tested will be maintained as a QC record in a manner specified in Section 11.7 and 11.10 of the QCP.

11.5.4 Equipment Maintenance and Tests

The ESCA RP Team or their subcontractors will perform the activities listed in Section 2.0 of this G1 SAP. The processes and activities are controlled in accordance with the noted reference documents in this G1 SAP.

Preparatory inspection of the investigation areas is performed to determine the presence of environmentally sensitive areas, degree and type of vegetation cover, MEC and scrap contamination, the best geophysical instrument to be used and where, construction support, and restoration requirements.

11.6 Measuring and Test Equipment

11.6.1 Control of Measuring and Test Equipment

A procedure will be implemented to control, calibrate, and maintain measuring and test equipment (M&TE; including test software) used to indicate or record critical parameters or to demonstrate compliance with specified permits and requirements. The procedures will implement the following requirements:

- M&TE will be used in a manner that ensures that the measurement uncertainty is known and is consistent with the required measurement capability.
- M&TE will be selected to provide the proper range and accuracy for its intended use. The participant will identify and document precision and accuracy tolerances.
- Calibration checks will be conducted and records will be maintained to ensure that the M&TE remains accurate for its intended purposes.

11.6.2 Equipment Control

The procedure will identify the following requirements to control equipment in use:

- Determine the measurements to be made and the precision and accuracy required.

- Identify and document all M&TE to be included in the controlled inventory.
- Calibrate each item at prescribed intervals, or prior to use, using certified equipment having a known relationship to nationally recognized standards. Where no such standards exist, the basis for calibration will be documented.
- Define the process used for the calibration of M&TE, including equipment type, unique identification, location, frequency of checks, and the calibration method to include individual components and system (loop) checks, acceptance criteria, and actions to be taken if results are determined to be unsatisfactory.
- Identify M&TE with a label or identification record to show the calibration status.
- Maintain calibration records for M&TE.
- Assess and document the validity of previous test results or plant operation history when M&TE is found to be out of calibration by a prescribed and approved percentage.
- Ensure that environmental conditions are suitable for the calibrations, measurements, and tests being performed.
- Ensure that the handling and storage of M&TE are performed in accordance with equipment specifications to maintain the accuracy and usefulness of the M&TE
- Safeguard M&TE from adjustments that could invalidate the calibration setting.
- Provide for regulatory agencies or their representatives to verify that M&TE is functionally adequate.

11.6.3 Instrument Calibration

The quality of geophysical data sets is dependent on the operational capabilities of the equipment used. By manufacturer's design, these instruments are calibrated at the time of manufacture and do not require field calibration. To ensure that equipment is fully capable and will perform in accordance with the manufacturer's specifications, pre-operational and post-operational checks will be performed. Following these checks, any equipment that is found unsuitable will immediately be removed from service. These checks will provide QC data indicating the proper functionality of the instruments.

Detailed information regarding instrument calibration is included in Section 5 and the QAPP in Appendix E of this G1 SAP.

11.6.4 UXOQC Geophysical Inspections/Surveys

An inspection/survey is an activity that involves measuring, examining, testing, or gauging one or more characteristics of an entity and comparing the results with specified requirements in order to establish whether conformance is achieved for each characteristic. QC geophysical inspections/surveys will be performed with the instrument type that was used initially for the activity being geophysically inspected/surveyed.

Individual sections of this G1 SAP contain specific information regarding final acceptance, sampling inspection acceptance criteria, the inspection process, and the requirements for maintenance of inspection records. MEC removal operations that fail final acceptance will be controlled as a nonconforming condition as described in Section 11.7. Grids and data/database information that fail final acceptance will be controlled by QC until verification of corrective action, final inspection, and acceptance has been completed.

11.6.5 QC Seeded Items

QC seeded items will be used as one of several QC measures to ensure that personnel operating geophysical instruments (analog or digital) in the field for the purpose of locating buried ordnance items have performed their function in a quality manner. The method involves planting inert ordnance items in known locations where geophysical surveys will be performed and determining whether the items were found as a result of these surveys. The items will be placed at depths and orientations that, when surveyed effectively, will cause instrument responses that indicate the presence of a buried metallic item.

11.6.6 Equipment Maintenance and Tests

Measurement equipment utilized on-site (i.e., magnetometers, monitors, geophysical mapping equipment, etc.) is checked for operational reliability.

As much as possible, equipment used on the FORA ESCA RP is dedicated solely to the project until the project is completed. At times, it will be necessary to rent equipment to meet surges. Equipment such as vehicles, backhoe, and chipping/grubbing equipment have before, during, and after operation maintenance performed in accordance with the equipment's operating manual. The UXOQC staff is specifically responsible for inspecting the equipment and its maintenance records. If equipment field checks indicate that any piece of equipment is not operating correctly, and field repair cannot be made, the equipment is tagged and removed from service. The PM or RPM is notified and a request for replacement equipment is placed immediately. Replacement equipment must meet the same specifications for accuracy and precision as the equipment removed from service.

The following equipment requires daily maintenance or tests: geophysical survey instruments (e.g., Schonstedt magnetometers, Geonics EM61-MK2, and Geometrics G-858/822) and GPS receivers. Instrument standardization checks are described in Section 5 of this G1 SAP.

11.6.7 Preventive Maintenance

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations.

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 will be kept in good operating condition. Qualified personnel will perform service to the equipment instruments, tools, etc.

11.6.8 Equipment Spare Parts

An extra battery pack for each type of geophysical instrument will be on-site at all times. A backup geophysical instrument will be kept on–site, or arrangements will be made with an equipment vendor so that replacement equipment or any spare parts needed can be delivered to the site by overnight delivery.

11.7 Nonconforming Items or Activities and Corrective Actions

11.7.1 Identification

Circumstances that prevent a work process to control the output 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 adversely affecting quality. The methodology for the nonconformance report (NCR) process is described in the SOP for Material or Activity Nonconformances and the SOP for Corrective and Preventive Action presented in Appendix D of this G1 SAP. The status of NCRs will be maintained in a log, and progress of their resolutions will be documented and reviewed monthly to ensure prompt attention to their conclusion.

11.7.2 Resolution, Corrective Action, and Verification

The appropriate level of management is responsible for evaluating the cause of an 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 QCM.

UXOQCS will maintain the NCR log that identifies the nature, location, and status of all NCRs. The NCR log status in addition to copies of all closed-out NCRs will be briefed to FORA weekly.

11.7.3 Material and Item Nonconformance

The QCMs ensure that the following requirements are implemented:

- Items that do not conform to prescribed technical and/or quality requirements are tagged or otherwise identified, documented, and reported as nonconforming. The documentation will include the following information:

a. Identification of the nonconforming activity, material, or item.

b. Identification of the technical and quality requirement(s) with which the activity, material, or item is not in compliance.

c. 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).

d. Names and dates of the individuals identifying the nonconformance.

e. Identification of the individual(s) or organization(s) responsible for resolution.

f. Indication of the severity of the nonconformance(s).

g. Indication regarding the continuance or stoppage of work associated with each nonconforming activity, material, or item.

- Nonconforming materials and items are segregated, when possible, from conforming materials and/or items to the extent necessary to preclude their inadvertent use.
- The status of nonconforming activities, materials, and items and the progress of their resolution are documented and routinely reviewed to ensure prompt attention to conclusion.

11.7.4 Review and Disposition of Nonconformance

The review is conducted by the PM or RPM, QCMs, and QC personnel 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:
  a. Reworked to meet the original requirements
  b. Accepted with or without repair by the designer
  c. Re-graded for alternative applications
  d. Rejected or scrapped
- Repaired or reworked materials and items are re-inspected.
- Each document used to identify and correct nonconforming conditions allows for the evaluation and approval of proposed actions by the appropriate authority.

11.7.5 Trend and Root Cause Analysis

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

- Total number of audit 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.
- Trends that are developing or that have developed.

The PM and RPM will perform the trend analysis once every year. QCM will verify the implementation of any preventive actions resulting from the trend analysis. The method for conducting root cause analysis of nonconformities identified by NCRs, customer complaints, and how to evaluate the need for action to ensure that the nonconformities do not recur, is presented in the SOP for Material or Activity Nonconformances and the SOP for Corrective and Preventive Action presented in Appendix D of this G1 SAP. This procedure also establishes the methodology to conduct trend analysis of nonconformities identified through NCRs, corrective actions, quality surveillance reports, and internal audit results.

The QCM is responsible for evaluating on a semiannual basis all NCRs affecting quality and will recommend solutions as well as steps for verifying their implementation.

The management assessment will propose and initiate measures necessary to deal with any problems requiring preventive action. When preventive action necessitates a revision to the project procedures, the PM and RPM will issue an administrative FVF describing the necessary change. The QCM will verify implementation of the preventive action during the audit.

11.7.6 Lessons Learned

The ESCA RP Team will document lessons learned in the Group 1 RI/FS report, which will be provided to the QCMs. Lessons learned will be reviewed by the QCMs and applied to other applicable projects.

11.8 Handling, Storage, and Preservation

11.8.1 General

Requirements of this subsection of the QCP apply to handling, storage, and preservation of explosives specified in Section 3, Explosives Management Plan, and Section 4, Explosives Siting Plan, of this G1 SAP.

11.8.2 Handling of Design Documents

All design documents prepared for contractual submittal to the regulatory agencies will be submitted to Document Controls after all specified internal reviews are completed. The original design documents will be logged and retained on file as specified in Section 11.9 of the QCP.

11.8.3 Handling of Materials and Items

The following requirements specified in Sections 11.8.4 through 11.8.6 for handling, storage, and preservation of materials and items will be implemented.

11.8.4 Handling

Proper handling ensures that the following requirements are met:

- The selection of equipment to be employed in handling items is reviewed to ensure adequacy with respect to capacity, range, and method(s) of contact with the item.
- Techniques to be used in handling items are documented and reviewed to ensure adequacy.
- Equipment used in the handling of items is inspected and/or tested at routine intervals to ensure its fitness for service.
- Operators of handling equipment are qualified and, when required by code, regulation, or procedure, certified to operate the equipment.
- Control of lifting and moving heavy equipment.

11.8.5 Storage

A detailed requirement for storage of materials and items ensures that:

- Materials and items are protected in storage to the extent necessary to preserve their usefulness, including the maintenance of protective environments and conditions established by or recommended by the manufacturer or supplier.
- Identification markings, tags, or labels are maintained.
- Measures are established and implemented to ensure that special storage conditions are routinely identified and reviewed, including identification of shelf-life, temperature conditions, and moisture levels.
- The authorities necessary for transactions to and from storage areas are defined.
- Items in stock are assessed upon arrival and at defined intervals during storage in order to detect deterioration.

11.8.6 Preservation

The ESCA RP Team will implement appropriate methods for preservation and segregation of items when the items are under ESCA RP Team control to include preventive maintenance as recommended by the manufacturer or supplier.

11.9 Records and Publications

11.9.1 Identification

Records are documents or other media that prescribe technical or quality requirements or that provide evidence of quality achievement for materials or items. These records are identified as documents prepared, reviewed, or approved in this QCP for implementing project procedures. Records are uniquely identified for ready access and retrieval.

Records that are required to be retained are summarized in the following sections and in project procedures presented in this G1 SAP. These records and documents will, at a minimum, apply to inspection, audits, and surveillance of MEC records, hazardous waste management, environmental restoration, and training.

11.9.2 Authentication

The validity of documents submitted for use as a record is ensured through management review of correspondence, a lead discipline engineer's review, and QCM review.

All correspondence to FORA is signed by the PM and RPM (or designee) after completion of satisfactory management review.

The authorizing signatures appear on the documents where provision has been made; e.g., the signature or initials of the authenticating person will appear for correspondence, drawings, and calculations.

11.9.3 Storage

The records will be retained in a records facility providing protection from deterioration, theft, and damage, including implementation of measures in consideration of wind, flood, fire, temperature, moisture, pressure, erasure, exposure to light, or injurious insects, mold, and rodents. Electronic storage will be considered dual storage. Dual storage facilities will be sufficiently remote from each other to reduce the chance of a simultaneous hazard.

11.9.4 Logs and Records

For all site work where PDAs are used, observations will be noted that might affect the quality of data.

The UXOQCS inspects all grid operations records on a daily basis. These inspections focus on the completeness, accuracy, and logic of the records. The results of these inspections are entered directly into the project database.

Following are the types of records expected to be prepared and maintained for this work:

Anomaly Excavation Records

The UXO Team Leaders prepare individual records for each operating grid. This record consists of fields that are used to record data on the excavation of anomalies and work conducted. These data are downloaded daily into the project database through synchronization of the UXO Team Leader's PDA. The following workday, these data are reviewed by the SUXOS and UXOQCS for completeness, accuracy, and overall quality.

Safety Log Book

The UXOSO maintains these logs. The logs are used to record all safety matters associated with the specific project such as: safety briefings/meetings (including items covered and attendees), safety training, safety audits, near-misses/accidents/incidents with cause and corrective action taken, weather conditions, and any other matters relating to safety.

Training Records

The UXOSO maintains training records for all site personnel. These records contain training certificates, licenses, and other qualifying data for an individual's duty position.

Visitor's Log Book

The UXOSO maintains this log. All personnel who are not directly involved in the project site activities are identified in this log by name, company, date, time in/out, and a contact phone number. Safety briefings and training for visiting personnel are also recorded in this log.

Photographic Log

Photographic logs are maintained by various functional departments and will be retained until the end of the project. These logs are used to record all video recording and photographs taken to document work and/or site conditions.

Correspondence Log

The Office Administrator generates individual correspondence numbers for all outgoing correspondence and maintains a log of all outgoing and incoming correspondence.

Site Maps

The PM, RPM, and Project GIS Specialist maintain current working maps of the operating areas in the field office throughout execution of this project. These maps are used to document MEC encountered and the locations of soil sampling, auguring, drilling, and other soil-disturbing activities.

11.9.5 Publications

The ESCA RP Team compiled a list of required publications to be maintained at the project office. In addition to this list, WESTON will make available, in a timely manner, any additional manuals the SUXOS may require. Prior to the start of operations and periodically throughout the project, the UXOQCS will check to ensure that the publications are present and in good repair. Results of these inspections are recorded and reported. Currently identified publications include:

- Copy of all Task Orders
- WESTON's Safety and Health Program
- OSHA, 29 CFR 1910, General Industry Standards
- 27 CFR Part 55, Commerce in Explosives
- OSHA, 29 CFR 1926, Construction Standards
- ATF P 5400.7, Alcohol Tobacco, Firearms, and Explosives Laws and Regulations
- NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities
- American Conference of Governmental Industrial Hygienists (ACGIH), TLVs for Chemical Substances and Physical Agents and Biological Exposure Indices
- Applicable sections of EPA, 40 CFR Parts 260 to 299, Protection of Environment
- Applicable sections of DOT, 49 CFR Parts 100 to 199, Transportation
- USACE EM 385-1-1, Safety and Health Requirements Manual
- USACE ER 385-1-92, Safety and Occupational Health Document Requirements for Hazardous Waste Remedial Actions
- DOD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives
- DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards
- DOD 4160.21-M, Defense Reutilization and Marketing Manual
- DA PAM 385-64, Ammunition and Explosives Safety Standards
- AR 385-64, Ammunition and Explosives Safety Standards
- AR 200-1, Environmental Protection and Enhancement
- AR 385-10, The Army Safety Program
- AR 385-16, System Safety Engineering and Management
- AR 385-40 with USACE supplement, Accident Reporting and Records
- TM 9-1300-200, Ammunition General
- TM 9-1300-214, Military Explosives
- TM 60 Series Publications

- USACE EM 1110-1-4009, Ordnance and Explosives Response

11.10 AUDITS AND SURVEILLANCES

11.10.1 Audit Planning

An LFR and WESTON Corporate QC representative will perform semiannual audits of the program activities, and audits of subcontractors/suppliers and of the environmental compliance program, as required in a manner specified below:

- All areas of the activities being performed (where audits are not planned for certain areas, the audit schedule will include an appropriate justification for the course of action).
- The audit schedule will identify office(s), including those in the subcontractor's organization, to be audited.
- The audit schedule will identify the sequence and dates of audits for a fiscal year.
- Before each fiscal year, the PM and RPM will approve the audit schedule for the fiscal year. The lead auditor will prepare the audit plans. The audit plan will be reviewed and approved by the LFR and WESTON Corporate QA Manager before execution.
- The audit plan will include the following information:
  - Identification of the organization and work areas to be audited.
  - Identification of location, times, and dates of the duration of the audit.
  - Identification of the documents that specify the criteria against which the work will be measured.
  - Checklists prepared as guides during the audit.
  - Identification of auditing personnel.
  - Signatures and dates approving the audit.
- The organization to be audited will be notified of the impending audits at least 15 days in advance.

11.10.2 Audit Personnel

The lead auditor will be qualified and certified. The lead auditor will be responsible for the organization and coordination of the planning, execution, and reporting of the audit. Auditors will not be responsible for the work being audited.

The QCM will be a qualified lead auditor, and is responsible for reviewing the response to the audit report and for the verification phase of the audit.

11.10.3 Audit Execution

A pre-audit briefing and a post-audit briefing will be conducted to inform the management of the organization being audited or to confirm the results of the audit, including concerns and findings. Daily briefings may be conducted, as needed, to inform the audited organizations of the progress of the audit and potential findings or concerns.

11.10.4 Audit Reporting

The audit results approved by the lead auditor will include the following information:

- Reference to audit plan.
- Identification of and justification for any differences that occurred between the audit plan and the actual conduct of the audit.
- Synopsis of the audit results.
- Description of nonconformity (identified as findings and observations).
- Completed audit checklist and documentation (objective evidence) supporting the discovery of the nonconformity.

Conditions determined to be in nonconformance with the contract, procedure, or other specified requirements are identified as findings. Conditions that are not in nonconformance 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.

The lead auditor (may be the QCM) will issue the audit report to the Corporate QC representative(s). The QCM will distribute the report to the PM or RPM depending on which company is performing the audit. The PM and RPM will issue the audit report to the subcontractors and suppliers audited.

11.10.5 Review and Approval of Recommended Action Response

The recommended corrective action proposed by the management of the organization audited in response to the nonconformity will be reviewed and approved by the QCM. Justification for rejection of the response will be documented by the QCM and transmitted to the organization providing the response.

11.10.6 Verification of Closeout Action

The management of the organization that is being audited will report the implementation of corrective action to close out the audit nonconformity. The lead auditor or the QCM will verify a closeout action at the time of the next scheduled audit.

Verification of closeout action will be documented to ensure the satisfactory closure of the audit nonconformity and will be reported to the PM or RPM and to the management of the organization audited, when applicable.

11.10.7 Surveillances/QC Audits

UXO QC personnel will perform scheduled (daily) and unscheduled surveillances/QC audits of the program activities to supplement the audit process so that confidence in the quality of items is maintained without duplication of effort. These QC audits will include, but not be limited to:

- equipment calibration audits
- property accountability audit
- MEC-related task audits
- search effectiveness audits
- equipment operator maintenance audit
- PPE audits

The surveillance will be conducted by personnel who do not report to management or to the supervisors immediately responsible for the work being evaluated. The surveillance report will document the objectives, scope, and basis of the surveillance conducted, along with the description of nonconformance(s). The surveillance report will be discussed and coordinated with the individual or group responsible for the document or activity evaluated and will be reported to the PM or RPM. The PM or RPM (or designee) will provide corrective action to the surveillance within four weeks from the date of issue of the surveillance report. The QCM is responsible for verifying the corrective action as soon as practical following the implementation of the corrective action.

11.10.8 Stop Work

When the QC audit, surveillance, or inspection nonconformance remains open past the recommended period for corrective action, the PM or RPM will first be notified that a stop-work order will be issued if the corrective action has not been taken. When activities stemming from such nonconformance continue to compromise safety or produce unsatisfactory work on critical and significant items, the QCM will issue a stop-work order until the nonconformance is corrected.

11.10.9 Records

The surveillance and audit reports will be maintained as records in the manner established in Section 11.9.

11.11 Training

11.11.1 General

Qualifications and training of all project personnel will comply with DDESB requirements.

11.11.2 Qualification Requirements

Personnel whose job requires the use of detectors or innovative detection techniques/equipment will be tested for proficiency in accordance with the QAPP, included in Appendix E of this G1 SAP. Qualifications will be conducted at the geophysical test plots (Section 5.15.3).

11.11.3 Training for UXO Personnel

For all UXO personnel assigned to this project, training includes the following courses:

- Prior to the start of any intrusive on-site operations, LFR and WESTON will submit copies of the OSHA Training Certificates for the above training to FORA for review and approval. Under no circumstances will any person be allowed to engage in intrusive activities until the requisite training is verified by FORA.
- All site personnel will be trained to a clearly identifiable and consistent standard, because all personnel will receive the same training.
- The training provided can be tailored to not only meet the regulatory requirements, but to address specific safety and health issues associated with this particular site and operational conditions.
- Tracking, scheduling, and performing annual refresher training will be facilitated by establishing a standardized start time for each individual's qualifications.
- In addition to the OSHA required training, UXO-qualified personnel receive the comparable training as provided to non-UXO personnel.

11.11.4 Training for Non-UXO Personnel

Prior to commencing site activities, WESTON will conduct required training for all non-UXO personnel assigned to this project. This training includes the following courses:

- MEC Recognition Training;
- Familiarization with the current work plan;
- Site-Specific Safety And Health Plan orientation and PPE training, hearing protection, and donning and doffing of PPE;
- Instruction applicable to equipment operation and maintenance with emphasis on safety procedures to be implemented, which will require operator qualification;

- A discussion of environmental considerations specific to the FORA ESCA RP;
- Employees must meet the standards of OSHA (29 CFR 1910.120). The employees will complete the OSHA training as described in paragraph 6.4.2.1; and
- Daily Safety and Tailgate Training: Briefings outlining the day's activities, unique hazards and safety precautions, and other operational issues related to the project.

The UXOSO and others conduct training as applicable. Records of attendance (and student performance when applicable) are recorded. Upon completion of Safety and Equipment Operator's Training, the employee is issued a certificate of training and a copy of this certificate is placed in the site personnel record. Prior to assignment to a duty position or change in duty position, the UXOQCS performs a check of the individual's site personnel record to ensure that the employee is qualified to fill the position.

Personnel involved in activities affecting the quality of operations and QC personnel assigned the responsibility for verifying the adequacy of MEC removal activities, clearance activity, environmental sampling, and related testing will be trained and certified.

11.11.5 Training Requirements

Personnel and subcontractors assigned on the FORA ESCA RP to perform activities affecting quality and safety will be trained to the project requirements and to the requirements of the QCP, as well as to the project and safety procedures. The project procedure will establish a formal training and qualification program.

The training program will ensure that project personnel:

- 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 acceptance and rejection criteria for the work process;
- Understand the safety conditions/requirements of the work task. Safety training for all on-site personnel will consist of daily tailgate safety meetings and weekly Safety Manager meetings;
- 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.

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

Training programs will describe the initial, refresher, and replacement training to be conducted.

Training records, including qualifications and certifications, will be maintained as project records in Document Controls files in accordance with requirements in Section 11.9.

11.12 QUALITY IMPROVEMENT

11.12.1 General

Measurable objectives and goals will be implemented to solicit customer feedback in order to improve the quality management process continually.

11.12.2 Goal and Objectives

The PM will establish measurable quality goals and objectives at relevant functions and levels within the project organization. The PM will measure these goals and objectives periodically and will identify any improvements needed from the measurements.

11.12.3 Customer Feedback

Management assessments, NCRs and trend analyses, and client feedback received during the course of the project execution will be considered as customer feedback by project management. All client concerns will be addressed by the PM in correspondence to the client.

11.12.4 Improvements

The measurements and feedback received by project management will be analyzed to identify improvement opportunities in the quality management system, processes, items, products, or services. Implemented improvements should be monitored by the PM to verify their effectiveness.

12.0 ENVIRONMENTAL PROTECTION PLAN

12.1 Introduction

This Environmental Protection Plan (EPP) outlines the procedures that will be implemented to protect natural resources. The EPP will comply with the Installation-Wide Multispecies HMP for former Fort Ord (USACE 1997) during RI in the Parker Flats MRA Phase II. The HMP incorporated conservation measures pursuant to U.S. Fish and Wildlife Service (FWS) Biological Opinions (BOs) dated prior to issuance of the HMP in April 1997. Specific to this G1 SAP, MEC activities were addressed in Chapter 3 of the HMP. Since April 1997, a number of BOs have been issued that are relevant to the activities contemplated in this G1 SAP (FWS 1999, 2002, and 2005). Accordingly, some information has been updated and additions have been added to this section so that this G1 SAP will be consistent with currently applicable conservation measures.

12.2 Description of Sites and Natural Resources

The Parker Flats MRA is located in the central portion of the former Fort Ord, bordered by the CSUMB Off-Campus MRA (formerly referred to as the CSUMB MRA) and the County North MRA (formerly referred to as the Development North MRA) to the north, the Interim Action Ranges MRA to the south, additional CSUMB campus property to the west, and additional former Fort Ord property to the east and southeast. The Parker Flats MRA is contained within the jurisdictional boundaries of the City of Seaside and the County of Monterey. Gigling Road is located along a portion of the northern boundary of the MRA, and Eucalyptus Road crosses the southern portion of the MRA. Watkins Gate Road borders a portion of the eastern boundary of the MRA, and Parker Flats Road crosses through the central portion of the MRA. A number of unpaved roadways and dirt trails are located throughout the MRA. The Parker Flats MRA (Phase I and Phase II areas) encompasses approximately 1,180 acres. The area completed under the Phase I activities was approximately 696 acres, leaving approximately 482 acres to be included under Phase II.

The Parker Flats MRA is primarily undeveloped land, and there are no fences and only limited gates or barricades that restrict access to the property, except for the four-strand barbed-wire fencing reinforced with concertina wire and locked chain link gates along the southern side of Eucalyptus Road, restricting access to a small portion of the MRA and the former impact area to the south. “U.S. Government Property-No Trespassing” and “Danger-Explosives Area” warning signs are posted along the fence line and locked gates. Vegetation in the Parker Flats MRA consists primarily of coast live oak woodland with smaller areas of maritime chaparral, grassland, and coastal scrub (USACE/Jones & Stokes 1992). Vegetation varies from sparsely vegetated areas to heavy brush. Past field activities have noted the presence of poison oak in the area. Wetland or vernal pools areas are not present at any of the sites, although portions of several parcels are located within known or potential habitat of the CTS.

An account of HMP species occurrence in the Parker Flats MRA is shown in Table 12-1. This table is a reorganization of data presented in the 1997 HMP (based largely on a 1992 baseline survey of the former Fort Ord). Because there have been changes in parcel borders and designations over time, parcels listed in the HMP as containing sensitive species are not identical to the parcels as identified in the SEDR (ESCA RP Team 2008). In many cases, a parcel as identified in the HMP was split into two or more parcels. To eliminate confusion arising from the parcel changes, both sets of parcel designations are shown, though the data are still organized according to the HMP designations.

12.3 Protection and Conservation of Natural Resources

Parker Flats MRA Phase II contains parcels designated for future residential and nonresidential reuse and parcels designated for future habitat reserve. Impact reduction measures will be undertaken in both residential and nonresidential reuse and in habitat reserve parcels, but, in accordance with Chapter 3 of the HMP (USACE 1997), additional measures will be undertaken in the habitat reserve parcels. A habitat checklist will be filled out and measures to reduce impacts to natural resources will be implemented. In addition, guidelines that minimize activities that could degrade lands through soil erosion or invasive weed problems will be followed. These considerations will be addressed in this section.

The ESCA RP Team Field Biologist will be present on work sites as needed to conduct and/or confirm that these environmental directives are being followed. The Field Biologist will also document and address as needed unforeseen environmental concerns, as they may occur. The ESCA RP Team will coordinate with the Fort Ord BRAC Office as needed on environmental issues that are not addressed in the HMP.

In the habitat reserve parcels, vegetation monitoring will be conducted in accordance with the relevant provisions in the HMP and the currently applicable protocol for such monitoring. This monitoring effort will accomplish three objectives for areas disturbed by ESCA RP activities: 1) identify certain areas where disturbance is to be avoided, if possible, or mitigation measures implemented, if necessary (e.g., HMP annual plant locations); 2) document recovery of HMP species after project fieldwork has been completed; and 3) identify the need for weed control measures if invasive non-native species colonize disturbed areas. In general, vegetation monitoring involves conducting a “baseline” survey prior to field remediation work, and conducting a series of surveys over a period of several years after the work is completed.

12.3.1 Interim Management Requirements

Interim management requirements include installing boundary markers (where appropriate) to separate MEC work sites from designated habitat reserve areas and implementing other measures to avoid disturbances to adjacent land parcels. To reduce soil erosion, erosion control measures—the application of certified weed-free straw or the installation of structures such as water bars—will be implemented, as necessary.

12.3.2 Avoidance and Mitigation of Environmental Impacts During Removal Activity

12.3.2.1 Removing Vegetation

A combination of mechanical and manual vegetation cutting methods will be used to clear brush.

12.3.2.2 Minimizing Impacts to Habitat and Endangered, Threatened, and Rare Species

The ESCA RP Team approach will minimize and avoid disturbances to areas with sensitive species as much as possible without unreasonably disrupting removal activities. The Field Biologist will conduct a preliminary environmental survey to identify locations of sensitive species. Vehicle access will be restricted to roads as much as possible, and removal activities will be coordinated so that they avoid HMP-listed species, where feasible.

HMP Mitigation Measures

The mitigation measures listed in Chapter 3 of the HMP for "Ordnance and Explosives Removal" are required for habitat reserve parcels, but not for residential and nonresidential parcels. Two of the parcels in Parker Flats MRA Phase II are designated for habitat reserve, and mitigation measures will be implemented in those parcels. The remainder of the parcels within the Parker Flats MRA Phase II are designated for residential and nonresidential reuse and, therefore, do not require HMP mitigation. Because the eastern portion of the Parker Flats MRA Phase II contains the interface between development and habitat reserve parcels (i.e., "borderland"), relevant mitigation measures as identified in Chapter 4 of the HMP will be implemented.

The following list provides a summary of the mitigation measures from Chapter 3 of the HMP that will be implemented in habitat reserve parcels:

- Minimize disturbance by restricting MEC removal sites to the smallest possible area and situating staging areas and access roads in such a way as to avoid HMP species and habitats, where possible
- Avoid populations of sand gilia and seaside bird's beak, where feasible
- Coordinate MEC removal with vegetation management, such as the burning and restoration program, where feasible
- Conduct an employee education program
- Minimize and compensate for impacts on California linderiella, CTS, and California red-legged frog
- Avoid vernal pools and ponds whenever possible; for each vernal pool or pond to be affected, develop mitigation and restoration plan

- Minimize impacts on black legless lizards and make maximum effort to preserve animals encountered during MEC removal
- Implement monitoring program for cleared maritime chaparral habitat and restored vernal pools and ponds and undertake corrective measures as necessary

The following mitigation measures from Chapter 4 of the HMP will be implemented in "borderland" areas:

- Develop fire breaks
- Limit vehicle access

Since the HMP was developed, additional BOs potentially relevant to this G1 SAP have been issued by FWS (FWS 1999, 2002, and 2005). Relevant mitigation measures from these BOs not included in the HMP will be implemented as part of this G1 SAP as summarized below.

California Tiger Salamander Mitigation Measures

Conservation measures relative to the CTS as provided in the FWS BO (FWS 2005) that are relevant to the activities included in this G1 SAP will be implemented by the Field Biologist.

12.3.2.3 Site Restoration and Monitoring for Invasive Weeds

The ESCA RP Team Field Biologist will assess the need for site restoration and will coordinate the work. Site restoration in development parcels will likely be limited to basic erosion and weed control measures as described in the HMP (e.g., straw application and straw crimping). The Field Biologist will also perform informal follow-up monitoring of the site for erosion or invasive weed problems before a land transfer.

Implementation of site closure, restoration, and monitoring (SCRM) for the Parker Flats MRA Phase II will involve interim measures because it is designated for development. These measures will minimize subsequent impacts on sensitive species and prevent site degradation and/or impacts on adjacent areas and sensitive habitats. The following SCRM measures will be implemented.

1. All trash associated with the construction work that could attract predators to the site will be removed upon completion of construction work.
2. Per the HMP, excavated areas will be allowed to revegetate naturally. If the excavation disturbs an area more than one acre and more than 100 feet in width, passive and active restoration with follow-up monitoring will be conducted in accordance with the procedures described in the Habitat Restoration Plan prepared for the Site 39 Inland Ranges (Denise Duffy & Associates 2008).
3. Excavations that result in steep-sided depressions without a gently sloping egress area that occur within 2 kilometers of a potential CTS breeding site will be filled with soil to approximately match adjacent ground level to prevent trapping or breeding of CTS during the wet season.

4. To reduce soil erosion, erosion control measures—the application of certified weed-free straw and straw crimping or the installation of structures such as water bars—will be implemented, as necessary.
5. Invasive weed control: surface soil-disturbed areas will be mapped via GPS and will be monitored within two months following the end of the current wet season (if construction occurs during the wet season) or next wet season (if construction occurs during the dry season) to determine if invasive weeds have colonized the disturbed areas. If invasive weeds are present, they will be removed by hand or other approved method and measure (4) above will be implemented on any newly surface soil-disturbed portion(s) of the area. Areas will be monitored at least once per year for five years, but monitoring will be terminated sooner if development construction begins in the area.

In the habitat reserve parcels, restoration monitoring will be conducted in accordance with the requirements described in Chapter 3 of the HMP and will involve vegetation sampling efforts for one pre-disturbance baseline and five post-disturbance annual sampling events. Restoration is anticipated to occur naturally (without intervention), but may be augmented by active restoration efforts if restoration targets are not met and if active restoration is deemed necessary for long-term recovery to approximate baseline conditions.

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13.0 INVESTIGATION-DERIVED WASTE PLAN

Investigation-derived waste (IDW) for this investigation and removal action will be managed in accordance with this IDW plan. For the purpose of this discussion, IDW includes recyclable materials that will be taken off site. Waste characterization and disposal will be performed in accordance with the DTSC regulations outlined in Title 22 CCR Division 4.5. IDW that could be generated may include, but not be limited, to the following:

- Hazardous materials packaging
- Painted construction debris and lead-based paint chips
- Lead-affected soil rock or fines
- Friable asbestos-containing material
- Non-friable asbestos-containing material
- Treated wood
- Unpainted construction debris not planned for recycling
- Recyclables related to structures (concrete, wood, etc.) and recyclable metals
- Asphalt-recyclable
- White goods
- Universal Waste-florescent bulbs; mercury switches, thermometers and gauges; batteries and similar waste
- Light ballasts
- Lubricating fluids
- Vehicles and related debris (non-tire)
- Tires-recyclable
- Compressed gas cylinders
- Wood and vegetative mulch
- Personal protective equipment (PPE) and field consumables
- Decontamination water
- Residual fluids in latrine pits
- MD

Procedures outlined in the IDW plan will be coordinated with the Army and FORA, as appropriate. FORA will be the waste generator for the Parker Flats MRA Phase II RI and will sign all manifest documentation prior to shipment off-site. As their contractor, the ESCA RP Team will prepare manifest documentation for FORA signature, ship, and dispose of IDW.

The management of IDW will depend on whether the IDW is hazardous, nonhazardous, or recyclable. To make this determination, waste will initially be segregated according to the type of material and according to the activity conducted that generated the IDW to prevent cross contamination. General protocol for the management of each type of IDW is outlined below:

- Hazardous materials packaging will be returned to the manufacturer for recycling or reuse as appropriate, or will be disposed of as a nonhazardous waste, unless there is evidence of gross contamination, in which case the packaging will either be disposed of as hazardous waste or sampled and chemically tested to confirm a designation as nonhazardous.
- Painted building debris will be visually assessed for lead-based paint. If paint is present or suspected of being present, the paint will be assumed to contain lead unless determined otherwise by sampling and chemical testing. Building debris containing lead will be segregated and characterized for disposal at an appropriately permitted landfill. A detailed plan describing appropriate building demolition practices and disposal requirements is provided in Appendix C of this G1 SAP.
- Soils from excavations will be returned to the excavations upon completion of the work at that location unless the soil is suspected to be contaminated. If contamination is suspected, the excavated soil will be stored on and covered with plastic sheeting. Composite soil samples will be collected from the soil stockpile or in-place soil and will be analyzed for the suspected contamination to evaluate soil disposal options.
- Regulated asbestos-containing material (ACM), such as friable fireproofing or transite debris will be appropriately disposed of at a facility permitted to accept that waste type. A detailed plan describing appropriate building demolition practices and disposal requirements is provided in Appendix C of this G1 SAP.
- Non-friable ACM such as roofing materials, floor tiles, transite panels, etc., that are intact will be labeled and disposed of as nonhazardous asbestos-containing construction debris at an approved and permitted Class 3 landfill.
- Used lumber treated with pentachlorophenol, creosote, or other preservative treatments, such as electric poles, telephone poles, and railroad ties, will be disposed of at a Class 2 or Class 3 landfill licensed to accept treated wood for disposal. An MSDS, if available, will be provided with the treated wood being provided to the landfill. If a landfill cannot be located to accept the used treated lumber, it will be sampled, profiled, and disposed of accordingly at a permitted Transfer Storage Disposal Facility or waste disposal facility.
- Unpainted construction debris not scheduled for recycling will be disposed of as nonhazardous construction debris at a permitted Class 3 landfill.
- Recyclables related to structures such as barbed wire, concertina wire, used pipes, concrete building foundations, unpainted wood structural members, and similar materials will be segregated and collected in a dumpster, laded, and picked up by the appropriate recycler.
- Recyclable asphalt will be transferred as road base material to approved areas of the former Fort Ord or will be classified for waste disposal.

- White goods will be transferred to a DTSC-certified appliance recycler.
- Universal Waste including fluorescent bulbs, mercury switches, thermometers, gauges, batteries, e-waste, and similar waste will be segregated, handled, and packed for recycling by an approved Cathode Ray Tube/Universal Waste Electronic Device recycler or other approved Universal Waste recycler.
- Light Ballasts will be visually assessed for the presence of polychlorinated biphenyls (PCBs). If the ballast is not clearly labeled as not containing PCBs the ballast will be handled as a PCB-containing waste and stored in a 55-gallon drum (or approved equivalent) for disposal or incineration at an approved facility.
- Lubricating fluids such as automotive fluids, pump oil, or similar non-suspect PCB containing fluid will be containerized and collected for recycling at an approved oil recycling facility.
- Vehicles and related debris (non-tire) will be brought to an approved and permitted automobile dismantler for recycling.
- Tires will be collected and sent to a tire recycler using an approved waste tire hauler. If more than 10 tires will be hauled the shipment will be recorded on the comprehensive trip log by the approved hauler.
- Labeled compressed gas cylinders will be returned to the owner (Praxair, BOC Gases, etc.). Cylinders verified to be empty and without ownership tags will be recycled as scrap metal.
- Wood and vegetative mulch will be transferred as vegetative mulch to approved areas of the former Fort Ord or will be verified as FFE prior to disposal.
- Used PPE and field consumables will be disposed of as nonhazardous solid waste unless there is evidence of gross contamination, in which case the PPE will either be disposed of as hazardous waste or sampled and chemically tested to confirm a designation as nonhazardous.
- Decontamination fluids will be containerized in DOT-approved 55-gallon drums or in temporary polyethylene storage tanks. When full, the drum and/or tank contents will be sampled and the samples submitted to an EPA-approved analytical laboratory for chemical analysis and waste classification. The decontamination fluid containers will be labeled as “Waste Water-Hold For Analysis” (or equivalent) as well as the accumulation start date, generator, and contact information for the material until a waste classification is made based on the laboratory analysis results. The contents will then be disposed of appropriately based on the hazard classification.
- Residual fluids in latrine pits will be pumped by a sanitary/septic tank pumping company permitted and approved for disposal at the Marina Coast Water District facility.
- MD not suitable for recycling and shown to be FFE will be disposed of at an approved landfill.

Hazardous IDW will be stored in either satellite accumulation points or temporary (less than 90-day) storage areas. Hazardous IDW will be manifested and transported for disposal in

accordance with appropriate regulatory requirements. Hazardous IDW will be disposed of only at approved Class 1 treatment, storage, and disposal facilities. Nonhazardous IDW will be stored in general storage areas. Nonhazardous IDW will be shipped to the disposal facility using nonhazardous waste manifests (for waste) or bills of lading (for recyclables). Nonhazardous IDW will be disposed of only at approved Class 2 or Class 3 facilities or at approved recycling facilities.

Both hazardous and nonhazardous waste as well as recyclables will be manifested using either a hazardous waste manifest, nonhazardous waste manifest, or a bill of lading. In addition to the above described manifesting requirements, submittal of Form 1348 showing that the material leaving the site is FFE will be required as will a copy of any land disposal restrictions for hazardous waste (if appropriate), and recording shipment information on a tracking log.

Additional specific characterization, handling, and disposal requirements are provided in the Standard Operating Procedure for Management and Characterization of Waste Streams from Field Activities presented in Appendix D of this G1 SAP.

14.0 REFERENCES

Denise Duffy & Associates Inc. 2008. Draft Final Habitat Restoration Plan, Site 39 Inland Ranges, Former Fort Ord, California. July.

Department of Defense Explosives Safety Board (DDESB). 2005. Technical Paper No. 18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel. December 20.

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Parsons. 2002. Draft Final, Ordnance Detection and Discrimination Study, prepared for U.S. Army Corps of Engineers, Sacramento District. December. (Fort Ord Administrative Record No. OE-0297B)

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United States Army Corps of Engineers/Jones & Stokes Associates, Inc. (USACE/Jones & Stokes). 1992. Flora and Fauna Baseline Study of Fort Ord, California. December. (Fort Ord Administrative Record No. BW-1938)

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———. 2005. Cleanup and Reuse of Former Fort Ord, Monterey County, California, as it affects California Tiger Salamander and Critical Habitat for Contra Costa

Goldfields (1-8-04-F-25R). March 14. (Fort Ord Administrative Record No. BW-2334)

GUIDANCE DOCUMENTS

EP 385-1-95a	U.S. Army Corps of Engineers - Huntsville Center (CEHNC) Safety Concepts and Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations
27 CFR 55	Alcohol, Tobacco Products and Firearms
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
49 CFR 100-199	Hazardous Materials Transportation
AR 190-11	Physical Security
AR 385-10	The Army Safety Program
AR 385-16	System Safety Engineering and Management
AR 385-64	Army Regulation, Ammunition and Explosives Safety Standards
ATF P-5400.7	ATF Explosives Laws and Regulations
DA PAM 385-64	Department of the Army Pamphlet, Ammunition and Explosives Safety Standards
DOD 4145.26-M	U.S. Department of Defense, Contractors' Safety Manual for Ammunition and Explosives
DOD 6055.9-STD	DOD Ammunition and Explosives Safety Standards
EM 385-1-1	USACE Safety and Health Requirements Manual, September 1996
HNC-ED-CS-96-8	Guide Selection and Sittings of Barricades for Selected Ordnance and Explosives, September 1997
HNC-ED-CS-S-98-1	U.S. Army Engineering and Support Center, Huntsville Division, Methods for Predicting Fragmentation Characteristics of Cased Explosives, January 1998.
HNC-ED-CS-S-98-7	U.S. Army Engineering and Support Center, Huntsville Division, Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions, August 1998.
HNC-ED-CS-S-98-8	U.S. Army Engineering and Support Center, Huntsville Division, Miniature Open Front Barricade, November 1998.
HNC-ED-CS-S-00-3	U.S. Army Engineering and Support Center, Huntsville Division, Use of Water for Mitigation of Fragmentation and Blast Effects Due To Intentional Detonation of Munitions, September 2000.
USACE EM 1110-1-4009	Ordnance and Explosives Response, June 2007
Title 22 CCR Division 4.5. IDW	Department of Toxic Substances Control

Table 2-1
Parker Flats MRA Phase II Remedial Investigation Areas

USACE Parcel Number (for land transfer)	Phase II Acreage To Be Investigated (Approximate)	Phase II Acreage Removal Action Completed (Approximate)	MRS Identifier
Future Land Use – Habitat Reserve			
E19a.2	72	0	MRS-27A, MRS-27B, non-MRS area
E19a.4	94	0	MRS-27B, MRS-27C, non-MRS area
Future Land Use – Nonresidential			
E18.1.1	29	0	MRS-44 EDC, non-MRS area
E18.1.2	12	0	MRS-44 EDC, non-MRS area
E19a.3	75	0	MRS-27A, MRS-45, non-MRS area
E21b.3	0	32	MRS-15 MOCO.02
L20.18	2*	4	MRS-44 PBC, MRS-15 MOCO.02, non-MRS area
L23.2	0	11	MRS-44 PBC
Future Land Use – Residential			
E18.1.1	8	0	non-MRS area
E18.1.2	1	0	non-MRS area
E18.1.3	39	1	MRS-04A, non-MRS area
E18.4	1	1	MRS-04A, non-MRS area
E19a.1	59	7	MRS-04A, non-MRS area
E20c.2	34	0	MRS-44 EDC
Total	426	56	
Phase II Total	482 acres		

Notes:
* = Acreage consists entirely of paved roadway (Eucalyptus Road).
MRA = Munitions Response Area
MRS = Munitions Response Site
USACE = U.S. Army Corps of Engineers

Table 3-1
Storage Compatibility Groups for Explosives and Ammunition

Group A	
Bombs, demolition	Mines, HEAT nitrocellulose wet 8 to 30 percent water exposed to detonation hazards at less than intra line distance
Bombs, fragmentation	Nitroguanidine
Bombs, general purpose	Nitrostarch Octol
Boosters	PBX
Boosters, auxiliary	Pentolite
Bursters	PETN, wet
Charge, demolition, snake	Picratol
Charge, springing earth rod, blast driven	Picric acid
Charge, supplementary, HE	Projectiles, HE, fuzed or unfuzed
Compositions A, A-2, A-3, A-4, B, B-3, C, C-2, C-3, and C-4	RDX (Cyclonite), wet
Cutter, cable M1	Rocket heads, HE, and HEAT (except pentolite loaded) w/o motors
Cyclonite (RDX), wet	Shaped charges
Cyclotol	Tetranitrocarbazole (TNC)
Demolition Blocks	Tetryl
Destructor, HE, M10	Tetrytol
Detonating cord (primacord) exposed to detonation hazard at less than intra line distance	TNT
Dynamite	Tritonal
Ednatol	Torpex
Cyclonite (RDX), dry	Mercury fulminate, wet
HMX, dry	PETN, dry
Lead azide, wet	RDX (cyclonite), dry
Lead styphnate, wet	Tetracene, wet
Group B	
Fuses (except chemically actuated fuses containing ampoules that may initiate, directly or indirectly, explosives and explosives-loaded components that are assembled in the conventional manner to form the finished explosive fuse).	Detonators
	Mines, practice, AP, M17
	Percussion elements
	Primer detonators
Group C	
Ammunition, blank and saluting, cannon	Cartridge, 90mm, canister, AP
Ammunition, .50 caliber, except API/incendiary	Cartridges, practice, over 40mm
Ammunition, 20mm, practice and high-pressure test	Catapults, aircraft ejection seat, M3A1, M4A1, M5
Ammunition, 25mm, with inert projectile	Charge, propelling, not assembled to projectiles EC powder
Ammunition, 27mm, caseless	Detonating cord (primacord)
Ammunition, 30mm, ball and high-pressure test	Nitrocellulose

Table 3-1
Storage Compatibility Groups for Explosives and Ammunition

Ammunition, 30mm, practice and training	Fuel (solid), emergency power unit
Ammunition, 37mm and 40mm, TP and AP	Propellant
Ammunition, 40mm, practice, M407A1, M382, and M385	Rockets, practice, 3.5-inch
Benite	Rocket motors, M3, M5, M6, M10, M13, M26, M30, M37, M42, M53, M66; Pershing 1st and 2nd stages; Spartan 1st, 2nd, and 3rd stages
Baron Potassium	
Group D	
Adapter booster	Explosive D
Ammonium nitrate, except in original shipping container or equivalent	Explosives, cratering
Ammonium perchlorate, except when particle size is over 15 microns and in original shipping container or equivalent	Grenades, rifle, AT (except pentolite loaded)
Ammonium picrate (Explosive D)	HMX, wet
Bangalore torpedoes	Mine, APERS, MN, M14 (w/integral fuse)
Baratol	Mines, antipersonnel (bounding type)
Black powder, bulk	Mines, antipersonnel (cast iron block)
Group E	
Ammunition, HEP	Ammunition, fixed and semi-fixed, 90mm through 106mm, loaded with ammonal, amatol, Explosive D, composition B, or TNT
Ammunition, 20mm, HE, HEI, and functional packs containing HE and HEI	Cartridge, heavy mortar over 81mm (including 81mm M56), except chemical loaded
Ammunition, 30mm, HEDP	Cartridge, light mortar, 81mm or less (excluding 81mm M56), except chemical loaded
Ammunition, 37mm, HE	Redeye guided missiles, packaged three complete rounds w/launcher
Ammunition, 40mm, HE, RDX loaded	
Ammunition, 40mm, HE, M406, M386, M441, and M463	Rockets, HEAT, 3.5-inch, complete round
Ammunition, 57mm through 81mm, except WP smoke, HEP and blank	Rockets, HE, 2.75-inch (in LAU-3/A rocket launcher)
Group F	
Grenades, hand offensive	Grenades, fragmentation
Group G	
Ammunition, .50 caliber API and incendiary	Grenades, hand, CN1, ABC, M25A1, w/fuse C12
Ammunition, 20mm, API	Grenades, hand, CM1, ABC, M25A2, w/fuse C12
Ammunition, 20mm, incendiary and functional packs containing incendiary, except those containing HE or HEI	Grenades, illuminating and incendiary
Ammunition, 40mm, riot control and pyrotechnic	Grenades, practice, w/spotting charge

Table 3-1
Storage Compatibility Groups for Explosives and Ammunition

loaded, except WP smoke	
Bombs, photoflash	Grenades, rifle, smoke, XM48E1 and M22 and M23
Cartridge, igniter, M2	Grenades, smoke (except WP and PWP)
Cartridge, illuminating	Grenades, riot control, CS1, M25A2
Cartridge, photoflash	Igniter, spotting charge
Cartridge cases, primer (w/o propellant)	Igniters for rocket motors (e.g., M12, M18, M20, and M29)
Charge, igniter assembly, for practice hand grenades	Ignition cartridge for trench mortar ammunition
Charge, spotting, APR practice, M8	Illuminating compositions (consolidated in final press operations)
Chemical ammunition, Group B, tear or smoke producing, w/explosive components, over 40mm	Mines, practice, w/spotting charge and /or fuse
Chemical ammunition, Group B, tear or smoke producing, w/o explosive components	Nuclear fire marker device 11-F2
Chemical ammunition, Group D, containing flammable solids, except for TEA or TPA, w/o explosive components	Photoflash powder
Chemical ammunition, Group D, fixed or semi-fixed rounds, containing flammable solids, except for TEA or TPA	Primers, artillery and cannon, percussion and electric
Clusters, incendiary bomb, M31 and M32 (w/o fusing components)	Projectiles, illuminating
Destroyer, file, M4	Rocket, riot control agent, CS, 2.75-inch FFAR, MX99
Detonation, simulator, explosive M80	Simulators, M110, M115, M116, M117, M118, M119, and XM142
Grenade, hand, smoke, HC, M8	Smoke pots
Grenades, hand CN, M7A1, w/fuse M201A1	Spotting charges (cartridge for miniature practice bombs)
Grenades, hand, CS, M7A3, w/fuse M210A1	
Group H	
Chemical ammunition, Group C	Grenade rifle, WP, M19
Grenades, WP	
Group J	
Chemical ammunition, Group D, containing flammable liquids or gels, with or w/o explosive components	Chemical ammunition, Group D, fixed and semi-fixed rounds, containing flammable liquids or gels with or without explosive components
Group K	
Chemical ammunition, Group A, with or without explosive components	Chemical ammunition, Group B, with or without explosive components, designed for toxic or incapacitating effects greater than lachrymation
Rockets, toxic chemical agents, complete rounds	
Group L	

Table 3-1
Storage Compatibility Groups for Explosives and Ammunition

Aluminum powder	Fuses, chemically actuated, containing ampoules which may initiate directly or indirectly, explosives and explosives loaded components which are assembled in the conventional manner to form the finished explosive fuse
Ammonium nitrate	Magnesium powder
Ammonium perchlorate	Grenades, rifle, AT (pentolite loaded)
Ammunition, pentolite loaded	Nitrates (inorganic), except ammonium nitrate (in original shipping container or equivalent)
Chemical ammunition, Group A, without explosive components	Perchlorates
Chemical ammunition, Group B, without explosive components, designed for toxic or incapacitating effects more severe than lachrymation	Peroxides, solid
Chemical ammunition, Group D, TEA or TPA components	Rocket heads, pentolite loaded, w/o motors
Chlorates	Zirconium (types I and II, spec. FED 1665)
DNT	
Group S	
Ammunition, 40mm, canister and multiple projectile	Fuse lighters
Ammunition, small arms, less than .50 caliber	Fuse safety
Explosive bellows	Squibs commercial
Firing devices	

Table 3-2
Storage Compatibility Chart

Groups	A	B	C	D	E	F	G	H	J	K	L	N	S
A	X	Z											
B	Z	X	Z	Z	Z	Z	Z					X	X
C		Z	X	X	X	Z	Z					X	X
D		Z	X	X	X	Z	Z					X	X
E		Z	X	X	X	Z	Z					X	X
F		Z	Z	Z	Z	X	Z					Z	X
G		Z	Z	Z	Z	Z	X					Z	X
H								X					X
J									X				X
K										Z			
L													
N		X	X	X	X	Z	Z					X	X
S		X	X	X	X	X	X	X	X			X	X

Notes:

1. The marking "X" at the intersection of the above chart indicates that these groups may be combined in storage. Otherwise, mixing is either prohibited or restricted per Note 2 below.
2. The marking "Z" at an intersection of the above chart indicates that, when warranted by operational considerations or magazine non-availability, and when safety is not sacrificed, these groups may be combined in storage.
3. The marking "U" on the above chart indicates that leaking toxic chemical munitions of one agent type, i.e., GB, with or without explosive components, may be stored together in one magazine specifically designated for storage of leakers of that agent type.
4. Equal numbers of separately packaged components of complete rounds of any single type of ammunition may be stored together. When so stored, compatibility is that of the assembled rounds; i.e., WP Filler in Group H, HE Filler in Groups D, E, or F, as appropriate.
5. Group K requires not only separate storage from other groups, but also requires that munitions having different toxic chemical agent fillers be stored separately from each other.
6. Ammunition designated "PRACTICE" by NSN and nomenclature may be stored with the fully loaded ammunition it stimulates.

Table 3-3
General Placarding Requirements for Any Quantity or Weight of Explosives

Category of Material (Hazard Class or Division Number and Additional Description, as Appropriate)	Placard Name	Placard Design Section Reference
1.1	Explosives 1.1	172.522
1.2	Explosives 1.2	172.522
1.3	Explosives 1.3	172.522

Table 3-4
General Placarding Requirements When Total Weight of Explosives Exceeds 1,001 Pounds

Category of Material (Hazard Class or Division Number and Additional Description, as Appropriate)	Placard Name	Placard Design Section Reference
1.4	Explosives 1.4	172.523
1.5	Explosives 1.5	172.524
1.6	Explosives 1.6	172.525

Table 5-1
Recovery and Penetration Depths of MEC Previously Encountered in Parker Flats MRA Phase II

MEC Type	Maximum Recovery Depth (feet bgs)	Maximum Calculated Penetration Depths in Sand (feet bgs)
Fuze, grenade, several types	1.5	Surface Munitions
Grenade, hand, several types	1.0	Surface Munitions
Grenade, rifle, several types	0.7	Surface Munitions
Projectile, 40 mm, cluster, white star, M585	0.2	0.2
Projectile, 40 mm, parachute, illumination, M583 series	0.0	0.2
Projectile, 75 mm, shrapnel, MK I	0.2	6.7
Signal, illumination, aircraft, AN-M37 series	0.0	Surface Munitions
Signal, illumination, ground, M125 series	0.5	Surface Munitions
Simulator, projectile, airburst, M74 series	0.0	Surface Munitions

Notes:
bgs = below ground surface
mm = millimeter
MEC = munitions and explosives of concern
MRA = Munitions Response Area

Table 11-1
Structure of Project Procedures

Procedure Number	Type of Procedures
1-X	Scope of Work
2-X	Administrative Procedures, includes Document Control, Personnel Proficiency, Records Control, Data Control
3-X	Cost Engineering, Scheduling, Estimating
4-X	Quality Control, Inspection and Testing, Supplier Quality, Training
5-X	Design Control, Configuration Control
6-X	Procurement Control, Subcontractor Control
7-X	Operational Procedures
8-X	Environmental Compliance Procedure

Table 11-2
Geophysical Quality Control Steps

Activity	QC Actions	Performed By	Overseen By
Digital Geophysical Mapping Surveys	Equipment Maintenance	Geophysical Field Team Coordinator	QC Geophysicist / UXO QC
	Weekly Instrument Checks (Instrument Standardization)	Geophysical Teams	QC Geophysicist
	Daily Instrument Checks (Instrument Standardization)	Geophysical Teams	QC Geophysicist / UXO QC
	Positioning Control Checks	Geophysical Teams	QC Geophysicist / UXO QC
	Static Checks	Geophysical Teams	QC Geophysicist / UXO QC
	Battery Strength Checks	Geophysical Teams	QC Geophysicist / UXO QC
	Audio Response Checks	Geophysical Teams	QC Geophysicist / UXO QC
	Field Data Quality Checks	Geophysical Teams	QC Geophysicist / UXO QC
	Cable Shake Test	Geophysical Teams	QC Geophysicist
	Metal-Free Operator Checks	Geophysical Teams	QC Geophysicist
	Download Checks	Digital Geophysical Teams / Processing Geophysicists	QC Geophysicist
	Field Record Checks	QC Geophysicist / Database Manager	QC Geophysicist / Database Manager
Digital Geophysical Mapping Data Processing	Data Quality Checks	Processing Geophysicists	QC Geophysicist
	Office Review of Field Forms	Processing Geophysicists	QC Geophysicist
	Instrument Standardization Checks	Processing Geophysicists	QC Geophysicist
	Data Sample Spacing Checks	Processing Geophysicists	QC Geophysicist
	Data Line Spacing Checks	Processing Geophysicists	QC Geophysicist
	Instrument Drift Checks	Processing Geophysicists	QC Geophysicist
	Processed Data Checks	Processing Geophysicists / QC Geophysicist / Project Geophysicist	QC Geophysicist

Table 11-2
Geophysical Quality Control Steps

Activity	QC Actions	Performed By	Overseen By
Digital Geophysical Mapping Data Processing (continued)	Data Deliverable Checks	Processing Geophysicists / QC Geophysicist / Project Geophysicist	QC Geophysicist
	Database Checks	Database Manager / QC Geophysicist / UXOQCS	Database Manager
	Dig Sheet Checks Prior to Delivery to UXO Teams	Processing Geophysicists / QC Geophysicist	QC Geophysicist
UXO Intrusive Operations	Field Verification of Geophysical Data Versus Intrusive Results	UXO Intrusive Teams / Processing Geophysicists / QC Geophysicist	QC Geophysicist / UXOQCS
Digital QC Surveys	Verification of Anomaly Removal During Intrusive Actions and After Completion of Initial Survey	Geophysical Teams	QC Geophysicist
Analog QC Surveys	Field Analog QC Surveys	UXOQCS	UXO QCM
Field QA Seeding and Surveys	Field QA Surveys	UXO QCM FORA QA Subcontractor EPA / DTSC	WESTON UXO Service Line Leader / FORA / EPA / DTSC
All Operations	Impromptu Field Team Checks for Adherence to Field / QC Procedures	Project Geophysicist, UXOQCS	QC Geophysicist / UXO QCM
	Daily Quality Control Reporting	UXO QC	QCM
Document Preparation	Check Document for Appropriate and Full Description of QC Activities	UXO QC	QCM

Notes:
DTSC = Department of Toxic Substances Control
FORA = Fort Ord Reuse Authority
QC = quality control
QCM = QC Manager
EPA = U.S. Environmental Protection Agency
UXO = unexploded ordnance
UXOQCS = UXO QC Specialist
WESTON = Weston Solutions, Inc.

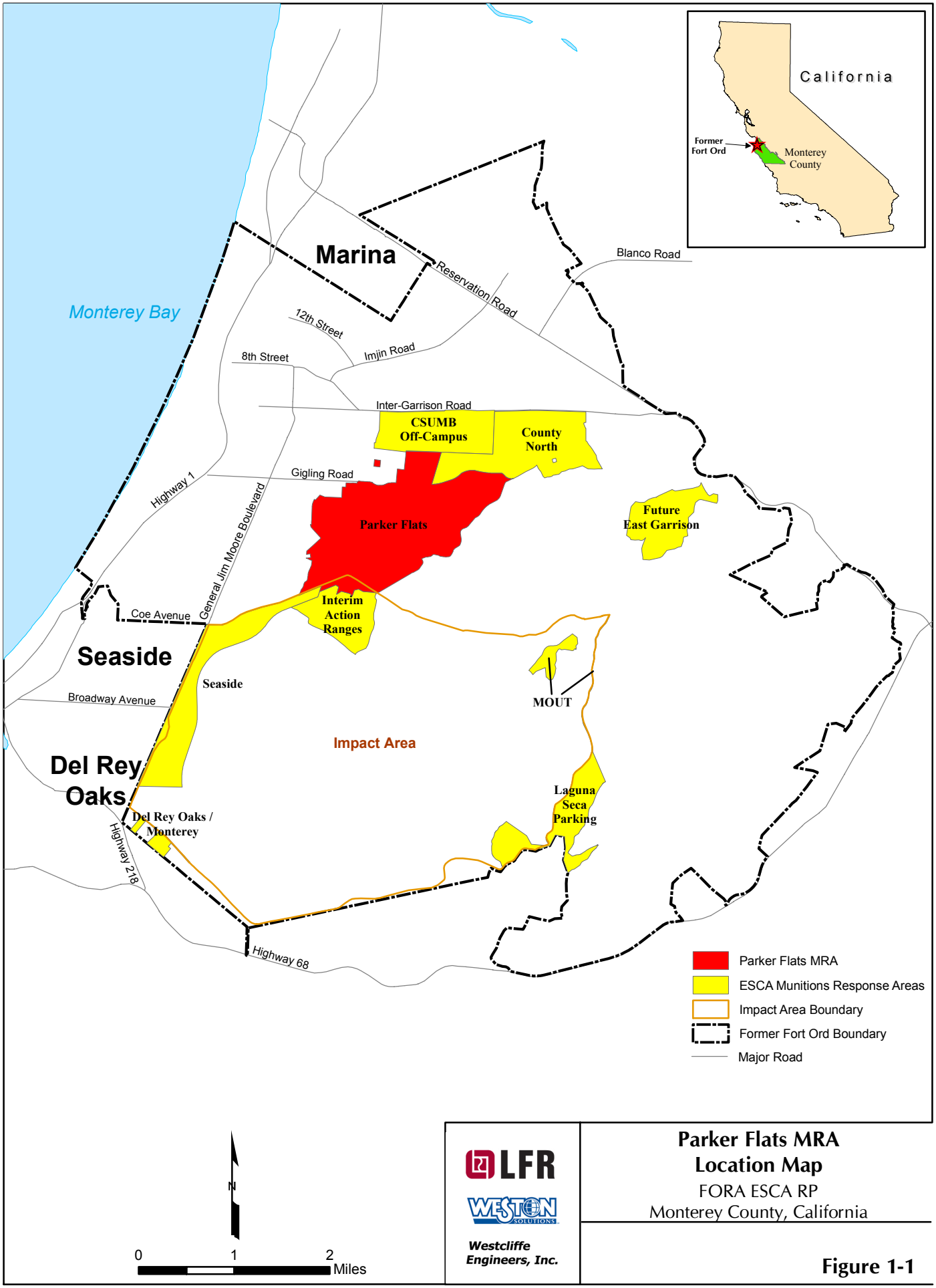
Table 11-3
List of Document Types for the Document Control Log

Description
Site-Specific Removal Report
Report / Minutes, Record of Meeting
Telephone Conversations / Correspondence Records
Conventional Explosives Safety Submission
Monthly Status Report
Weekly Status Report

Table 12-1
Parker Flats MRA – Possible Occurrence of HMP Species by Parcel

USACE Parcel as Referenced in the HMP	Corresponding USACE Parcel and/or Portion of Parcel Currently Used for Property Transfer Documentation	Sand Gilia	Monterey Spineflower	Seaside Bird's Beak	Toro Manzanita	Sandmat Manzanita	Monterey Ceanothus	Eastwood's Ericameria	Hooker's Manzanita	California Black Legless Lizard	California Tiger Salamander	Monterey Ornate Shrew
E18.1	E18.1.1, E18.1.3		X				X			X		X
E18.4	E18.4		X									X
E19a.1	E19a.3		X			X				X		X
E19a.2	E19a.1, E19a.2, E19a.4		X		X	X	X		X	X		X
E19a.3	E18.1.2, E19a.1, E19a.3, E19a.5		X		X	X	X		X	X		X
E20c.1.1	E20c.2		X			X	X	X		X		X
E20c.2.1	E18.1.1		X			X	X	X		X		X
E21a	E19.1.2, E19a.5		X			X	X	X		X		X
E21b.1	E19a.4, E19a.3, E19a.5		X		X	X	X	X	X	X		X
E21b.2	E18.1.2, E19a.4, E19a.5	X	X		X	X	X	X	X	X		X
E21b.3	E21b.3		X	X		X	X	X		X		
L20.18	L20.18		X	X		X	X	X		X		X
L23.2	L23.2		X			X	X					

Notes:
HMP = Habitat Management Plan
MRA = Munitions Response Area
USACE = United States Army Corps of Engineers



T:\Projects\Parker Flats\P1 work plan volume 2\1-1 Parker Flats MRA Location Map.mxd - 10/20/2008 @ 3:09:52 PM

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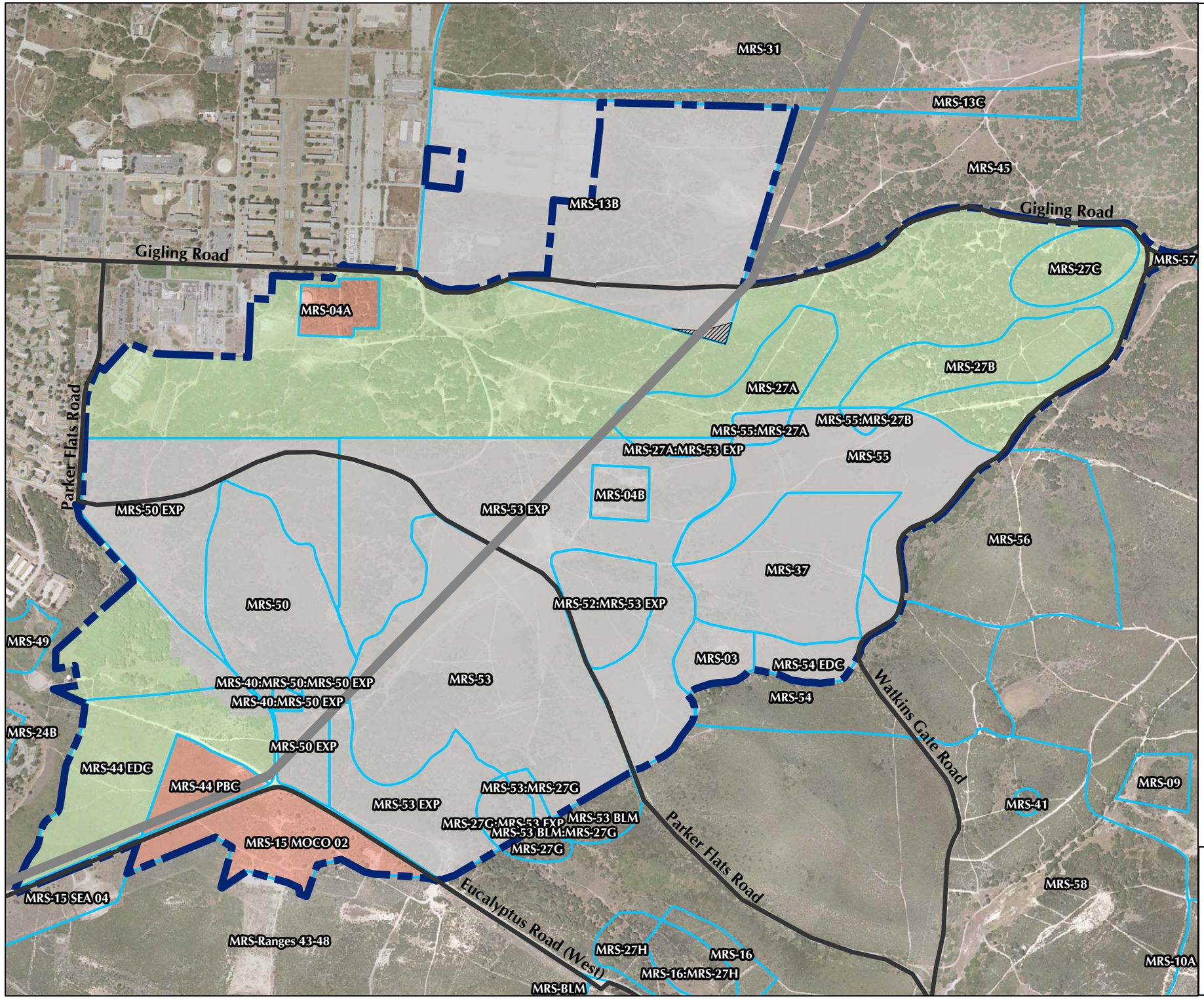
WESTON SOLUTIONS
Westcliffe Engineers, Inc.

Parker Flats MRA Location Map

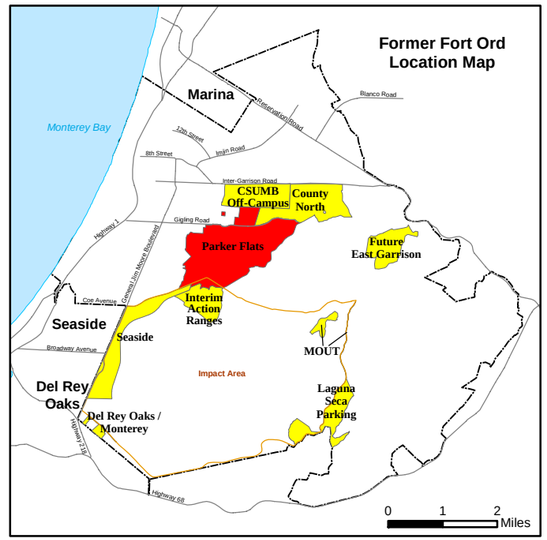
FORA ESCA RP
Monterey County, California

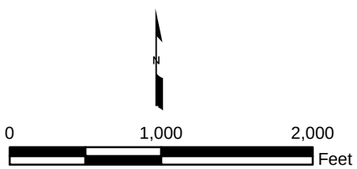
Figure 1-1



Legend

- Parker Flats MRA
- High-Power Transmission Line and Right of Way
- MRS-53 — MRS Boundaries
- Major Road
- Phase I Remedial Investigation Area
- Phase II Removal Action Completed
- Phase II Remedial Investigation Area
- Phase I Remedial Investigation Area to be evaluated as part of the Phase II Feasibility Study





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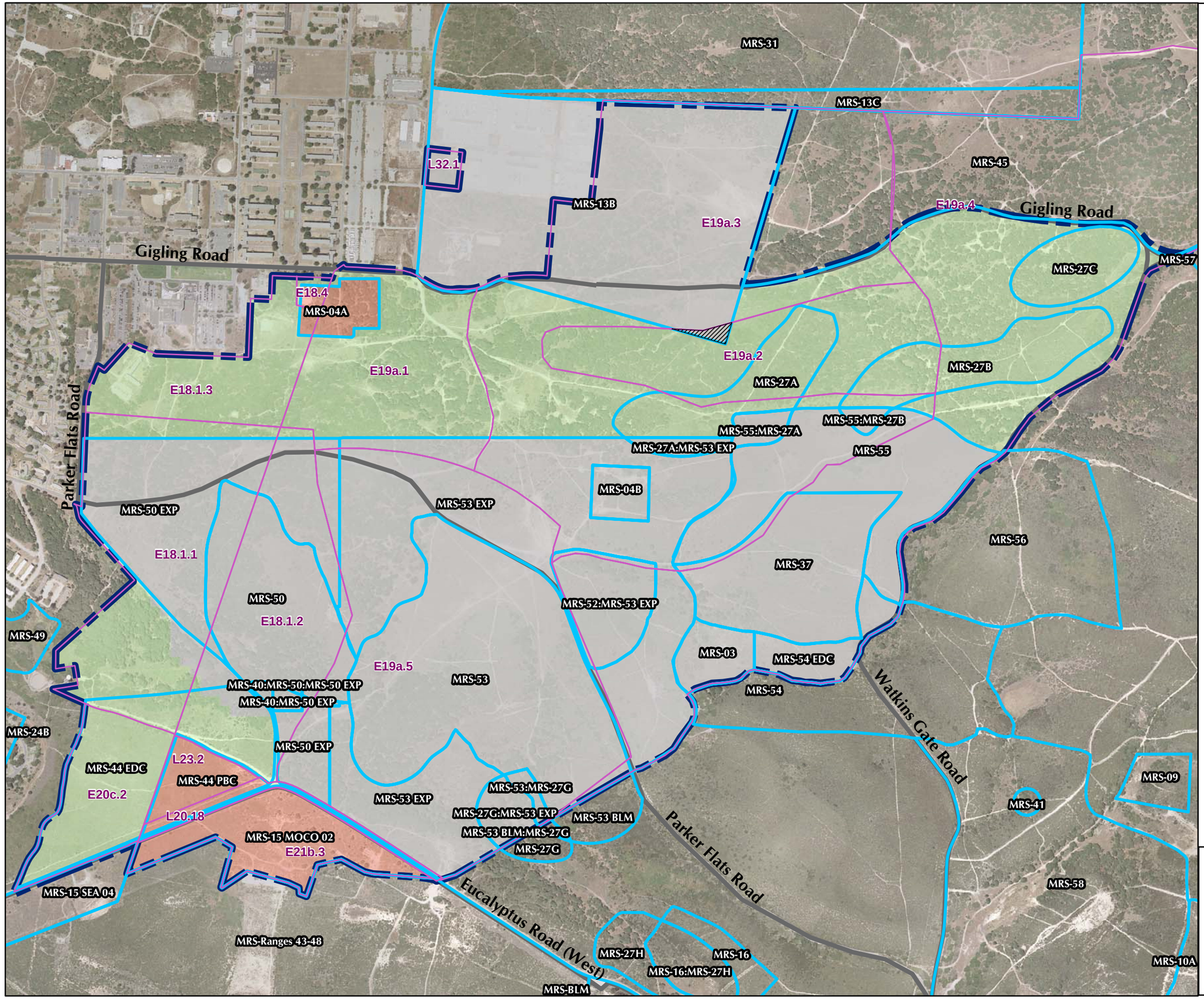
Westcliffe Engineers, Inc.

Parker Flats MRA Phase II Sampling and Analysis Plan

FORA ESCA RP
Monterey County, California

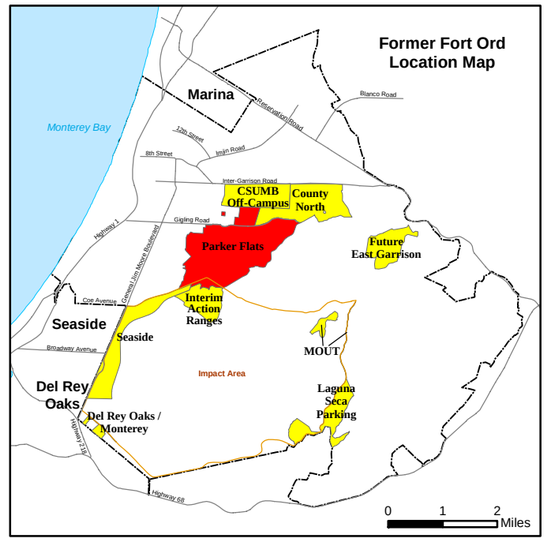
Figure 2-1

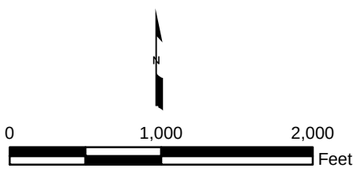
T:\Projects\Parker Flats\P1 work plan volume 2\Parker Flats MRA Phase II Sampling and Analysis.mxd - 11/10/2008 @ 1:43:33 PM



Legend

- MRS-53 — MRS Boundaries
- Parker Flats MRA
- Major Road
- E19a.1 — USACE Parcel
- Phase I Remedial Investigation Area
- Phase II Removal Action Completed
- Phase II Remedial Investigation Area
- Phase I Remedial Investigation Area to be evaluated as part of the Phase II Feasibility Study





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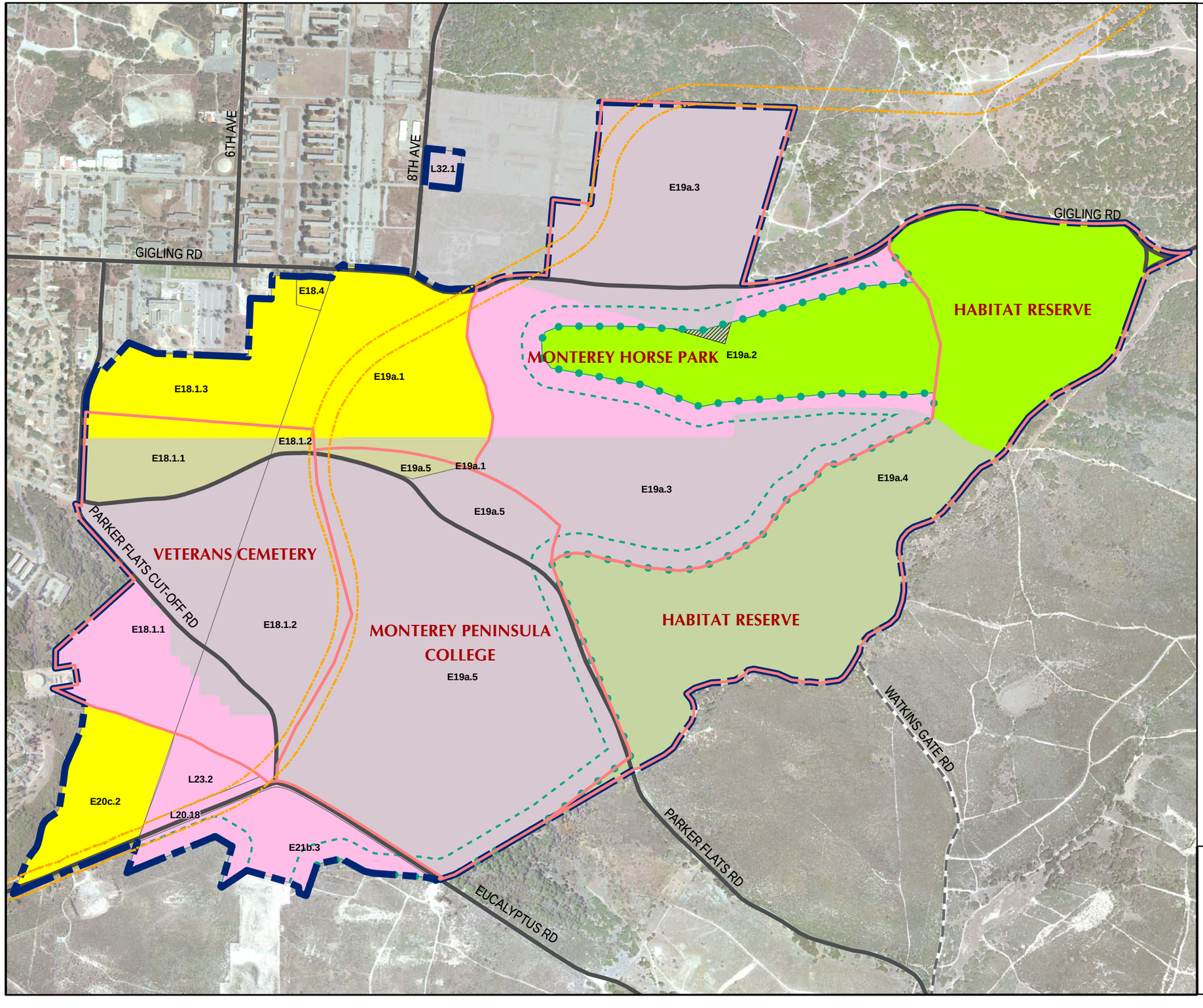
Parker Flats MRA
Phase I and Phase II
USACE Transfer Parcels

FORA ESCA RP
Monterey County, California

Figure 2-2

T:\Projects\Parker Flats\P1 work plan volume 2\Parker Flats MRA Phase I and Phase II USACE Parcels.mxd - 11/10/2008 @ 1:44:08 PM



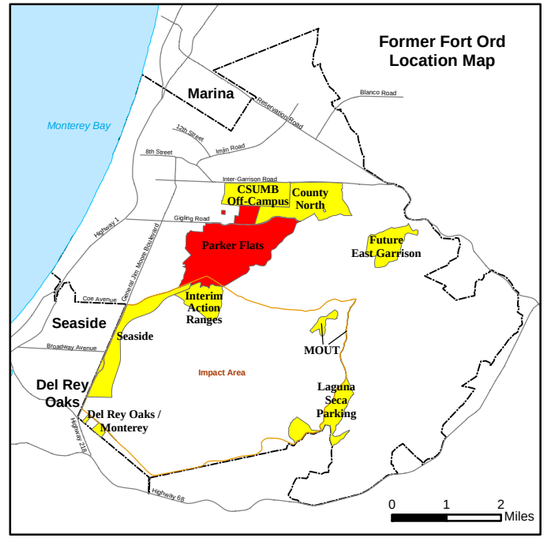
T:\Projects\Parker Flats\P1 work plan volume 2\Parker Flats Land Use Profile Reuse Plan.mxd - 11/10/2008 @ 1:51:46 PM

Legend

- Proposed Roadway Alignment
- Reuser Boundary
- Parker Flats Munitions Response Area
- Major Road
- Dirt or Gravel Road
- E19a.1 — USACE Parcel
- Phase I Remedial Investigation Area
- Phase I Remedial Investigation Area to be evaluated as part of the Phase II Feasibility Study

Future Land Use

- Residential
- Non-Residential
- Habitat Reserve
- Borderland Interface
- 200-Foot Buffer from Borderland Interface



N

0 1,000 2,000 Feet

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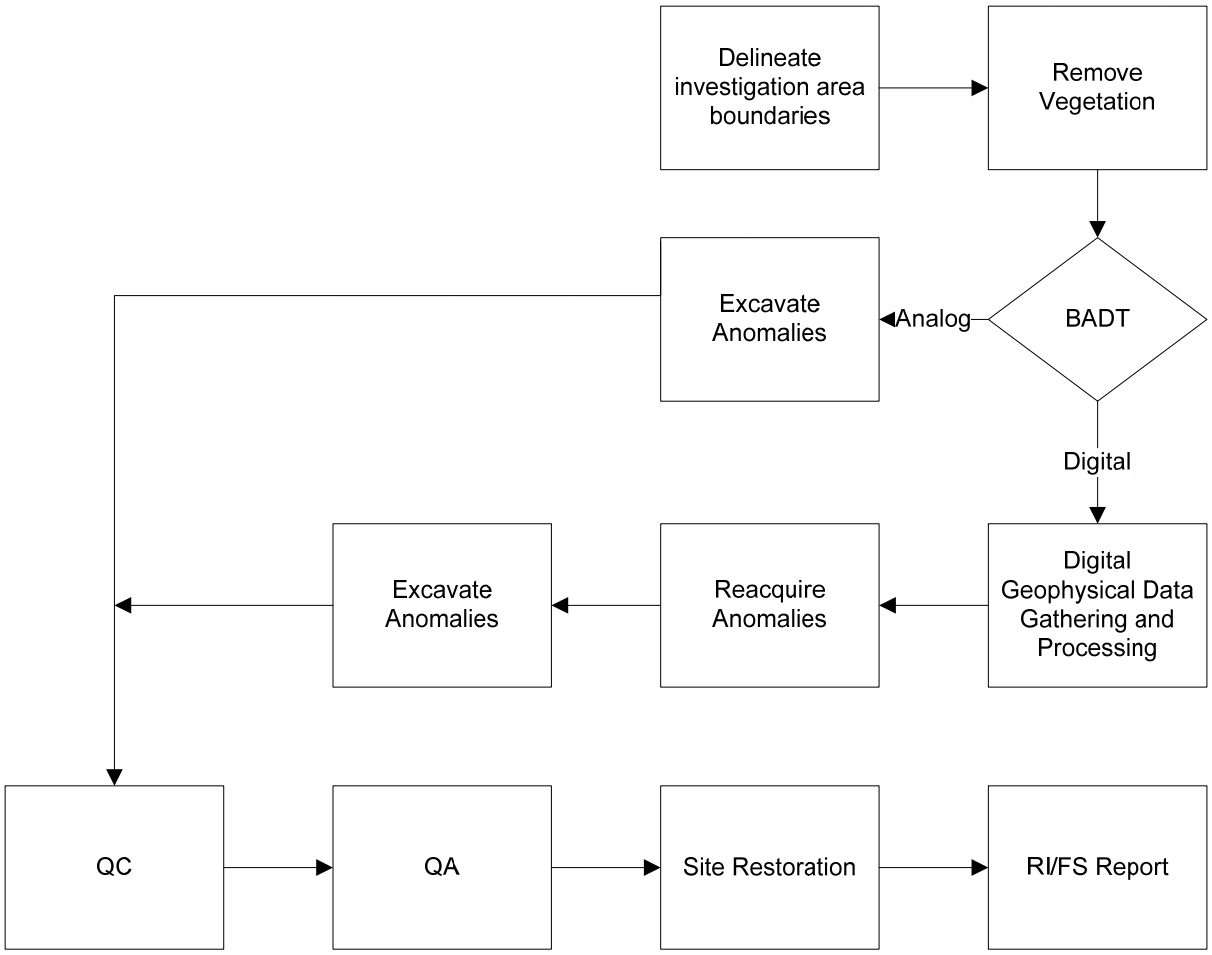
Parker Flats MRA Land Use Profile Reuse Plan

FORA ESCA RP
Monterey County, California

Figure 2-3



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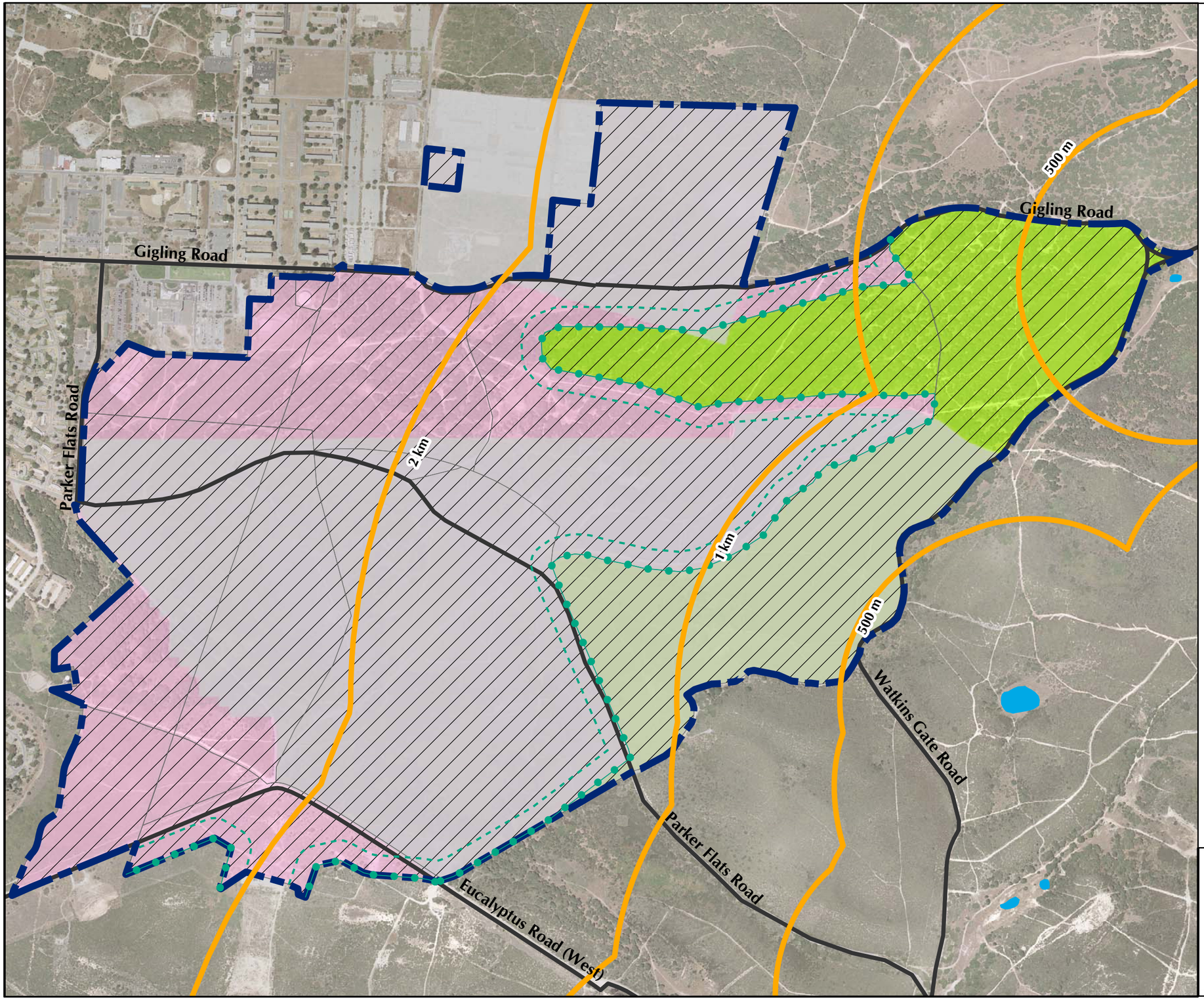
Process Flow of Site Activities

FORA ESCA RP
Monterey County, California

Figure 2-4

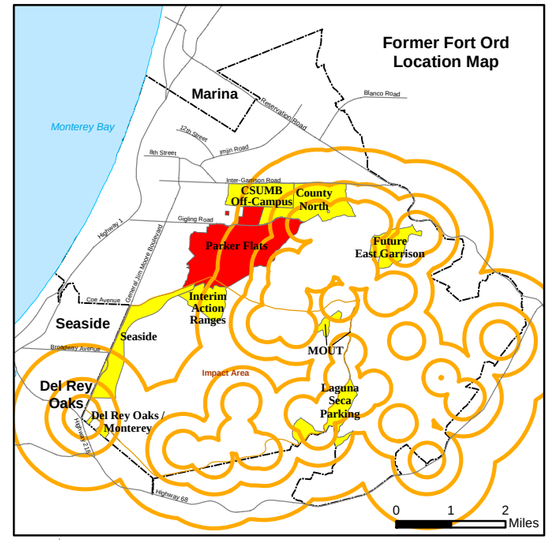


Legend

- Munitions Response Area
- California Tiger Salamander Buffer
- Major Road
- Borderland Interface
- 200-Foot Buffer from Borderland Interface
- Aquatic Features
- Phase I Remedial Investigation Area

Habitat Management Plan Category

- Development (Includes Residential and Non-Residential)
- Development with Reserve or Restrictions
- Habitat Corridor
- Habitat Corridor with Development
- Habitat Reserve



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Parker Flats MRA
Ecological Profile
Habitat Type

FORA ESCA RP
Monterey County, California

Figure 2-5

T:\Projects\Parker Flats\P1 work plan volume 2\Parker Flats Ecological Profile Habitat Type.mxd - 10/20/2008 @ 3:10:09 PM

Gigling Road

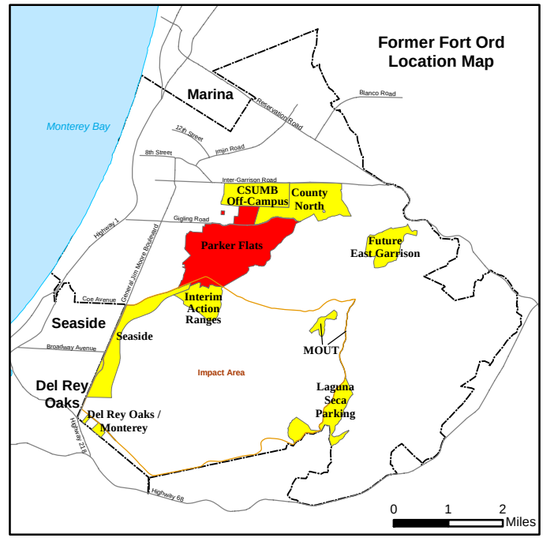
Legend

- Parker Flats MRA
- Major Road
- High-Power Transmission Line and Right of Way
- Borderland Interface
- Phase I Remedial Investigation Area

Trails and Roads

- Unpaved Road 1 (1.1 AC; 1,176 LF)
- Unpaved Road 2 (1.6 AC; 1,178 LF)
- Unpaved Road 3 (2.0 AC; 2,879 LF)
- Trail (8.9 AC; 22,038 LF)
- Trail Convergence Areas (1.3 AC)

Source: Aerial Photo 2003



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Roads and Trails in Future Habitat Reserve

FORA ESCA RP
Monterey County, California

Figure 2-6

T:\Projects\Parker Flats\P1 work plan volume 2\Trails and Open Spaces.mxd - 10/20/2008 @ 3:10:09 PM

T:\Projects\Parker Flats\P1 work plan volume 2\Parker Flats Generalized Vegetation Communities.mxd - 10/20/2008 @ 3:42:41 PM

Gigling Road
Gigling Road
Gigling Road
Parker Flats Road
Parker Flats Road
Watkins Gate Road
Eucalyptus Road (West)
L32.1
E18.4
E19a.1
E18.1.3
E19a.2
E19a.3
E19a.4
E18.1.1
E18.1.2
E19a.5
L23.2
E20c.2
L20.18
E21b.3

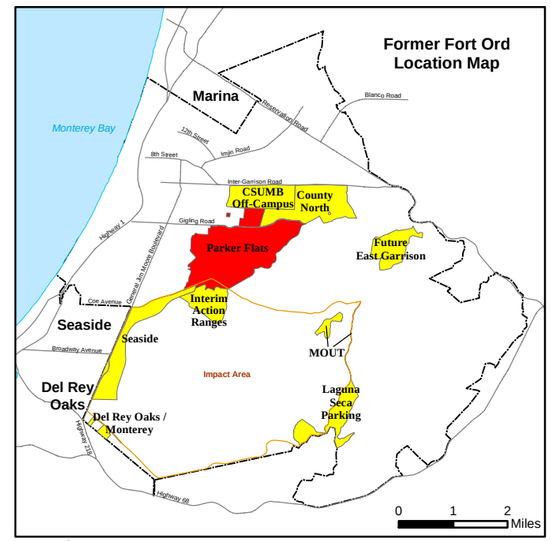
Legend

- Munitions Response Area
- Major Road
- Phase I Remedial Investigation Area
- Borderland Interface
- 200-Foot Buffer from Borderland Interface
- E19a.2 — USACE Parcel

Vegetation Type

- Grassland
- Maritime Chaparral
- Coastal Coast Live Oak Woodland
- Coastal Scrub
- Ice Plant Mats
- Aquatic Features
- Developed / Disturbed

Source: Flora and Fauna Baseline Study of Fort Ord, California, Jones and Stokes Association Inc., December 1992.



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Parker Flats MRA Physical Profile
Generalized Vegetation Communities

FORA ESCA RP
Monterey County, California

Figure 2-7

Michael Houlemard – Exec. Officer
Jim Feeney – Asst. Exec. Dir./ Eng. Mgr.
Jim Arnold – Eng. Project Mgr.
Stan Cook – ESCA Project. Manager
FORA Program Management and Public Outreach

FORA Third Party QA

Barry Steinberg – *FORA Special Counsel*

Candy Ingram – *FORA Public Relations Specialist*

Ivana Bednarik – Controller *FORA Admin*

Tom Johnson *LFR Corporate QC*

Owen Douglas *Weston Corp. QC Rep*

Randy Brandt *LFR NW Reg. Mgr./ Project QC Mgr.*

Cris Jesperson *Weston Pac Div PC Manager*

Hud Heaton *Weston Environmental Service line Manager*

Kristie Reimer *LFR Project Manager*

Raquel Frogier *LFR Project Controller*

George Pita *Weston Project Analyst*

Emma Popek *Project QC Mgr.*

Tracie White *Weston UXO Service Line Leader*

Aimee Houghton *Public Outreach/ Relations Westcliffe*

Jeff Swanson *Regulatory Specialist Westcliffe*

Linda Temple *Weston Remediation Project Mgr.*

Mike Stuart *Weston PHSO*

Sonny Richardson *Weston UXO Technical Mgr. / UXO QC Mgr.*

Chris Spill *LFR Project Technical Manager*

George Crawford, CIH *Certified IH*

Tessa Chapman *LFR Project Administration*

Kersten Holmes *Weston Field Admin*

Weston UXO Safety Officer SSHO

Donald Kean Weston UXO Quality Control

Bruce Moe *Weston SUXOS*

Mike Doherty *LFR Demolition Manager*

Lucas Goldstein *LFR Project Engineer*

Phil Lebednik Qualified Biologist *LFR Bio Team*

Sean Gutknecht *LFR DBM/GIS/CADD*

LFR Subcontractors - Brush Cutting, Demolition, Surveying, Fencing and Burning

Weston Geo-Physicists Team

UXO Team 1

UXO Team 2

UXO Team 3

UXO Team 4

UXO Team 5

LEGEND

- Local Office/ Field Personnel
- Organizational Reporting
- FORA Third Party QA Communication Lines
- Inter-Team Communication and Information Transfer
- Inter-Corporate Communication and Reporting

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Westcliffe Engineers, Inc.

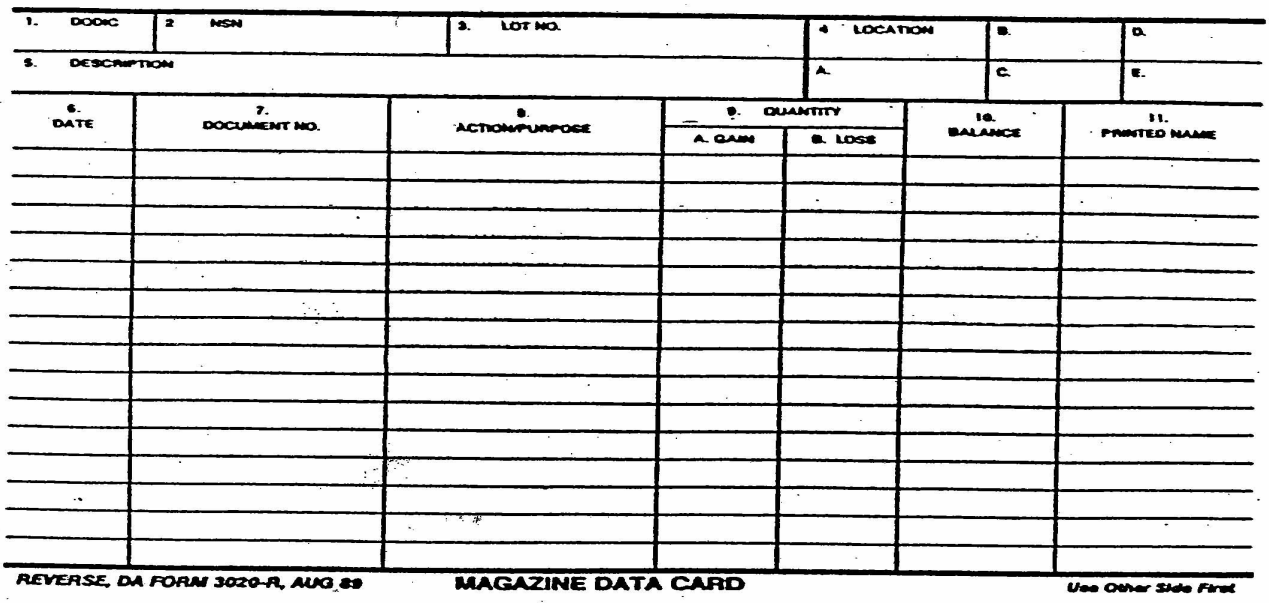
Project Organization Chart

Figure 2-8

Figure 3-1: Explosives Purchase/Receipt/Transportation Authorization List

Address and County: (Home Office) Address and County: (Home Office)			
Federal License #: Expiration Date:			
The following individuals are agents, employees, or representatives of the undersigned, and are authorized to order or acquire explosive materials on behalf of Weston			
Name and Home Address	Driver's License No.	Soc. Sec. Number	Place of Birth
The undersigned certifies the foregoing information to be true and correct to the best of his knowledge and belief, and that he will communicate any additions or deletions to the foregoing list to Weston			
	Date		

Figure 3-2: Magazine Data Card



1. DODIC	2 NSN	3. LOT NO.	4 LOCATION	B.	D.
5. DESCRIPTION			A.	C.	E.

6. DATE	7. DOCUMENT NO.	8. ACTION/PURPOSE	9. QUANTITY		10. BALANCE	11. PRINTED NAME
			A. GAIN	B. LOSS		

REVERSE, DA FORM 3020-R, AUG 89 — MAGAZINE DATA CARD — Use Other Side First

Figure 3-3: Explosive Usage Form

Team Number: Date: Team Leader: Work Areas & Grid Numbers: Project Name:

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.

Figure 3-4: Emergency Response Information

SHIPPING PAPER AND EMERGENCY RESPONSE INFORMATION FOR HAZARDOUS MATERIALS					
THIS VEHICLE IS TRANSPORTING HAZARDOUS MATERIALS					
Date Prepared:	Date of Travel:			Page_____of_____	
Proper Shipping Name	**Hazard**	**ID No.**	**PG**	**Qty/Units**	**Weight**
Emergency notification. In all cases of accident, incident, breakdown or fire, prompt notification must be given. **FOR EMERGENCY RESPONSE INFORMATION, SEE BACK OF THIS FORM**					
Remarks:					
Certification: This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.					
Signature of Shipper Representative:	Signature of Vehicle Operator(s):				
24-Hour Emergency Assistance Telephone Numbers:	Work Hours Emergency Phone Numbers:				

Figure 3-4: Emergency Response Information (Continued)

EMERGENCY RESPONSE INFORMATION

Guide Number 46 and 50 from the U.S. Department of Transportation Emergency Response Guide Book P 5800.6 are reproduced hereon. These guides are applicable to Hazard Class 1 Materials (Explosives).
Mark an X in the appropriate box:

☐ **USE GUIDE 46 FOR EXPLOSIVES (1.1), (1.2), (1.3), (1.5), AND (1.6)**

☐ **USE GUIDE 50 FOR EXPLOSIVES (1.4)**

For all other hazardous materials or substances, annotate appropriate Emergency Response Guide Book Guide Number in the block below, and attach a copy of the guide number page or pages.

Guide Numbers:

GUIDE 46 (ERG 93)

POTENTIAL HAZARDS
FIRE OR EXPLOSION:
May explode and throw fragments 1 mile or more if fire reaches cargo.
HEALTH HAZARDS:
Fire May produce irritating or poisonous gases.

EMERGENCY ACTION
If fire reaches cargo, do not fight fire.

If you know or suspect that heavily-encased explosives, such as bombs or artillery projectiles are involved, stop all traffic and begin to evacuate all persons, including emergency responders, from the area in all directions for 5000 feet (1 mile) for rail car or 4000 feet (3/4 mile) for tractor/trailer.

When heavily-encased explosives are not involved, evacuate the area for 2500 feet (½ mile) in all directions.

Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.

CALL Emergency Response Telephone Number on Shipping paper FIRST. If Shipping Paper NOT AVAILABLE or NO ANSWER, CALL CHEMTREC AT 1-800-424-9300.

FIRE
Cargo Fires: DO NOT FIGHT FIRE WHEN IT REACHES CARGO. Withdraw from area and let fire burn.

Truck and Equipment Fires: Try to prevent fire from reaching the explosive cargo compartment. Flood with water; if no water is available use Halon, dry chemical or earth.

Promptly isolate the scene by removing ALL PERSONS from the vicinity of the incident if there is a fire. First, move people out of line-of-sight of the scene and away from windows. Then, obtain more information and specific guidance from competent authorities listed on the shipping papers.

SPILL OR LEAK
Shut off ignition sources; no flares, smoking or flames in hazard area. Do not touch or walk through spilled material.

FIRST AID
Call emergency medical care.
Use first aid treatment according to the nature of the injury.

GUIDE 50 (ERG 93)

POTENTIAL HAZARDS
FIRE OR EXPLOSION:
May explode and throw fragments 1/3 mile or more if fire reaches cargo.
HEALTH HAZARDS:
Fire May produce irritating or poisonous gases.

EMERGENCY ACTION
If fire reaches cargo, do not fight fire.

Stop all traffic and begin to evacuate all persons, including emergency responders, from the area for 1500 feet (1/3 mile) in all directions.

Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.

CALL Emergency Response Telephone Number on Shipping paper FIRST. If Shipping Paper NOT AVAILABLE or NO ANSWER, CALL CHEMTREC AT 1-800-424-9300.

FIRE
Cargo Fires: DO NOT FIGHT FIRE WHEN IT REACHES CARGO. Withdraw from area and let fire burn.

Truck and Equipment Fires: Try to prevent fire from reaching the explosive cargo compartment. Flood with water; if no water is available use Halon, dry chemical or earth.

Promptly isolate the scene by removing ALL PERSONS from the vicinity of the incident if there is a fire. First, move people out of line-of-sight of the scene and away from windows. Then, obtain more information and specific guidance from competent authorities listed on the shipping papers.

SPILL OR LEAK
Shut off ignition sources; no flares, smoking or flames in hazard area. Do not touch or walk through spilled material.

FIRST AID
Call emergency medical care.
Use first aid treatment according to the nature of the injury.

SUPPLEMENTAL INFORMATION
Packages bearing the 1.4S label contain explosive substances or articles that are designed or packaged in such a manner that when involved in a fire, may burn vigorously with localized detonations and projection of fragments; effects are usually confined to immediate vicinity of packages.

If fire threatens cargo area containing packages bearing the 1.4S label, consider initial isolation of at least 50 feet in all directions. Fight fire with normal precaution from a reasonable distance.

Figure 3 -5: Motor Vehicle Inspection Checklist

This form must be filled out for any vehicle carrying explosives, prior to loading.			
This form is for use on site only.			
DRIVERS NAME		LICENSE NUMBER	
COMPANY			
TYPE OF VEHICLE		VEHICLE NUMBER	
INSPECTION DATE/TIME		INSPECTOR	
PART INSPECTED	SAT.	UNSAT.	COMMENT
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 (INSPECTOR INITIAL)			
ACCEPTED:			
REJECTED:			
REMARKS			
DRIVERS SIGNATURE/DATE			INSPECTORS SIGNATURE/DATE