

Track 1
Plug-In Approval Memorandum
Bureau of Land Management (BLM) Area C
Former Fort Ord, California

Prepared for

United States Department of the Army
Base Realignment and Closure (BRAC)
Former Fort Ord, California

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Table of Contents

List of Tables	ii
List of Figures	ii
List of Appendices	ii
Acronyms and Abbreviations	iii
1.0 Introduction.....	1-1
1.1 Fort Ord and Munitions Response RI/FS Background	1-2
1.2 Track 1 Plug-In Process.....	1-4
1.3 Approval Memorandum Organization.....	1-5
2.0 Site Summaries.....	2-1
2.1 Site Location and Description.....	2-1
2.2 Aerial Photography Review.....	2-2
2.3 Site History by Area	2-4
2.4 History of Area Investigations and Removals	2-9
2.4.1 MRS-Specific Investigation History.....	2-13
2.4.2 Adjacent Areas.....	2-23
2.4.2.1 Track 1 Sites.....	2-23
2.4.2.2 Track 2 Sites.....	2-24
2.4.2.3 Track 3 Sites.....	2-26
2.4.2.4 Adjacent ESCA MRAs.....	2-26
3.0 Conceptual Site Model (CSM) Development	3-1
3.1 Site Features.....	3-1
3.2 Identified Training Practices.....	3-1
3.3 Potential Sources and Locations of MEC	3-4
3.4 Potential Exposure Pathways.....	3-5
3.5 Current and Future Land Use.....	3-14
4.0 Site Evaluation	4-1
4.1 Literature Review	4-1
4.1.1 Type of Training and Military Munitions Expected.....	4-1
4.1.2 Subsequent Use of the Area.....	4-2
4.1.3 Establishment of Site Boundaries	4-2
4.1.4 Summary of Literature Review Analysis.....	4-2
4.2 Site Walk Review	4-2
4.2.1 Site Walk Results (Items Found).....	4-2
4.2.2 Site Boundaries Review.....	4-3
4.2.3 Quality Assurance/Quality Control	4-3
4.3 Sampling and Removal Action Review.....	4-4
4.3.1 Sampling and Removal Results (Items Found)	4-5
4.3.1.1 Sampling Results.....	4-5
4.3.1.2 Removal Results.....	4-5
4.3.2 Site Boundaries Review.....	4-6
4.3.3 Equipment Review.....	4-6
4.4 Sampling Methods Discussion.....	4-9
4.5 Quality Assurance/Quality Control	4-11
4.5.1 Field Sampling QA/QC	4-11
4.5.2 Data Management QA/QC	4-12
4.5.3 Data Quality Conclusions	4-13
5.0 Conclusions and Recommendations.....	5-1

5.1	Conclusions.....	5-1
5.2	Sampling and Removal Adequacy and Data Quality	5-5
5.3	Recommendations.....	5-6
6.0	References	6-1

List of Tables

Table 1A	BLM Area C North Acreage
Table 1B	BLM Area C East Acreage
Table 2A	BLM Area C North MEC Items Identified
Table 2B	BLM Area C East MEC Items Identified
Table 3A	BLM Area C North MD Identified
Table 3B	BLM Area C East MD Identified

List of Figures

Figure 1	Regional Location Map
Figure 2	BLM Area C Location Map
Figure 3	Parcel Map
Figure 4	BLM Area C North Munitions Response Sites
Figure 5	BLM Area C East Munitions Response Sites
Figure 6	BLM Area C Historical Training Areas
Figure 7	BLM Area C North Reported Historical Training Areas
Figure 8	BLM Area C East Reported Historical Training Areas
Figure 9	BLM Area C North 1941 Aerial Photograph
Figure 10	BLM Area C East 1941 Aerial Photograph
Figure 11	BLM Area C North 1956 Aerial Photograph
Figure 12	BLM Area C East 1956 Aerial Photograph
Figure 13	BLM Area C East 1966 Aerial Photograph
Figure 14	BLM Area C East 1975 Aerial Photograph
Figure 15	BLM Area C North 1986 Aerial Photograph
Figure 16	BLM Area C East 1986 Aerial Photograph
Figure 17	BLM Area C North Investigation Results
Figure 18	BLM Area C East Investigation Results

List of Appendices

Appendix A	Glossary
Appendix B	Geographical Areas from Remaining RI/FS Areas Management Plan and Associated Decision Documents
Appendix C	Site Evaluation Checklists

Acronyms and Abbreviations

AR	Administrative Record
Army	United States Department of the Army
ASP	Ammunition Supply Point
ASR	Archives Search Report
ATT	Army Training Test
bgs	below ground surface
BLM	Bureau of Land Management
BRA	Basewide Range Assessment
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMS	CMS Environmental, Inc.
CS	2-chlorobenzylidene malononitrile
CSM	Conceptual Site Model
DGM	Digital Geophysical Mapping
DMM	Discarded Military Munitions
DQO	Data Quality Objective
DTSC	[California] Department of Toxic Substances Control
EFA	Eucalyptus Fire Area
EM	electromagnetic
EOD	explosive ordnance disposal
EPA	[United States] Environmental Protection Agency
ESCA	Environmental Services Cooperative Agreement
ESCA RP	Environmental Services Cooperative Agreement Remedial Program
FFA	Federal Facility Agreement
FORA	Fort Ord Reuse Authority
GPS	Global Positioning System
HE	High Explosive
HLA	Harding Lawson Associates
HMP	Habitat Management Plan
HUMRO	Human Research Organization
ISD	Insufficient Data
KEMRON	KEMRON Environmental Services, Inc.
MACTEC	MACTEC Engineering and Consulting, Inc.
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
mm	millimeter
MMRP	Military Munitions Response Program
MOUT	Military Operations in Urban Terrain
MPPEH	material potentially presenting an explosive hazard
MR	Munitions Response
MRA	Munitions Response Area
MRS	Munitions Response Site
NFA	No Further Action
NRMA	Natural Resources Management Area
ODDS	Ordnance Detection and Discrimination Study
OE	Ordnance and Explosives
QA/QC	Quality Assurance/Quality Control

Acronyms and Abbreviations (Continued)

QCP	Quality Control Plan
Parsons	Parsons Engineering Science, Inc.
PA/SI	Preliminary Assessment/Site Inspection
PD	point detonating
PM	Project Manager
RAC	Risk Assessment Code
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SFC	Sergeant First Class
Shaw	Shaw Environmental, Inc.
SUXOS	Senior UXO Supervisor
TCRA	Time Critical Removal Action
TM	Technical Manual
USA	USA Environmental, Inc.
USACE	U.S. Army Corps of Engineers
UXB	UXB International, Inc.
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
VSP	Visual Sample Plan

1.0 Introduction

The Munitions Response Remedial Investigation/Feasibility Study (MR RI/FS) for the former Fort Ord, California is being implemented to evaluate and address all areas within the base known or suspected to contain munitions and explosives of concern (MEC) from past military training activities. This Track 1 Plug-In Approval Memorandum (Approval Memorandum) was prepared for Bureau of Land Management (BLM) Area C located within the former Fort Ord in Monterey County, California. The purpose of this Approval Memorandum is to provide the information necessary to define BLM Area C as a Track 1 site according to the United States Department of the Army's (Army) Record of Decision, No Further Action Related to Munitions and Explosives of Concern - Track 1 Sites, No Further Remedial Action with Monitoring for Ecological Risks from Chemical Contamination, Site 3 (Track 1 ROD, Army, 2005b). The MR RI/FS program is being completed by grouping areas and sites within the former Fort Ord into a series of "tracks" numbered 0 through 3, based on MEC-related characteristics, to expedite clean-up, reuse, and/or transfer of former Fort Ord property. The Track 1 portion of the MR RI/FS program addresses sites or areas that were suspected to have been used for military training with military munitions but based on the RI/FS, the sites fall into one of the following three categories:

- Category 1: There is no evidence to indicate military munitions were used at the site, i.e., suspected training did not occur; or
- Category 2: The site was used for training, but the military munitions items used do not pose an explosive hazard, i.e., training did not involve explosive items; or
- Category 3: The site was used for training with military munitions, but military munitions items that potentially remain as a result of that training do not pose an unmitigated risk based on site-specific evaluations conducted in the Track 1 RI/FS. Field investigations identified evidence of past training involving military munitions, but training at these sites involved only the use of practice and/or pyrotechnic items that are not designed to cause injury. In the unlikely event that a live item of the type previously observed at the site is found, it is not expected that the item would function by casual contact (i.e., inadvertent and unintentional contact).

BLM Area C includes approximately 2,170 acres located in the eastern portion of the former Fort Ord (Figure 1). The Track 1 ROD described the Plug-In process for sites that may be identified after further research has been completed in the MR RI/FS program. BLM Area C has been identified as eligible as a Track 1, Category 3 Plug-In site based on the location, physical features, types of past training activities, and MEC and munitions debris (MD) found.

When written concurrence from the United States Environmental Protection Agency (EPA) and acknowledgement from the California Department of Toxic Substances Control (DTSC) are received, this Approval Memorandum will serve as the Decision Document stating that No Further Action (NFA) regarding munitions response is required for BLM Area C. The following sections provide an overview of the former Fort Ord background, the Track 1 Plug-In process, and site-specific information including

history of the area, future use, and rationale for the inclusion of BLM Area C into the Track 1 process. A glossary of Military Munitions Response Program (MMRP) terms is provided in [Appendix A](#).

1.1 Fort Ord and Munitions Response RI/FS Background

The former Fort Ord is located in northern Monterey County approximately 80 miles south of San Francisco. The former Army base is made up of approximately 28,000 acres of land next to Monterey Bay and the cities of Seaside, Sand City, Monterey, and Del Rey Oaks to the south, and the city of Marina to the north. The former Fort Ord is bounded to the east and north by the Salinas Valley. Highway 1 passes through the western part of Fort Ord, separating the beachfront portions from the rest of the base. Laguna Seca Recreation Area and Toro Regional Park also border Fort Ord to the south and southeast, respectively, as well as several small communities along Highway 68.

Since it was established in 1917, Fort Ord served primarily as a training and staging facility for infantry troops. Fort Ord was a basic training center from 1947 to 1975. The 7th Infantry Division was activated at Fort Ord on 21 October 1974 and occupied Fort Ord until base closure in 1994. Fort Ord was selected for closure in the 1991 Base Realignment and Closure (BRAC) Act. Fort Ord was officially closed in September 1994. No active Army division is stationed at Fort Ord; however, Army personnel operate the areas of Fort Ord still held by the Army. Much of the installation has been or will be disposed to federal, state, local, and private entities through economic development conveyance, public benefit conveyance, negotiated sale, or other means.

Portions of the former Fort Ord were used by Army units between 1917 and 1994 for maneuvers, target ranges, and other purposes. The types of munitions used at the former Fort Ord include artillery and mortar projectiles, rockets, guided missiles, rifle and hand grenades, practice land mines, pyrotechnics, bombs, and demolition materials. As a result, a wide variety of conventional MEC, both unexploded ordnance (UXO) and discarded military munitions (DMM) items, have been encountered at sites throughout the former Fort Ord.

In preparation for transfer and reuse of former Fort Ord property, various military munitions-related investigative and removal/remedial activities have been performed since 1993. Potential soil contamination at the former Fort Ord was investigated under the *Basewide Remedial Investigation/Feasibility Study* (Harding Lawson Associates [HLA], 1995), and continues to be addressed under the Basewide Range Assessment and Site 39 programs. Based on the Basewide Range Assessment for potential soil contamination, no additional investigation or remediation is required for BLM Area C.

A Federal Facility Agreement (FFA) was signed in 1990 by the Army, EPA, DTSC, and the Central Coast Regional Water Quality Control Board. The FFA establishes schedules for performing RI/FSs and requires that remedial actions be completed as expeditiously as possible. In 1998, the Army agreed to evaluate military munitions at the former Fort Ord in a basewide MR RI/FS (formerly ordnance and explosives [OE] RI/FS) consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The basewide MR RI/FS program addressed MEC hazards on the former Fort Ord and evaluated past removal actions as well as recommended preferred remedial actions deemed necessary to protect human health and the environment for future uses. In April 2000, an agreement was

signed among the Army, EPA, and DTSC to evaluate military munitions at the former Fort Ord subject to the provisions of the FFA. The MR RI/FS uses a “tracking” process that categorizes areas with similar MEC-related characteristics to expedite cleanup, reuse, and/or transfer of former Fort Ord property. According to this tracking process, an area under investigation is assigned one of four tracks, Tracks 0 through 3, which are described as follows.

- Track 0: Areas that contain no evidence of MEC and have never been suspected as having been used for military munitions-related activities of any kind. Details of the Track 0 program and areas addressed are provided in the *Final Record of Decision No Action Regarding Ordnance-Related Investigation, Former Fort Ord, California (Track 0)* (ROD; Army, 2002), and the *Explanation of Significant Differences Final Record of Decision No Action regarding Ordnance-Related Investigation (Track 0 ROD) Former Fort Ord, California* (Army, 2005a).
- Track 1: Sites where military munitions were suspected to have been used, but based on the RI/FS for each site, fall into one of the following three categories.
 - Category 1: There is no evidence to indicate military munitions were used at the site, i.e., suspected training did not occur; or
 - Category 2: The site was used for training, but the military munitions items used do not pose an explosive hazard, i.e., training did not involve explosive items; or
 - Category 3: The site was used for training with military munitions, but military munitions items that potentially remain as a result of that training do not pose an unacceptable risk based on site-specific evaluations conducted in the Track 1 RI/FS. Field investigations identified evidence of past training involving military munitions, but training at these sites involved only the use of practice and/or pyrotechnic items that are not designed to cause injury. In the unlikely event that a live item of the type previously observed at the site is found, it is not expected that the item would function by casual contact (i.e., inadvertent and unintentional contact).

NFA related to munitions response is required for designated Track 1 sites. Details of the Track 1 program and sites addressed are provided in the Track 1 ROD (Army, 2005b).

- Track 2: Sites where MEC items were present and a MEC removal action has been conducted.
- Track 3: Areas where MEC items are known or suspected to be present, but MEC investigations have not yet been completed.

Elements of the MR RI/FS program include several completed RODs for Track 0, Track 1, Track 2, and Track 3 addressing significant portions of the former Fort Ord. In 2000, the approach for completing the investigation for the remaining areas was developed and outlined in the *Final Remaining Remedial Investigation/Feasibility Study Areas Management Plan, Former Fort Ord, California* (Management Plan; MACTEC/Shaw, 2010). As part of the evaluation process, the remaining areas were divided into nine geographic areas to facilitate investigation and documentation. These areas were established based on (1) the date the Army acquired the property, (2) the primary vegetation type, (3) munitions response site (MRS) boundaries, and (4) geographic areas, as appropriate. Based on an evaluation of each of the

geographic areas, the Management Plan outlined the following approach: additional field investigation through site assessment, where warranted, and completion of documentation through the Track 1 and Track 2 processes (MACTEC/Shaw, 2010).

Six of the nine geographic areas are located within current and future BLM habitat reserve areas. These areas were subsequently evaluated in the MR RI/FS process as BLM Area A, BLM Area B, and BLM Area C (Figure 2). BLM Area A was addressed through the Track 1 process and is documented in the *Track 1 Plug-in Approval Memorandum BLM Area A, Former Fort Ord, California* (ITSI, 2012). BLM Area B was addressed through the Track 2 process and is documented in the *Final Record of Decision, Track 2 Bureau of Land Management Area B and Munitions Response Site 16, Former Fort Ord, California* (Army, 2017a). BLM Area C is addressed in this Track 1 Plug-In Approval Memorandum. BLM Area C addresses much of the geographic areas "BLM East/Pre-1940 (Northern Portion)," "BLM East/Pre-1940 (Southern Portion)," "BLM North (Northern Portion)," and "BLM North (Southern Portion)." The Track 1 Plug-In process, which addresses Track 1 sites not included in the original Track 1 ROD, is described below. When this BLM Area C Track 1 Plug-In Approval Memorandum is approved, the evaluation of all of the nine geographic areas identified in the Management Plan will be complete. Decision documents associated with the nine geographic areas are identified in [Appendix B](#).

1.2 Track 1 Plug-In Process

This section describes the Track 1 program and summarizes steps to address future sites eligible for Track 1 through the Plug-In process.

As described in the Track 1 ROD, NFA decisions for future Track 1 Plug-In sites (e.g., BLM Area C) will be proposed and documented in Approval Memoranda. This Approval Memorandum provides the same level of information that was included in the RI Site Reports and in the *Final Track 1 Ordnance and Explosives Remedial Investigation/Feasibility Study* (MACTEC, 2004), and describes the rationale for Track 1 designation. In accordance with the Track 1 ROD, the Approval Memorandum for BLM Area C includes the following:

1. A description of the site;
2. A description of the historical use of the site;
3. Rationale for the designation of BLM Area C as Track 1; and
4. Figures of BLM Area C detailing its location and any pertinent available MEC-related information.

There is a public review process for Approval Memoranda, and they will be primary documents under the FFA. Each Track 1 Plug-In Approval Memorandum will be submitted and finalized according to the agency consultation process outlined in Section 7 of the FFA. Following agency review of the draft Approval Memorandum and necessary revisions, the Army will submit the Approval Memorandum for a 30-day public review and comment period. A public notice will be posted in a local newspaper announcing the opportunity to review and comment on the proposed decision(s). Subsequently, the Army will submit to the agencies a summary of public comments and responses to the comments, and any

needed revisions to the Approval Memorandum, at which time the Approval Memorandum will be considered a draft final document as defined in the FFA. Within 30 days of this submittal, the agencies will, in writing, either concur with or acknowledge the Army's decision(s), or initiate a dispute per Section 12 of the FFA.

When the written concurrence from EPA and acknowledgement from DTSC are received, a public notice will be posted in a local newspaper. Planned and completed "NFA Related to MEC" site determinations will also be described in former Fort Ord environmental cleanup newsletters prepared by the Army for local residents. Notification of these proposed and completed activities will also be distributed to appropriate local agencies. The Proposed Plan and ROD for Track 1 and other tracks, as well as associated Approval Memoranda, have been placed in the former Fort Ord Administrative Record (AR).

1.3 Approval Memorandum Organization

This Approval Memorandum contains two major elements: (1) a presentation and assessment of archival data ([Section 2](#) and [Section 3](#)), and (2) a site evaluation ([Section 4](#)) that uses the archival data presented in the preceding sections.

The archival data presented in [Section 2](#) includes a review of the area history, evaluation of potential military munitions in the area, and a summary of previous MR investigations. [Section 3](#) presents the conceptual site model (CSM) for BLM Area C. The site evaluation in [Section 4](#) was conducted in accordance with the procedures described in the *Final Plan for Evaluation of Previous Work Ordnance and Explosives Remedial Investigation/Feasibility Study* (HLA, 2000) and may restate some information presented in [Section 2](#) and [Section 3](#). The site evaluation discusses the evaluation of literature review, sampling, site walk, and MEC removal processes based on information from standardized evaluation checklists ([Appendix C](#)) and summarizes the conclusions for the area. The recommendations for BLM Area C are presented in [Section 5](#). References cited in this Approval Memorandum are in [Section 6](#).

2.0 Site Summaries

2.1 Site Location and Description

BLM Area C is located in the eastern portion of the former Fort Ord, as depicted on [Figure 1](#), with a total acreage of approximately 2,170 acres. The property was purchased by the Army in 1917 and was included as part of the land transferred to the BLM in 1996.

BLM Area C comprises two non-contiguous areas that include several MRSs and areas in between these MRSs. For the purpose of this document, these two areas are referred to as “BLM Area C North” and “BLM Area C East.” BLM Area C North is located north of BLM Area B, which is addressed as a Track 2 area. BLM Area C East is located east of the historical Impact Area and adjacent to BLM Area A, an approved Track 1 NFA site. [Tables 1A](#) and [1B](#) provide a listing of MRSs included in BLM Area C and their respective acreages. The MRS locations are depicted on [Figure 4](#) and [Figure 5](#).

BLM Area C North is approximately 456 acres and includes ([Table 1A](#); [Figure 4](#)):

- MRS-27D,
- MRS-57,
- MRS-59, and
- approximately 217 acres of land between and around these sites.

BLM Area C does not include two approved Track 1 NFA sites located in the vicinity, MRS-27F and MRS-59A ([Figure 2](#)). Information about these two completed Track 1 sites is presented in this document as it pertains to the investigations in the surrounding areas.

BLM Area C East is approximately 1,714 acres and includes ([Table 1B](#); [Figure 5](#)):

- MRS-14B (excludes portions located in BLM Area A and BLM Area B),
- MRS-14E (excludes portion located in BLM Area B),
- MRS-27K,
- MRS-27L,
- MRS-27M,
- MRS-27O (excludes portion located outside of BLM Area C),
- MRS-27P,
- MRS-27Q (excludes portion located in BLM Area A),
- MRS-27T (excludes portion located in BLM Area A),
- MRS-27V (excludes portion located in BLM Area A),
- MRS-27W (excludes portion located in BLM Area A),

- MRS-60,
- MRS-64 (excludes portion located in BLM Area A),
- MRS-65, and
- approximately 1,206 acres of land between and around these MRSs.

2.2 Aerial Photography Review

Aerial photographs covering BLM Area C from 1941, 1956, 1966, 1975, and 1986 were reviewed and are discussed in this section.

1941 aerial photograph (Figures 9 and 10)

- BLM Area C North
 - Most of MRS-57 that is located within BLM Area C North is covered by two interconnected ponds. There is disturbed area just south of the two ponds near a patch of trees. Several roads traverse MRS-57. On the northern edge of MRS-57, southeast of the intersection of Watkins Gate Road and Hennekens Ranch Road, a turn-off is apparent from the road leading down to the pond. Also, there are several small square areas of disturbed soil in the southern portion of MRS-57 where it overlaps with MRS-27D (shown as “MRS-57:MRS-27D” on [Figure 9](#)). Several foot-trails also cross the area. The aerial photograph shows a trench in the central portion of MRS-59. Several ponds are visible in the northern portion of MRS-59. No additional obvious features other than roads and trails are shown in the BLM Area C North.
- BLM Area C East
 - A disturbed or fill area is evident at the northern portion of BLM Area C East, southwest of Reservation Road. This feature extends into the northern portion of BLM Area C East from adjacent MRS-23 (adjacent to the BLM Area C boundary) ([Figure 10](#)). A small disturbed area appears within the northern part of BLM Area C East, just south of the larger disturbed area in MRS-23. This disturbed area appears to have a trail connecting it to the larger disturbed area. Another disturbed area is visible in the western portion of BLM Area C East at the intersection of Barloy Canyon Road and Eucalyptus Road, within MRS-27O. A building can be seen just to the east of this disturbed area, in the approximate middle of MRS-27O. No other features are visible in the 1941 photograph.

1956 aerial photograph (Figures 11 and 12)

- BLM Area C North
 - The small area of disturbed soil in the northern section of MRS-27D where it overlaps with MRS-57 (MRS-57:MRS-27D) and in the adjacent portion of MRS-27D has been replaced by larger areas of disturbed soil. Due to the poor quality of the photograph, it is not possible to tell if these are artificial or natural features. The southern pond in MRS-57 appears to be dry and the northern one is much smaller. The turn-off to the pond is still visible and the disturbed area of soil near the trees is no longer apparent. In MRS-59, the trench that was visible in the 1941 photograph is no longer visible and the ponds

appear to be dry. Various roads and trails traverse the area. No other features are visible in the 1956 photograph.

- BLM Area C East
 - Various roads and trails traverse the area. No other features are visible in the 1956 photograph.

The 1966 aerial photograph ([Figure 13](#))

- BLM Area C North
 - No aerial photograph was available for the year 1966.
- BLM Area C East
 - Grid-like disturbed areas on the eastern edge of MRS-27K and in MRS-27M and MRS-60, and several areas southeast of MRS-27O are visible. There are also several disturbed areas near MRS-27L. Multiple roads are visible south of MRS-60 in the area described as a driving course area identified on 1950s and 1960s Fort Ord training maps. Mudhen Lake is visibly smaller than in the previous aerial photograph.

1975 aerial photograph ([Figure 14](#))

- BLM Area C North
 - No aerial photograph was available for the year 1975.
- BLM Area C East
 - The cleared areas between the edge of the northern boundary of BLM Area C East and MRS-27L are still visible. The grid-like disturbed pattern at MRS-27M is much smaller and no longer in the shape of a grid - it appears to be a line with cross hatching. The former grid area disturbed patterns south of MRS-27O appear less distinct. A small cleared area is visible in the overlapping area of MRS-65 and MRS-27M. Two cleared areas are visible in the central portion of MRS-14E. Roads are visible crossing MRS-14B and MRS-14B.

1986 aerial photograph ([Figures 15 and 16](#))

- BLM Area C North
 - Several, obviously artificial, disturbed areas are visible in the southern portion of MRS-27D. They appear as three interconnected rectangular areas. The turn-off from the road to the northern pond in MRS-57 is again present. A small area of disturbed soil is seen by the trees south of the ponds (although it is different in shape from the area in the 1941 aerial photographs). Both ponds in MRS-57 contain water in the 1986 photograph.
- BLM Area C East
 - Due to the better quality of the 1986 aerial photographs, the grid-like disturbed pattern at MRS-60 is visible but overgrown. The disturbed areas and roads in MRS-14E are now overgrown. The roads traversing the Driving Course Area are still visible. The cleared area in the overlapping area of MRS-65 and MRS-27M is still visible in the 1986 aerial photograph, but appears to be overgrown.

2.3 Site History by Area

MRSs were identified and listed in the 1997 *Revised Archives Search Report, Former Fort Ord, California, Monterey County, California* (Revised ASR; U.S. Army Corps of Engineers [USACE], 1997a), which was an update to the *Archives Search Report, Former Fort Ord, California, Monterey County, California* (ASR; USACE, 1993). The site history, development, and use – based on a review of historical maps presented in the Revised ASR (dated between 1940 and 1992) – for the subject areas are summarized below and shown on [Figures 6, 7, and 8](#). [Tables 1A and 1B](#) list MRSs included in BLM Area C and their respective acreages. Additionally, a significant historical record review was conducted during the development of the *Final Technical Memorandum Site Assessment Approach BLM East/Pre-1940 (Northern and Southern Portions) Remaining RI/FS Areas Former Fort Ord, California* (MACTEC/Shaw, 2011a) and the *Final Technical Memorandum Site Assessment Approach BLM North (Northern and Southern Portions) Remaining RI/FS Areas Former Fort Ord, California* (MACTEC/Shaw, 2011b).

BLM Area C North

MRS-27D

The 1994 *Archives Search Report (Supplement No. 1), Fort Ord, California, Monterey, California* (ASR Supplement; USACE, 1994) identified 25 training sites as part of the MRS-27 series of sites (USACE, 1994). The training sites were authorized for overnight bivouac training. MRS-27D is approximately 42 acres in size and is located in the central portion of BLM Area C North ([Figure 4](#)). Approximately 9 acres of the northern part of the MRS-27D overlaps MRS-57.

According to a 1945 training map (Army, 1945), the vicinity of MRS-27D was located within a combat range ([Figure 6](#)). The site vicinity was reported to be in use by the 11th Infantry as a tactical training area (Army, 1953 and 1956) and later by the 3rd Brigade (Army; 1957, 1958, and 1964). MRS-27D is identified as Training Site 4 on 1978 through 1987 ranges and training maps (Army, 1978 and 1987).

MRS-57

MRS-57 is approximately 40 acres of which approximately 19 acres lie within BLM Area C. Approximately 9 acres overlap with MRS-27D. MRS-57 is located in the northwestern corner of BLM Area C North, at the intersection of Hennekens Ranch Road and Watkins Gate Road ([Figure 4](#)).

A 1945 training map (Army, 1945) shows the area as part of a combat range ([Figure 6](#)). The vicinity of MRS-57 was identified as being used as a tactical training area by the 11th Infantry in 1953 and 1956 (Army, 1953 and 1956) and later by the 3rd Brigade in 1957 through 1967 (Army; 1957, 1958, and 1967). The 1953 training map shows the area as part of a tactical training area.

Interviews were conducted during the Revised ASR with former Fort Ord Fire Chief Mr. Stephani. Mr. Stephani served as a Fort Ord fire fighter from 1942 until 1944 at which time he left the Fort Ord fire department and joined the Army. Mr. Stephani returned to the Fort Ord fire department in 1947 where he worked until he retired as Fire Chief in 1978. According to an interview with Mr. Stephani in the 1997 Revised ASR (USACE, 1997a), in which the area is referred to as “K1,” the intersection of Hennekens

Ranch Road and Watkins Gate Road was a firing point for machine guns, rifle grenades, smoke grenades, and shoulder-launched projectiles from the 1940s through the 1960s (Figure 7).

MRS-59

MRS-59 is approximately 174 acres in total and 170 acres is located in the eastern portion of BLM Area C North. The portion of MRS-59 (Figure 4) that is co-located with MRS-27F is not included in BLM Area C North.

A known-distance range is depicted on the 1945 training map (Army, 1945). A tactical training area (Army, 1953) overlaps the western part of MRS-59 (Figure 6). The area where MRS-59 is located was identified as being used by the 3rd Brigade in 1957 (Army, 1957) and the 4th Brigade in 1958 (Army, 1958). The area is listed as a “NCOA” training area in 1956 (Army, 1956). This acronym was not listed on the Army’s Authorized Acronyms, Brevity Codes, and Acronyms (Army, 1985); however, “NCOA” potentially stands for “Non-Commissioned Officer Academy.” On a 1972 training map, a small bore range overlaps the eastern edge of the site. A 1975 training map identifies this area as “Impact Area – Firing Ranges” (Army, 1975).

Mr. Stephani referred to the area as “K10,” and indicated that in the 1940s this area included a 2.36-inch rocket range. The range was not active when he was at Fort Ord, but he believes that it was active during the days of the "tent city" in East Garrison (Figure 7).

BLM Area C East

MRS-14B

Site 14 was identified based on interviews. It was subdivided into five sites, including MRS-14B and MRS-14E, discussed below (USACE, 1997a). MRS-14B is approximately 283 acres of which 32 acres lie within BLM Area C. It is located north of Skyline Road and east of Barloy Canyon Road in the southern portion of BLM Area C East (Figure 5).

A 1956 map depicts a range originating in MRS-14B with a direction of fire toward the west-northwest (Army, 1956). The 1956 map was not available in the geographical information system database; therefore, the range is not presented on any figures for this memorandum. No evidence of firing points or range debris has been identified in this area and the range is not shown on any other maps. It is assumed that this range was never built.

According to interviews for the 1993 ASR, MRS-14B was suspected of containing 7-inch and 8-inch naval gun projectiles that overshot the impact area (USACE, 1993). No evidence of 7- or 8-inch naval gun projectiles was found during sampling operations at the site (UXB International, Inc. [UXB], 1995a).

MRS-14E

MRS-14E is a 70-acre subsite of former Site 14. MRS-14E is located east of Lookout Ridge Road on the eastern edge of BLM Area C East (Figure 5). It consists of 62 acres located within BLM Area C. The remaining 8 acres lie within BLM Area B to the west. The northeast corner of MRS-14E is overlapped by

MRS-27T and the southeast corner of MRS-14E is overlapped by MRS-27V. Training associated with this area is discussed in these MRSs below.

MRS-27K

The 1994 ASR Supplement identified 25 training sites as part of the MRS-27 series of sites (USACE, 1994). The training sites were authorized for overnight bivouac training (Figure 6). MRS-27K is an approximately 23-acre training site shown located south of Eucalyptus Road and west of Jacks Road in the central portion of BLM Area C East.

A patrolling area was identified in the vicinity of MRS-27K on a 1972 training map (Army, 1972). On 1976 through 1987 ranges and training maps, this area is identified as Training Site 11 (Army, 1976 and 1987). Training Site 11 is also visible on the 1982 ranges and training map; however, its location is different and appears just northwest on the 1987 ranges and training map (Army, 1982 and 1987).

In an interview presented in the Revised ASR, Sergeant First Class (SFC) Howard Beardsley – an explosive ordnance disposal non-commissioned officer stationed at Fort Ord for many years – identified a “Small Arms 40 millimeter (mm) Claymores” area that encompasses Training Site 11 (MRS-27K) and areas to the north and south of Training Site 11 (USACE, 1997a). MRS-27K is also located in the range fan of Firing Point 2, which was a suspected 105mm artillery range (Figure 8).

MRS-27L

MRS-27L is identified as an approximately 63-acre former training site located in the central portion of BLM Area C East, north of Crescent Bluff Road and east of Barloy Canyon Road (Figure 5).

A training area for light vehicle driving – or basic driving course – is identified on 1950s and 1960s Fort Ord training maps in the general area of MRS-27L. The MRS is identified as Training Site 12 on 1976 through 1987 ranges and training maps (Army, 1976 and 1987) (Figure 6).

According to Mr. Stephani, this region was used as a maneuvering area by soldiers. Training involved use of military munitions that could be carried and fired, such as hand grenades, rifle grenades, shoulder-launched projectiles, and booby traps (Figure 8). The Revised ASR notes that the area was used for this type of training until at least the early 1970s, when the 7th Infantry took over (USACE, 1997a).

MRS-27M

MRS-27M is an approximately 44-acre former training site located in the central portion of BLM Area C East. The southeastern edge of the site overlaps MRS-64 and the southwestern portion overlaps MRS-65 (Figure 5).

A Helicopter Training Area was identified in the general vicinity of MRS-27M on a 1972 training map (USACE, 1972). The MRS is identified as Training Site 13 on 1976 through 1987 Army training maps (Army, 1976 and 1987) (Figure 6).

A firing point was hand drawn onto the southern end of Training Site 13 based on an interview with SFC Howard Beardsley as presented in the Revised ASR (USACE, 1997a). The firing point was identified as Firing Point 2. The fan for the firing point was directed to the west-southwest (Figure 8).

MRS-27O

MRS-27O is identified as an approximately 23-acre former training site (of which 22 acres are within BLM Area C East) located on the western edge of BLM Area C East, south of Eucalyptus Road (Figure 5).

Bivouac Area L was identified in the vicinity of MRS-27O on a 1964 training map (Army, 1964). On 1976 through 1987 ranges and training maps, MRS-27O is identified as Training Site 15 (Army, 1976 and 1987).

The site is located within the range fan of the firing point located in MRS-27M.

MRS-27P

MRS-27P is identified as an approximately 41-acre former training site located in the southeastern portion of BLM Area C East, northwest of Pilarcitos Canyon Road (Figure 5). A small portion in the southeast corner overlaps with MRS-27T.

Pilarcitos Canyon Training Area was identified in the area of MRS-27P on 1950s Fort Ord training maps. On 1964 through 1972 training maps, the MRS is identified as General Purpose Training Area (Army, 1964 and USACE, 1972). The site is identified as Training Site 16 on 1976 through 1987 ranges and training maps (Army, 1976 and 1987) (Figure 6).

MRS-27Q

MRS-27Q is identified as an approximately 15-acre former training site located on the eastern edge of the northern portion of BLM Area C East, at the intersection of Jacks Road and Pilarcitos Canyon Road (Figure 5). The southeastern portion of MRS-27Q (approximately 4 acres of the MRS) lies outside the boundary of BLM Area C.

A 1958 Army training and facilities map identified the vicinity of MRS-27Q as “ST-5” (Army, 1958). ST might stand for Service Test as defined in Authorized Abbreviations, Brevity Codes, and Acronyms (Army, 1985). The MRS is identified as Training Site 17 on Army 1976 through 1987 ranges and training maps (Army, 1976 and 1987) (Figure 6).

MRS-27T

MRS-27T is approximately 31 acres and is located on the eastern edge of BLM Area C East, primarily between Pilarcitos Canyon Road and Skyline Road (Figure 5). The southwest corner of MRS-27T overlaps the northeast corner of MRS-14E and the northwest corner overlaps MRS-27P. A total of approximately 7 acres of MRS-27T lie inside of BLM Area C.

Training is identified in the general area of MRS-27T on available training maps dating back to 1954 (USACE, 1997a) (Figure 6). On a 1964 training facilities map and the 1967 Back Country Roads map, an Army Training Test (ATT) area is identified in the vicinity of MRS-27T (Army, 1964 and 1967). The site was used as a Human Research Organization (HUMRO) Test Area from 1957 through 1964 (Army, 1957 and 1964). HUMRO was a soldier psychology project and did not involve the use of military munitions. A Vietnam village is shown to the west of the site on a 1967 Back Country Roads map (Army, 1967). Demonstration Village appears just northwest of the site on a 1971 training facilities map (USACE, 1971). The area is identified as Counter Ambush Techniques on a 1972 training map (Army, 1972). MRS-27T is identified as Training Site 20 on 1976 through 1987 ranges and training maps (Army, 1976 and 1987) and was used as an overnight bivouac area.

MRS-27V

Approximately 6 acres of MRS-27V lies within the southern portion of BLM Area C East (Figure 5). The central portion of the site overlaps with MRS-14E.

On 1957 through 1964 training maps, the vicinity of MRS-27V is identified within the HUMRO Test Area (Army, 1957 and 1964). It is identified as Training Site 22 on 1976 through 1987 ranges and training maps (Army, 1976 and 1987) (Figure 6).

MRS-27W

MRS-27W is approximately 23 acres of which 7 acres lies within BLM Area C (Figure 5). MRS-27W lies completely within the boundaries of MRS-64.

MRS-27W is identified as Training Site 23 on 1970s through 1980s training maps (Figure 6).

MRS-60

MRS-60 is approximately 45 acres and is located in the northernmost portion of BLM Area C East (Figure 5).

The 1957 map (Army, 1957) depicts this area as a Field Expedient Area. An aviation training area is identified in the western portion of MRS-60 on a 1964 training map (Army, 1968). On a 1971 training map, the site area appears within a larger Light Vehicle Driving Course training area (USACE, 1971) (Figure 6).

MRS-60 was identified in interviews with Mr. Stephani. According to the 1997 Revised ASR, MRS-60 was used for training until at least the early 1970s (USACE, 1997a). Mr. Stephani stated that this region was a target area for hand grenade, rifle grenade, and shoulder-launched projectiles (Figure 8). There were two firing areas, one from the east and the other from the northeast (USACE, 1997a).

MRS-64

MRS-64 is located on the eastern edge of BLM Area C East (Figure 5). Approximately 62 acres of MRS-64 – the northwestern portion – lies within BLM Area C. The western wedge of MRS-64 overlaps with MRS-27M and MRS-64 encompasses MRS-27W.

On the 1967 Back Country Roads map (Army, 1967) and a 1972 training map (USACE, 1972), a Vietnam village is identified within the site (Figure 6).

According to the 1997 Revised ASR, MRS-64 was identified in interviews with Mr. Stephani and former Fort Ord Range Control Officer Lee Stickler (USACE, 1997a). Mr. Stephani stated that small arms and rifle grenades were fired from both sides of Pilarcitos Canyon road into the cliffs and up the canyon (Figure 8). This use occurred until the 7th Infantry Division was activated at the installation in 1974. Mr. Stickler mentioned there was a Vietnam village training area within MRS-27W, in which only small arms were used. The 1997 Revised ASR notes that the village was torn down in the 1980s (USACE, 1997a).

MRS-65

MRS-65 is a total of approximately 47 acres and is located in the central portion of BLM Area C East (Figure 5). MRS-65 overlaps the southern portion of MRS-27M.

On a 1945 Fort Ord training facilities map (Army, 1945), the general vicinity of MRS-65 is identified as a Demonstration Area (Figure 6).

The firing point identified in MRS-27M is located in the center of MRS-65. The fan for the firing point was directed to the west-southwest (Figure 8). Mr. Stephani stated that practice “bazooka” and rifle grenades were fired from the north edge of the canyon top in MRS-65 to the south in the 1950s and 1960s (USACE, 1997a).

Areas Outside MRS Boundaries

A large portion of the BLM Area C East is not encompassed by any identified MRS. There are historical range fans that extend across the subject area. The range fan for the “impact area firing ranges” extends from the north and covers most of the central portion of BLM Area C East. Based on the historical training maps (Army, 1972, 1975, and 1976), only small arms ammunition was associated with these range fans. In addition, the range fan from the Tank Gunnery Range located within MRS-32A (Army, 1956) covers the southern portion of BLM Area C East (Figure 6). During the Track 1 RI/FS evaluation of MRS-32A, it was noted that “One possible explanation for the use of the Tank Gunnery Range was that it may have been used for firing tank mounted .30 caliber and/or .50 caliber machine guns.” Sampling at MRS-32A identified 239 small arms blanks and three expended military munitions items (M18 series smoke grenade and ground illumination signals) (MACTEC, 2004).

2.4 History of Area Investigations and Removals

The information presented below is based on previous site investigations associated with areas in or adjacent to BLM Area C as documented in the references listed in each subsection below.

UXB International, Inc. (UXB) – July 1994 through August 1995 (UXB, 1995a, b)

UXB was contracted by USACE from July 1994 through August 1995 to perform MEC sampling and removal actions on selected sites at Fort Ord including MRS-14B, MRS-14E, and in grids near MRS-65. Site locations were based on the 1993 ASR (USACE, 1993) and 1994 ASR Supplement (USACE, 1994) with site perimeters and priorities provided by the Fort Ord BRAC office and USACE project manager.

Investigation grids were 100 feet by 100 feet square and spaced so that no two grids were any closer than 200 feet to provide maximum dispersion of the sample grids throughout the site. Investigation grids were required to cover at least 10% of the total site area being sampled. Once the investigation grid locations were established, each grid was divided into five-foot wide search lanes. Each lane was investigated visually while simultaneously searching for subsurface anomalies with a magnetometer. Instruments used included the Schonstedt GA-52C, the Schonstedt GA-72Cv, and the Schonstedt GA-52Cx magnetometers. Each anomaly was marked (flagged) and excavated by hand by a UXO technician. Grids with high concentrations of subsurface ferrous metals required a second pass normally made at an angle of 90 degrees to the first pass.

Excavation to a depth of up to four feet below ground surface (bgs) (three feet bgs prior to December 14, 1994) was required to identify the presence of MEC. If the anomaly could not be uncovered within three or four feet bgs, the onsite OE Safety Specialist determined if deeper excavation was required. Grid records did not indicate the depth at which MEC was identified; therefore, MEC items were assigned a depth of zero (on the surface) in the Fort Ord MMRP database. It should also be noted that MEC items recovered by UXB are assigned a location at the center of the grid in which they were identified because specific locations within the grids were not available. UXB was required to identify whether the items were high explosive (HE) or inert. MEC and MD items were also identified by type, location and quantity.

Quality control (QC) checks were performed on each grid after MEC operations were finished to confirm that MEC removal was completed properly. After the QC check was performed, the OE Safety Specialist performed a quality assurance (QA) check of the site prior to accepting the work as complete according to contractual specifications.

CMS Environmental, Inc./USA Environmental, Inc. (USA) – August 1995 to 2001 (CMS, 1995, 1997a, 1997b; USA, 1999, 2000a, 2001a, 2001b)

CMS Environmental, Inc. (CMS) – which became USA Environmental, Inc. in 1998 – was contracted by the Army to perform sampling and removal of MEC at selected sites within the former Fort Ord including MRS-27O, MRS-27T, and MRS-14E as well as site walks in areas outside of MRS boundaries. The objective of CMS/USA's work was to safely locate, identify, and dispose of all MEC located on the project site to a depth of four feet bgs, unless approval was given based on studies, site conditions, or Department of Defense Explosives Safety Board acceptance of a variance from the four foot depth (CMS, 1997a).

Beginning in 1995, 100- by 100-foot grids were surveyed and investigated with a Schonstedt GA-52Cx magnetometer along maximum 5-foot wide search lanes. Whenever a subsurface anomaly or metallic

surface object was encountered, it was investigated by being excavated with hand tools to a designated removal depth. While digging, a magnetometer was used to verify the location of the anomaly (CMS, 1995). Locations of MEC and MD were surveyed using a Trimble XL global positioning system (GPS) receiver that had a possible accuracy of +/- 1 to 3 meters.

Throughout operations, CMS/USA performed daily operational checks and QC inspections of its work. These inspections consisted of both informal inspections of operational activities and formal inspections of work-in-progress and work completed. The QC Specialist inspected at least 10% of each grid using a magnetometer for inspection.

To address the possible threat to the public posed by the potential presence of MEC on the ground surface, trails, and roads, a visual surface reconnaissance was conducted by USA at the direction of USACE during the period 28 September through 12 October 1999. It included portions of BLM Area C North and BLM Area C East. Maps and a listing of MEC and MD items recovered were provided to USACE (USA, 1999).

Parsons Engineering Science, Inc. (Parsons) – July 2000 through July 2005 (Parsons, 2002a, 2002b)

In 2000, Parsons and its teaming partners were selected by USACE to clear Fort Ord of MEC and support other remedial activities to prepare the base for transfer and reuse. Tasks completed under this 5-year contract entailed historical research, characterization studies, and the cleanup of MEC.

In 2001 and 2002, Parsons conducted a visual surface removal over the trails, paths, and other accessible areas of the BLM Area East of Parker Flats. This area correlates to the central portion of BLM Area C North. These operations were performed without vegetation removal efforts. The UXO teams removed, destroyed, and recorded any MEC items that were encountered. The UXO teams removed all MEC-like MD and recorded them by weight per grid. After visual surface removal was completed, a visual QC inspection that covered at least 10% of the area cleared was performed (Parsons, 2002b).

Shaw Environmental, Inc. (Shaw) – 2003 through 2004 (Shaw, 2005)

Shaw Environmental, Inc. (Shaw) performed MMRP work at the former Fort Ord under the Total Environmental Restoration Contract DACW05-96-0011. Shaw conducted a MEC removal action and surface reconnaissance in the Eucalyptus Fire Area (EFA), of which a portion is co-located with parts of BLM Area C.

A munitions reconnaissance survey in the BLM property east of the Impact Area and Time Critical Removal Action (TCRA) in the Impact Area were performed at the EFA between October 2003 and May 2004. The survey and removal action within the EFA was conducted following an accidental wildfire that started at the Military Operations in Urban Terrain (MOUT) site and burned vegetation in the area. The burning of the vegetation provided substantially increased visibility and access to the area to allow the operations to take place.

The reconnaissance occurred on approximately 270 acres of BLM property to the east of the Impact Area MRA boundary. The scope of work for the reconnaissance included removal of any material potentially

presenting an explosive hazard (MPPEH) encountered on the ground surface and removal of any MD item greater than two inches in diameter encountered on the ground surface. The general procedure was to sweep across the designated area with UXO technicians and sweepers (laborers) spread across a line, initially at 4 feet apart and later at 8 feet apart. The UXO team leader and a GPS technician would follow behind the line to inspect and record the items found. The work plan allowed for the use of Schonstedt GA-52CX magnetometers to supplement visual inspection in areas where surface ordnance could be hidden by vegetation; however, no areas within the BLM property were identified that required the use of Schonstedt magnetometers.

The Shaw UXO QC Specialist performed a resurvey of each grid with coverage of 10% to 20% or, for heavily vegetated grids, 15 to 25% coverage. The USACE OE Safety Specialist conducted QA assessments in at least 10% of each grid. All grids passed QC and QA inspections (Shaw, 2005).

Basewide Range Assessment (MACTEC/Shaw, 2012)

MACTEC and Shaw performed an evaluation of the potential for soil contamination related to munitions training throughout the former Fort Ord. The investigations were conducted according to the *Basewide Range Assessment Work Plan* (IT Corporation, 2001) and the *Basewide Range Assessment Sampling and Analysis Plan* (MACTEC/Shaw, 2003).

These documents outline the process for conducting:

1. review of historical documents including historical training maps, aerial photographs, range control records, and munitions after action reports;
2. site reconnaissance and mapping of MEC and MD items, fighting positions, soil pits (depressions), targets, range fan markers, and evidence of possible chemical contamination;
3. limited soil sampling for screening purposes;
4. site characterization; and
5. remediation/habitat mapping.

These were applied throughout the former Fort Ord to identify munitions training sites, potential presence of MEC and MD items, and potential presence of munitions constituents (MC) related to munitions training. The BRA also evaluated the potential for chemicals, such as total petroleum hydrocarbons which could be associated with flame thrower training or flame field expedient training. The results of the BRA are presented in the *Basewide Range Assessment Comprehensive Report* (MACTEC/Shaw, 2012).

Site walks completed as part of the BRA included: MRS-27K, MRS-27L, MRS-27M, MRS-27P, MRS-27O, MRS-27Q, MRS-60, MRS-65, portions of MRS-14B, MRS-27D, MRS-57, and MRS-59. BRA reconnaissance was also conducted within the boundaries of the EFA.

Site Assessments – 2011 (Shaw, 2012a, 2012b)

Based on the evaluation of available data, the Management Plan (MACTEC/Shaw, 2010) outlined additional field investigation through site assessment. This site assessment process consists of two parts:

(1) the pre-field data evaluation and (2) the site assessment field investigation. The pre-field data evaluation – which was described in the site assessment Technical Memorandums (MACTEC/Shaw, 2011a, 2011b) – consisted of an extensive review of maps, records, interviews, reports, and previous investigations. The site assessment field investigations included visual and instrument-aided mapping of site features related to past training activities, mapping of MEC or MD identified during the site assessment, and mapping of the paths walked.

The site assessment process was designed to collect data necessary to fill data gaps identified in the Management Plan (MACTEC/Shaw, 2010). The data gaps for BLM-East/pre-1940 and BLM North included areas where there is no specific evidence of military munitions use, such as the areas outside of MRS boundaries. These areas were investigated with random site walks. Also identified as data gaps in the Technical Memorandums (MACTEC/Shaw, 2011a, 2011b) are disturbed areas present on aerial photographs, areas identified for potential military munitions use on historical training maps, and MEC and MD found during previous investigations. MRS-64 required evaluation due to the presence of MD from a 75mm shrapnel projectile, found in 1997 by BLM at the site, that could indicate an undocumented impact area. A focused characterization was conducted, which included portions of BLM Area C North, to confirm that this area was not used as a target area. The focused characterization included approximately 17 miles of biased searches using both a Schonstedt GA-52Cx and a Geonics EM61. Search path spacing was established based on Visual Sample Plan (VSP) analysis. The paths were limited to trails and areas of less dense vegetation. Initially, 20% of subsurface anomalies were planned to be intrusively investigated. However, because of the limited number of anomalies, all subsurface anomalies were intrusively investigated for Schonstedt GA-52Cx identified anomalies in BLM Area C North and East. Of the subsurface anomalies identified with the Geonics EM-61 in BLM Area C North, approximately 30% were intrusively investigated. No target area was identified during the focused characterization (Shaw, 2012b).

The types of features identified during the site assessment fieldwork and types of MD found during the fieldwork support the identification of BLM Area C East as primarily a bivouac and maneuver training area involving the use of practice items. The MD found during the site assessment fieldwork in BLM Area C North included flares, simulators, signals, and smoke grenades that were generally used for maneuvers and general training (Shaw, 2012b).

2.4.1 MRS-Specific Investigation History

The MRS-specific investigation history is presented below. [Tables 1A](#) and [1B](#) provide a list of the sites and their acreages that lie within BLM Area C.

BLM Area C North

MRS-27D

During the Revised ASR site walk conducted in 1996, the USACE OE Safety Specialist found only expended pyrotechnics in this area (USACE, 1997). Locations of items found during the site walk were not provided in the documentation and the items are not listed in the MMRP database.

This area was included in the 1999 site walk that was conducted by USA at the direction of USACE (USA, 1999). MD items found included five items described as “grenade spoons (model unknown)” (likely hand grenade safety levers) and one M49 trip flare. There were no MEC items found.

MRS-27D was also investigated as part of the BRA reconnaissance conducted in November 2001. Items found included blank small arms casings, a “grenade spoon” (hand grenade safety levers) identified as MD, and a container for 60mm mortar projectiles. One possible fighting position and other items were mapped; however, no evidence of targets or range features were identified (MACTEC/Shaw, 2012).

Parsons conducted visual surface removal activities over the trails, paths, and accessible areas within the BLM Area East of Parker Flats, which includes MRS-27D, between December 2001 and February 2002. One MEC item, an M49 surface trip flare, was found just outside of the MRS-27D eastern boundary, during this non-instrument aided site walk (Parsons, 2002b).

MRS-57

MRS-57, including the portion outside of BLM Area C North, was investigated as part of the Revised ASR site walk conducted in 1996 (USACE, 1997a). Items found during the site visit included a 75mm shrapnel projectile identified as MD, a smoke grenade, and illumination signals. The smoke grenade and illumination signals were not reported as MEC or MD. Locations of items found during the site walk were not provided in the documentation and the items are not listed in the MMRP database.

This area was also included in the 1999 site walk conducted by USA at the direction of USACE (USA, 1999). MD items found included a grenade, hand, smoke, M48, a signal, illumination, ground, M126 series, and a grenade, hand, smoke, M18 series.

In August 2001, this area was investigated as part of a BRA reconnaissance. Items found included blank small arms casings, one signal flare, and two ammunition boxes. No other military munitions-related items, fighting positions, or targets were discovered during the site visit. Range-related debris items identified during the site visit include concertina wire, four utility poles, and nine soil pits (depressions) (MACTEC/Shaw, 2012).

Between December 2001 and February 2002, Parsons conducted visual surface removal activities over the trails, paths, and accessible areas within “BLM Area East of Parker Flats,” which includes the entire MRS-57. One pound of MD (not identified) and no MEC items were found at MRS-57 (Parsons, 2002b).

In addition to the military munitions-related items found during investigations at MRS-57, one incidental ground illumination signal was found in 1999. There was insufficient data recorded at the time of discovery to indicate whether this item was MEC or MD.

MRS-59

Approximately 10% of the site was investigated as part of the Revised ASR investigation site walk conducted in February 1996 (USACE, 1997a). Items found during the site visit included one instance of 60mm mortar projectile fragments identified as MD. The location of the item found during the site walk

was not provided in the documentation. No other evidence of MEC or MD was discovered during this site walk.

This site was also investigated as part of the BRA reconnaissance conducted in December 2001. One fighting position was identified; however, no evidence of targets or associated military munitions was encountered. Items found during the reconnaissance include sewer pipes, three stakes, and concrete debris. Site reconnaissance notes indicate that no targets, areas of concentrated small arms spent ammunition, MEC or MD were encountered. It should be noted that access to the southern portion of the site was limited to trails and roads due to dense vegetation (MACTEC/Shaw, 2012).

The BLM found three MD items during their activities in MRS-59. One smoke hand grenade was found in June of 2000 and a second in July of 2001. In January of 2005, BLM found an airburst simulator. These items were found on the surface and were not found as part of a scheduled removal operation.

Areas Outside MRS Boundaries

These areas were investigated as part of the 1999 site walk conducted by USA at the direction of USACE (USA, 1999). MD items were recorded as expended smoke hand grenades (M48 and M18 series), simulators (M74 and M118 models), practice hand grenade fuzes (M228 model), a surface trip flare (M49 series) and related components (an arming pin, a lever, and a base), an empty flare container, a ground illumination signal (M125 series), and the tail section of a signal.

Between December 2001 and February 2002, Parsons conducted surface removal activities over the trails, paths, and accessible areas within the “BLM Area East of Parker Flats,” which includes a large portion of the area outside of MRS boundaries in BLM Area C North (Parsons, 2002b). MEC items found include an M49 surface trip flare and six electric blasting caps (M6 model).

In June 2018, a dirt road was constructed to support the prescribed burn of the northern portion of BLM Area B. The new road, Lion's Revenge Road, connects Watkins Gate Road and Hennekens Ranch Road and crosses into both BLM Area B and BLM Area C (Figure 3). Vegetation removal and surface removal have been performed in burn containment areas north and south of the newly constructed road. Within the 200-ft wide area north of the road (within BLM Area C), one signal, illumination, ground parachute, M126 series and two projectile, 37mm, LE, MK1 (MPPEH, awaiting detonation) were discovered. Within the 316-ft wide area south of the new road (within BLM Area B), one flare, surface, trip, M49 series (UXO) was recovered. Another flare, surface, trip, M49 series (UXO) was recovered in a burn containment area along Hennekens Ranch Road (within BLM Area B).

Incidental MEC and MD have been discovered outside investigation or removal activities. Pyrotechnic ash was found in the maritime chaparral southeast of MRS-27D and along Trail 16 in the southeast portion of the area outside of MRS boundaries. Items found between 1997 and 2012 in BLM Area C North were primarily MD and consisted of practice items, simulators, and pyrotechnic items (Tables 2A and 3A). One signal, illumination, ground, M126 series listed as insufficient data (ISD¹) was found

¹ Based on the review of the database, if sufficient data is unavailable to definitively confirm an item as explosive (MEC) or inert (MD), it is categorized as ISD. ISD items are conservatively evaluated as MEC.

(Table 2A). MD items found include three signal, illumination, ground (two M126 series and one M19 series); one grenade, rifle, smoke (model unknown); two grenade, hand, smoke, M18 series; one grenade, hand, practice, M69; one signal, ground, rifle, parachute, M17 series; and two simulator, projectile, airburst, M74 series (Table 3A).

Site Assessment Results

The *Draft Final Site Assessment Data Report, BLM North (Northern and Southern Portions), Former Fort Ord, California* (MACTEC/Shaw, 2012b) provides the results for BLM Area C North and the area south of BLM Area C North that is part of BLM Area B. The site assessment consisted of follow-up evaluation of MEC and MD from previous investigations identified both within the existing MRS boundaries and in areas outside MRS boundaries as well as areas where there is no specific evidence of military munitions use. In addition, disturbed areas identified on aerial photographs and areas identified for potential military munitions use on historical training maps were evaluated. Focused characterization was conducted in BLM Area C North to confirm that this area was not used as a target area. Focused characterization included approximately 28 miles in BLM Area C North of random visual searches, and technology-aided random and biased searches using a Schonstedt GA-52Cx. Focused characterization was conducted in the southwestern portion of and south of BLM Area C North to confirm that this area was not used as a target area. The focused characterization included approximately 17 miles of biased searches using both a Schonstedt GA-52Cx and a Geonics EM61. Search path spacing was established based on VSP analysis. Five Geonics EM61-aided meandering transects covered approximately 3 miles that were masticated to create paths in areas that were not accessible due to dense vegetation. The balance of search paths was limited to trails and areas of less dense vegetation (MACTEC/Shaw, 2012b). There were no MEC items and no new training areas found in BLM Area C North. One MD item was listed in the Site Assessment Data Report as fragmentation from a projectile, 75mm (model unknown) within MRS-59. However, most of the MD items found during the site assessment field investigations were found outside of MRS boundaries (unless noted below)are consistent with a bivouac training and maneuver area. These include: flare, parachute, trip, M48, holder (one in the overlap of MRS-57 and MRS-27D); grenade, hand, safety pull ring (model unknown); grenade, hand, smoke M18; grenade, hand, smoke, safety lever (model unknown); grenade, safety lever, (model unknown); projectile, 40mm, parachute, star; signal, illumination, ground, M127A1; and simulator, projectile, air burst, M74 series (one in MRS-59). Table 3A lists the MD items as “Assorted MD Components” as they are listed in the database. Item locations are shown on Figure 17.

BLM Area C East

MRS-14B

MRS-14B was included in a random sampling by UXB of Site 14 in 1994 and 1995, before it was subdivided into five parts (A through E). UXB survey personnel laid out, marked, and recorded 100-foot by 100-foot sample grids located such that no two grids were closer than 200 feet apart over all of what was then Site 14. UXB performed 100% grid sampling (all detected anomalies were investigated) on 109 grids (approximately 5% of the total area) of these operating grids to a depth of 4 feet until their contract ended in August 1995 (UXB, 1995b). UXB recovered six MD items – three ground signals, an empty training mine, a 3-inch MK1 practice Stokes mortar, and an item identified as 37mm HE (Model

Unknown) – within the area of MRS-14B located inside of BLM Area C. The 3-inch practice Stokes mortar projectile was found along a road during the sampling in BLM Area C East. No additional evidence of 3-inch Stokes mortar projectiles were found in the sample grids surrounding the area where this item was found. Two MEC items, an illumination pyrotechnic mixture (MEC) and an M22 series smoke rifle grenade (ISD), were identified during the random sampling operations by UXB at the BLM Area C portion of MRS-14B.

This area was also investigated as part of the BRA reconnaissance (MACTEC/Shaw, 2012) conducted in November 2001. Small arms casing and one signal flare (condition unknown) were found during the site visit. Several fighting positions were mapped; however, no evidence of targets or range features was identified.

MRS-14E

MRS-14E was included in a MEC sampling effort performed by CMS as part of MRS-14 before it was subdivided into five parts (A through E) (CMS, 1997a). Fifty-three 100-foot by 100-foot randomly distributed grids were 100% sampled (all detected anomalies were investigated) to a depth of 4 feet. MEC items removed as part of the investigation included two M49 series trip flares. MD removed included a 90mm illumination projectile (unknown model), three M125 series illumination signals, and an M18 smoke hand grenade. It should be noted that the “90mm illumination projectile” was identified as such in the original grid sheet generated during sampling; however no such item exists in the U.S. military inventory of type classified munitions. Therefore, the description of this item is suspect. In addition to the military munitions that were identified, several thousand small arms ammunition blank cartridges were also found and removed.

In addition to the MEC and MD found during sampling at MRS-14E, one incidental rifle grenade (unknown model) was found in 1993. There was insufficient data recorded at the time of discovery to indicate whether this item was MEC or MD.

MRS-27K

In March 1996, a USACE OE Safety Specialist conducted a site walk and found expended small arms blanks and expended pyrotechnic items. Locations of some items found during the site walk were not provided in the documentation and the items are not listed in the MMRP database.

BRA reconnaissance was also conducted within the MRS. During the site visit (MACTEC/Shaw, 2012), blank small arms casings, MD (including three expended signals), one smoke grenade (model not identified), and one training booby trap (model not identified) were found. Several fighting positions were mapped; however, no evidence of targets or range features was identified. Other items found include several soil pits (depressions) of unknown purpose, concertina wire, scrap metal, four utility poles, one fence post, one bench mark, two wood structures, four firing points, one wood box top, and one empty 55-gallon drum (MACTEC/Shaw, 2012).

As part of the EFA visual surface reconnaissance, which consisted of a visual surface removal, the northern half of MRS-27K was investigated in October 2003. One MEC item (M382 practice 40mm cartridge) was identified (Shaw, 2005).

MRS-27L

A USACE OE Safety Specialist performed a site walk in 1995 as part of the Revised ASR. Expended blank small arms ammunition, flares, and signals were noted during the site walk. A magnetometer survey was conducted as part of the site walk and no evidence of MEC was encountered. The Revised ASR also states that 35 rockets were found, but that they were of the practice type and appear to have been dumped over a cliff for disposal with other trash (USACE, 1997a). Locations of the items found during the site walk were not provided in the documentation and the items are not listed in the MMRP database.

This area was also investigated as part of the BRA reconnaissance conducted in January 2002. Items found within the MRS include several blank small arms casing locations, one expended signal, one culvert, one wood structure, and one barbed wire fence (MACTEC/Shaw, 2012).

One incidental MD item, an M18 series smoke hand grenade, is listed in the MMRP database as being found by BLM personnel in 1999.

MRS-27M

As part of the Revised ASR investigation in February 1996, a USACE OE Safety Specialist conducted a site walk that covered approximately 10% of MRS-27M utilizing a magnetometer. There was no evidence of MEC at the site documented during the site walk; only expended small arms blanks and expended pyrotechnic items (MD) were found (USACE, 1997a). Locations of some items found during the site walk were not provided in the documentation and the items are not listed in the MMRP database.

In September 2001, the site was also investigated as part of the BRA reconnaissance. Items found at the MRS include blank small arms casings and an expended grenade fuze (MD, model not identified). Five soil pits (depressions) and two wooden structures were also mapped during the site visit. It should be noted that due to dense vegetation and steep terrain, access to portions of the site was limited to mostly trails and roads (MACTEC/Shaw, 2012).

MRS-27O

During a site walk conducted in March 1996 by a USACE OE Safety Specialist as part of the Revised ASR, expended small arms blanks and expended pyrotechnic items were encountered (USACE, 1997a). Locations of some items found during the site walk were not provided in the documentation and the items are not listed in the MMRP database.

During a 1999 site walk conducted by USA Environmental at the direction of USACE, an M49 series surface trip flare (MEC) was discovered (USA, 1999).

This area was also investigated as part of the BRA site reconnaissance in January 2002. Expended blank small arms ammunition casings were found during a site reconnaissance, however, no other military munitions items were identified at that time (MACTEC/Shaw, 2012). Additional items mapped during the site reconnaissance were two utility poles, one 6-inch water main, and one wooden structure. No targets or other range features were found.

The MRS was investigated as part of the EFA visual surface reconnaissance. One MEC item (M49 series trip surface flare) and three MD items (a ground illumination signal booby trap, a signal flare, and a 40mm cartridge case) were identified during this investigation (Shaw, 2005).

Two incidental items were encountered by BLM during work within the MRS: an M110 flash artillery simulator (MEC) in September 2001 and an M228 practice hand grenade fuze (MD) in December 2005.

MRS-27P

This area was investigated as part of the BRA reconnaissance conducted in 2002. Blank small arms casings were discovered during the site visit; however, evidence of MEC was not found (MACTEC/Shaw, 2012).

MRS-27Q

According to the 1997 Revised ASR, one M201 igniting grenade fuze was found at MRS-27Q within BLM Area C (USACE, 1997a). The location of the item found during the site walk was not provided in the documentation.

This MRS was investigated as part of the BRA reconnaissance conducted in January 2002. Expended blank small arms ammunition casings and several range-related debris items were found; however, no MEC or MD were identified during the site reconnaissance. Access to the southwestern and northeastern portions of the MRS was not possible during the BRA reconnaissance due to dense vegetation and steep terrain. (MACTEC/Shaw, 2012)

MRS-27T

Sampling of adjacent MRS-14E was conducted in 1996 by CMS. Anomalies detected within the grids were investigated to a depth of 4 feet. One of the investigated grids was located in the area where MRS-14E and MRS-27T overlap. One ISD item, a 22mm subcaliber practice projectile, was found in the grid (CMS, 1997a). However, no training involving 22mm subcaliber practice projectiles is known to have occurred in MRS-27T or in neighboring MRS-14E. MEC and MD were not found in any of the MRS-14E grids that are adjacent to MRS-27T.

During the site walk conducted by USA in 1999, portions of Pilarcitos Canyon Road and Skyline Road within and adjacent to MRS-27T were inspected. No MEC or MD was observed in and around MRS-27T.

This area was also investigated as part of the site reconnaissance conducted in January 2002 under the BRA. Items found included blank small arms casings. No MEC or MD or fighting positions were encountered during the site visit (MACTEC/Shaw, 2012).

A visual sweep of the roads and trails was conducted by USA at the direction of USACE in October 1999 (USA, 1999). Portions of Pilarcitos Canyon Road and Skyline Road within and adjacent to MRS-27T were inspected. No MEC or MD was observed in and around MRS-27T.

MRS-27V

In 1994, a portion of the MRS-27V site was sampled by UXB as part of the MRS-14 evaluation. Three expended signal/illumination flares and four live small arms blanks were found within the MRS (UXB, 1995b).

Sampling of MRS-14E was conducted in 1996 by CMS. Anomalies detected within the grids were investigated to a depth of 4 feet. Two MD items, an illumination signal and a practice antipersonnel mine, were found within MRS-27V (CMS, 1997a).

This area was also investigated as part of the BRA reconnaissance conducted in January 2002. Two wood structures were mapped and blank casings were found during the site visit (MACTEC/Shaw, 2012).

MRS-27W

This area is completely within the boundaries of MRS-64 and is further detailed under the description for MRS-64 below.

MRS-60

In December 1995, a USACE OE Safety Specialist conducted a site walk as part of the 1997 Revised ASR (USACE, 1997a). Items found were limited to expended blank small arms and expended signal and illumination flares. Locations of some items found during the site walk were not provided in the documentation and the items are not listed in the MMRP database.

This area was investigated as part of the site reconnaissance conducted in January 2002 under the BRA. Items found included blank small arms casings and a few small arms ball round casings. No fighting positions or targets were discovered. Additional features identified during the site visit included soil pit (depression) of unknown purpose and concrete debris (MACTEC/Shaw, 2012).

MRS-64

During a site inspection conducted in 1995 by a USACE OE Safety Specialist, 5.56mm and 7.62mm blanks, a ground illumination signal, and an expended M-18 smoke grenade were discovered along the roads within MRS-64 (USACE, 1997a). Locations of some items found during the site walk were not provided in the documentation and the items are not listed in the MMRP database

This area was also investigated as part of the BRA reconnaissance conducted in October 2001. Expended blank small arms ammunition casings were found during the site visit; however, no MEC or MD was

found at the MRS. Two fighting positions were mapped, although no evidence of targets or other range features was identified. Other items found during the site visit include an area of concrete debris, one wood structure, four utility poles, one range flagpole, one hunting sign, and two soil pits (depressions) (MACTEC/Shaw, 2012).

The BLM found a MK1 75mm shrapnel projectile on the surface in June 1997 (listed as MD) on the portion of MRS-64 in BLM Area C. Assorted MD components (reported in the Site Assessment Data Report as signal, illumination, ground, M127A1 [expended]) were found during site assessment in BLM East/Pre-1940 (Northern and Southern Portions), but no evidence of an impact area was identified (Shaw, 2012a).

MRS-65

During a site walk conducted in November 1995 by a USACE OE Safety Specialist, expended 5.56mm and 7.62mm small arms ammunition were discovered. According to the 1997 Revised ASR, one illumination signal was also found during the site walk (USACE, 1997a). Locations of some items found during the site walk were not provided in the documentation and the items are not listed in the MMRP database.

This area was investigated as part of the site reconnaissance conducted in October 2001 under the BRA. Blank small arms casings and one fighting position were mapped during the site visit, however, no military munitions targets or range features were identified. Additional items found during the site visit include two fence posts, two utility poles, one wood structure, one range flagpole, and five soil pits (depressions) (MACTEC/Shaw, 2012). It should be noted that access to the western portion of the site was limited due to steep terrain and dense vegetation.

In 2011, BLM encountered an MD item – an M74 series airburst simulator projectile – during work within the MRS.

Areas Outside MRS Boundaries

In 1997, USA conducted a visual surface removal over the eastern portion of MRS-21 which extended into areas outside the MRS. The surface removal was completed up to the waterline of Mudhen Lake. The visual surface removal included the investigation of fifty-four (54) 100- by 100-foot grids and partial grids, including the seven grids previously sampled by UXB in 1994 and 1995. No MEC or MD were discovered during this removal operation (USA, 2000c).

In 1994 and 1995, UXB conducted sampling in 20 random 100- foot by 100-foot grids at MRS-12 to a depth of four feet. Small portions of the MRS-12 grids extend into BLM Area C East. Depths for the MEC and MD found during the UXB investigation were not required to be documented at the time this operation took place and are assigned the depth of zero in the MMRP database. It should also be noted that items are assigned a location at the center of the grid in which they were identified because specific locations within the grids were not documented (UXB, 1995c).

In September 1997, USA began munitions removal activities over 100 percent of MRS-12 to a depth of one foot. Small portions of the MRS-12 grids extend into BLM Area C East. Anomalies found to be buried deeper than one foot were flagged, and GPS locations noted, but were not removed (USA, 2000b).

In October, 1999, a site walk was conducted by USA at the direction of USACE that included areas outside of the MRS boundaries (USA, 1999). Items found during the site walk within BLM Area C East, and outside of MRS boundaries, include 13 MD items identified as 35mm subcaliber M73 practice rockets.

The fieldwork for the EFA reconnaissance in BLM Area C East, including MRS-27K and MRS-27O, was conducted in October 2003 (Shaw, 2005). Twenty-one MEC items were removed including: M69 practice hand grenades, an ABC-M25A1 CN1 riot hand grenade, M18 series smoke hand grenades, an M651 CS 40mm projectile, M125 series ground illumination signals, an M19 series rifle parachute ground illumination signal, M110 flash artillery simulators, and an M74 series airburst projectile simulator. Also located during the EFA visual reconnaissance were three M126 illumination signals (MD). These items are similar to items found within the surrounding MRSs.

Additional MEC and MD have been discovered outside investigation or removal activities (incidental items). Items found were primarily MD and consisted of practice items, simulators, and pyrotechnic items. MEC items found included a practice 40mm cartridge (DMM) and a fragmentation hand grenade (UXO) (Table 2B). ISD items, which are considered MEC, include one grenade, rifle (model unknown); one simulator, projectile, ground burst, M115A2; two projectiles, 40mm (model unknown); one grenade, hand, smoke, M18 series; one smoke, grenade, and one item listed as "OTHER (model unknown)" (Table 2B). The grenade, hand, smoke, M18 series; ten signals, and the one "OTHER (model unknown)" item were discovered in the same location on the same day which indicates that the items were discarded.

Site Assessment Results

The report *Final Site Assessment Data Report, BLM East/Pre-1940 (Northern and Southern Portions), Former Fort Ord, California* provides the results of the site assessment conducted in BLM Area C East and areas now included in BLM Area B. The site assessment consisted of follow-up evaluation of MEC and MD from previous investigations identified both within the existing MRS boundaries and in areas outside MRS boundaries as well as areas where there is no specific evidence of military munitions use. In addition, disturbed areas identified on aerial photographs and areas identified for potential military munitions use on historical training maps were evaluated. A combination of random and technology-aided biased searches were used for the site assessment field investigation in BLM Area C East. The investigation was limited to accessible portions of the site and was in some cases restricted due to the steep slopes present in the area. No vegetation removal or cutting was conducted as part of the investigation. There were no MEC items found. MD identified within the existing MRS boundaries and in the surrounding areas are consistent with uses identified in the historical record, particularly use as general training and maneuver areas (Shaw, 2012a). These include: flare, surface, trip, M49 series (one outside of MRS boundaries); fuze, grenade, hand, M227 series (one outside of MRS boundaries); fuze, grenade, practice, M228 (one in MRS-60 and one outside of MRS boundaries); grenade, hand, smoke, M48 (one in MRS-65); grenade, illumination MK1 (one in MRS-14E); projectile, 40mm, parachute,

illumination, M583 series (one outside of MRS boundaries); projectile, 40mm, practice, M781 (one in MRS-27L); signal, illumination, ground, M127A1 (one in MRS-64, one in MRS-27L, and 8 outside of MRS boundaries); and signal, ground, rifle, starcluster, M118 (one outside of MRS boundaries). [Table 3B](#) lists the MD items as “Assorted MD Components” as they are listed in the database. Item locations are shown on [Figure 18](#).

2.4.2 Adjacent Areas

2.4.2.1 Track 1 Sites

MRS-27F, MRS-59A, BLM Area A, Environmental Services Cooperative Agreement (ESCA) County North MRA, and East Garrison Areas 2 and 4 NE ([Figure 2](#)) are designated as Track 1 sites and NFA is required in accordance with the Track 1 ROD. They are adjacent to BLM Area C included in this Approval Memorandum.

MRS-27F

A portion of MRS-27F is located within MRS-59 and is identified as Training Site 6. The MRS was evaluated under the Track 1 process and is included as an NFA site in the *Track 1 Plug-in Approval Memorandum, Multiple Sites, Groups 1 - 5, Former Fort Ord* (Army, 2006). One MEC item was found in this portion of MRS-27F. The item is in the MMRP database with description “unknown dud (model unknown).” It is an incidental item from the range control file.

MRS-59A

MRS-59 was identified as a possible 2.36-inch rocket range during an interview with Mr. Stephani. MRS-59A was separated from MRS-59 to be evaluated under the Track 1 process and is included as an NFA site in the Track 1 ROD (Army, 2005b). No training areas where military munitions would have been used were identified on historical training maps.

Two site reconnaissance efforts were performed within MRS-59A (preliminary assessment/site inspection [PA/SI] and BRA). No evidence of the use of 2.36-inch rockets or the presence of an impact area (e.g., firing points, targets, fragmentation, fuzes, or projectiles) was found. In 1994, under contract to the Army, Human Factors Applications conducted sampling in 10 locations in the area of MRS-59A and MRS-5 and removed some MD. A site walk was conducted in 2003. Items found during the site walk included MD (two expended pyrotechnic signals), small arms ammunition, and small arms ammunition clips. The presence of expended pyrotechnics found during the 2003 site walk indicates that military training was conducted in this general area. (Army, 2005b)

East Garrison Areas 2 and 4 NE

The *Track 1 Plug-In Approval Memorandum, East Garrison Areas 2 and 4 NE, Former Fort Ord, California* (Parsons, 2006) provides the evaluation of East Garrison Areas 2 and 4 NE as NFA sites through the Track 1 plug-in process. East Garrison Area 2 is located adjacent to and east of BLM Area C North, with a total acreage of 114 acres. East Garrison Area 4 NE is located east of East Garrison Area 2 and has a total acreage of 63 acres.

East Garrison Areas 2 and 4 NE were investigated through literature reviews and site walk reviews. East Garrison Area 4 NE also includes MRS-33. East Garrison Areas 2 and 4 NE met the Track 1, Category 3 criteria because historical research and field investigations identified that evidence of past training involving military munitions at these sites involved only the use of practice and pyrotechnic items that are not designed to cause injury.

BLM Area A

The *Track 1 Plug-In Approval Memorandum, BLM Area A, Former Fort Ord, California* (ITSI, 2012) provides the evaluation of BLM Area A as an NFA site through the Track 1 plug-in process. BLM Area A is located in the eastern portion of the former Fort Ord, east of BLM Area C East, with a total acreage of approximately 3,976 acres (Figure 2). The property was purchased by the Army after 1940. All parcels, with the exception of Parcel L20.4, were transferred to BLM in 1996.

BLM Area A was investigated through the site assessment process including site walks, BRA site reconnaissance walks, USACE PA/SI site walks, USA site walks, MEC sampling at MRS-14B, MRS-14C, MRS-17, and MRS-32C, and MEC removal at MRS-14C and MRS-32C. Results of the investigations confirmed the use as a general training and maneuver area with designated practice training areas.

ESCA County North MRA

The *Track 1 Plug-In Approval Memorandum, County North Munitions Response Area, Former Fort Ord, California* (Army, 2010) provides the evaluation of the County North MRA as an NFA site through the Track 1 plug-in process. County North MRA is located in the north-central portion of the former Fort Ord, north of BLM Area C North, with a total acreage of 506 acres. The property was purchased by the Army in 1917.

County North MRA was investigated through site investigations, sampling investigations, and surface and subsurface MEC removal actions. County North MRA met the Track 1, Category 3 criteria because historical research and field investigations identified that evidence of past training involving military munitions at these sites involved only the use of practice and pyrotechnic items that are not designed to cause injury.

2.4.2.2 Track 2 Sites

BLM Area B is designated as a Track 2 site. It is adjacent to BLM Area C included in this Approval Memorandum.

BLM Area B

BLM Area B is north and east of the Impact Area MRA (Figure 2). BLM Area B is 1,597 acres and is comprised of several MRSs and areas located in-between the identified MRSs. The Army purchased the property in 1917. The majority of the property within BLM Area B was transferred to BLM in 1996 as a habitat reserve. The remainder of BLM Area B is planned for future transfer to BLM. BLM Area B was evaluated in *Final, Revision 2, Track 2 Remedial Investigation/Feasibility Study, BLM Area B and MRS-*

16, *Former Fort Ord, California* (Gilbane, 2015). Investigations and MEC removal actions performed to date have identified historical use of BLM Area B for various close combat and weapons training purposes, including use of machine guns, mortars, grenades, and shoulder-launched projectiles. Depending on the types of known or suspected military training and associated military munitions uses, field investigations included visual site walks, sampling or transect investigations that included investigation of subsurface anomalies, and MEC removal actions. Hand-held magnetometers and/or digital geophysical instrument were used in these investigations.

The *Final Record of Decision, Track 2 Bureau of Land Management Area B and Munitions Response Site 16, Former Fort Ord, California* (Army, 2017a) was signed in May 2017. The selected remedy includes surface MEC removal in a portion of BLM Area B and subsurface removal in selected areas. Land use controls apply to the entire BLM Area B.

Field work in the portions of BLM Area B north of the Impact Area MRA began in 2017 in accordance with the *Final, Site-Specific Work Plan, Munitions and Explosives of Concern Remedial Action, BLM Area B, Former Fort Ord, California* (KEMRON, 2017).

Vegetation removal, surface removal, and digital geophysical mapping have been performed in the portion of BLM Area B immediately south of BLM Area C North and east of Hennekens Ranch Road. Two Projectile, 37mm, low explosive MEC items were located east of Addington Road over 300 feet from the southern boundary of BLM Area C North. West of Addington Road, three MEC items have been located within 300 feet of the southern boundary of BLM Area C North: one mine, antitank, practice, M20; one fuze, grenade, hand, M204 series; and one flare, surface, trip, M49 series.

Vegetation removal, surface removal and digital geophysical mapping have been performed in the portion of BLM Area B immediately west of BLM Area C East, west of Barloy Canyon Road and south of East Machine Gun Flats Road. Within 300 feet of BLM Area C East, MEC recovered during surface removal included: one flare, surface, trip, M49 series (UXO), and one fuze, grenade, hand, practice, M228 (DMM).

Approximately 500 feet from BLM Area C East, one 4.2-inch smoke mortar projectile (UXO) was recovered. At the time of its discovery, its filler could not be confirmed visually. While this item was subsequently confirmed to contain a smoke filler, it was of a munition type that has the potential to be used for delivery of chemical warfare agent. There has been no evidence to indicate that chemical weapons were ever used at Fort Ord. Following the standard procedures when a munition with an unknown filler is found, an active duty explosive ordnance disposal (EOD) unit was contacted to identify the filler. After the filler was confirmed as smoke agent, the projectile was destroyed by detonation. This item was found in MRS-48 where several pieces of MD from 4.2-inch smoke projectiles previously were recovered during a 1998 sampling investigation. However, in the sampling grid closest to BLM Area C East, no MEC or MD related to 4.2-inch smoke projectile was found. In MRS-10B, south of MRS-48 and adjacent to BLM Area C East, no indication of 4.2-inch smoke mortar projectiles or related MD had been found during munitions responses including a 1997 sampling investigation. These sampling results are described in *Final, Revision 2, Track 2 Remedial Investigation/Feasibility Study, BLM Area B and MRS-*

16, *Former Fort Ord, California* (Gilbane, 2015). Based on the information, it is not expected that a 4.2-inch smoke mortar impact area occurred within BLM Area C East.

2.4.2.3 Track 3 Sites

The Impact Area MRA is designated as a Track 3 site and is adjacent to BLM Area C.

Impact Area MRA

The Impact Area MRA, located south and west of BLM Area C, consists of the 6,560-acre portion of the 8,000-acre historical Impact Area that is entirely within the Natural Resources Management Area (NRMA) and is designated as a habitat reserve. Former land use included live-fire training with military munitions. Multiple firing ranges operated within the historical Impact Area, and weapon firing generally was directed toward the center of the historical Impact Area. Several investigations in support of, and independent of, the Fort Ord military munitions response program have been conducted within the Impact Area. These include sampling, TCRAs, road and trail clearance, clearances conducted to support the establishment of fuel breaks, and Interim Actions.

Based on the Impact Area MRA RI/FS (MACTEC/Shaw, 2007), a ROD was signed in 2008 selecting technology-aided surface MEC removal, with subsurface MEC removal in selected areas and land use controls. Prescribed burning was identified as the primary method of vegetation clearance (Army, 2008). The Army has been conducting the remedial action within the Impact Area MRA since 2008.

2.4.2.4 Adjacent ESCA MRAs

Based on the 2007 ESCA, Fort Ord Reuse Authority (FORA) conducts munitions response actions (except for those responsibilities the Army has retained) and to obtain regulatory closure, for approximately 3,300 acres of the former Fort Ord. The FORA ESCA Remediation Program (RP) includes evaluation of four MRAs adjacent to BLM Area C where MEC removals were conducted..

ESCA Parker Flats MRA (Phase II)

The Parker Flats MRA Phase II is located west of BLM Area C North (Figure 2). Parker Flats MRA Phase II was evaluated in the *Final Group 1 Remedial Investigation/Feasibility Study, Seaside and Parker Flats (Phase II) Munitions Response Areas, Former Fort Ord, Monterey County, California* (Group 1 RI/FS; FORA ESCA RP, 2017b).

Historical records and recovered MEC and MD indicate that the Parker Flats MRA Phase II was used for military training since the initial 1917 government purchase and designation of the land as an artillery range. Cavalry and artillery troops reportedly conducted training activities near the Parker Flats MRA.

The MEC investigations and removal actions in Parker Flats MRA Phase II were completed by the Army and FORA. The area immediately adjacent to BLM Area C is designated as a habitat reserve reuse area. In the habitat reserve reuse areas, a subsurface MEC removal was completed within unpaved roads, trails, and a 5-foot buffer area along the sides of trails. A near surface clearance to 3 inches below ground surface was completed in all other portions of the habitat reserve reuse areas. The documented historical

use of the area was for training maneuvers. The majority of MEC and MD encountered within the Parker Flats MRA Phase II were consistent with historical uses of the area (FORA ESCA RP, 2017b).

Based on the evaluation, the Group 1 RI/FS identified the preferred alternative of Land Use Controls.

ESCA Future East Garrison MRA

The ESCA Future East Garrison MRA is located adjacent to and between BLM Area C North and BLM Area C East. This area was evaluated in the *Final Group 4 Remedial Investigation/Feasibility Study, Future East Garrison Munitions Response Area, Former Fort Ord, Monterey County, California* (Group 4 RI/FS; FORA ESCA RP, 2017c). Known and suspected training sites in the vicinity of the Future East Garrison MRA include: Demolition Training and Hand Grenade Area; Mechanic Training Area; Engineer Training Area “C”; and suspected impact area for Stokes trench mortars.

The Future East Garrison MRA encompasses approximately 252 acres. The Future East Garrison MRA was purchased by the government in 1917 and designated as an artillery range. The Future East Garrison MRA includes three planned reuses: approximately 57 acres for residential reuse; approximately 18 acres for non-residential development; and approximately 177 acres for habitat reserve.

Several MEC investigations and removal actions were completed in the Future East Garrison MRA. The actions performed by the Army and FORA resulted in subsurface MEC removal in the Future East Garrison MRA, with exception of isolated areas with steep terrain having no evidence of munitions use, and areas under existing roadways, structures, paved areas, and fences. Utility corridors were investigated; however, utilities were not required to be removed. The majority of MEC and MD encountered within the Future East Garrison MRA were consistent with the historical uses of the area for rifle grenade training, hand grenade training, a possible Stokes mortar impact area, and troop training and maneuvers. Items found adjacent to BLM Area C East include projectiles, 3inch, Stokes mortar (MEC [practice] and MD [practice, low explosive, and high explosive]); projectiles, 37mm (MEC [low explosive] and MD [low explosive and high explosive]); grenade, rifle, antitank (MEC and MD); Grenade, hand (MEC [high explosive and practice] and MD); projectile, 81mm, mortar (MD); projectile and mortar fuzes (MD); and pyrotechnics. Three MD items (one projectile, 37mm [Model Unknown] – fragments; one grenade, rifle, practice [Model Unknown]; and one signal, illumination) were identified during the RI/FS immediately adjacent to BLM Area C North (FORA ESCA RP, 2017c).

Based on the evaluation, the Group 4 RI/FS identified the preferred alternative of Land Use Controls.

ESCA MOUT Site MRA

The ESCA MOUT Site MRA includes a portion of Barloy Canyon Road adjacent to BLM Area C East. Data available from investigations and removal actions conducted in areas adjacent to the road were evaluated in the *Final Group 3 Remedial Investigation/Feasibility Study Report, Volume 1, 2, and 3 – Del Rey Oaks / Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain Site, Munitions Response Areas, Former Fort Ord, Monterey County, California* (Group 3 RI/FS; FORA ESCA RP, 2012). Based on the evaluation, the Group 3 RI/FS identified the preferred alternative of Land Use Controls. The selected remedy is documented in the *Final Record of Decision Group 3 Del Rey Oaks /*

Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain Site, Munitions Response Areas, Former Fort Ord, California (Group 3 ROD; Army, 2014).

ESCA Laguna Seca Parking MRA

The Laguna Seca Parking MRA is located adjacent to and immediately south-southwest of BLM Area C East. The Laguna Seca Parking MRA was evaluated in the Group 3 RI/FS (FORA ESCA RP, 2012).

The Laguna Seca Parking MRA encompasses approximately 276 acres. Historical records and recovered MEC and MD indicate that these MRSs were previously used for artillery training, mortar training, troop training, and basic maneuvers. The portion of the MRA adjacent to BLM Area C is MRS-14A, one of the five subsites of Site 14 identified in the Revised ASR (USACE, 1997a). MEC removal actions conducted in MRS-14A included 4 foot depth in the central portion and 1 foot depth along the western and eastern slopes of the site. Munitions encountered included electric blasting caps, smoke grenades and assorted pyrotechnics, expended 37mm, 57mm, and 75mm projectiles, and training 81mm mortars..

Based on the evaluation, the Group 3 RI/FS identified the preferred alternative of Land Use Controls. The selected remedy is documented in the Group 3 ROD.

3.0 Conceptual Site Model (CSM) Development

CSMs are developed to provide a basis for identification of potential release and exposure routes. CSMs incorporate information regarding the physical features and limits of the area of concern (the site), nature and source of the contamination (in this case, MEC), and exposure routes (potential scenarios that may result in contact with MEC).

The CSMs for BLM Area C are based on the currently available information summarized in [Section 2](#). The following sections present a summary of training practices identified for the area, the site features, the potential sources and locations of MEC, and the potential exposure pathways.

3.1 Site Features

BLM Area C North primarily consists of gently rolling hills and valleys. Vegetation in BLM Area C North consists of predominantly (more than 80%) Maritime Chaparral with some coastal live oak woodland, inland coast live oak woodland, and grasslands. The coastal live oak woodland is present in the northern portion of this area, while the inland coast live oak woodland is located in southeastern portion of this area.

BLM Area C East is characterized by a series of sand stone ridges and valleys with slopes greater than 30% present in many of the areas. Vegetation in the majority of BLM Area C East consists of predominantly (more than 80%) Maritime Chaparral with coastal scrub, coast live oak riparian forest, inland coast live oak woodland, and grasslands. Vegetation in MRS-14B and MRS-14E consists of predominantly grasslands with some coastal live oak savanna, coastal scrub, and inland coast live oak woodland.

3.2 Identified Training Practices

The types of training identified within BLM Area C include general training and maneuvers, bivouac training, practice rifle grenade training, practice hand grenade training, aviation training, training using simulators, small arms and machine gun training, shoulder-launched projectile training, light vehicle and basic driving, tactical training, mechanic training, engineer training, combat range training, and a HUMRO test area. Brief descriptions of these types of training are provided below.

General Training/Maneuver Area/Combat Range Training/Tactical Training

A maneuver area may have included using the site for squad patrols. Infantry platoons and squads conduct three types of patrols: reconnaissance, combat, and tracking (Army, 1992). Each patrol includes specific objectives using infantry troops, sometimes with engineer support, to gather information or conduct combat operations. Military tactics involve how best to organize, employ, and deploy a military force on a small scale and the techniques for combining and using weapons and units to engage and defeat an enemy. Practices concerning creating and using obstacles as well as using the area (heights, choke points, natural cover, etc.) to the best advantage were likely conducted. General, maneuver, and tactical training could employ the use of blank small arms ammunition, and possibly pyrotechnics and smoke-

producing items (e.g., signals, flares, and smoke – rifle and hand – grenades). Training sites that may have been used in this manner were identified in the vicinity of MRS-27D, MRS-27K, MRS-27L, MRS-57, and MRS-59. However, it is possible training of this type occurred throughout BLM Area C.

Bivouac Area

Bivouac areas at Fort Ord were used for overnight training and field exercise. Twenty-six bivouac areas had been established by 1980 and are documented in Fort Ord Regulation 350-5 (Army, 1980). Ammunition storage was not allowed within 100 feet of a bivouac area. Normally, only blank cartridges, simulators, pyrotechnics, and smoke items were allowed to be stored near bivouac areas. However, field storage of sensitive items, demolition materials and small arms ammunition (other than blanks) was permitted if clearance was obtained from the division ammunition officer (Army, 1980). Ammunition holding areas were to be individually fenced with triple concertina wire or comparable fencing. Depending on the quantity of ammunition stored, an armed guard may have been required to maintain access control. According to Fort Ord Regulation 350-5 “Strict accountability will be maintained so that items cannot be buried or discarded to avoid returning unspent ammunition.” To discourage the burial or discarding of unspent ammunition, ammunition was inventoried: (1) when checked out from the Ammunition Supply Point (ASP), (2) daily while stored in the field, and (3) again when the unused ammunition was turned in at the ASP.

Fort Ord range regulations required that units be checked into and out of all bivouac areas. Joint inspections of the bivouac areas were conducted by the unit representative and a representative of Range Control before the bivouac area was released from unit responsibility. All tactical digging or holes were to be filled in and all wire removed. All garbage (wet or dry) was to be hauled to the sanitary landfill for disposal or placed within dumpsters in the Main Garrison, if the landfill was closed.

Regulations for use of bivouac areas prior to 1980 were not found, so it is possible that prior to 1980, garbage was buried on site. The garbage areas likely would have been marked with signs. It also is possible that field latrines were dug, treated with lime, and then covered with soil when a unit left the area. It is possible that prior to 1980, some unused munitions could have been buried on site.

Although it is unlikely (for the reasons stated above) that unspent ammunition authorized for use in the bivouac areas could have been buried, the possibility that burial did occur does exist. If the burial of ammunition occurred, these items would not present a hazard if encountered. Training sites within BLM Area C that may have been used as bivouac areas included: MRS-27D, MRS-27K, MRS-27L, MRS-27O, MRS-27T, MRS-27V, and MRS-27W.

Practice Rifle Grenade Training/Shoulder-Launched Projectile Training

Review of available information indicates that practice rifle grenade training and shoulder-launched projectile training could have occurred in portions of BLM Area C.

Range configuration information for practice rifle grenade and shoulder-launched projectile training was obtained from *Policies and Procedures for Firing Ammunition for Training, Target Practice, and Combat* (Army, 1983). Military munitions descriptions were obtained from Technical Manual (TM) 43-0001-29

and TM 9-1985. Information on World War II grenade launchers and information on the available World War II military munitions was obtained from *The American Arsenal* (Hogg, 2001). According to the policies and procedures (Army, 1983), practice rifle grenades are fired from behind a protective barrier equivalent to a screen of sandbags 0.5 meters thick or reinforced concrete walls 0.16 meters thick. It is suspected that this would be simulated in the practice training area. The maximum range of the practice rifle grenade M11 series (version found in TM 9-1985) is 260 yards, therefore, it is expected that the training area used would be at least 260 yards in length. The range of the M11 practice rifle grenade varied with the elevation angle. Elevation angles of the firing rifle with the M7 launcher would achieve the following associated ranges: 35 degrees = 256 yards; 40 degrees = 261 yards; and 45 degrees = 260 yards. Therefore, it is expected that targets would be placed at various distances to practice firing at different ranges. Because practice rifle grenades are inert, no MEC associated with practice rifle grenade training would be expected.

The types of shoulder-launched projectiles that could be present include practice 2.36-inch and practice 3.5-inch rockets. Before firing of shoulder-launched projectiles, the danger zone to the rear of the launcher is cleared of personnel, material, and vegetation. The danger zone to the rear of the launcher is an isosceles triangle with apex at the breech and the width of triangle corresponding with rearward extension of line of fire. All loading preparation for firing and unloading is on the firing line, with the muzzle pointed downrange.

Based on available information, practice rifle grenade and shoulder-launched projectile training may have occurred in MRS 27-L, MRS-57, MRS-59, MRS-60, MRS-64, and MRS-65.

Practice Hand Grenade Training

Practice hand grenade training may have occurred within portions of BLM Area C. Hand grenade training areas usually consist of throwing bays or trenches and targets. According to training manual Field Manual 3-23.30 (Grenades and Pyrotechnics Signals), the targets could include silhouettes in the open at 20 meters, a fortified mortar pit at 20 meters, a fighting position at 30 meters, and a trench target at 40 meters. Training would include practice in the proper way to hold and throw the grenade (Army, 2000). According to FM 3-23.30, all soldiers must go through a mock-bay training before training in the live bay. It is anticipated that historical practice hand grenade training areas would have been similar to the training areas used today and that practice training may have occurred within BLM Area C in a mock area. Based on available information, practice hand grenade training may have occurred in MRS-60, MRS-64, and MRS-65.

Aviation Training

According to the Fort Ord Range Control officer present at Fort Ord from 1970 through 1990, training at the aviation training areas included helicopters landing and taking off as part of a practice emergency evacuation scenario (MACTEC/Shaw, 2010). The officer also stated that the use of military munitions was not a part of this training and that Range Control was responsible for scheduling and inspecting these training areas prior to checkout of the unit using the area. The use of military munitions at this training area is not expected.

Training Using Simulators

Flash artillery and ground burst projectile simulators are used in battlefield training operations. They are used to simulate battle conditions in artillery maneuvers, as decoys in forward combat areas, and during troop maneuvers. They simulate battle noises and effects such as flashes that closely resemble that of large munitions items, shells in flight, and ground explosions. Training sites that may have been used in this manner were identified in the vicinity of MRS-14E, MRS-27L, MRS-27O, and MRS-59. However, it is possible training of this type occurred throughout BLM Area C.

Small Arms and Machine Gun Training

Select ranges were used for small arms and machine gun training activities. Areas within BLM Area C where only small arms were used include a Vietnam village training area within MRS-27W, which lies entirely within MRS-64, and three historic range fans that extend from the north and cover most of the central portion of BLM Area C East. While small arms ammunition is considered military munitions, it does not pose the same explosives safety risk as other munitions items and is not classified as MEC.

Mechanic Training/Light Vehicle and Basic Driving/Engineer Training

Mechanic training, light vehicle and basic driving, and engineer training may have occurred within portions of BLM Area C. An area in the northwest part of BLM Area C East to the west of MRS-60 was identified on a 1953 training map as a mechanic training area. Additionally, a training area for light vehicle driving is identified on 1950s and 1960s Fort Ord training maps in the general area of MRS-27L. On a 1971 training map, MRS-60 appears within a larger Light Vehicle Driving Course training area. Basic driving training may have involved practice with driving a variety of vehicles within different terrain and vegetation types. It is likely that mechanic training involved maintaining these vehicles. Major activities associated with the engineer groups include road and bridge upgrading, base construction and maintenance, lines of communication, and support of various military divisions. The use of military munitions is not expected.

HUMRO Test Area

MRS-27V was identified on 1957 through 1964 training maps within the HUMRO Test Area and MRS-27T was used as a HUMRO Test Area in the early 1960s. HUMRO was a soldier psychology project and did not involve the use of military munitions.

3.3 Potential Sources and Locations of MEC

Based on a review of historical information and MEC sampling performed within and adjacent to the site, the types of MEC that could potentially be encountered include practice items associated with general training and maneuvers, bivouac training, tactical training, practice rifle grenade training, practice hand grenade training, training using simulators, shoulder-launched projectile training, and combat range training. Aviation training, small arms and machine gun training, light vehicle and basic driving, mechanic training, engineer training, and a HUMRO test area are not considered potential sources of MEC as the use of military munitions is not expected in these types of training activities.

The types of munitions associated with general, bivouac, maneuver, practice grenade (hand and rifle), combat, and tactical training include blank cartridges, simulators, pyrotechnics, practice munitions, and smoke items. Use and storage of items that required additional control, such as demolition materials and small arms ammunition (other than blanks), were allowed by permission of the division ammunition officer.

Hand grenade training would include practice in the proper way to hold and throw the grenade. Practice hand grenades would be expected to be present on the ground surface. Rifle grenade training may have occurred within the canyons, based on an interview with former Fire Chief Stefani. Inert practice rifle grenades would not present a safety risk because the only live components associated with inert practice rifle grenades are the blank cartridges required to launch it. If smoke rifle or hand grenades were used, the possibility exists that some live smoke grenades could be present at or near the ground surface.

Based on the interview with Mr. Stefani, it is possible that training included shoulder-launched projectiles. Based on this identified use, the types of military munitions that could be present include practice 2.36-inch and practice 3.5-inch rockets. Based on the design and use of the projectiles and rockets, they would normally be found at the surface or near surface. Training involving shoulder-launched projectiles identified during interviews conducted as part of the Revised ASR were not substantiated by site assessment and sampling conducted at the site.

A list of MEC and MD found at BLM Area C is presented in [Tables 2A, 2B, 3A and 3B](#).

3.4 Potential Exposure Pathways

While the established roads and trails have been previously investigated, based on the review of the existing data, it is possible that military munitions items related to training could be present on the ground surface off of roads and trails. These items could be encountered by the public or BLM personnel. The following discussion provides information about the types of MEC items that have been found during previous investigations within BLM Area C including: (1) how an item was designed to function, (2) the likelihood that an item would function if found on site and handled, and (3) the effects if it functions.

Cap, blasting, electric, M6

Electric blasting cap M6 is used to initiate HE with a blasting machine or other suitable source of electric power. Recovery of these items along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area. No evidence was identified to indicate the presence of a demolitions range or other use of these materials. The blasting caps were likely carried into the area for the purpose of training or demonstration and inadvertently discarded.

The blasting cap is encased in an aluminum tube. This electric cap has two 12 foot lead wires protruding from the tube. The lead wires are connected by a bridge wire in the ignition charge, extending through a rubber plug assembly in the open end of the tube. To function the cap, its leads are connected to a blasting machine. The blasting machine is actuated to produce electrical current which flows through the cap's bridge wire producing heat. If sufficient current is put through the bridge wire, the head ignites the ignition charge, which initiates the intermediate charge (Army, 1994d).

Summary: It is possible that a person could cause an intact M6 electric blasting cap to function through casual contact such as stepping on it; however, it is unlikely. Blasting caps are sensitive to static electricity, heat, and shock (e.g., being dropped on a hard surface); however, degradation, weathering, and especially moisture can make blasting caps less sensitive.

Cartridge, 40mm, practice, M382

Two M382 practice cartridges (DMM) were recovered in BLM Area C East. Recovery of these items along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area.

This cartridge is a fixed round of ammunition consisting of a projectile body and a cartridge case assembly containing a propelling charge and a percussion primer. A hollow, aluminum ogive is fitted to the front end of the projectile. Fitted in the rear of the projectile is a hollow steel ball assembly containing a yellow dye marking material. An RDX booster pellet with a point detonating (PD) fuze assembly is threaded into a cavity at the forward side of the ball assembly. After the projectile leaves the launcher tube, setback force causes the firing pin in the fuze to be withdrawn from the ball detent, and centrifugal force created by rotation of the projectile causes the rotor ball assembly to align the detonator with the explosive train. The fuze arms after the projectile has traveled approximately 2.4 to 3 meters (8 feet) from the launcher. Upon graze or impact with the target, the inertial force from impact causes an inertial ring to act on the push pins, pivoting the levers inward, and forcing the firing pin into the detonator. The detonator explodes the RDX booster pellet which shatters the chamber and emits a yellow puff of smoke to simulate the explosion of a service round (Army, 1994b).

Summary: It is not likely that a person could function a cartridge, 40mm, practice, M382 through casual contact. The cartridge is initiated when the percussion primer is struck by the weapon firing pin. If the cartridge functioned while not in the firing tube of a weapon system, the projectile would separate from the cartridge but would not arm the projectile. The fuze in the projectile requires both setback and rotation to become armed. Exposure to moisture and weathering does not increase the risk associated with this cartridge.

Cartridge, 40mm, practice, M781

One M781 practice cartridge (DMM) was recovered in BLM Area C East. Recovery of this item along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area.

This cartridge is a fixed, practice type ammunition designed to be fired from a grenade launcher. It consists of a metal projectile body with a rotating band and a cartridge case assembly. A hollow plastic ogive is filled with a high visibility yellow-orange dye. The projectile assembly is attached to a cartridge case with an attached adhesive substance. A .38 caliber blank cartridge is press-fitted into the base of the cartridge case and provides the gas pressure needed to propel the projectile through the launcher barrel. The weapon firing pin strikes the .38 caliber blank cartridge primer, igniting the propelling charge. The burning propelling charge generates sufficient pressure to release the expanding propellant gases through the vent hole into the low-pressure chamber. The rotating band around the projectile engages the rifling

in the launcher tube, imparting a spin to the projectile. Upon impact with the target, the frangible ogive ruptures and releases the dye, causing a puff of yellow-orange smoke which simulates explosive impact (Army, 1994b).

Summary: It is not likely that a person could function a cartridge, 40mm, practice, M781 through casual contact. The cartridge is initiated when the .38 caliber blank cartridge primer is struck by the weapon firing pin. If the cartridge functioned while not in the firing tube of a weapon system, the projectile would separate from the cartridge but would not arm the projectile. Exposure to moisture and weathering does not increase the risk associated with this cartridge.

Flare, surface trip, M49 series

This pyrotechnic device is designed to give warning of infiltrating troops by illuminating the field of the advancing enemy. The flare has a cylindrical body, with a fuze that protrudes from the head end. The flare has a laminated paper body closed at both ends by metal caps. The upper cap has taped holes and a threaded central hole for Trip Fuze M12. The mounting bracket and trigger mechanism are attached to the base cap. The trigger mechanism is spring loaded. A narrow tongue on the trigger will hold the safety lever in place. A trip wire is packed with the flare. The upper arm of the trigger is attached to a trip wire, and the lower arm of the trigger restrains the safety lever after the removal of the safety pin. A pull on the trip wire causes either the trigger tongue or pull pin to release the lever, which causes the firing pin to strike the primer. The primer sets off the intermediate charge, which ignites the first-fire composition on the ignition increment of the flare (Army, 1977). A grenade-type fuze is used but it has no delay element. The fuze ignites the flare instantaneously (Navy, 1957).

Summary: It is not likely that a person could cause an M49 flare with safety pin in place to function with casual contact. However, in the unlikely event one remained in a “prepared to function” condition (e.g., attached to a trip wire or other triggering mechanism) or fixed position (e.g., attached to a tree), it is possible that a person could cause it to function through casual (inadvertent or unintentional) contact. Serious injury beyond burns would not be expected because the flare is designed to burn “in place” where it was placed or mounted.

Grenade, hand: Riot, CN1, ABC-M25A1

This type of hand grenade is used for riot control and simulating mass casualties. Recovery of this item along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area.

The body of this riot hand grenade is spherical. It is made of two plastic hemispheres cemented together. The two pieces form a burster well and slider housing. The fuze is a pyrotechnic delay-detonating type fuze integral with the grenade body. The fuzing components consist of an arming sleeve, firing spring, slider assembly, and firing pin. The slider assembly contains a primer, pyrotechnic delay column, and a detonator. The grenade is assembled with a safety pin and pull ring. Safety clips are not required with these grenades. The safety pin locks the arming sleeve to the grenade body through the slider assembly. It also retains the arming pin in a horizontal position. When the safety pin is removed, the arming sleeve is free to separate from the grenade body. The slider assembly is released and driven against the firing

pin. The firing pin initiates a primer in the end of the slider. The primer initiates the delay column which, in turn, initiates the detonator. The detonator shatters the grenade body, dispersing the tear-producing agent. The CN1 produces a powerful lachrymal effect and is irritating to the upper respiratory passages. In higher concentrations, it is irritating to the skin, causing a burning and itching sensation. The onset of incapacitation is from 15 to 30 seconds and the duration from 5 to 20 minutes depending upon dosage concentration (Army, 1994c).

Summary: There is a low likelihood that a person would be able to cause a CN1 riot hand grenade with pin in place to function through casual (inadvertent or unintentional) contact if one were found at the site. If it were caused to function, it would produce eye and ear irritation and possibly minor cuts due to the shattering of the grenade body.

Grenade, hand, fragmentation, M67

An M67 fragmentation hand grenade was identified in December 1992. According to the EOD incident report, an unexploded M67 fragmentation hand grenade was destroyed in an area described as Range N-1. The MMRP database indicated the item location to be within BLM Area C East. The location of the item was called into question as no Range N-1 has been identified. In a 2014 review of the EOD incident report, the M67 was considered to be associated with actions at Range 36 inside the Impact Area MRA. Therefore, this item was likely not found in BLM Area C and the location in the database is not reliable. A note has been added to the MMRP database. No evidence of a high explosive hand grenade range has been found in BLM Area C.

The body of this fragmentation hand grenade is a 2.5-inch diameter steel sphere designed to burst into numerous fragments when detonated. The grenade body contains 6.5 ounces of high-explosive, Composition B. Each grenade is fitted with a fuze that initiates the explosive charge. The M67 grenade uses the M213 fuze, which is a pyrotechnic delay-detonating fuze. It will cause the grenade to function 4 to 5 seconds after release of the safety lever. The body of the fuze contains a primer and a pyrotechnic delay column. Assembled to the body are a striker, striker spring, safety lever, safety pin, pull ring, safety clip, and a detonator assembly. The M213 fuze is equipped with a steel safety pin and pull ring. The split end of the safety pin is either spread approximately 40 degrees or diamond-shaped to prevent accidental removal and arming during shipping and handling. The pull ring is provided to facilitate easy removal of the safety pin. A second safety feature is the steel safety clip. The safety clip's purpose is to prevent the safety lever from snapping upward into a triggered position, in the event the safety pin is accidentally dislodged from the fuze. Release of the safety clip and removal of the safety pin permits release of the safety lever. When the grenade is thrown, the striker assembly, through the action of the spring, throws off the safety lever and impacts the percussion primer, which functions the primer charge. The primer charge ignites the delay composition which will burn for approximately 4 to 5 seconds. Upon completion of burning, the delay composition sets off the detonator which ignites the main explosive charge and detonates the grenade (Army, 1994c).

Summary: It is not likely that a person could cause an M67 with safety pin in place to function with casual contact. In the unlikely event one were caused to function, it could result in significant injuries or

death. However, this item likely was not found in BLM Area C. No evidence of a high explosive hand grenade range has been found in BLM Area C.

Grenade, hand, practice M69

The M69 practice hand grenade is used as training version of the M67 fragmentation hand grenade. The practice hand grenade body is steel and is essentially spherical in shape. The body is empty, i.e., without any explosive filler. There is a hole in the base of the body. (This vents the gases generated from the fuze igniter and permits removal of residual metal that remains in the grenade body from the igniter case. The grenade body may be recovered and reloaded with a new fuze and safety clip.) Hand grenade practice fuze M228 is a pyrotechnic delay-igniting fuze. The fuze body contains a primer and a pyrotechnic delay column. Assembled to the body are a striker, striker spring, safety lever, safety pin with pull ring, safety clip, and igniter assembly. The split end of the safety pin has an angular spread or a diamond crimp. The hand grenade safety clip is designed to keep the safety lever in place, should the safety pin be unintentionally removed from the grenade. It is an additional safety device used in conjunction with the safety pin. The safety clip is assembled to the fuze. Release of the safety clip and removal of the safety pin permit release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense spit of flame, igniting the delay element. The delay element burns for 4 to 5 seconds, then sets off the igniter. A loud report, like that of a firecracker, and a puff of white smoke follows (Army, 1994c).

Summary: It is unlikely that a person would be able to cause a practice grenade with pin in place to function through casual (inadvertent or unintentional) contact if one were found at the site. In the unlikely event a practice grenade were to function, it could cause minor burns or lacerations from metal fragments from the ignitor housed within the grenade; the practice grenade itself would not fragment. However, the grenade would have to contain a live fuze and functioning ignitor.

Grenade, hand, smoke, red, M48

The body of an M48 hand grenade consists of a rubber assembly, an XM227E1 fuze, and a filling of red smoke mixture. The grenade weighs approximately 14 ounces and is 3.5 inches in diameter. The grenade body is made of two rubber hemispheres. The top half of the grenade contains the fuze and the bottom half of the grenade contains the filling hole and the exhaust port. The grenade is filled with approximately six ounces of red smoke mixture. Assembled to the body is tape over the emission port, safety pin, and safety latch. The firing pin initiates a primer, which in turn initiates a starting mixture. The starting mixture initiates the delay charge, which lights the ignition mix. The built-up pressure forces the red smoke mixture through the emission port, dispersing the mixture (Army, 1994c).

Summary: There is a low likelihood that a person would be able to cause a an M48 smoke hand grenade with pin in place to function through casual (inadvertent or unintentional) contact if one were found at the site. If it were initiated, it would produce red smoke and hot gases that could cause minor burn injuries.

Grenade, hand, smoke M18 series

The M18 is a colored-smoke hand grenade used for ground-to-air or ground-to-ground signaling. The grenades may be filled with any one of four smoke colors: red, green, yellow, or violet. Each grenade will emit smoke for 50 to 90 seconds. The grenade body is of thin sheet metal and is filled with smoke composition and topped with a starter mixture. The hand grenade fuze M201A1 is a pyrotechnic delay igniting fuze. The body contains a primer, first-fire mixture, pyrotechnic delay column, and ignition mixture. Assembled to the body are a striker, striker spring, safety lever, and safety pin with pull ring. The grenade weighs 19 ounces and contains 11.5 ounces of smoke composition. It functioned when a soldier removed the safety pin from the safety lever and threw the grenade, allowing the safety lever to fly free, releasing the spring-loaded striker to strike the primer. The percussion primer ignited the first fire mixture. The fuze-delay element, which burns for 0.7 to 2 seconds, ignition mixture, and grenade starter mixture and filler, are ignited by the preceding component. The pressure sensitive tape is blown off the emission holes from which the colored smoke emits (Army, 1977).

Summary: An M18 smoke grenade with safety pin in place is unlikely to function due to casual contact. If an M18 smoke grenade without its safety pin were discovered, it is possible that a person could inadvertently cause it to function resulting in burns from the smoke composition. Given that these items have been exposed to the elements for many years, moisture can penetrate and degrade the pressure sensitive tape, the smoke composition, and the condition of the sheet metal case of the grenade reducing the integrity of the components that cause it to function.

Grenade, Rifle, Smoke, M22 Series

The grenade, rifle, smoke M22 series (green, red, violet, and yellow) was designed for signaling and laying smoke screens during troop training and battlefield simulation. The M22 Series consist of three basic parts: a steel stabilizer assembly, an integral fuze and a body. The fuze is a mechanical impact-igniting type. The body is filled with a burning-type smoke charge which contains a dye to color the smoke. The surfaces of the smoke charge within the body are coated with a starter mixture charge to facilitate ignition. A nose-closing plug covers a small opening or air hole in the nose of the ogive. After being fired from a rifle equipped with a grenade launcher, it functioned by impact with the ground or other hard target, causing the firing pin to strike the primer, which ignites the starter mixture charge, and in turn causes the smoke charge to burn. The smoke charge consists of baking soda, potassium perchlorate, sugar, and dye. The rifle grenades emit a cloud of colored smoke for approximately one minute (Army, 1994b).

Summary: It is highly unlikely that a person could function an M22, Smoke Rifle Grenade through casual contact, because the grenade was designed to be functioned by a hard nose-on impact with the ground or other hard target. If caused to function, the type of injuries that could be sustained would be burns from the burning smoke charge.

Projectile, 22mm, subcaliber, practice

One projectile, 22mm, subcaliber, practice (ISD) was found in MRS-27T. The 22mm subcaliber practice cartridge is used with the 60mm and 81mm mortar training devices; however, training involving the

22mm practice cartridge is inconsistent with the use of MRS-27T. A practice range associated with 22mm subcaliber practice mortar was located in MRS-14D over 750 feet to the west of MRS-27T. No related items were found in investigation in areas immediately surrounding the grid where the one 22mm subcaliber practice projectile was found. Based on this information, there is no indication that training use of 22mm occurred in this portion of BLM Area C East.

The 22mm practice cartridge is used to provide realistic mortar firing training at distances which correspond to range firing distances in the ratio of one to 10. The 22mm subcaliber projectile found in other areas of Fort Ord (the M744) has a maximum effective range of 195 meters. The 22mm subcaliber practice cartridge, M744 is comprised of a steel-bodied projectile which is assembled to a cartridge case containing a propelling and ejection charge. The projectile is flattened at the tip and contains a percussion piece assembly and smoke charge. On impact, the 22mm projectile functions and produces a yellow cloud of smoke and an audible sound (Army, 1994b).

Summary: It is unlikely that a person could function a 22mm subcaliber practice projectiles through casual contact because the projectile was designed to be functioned by a hard impact with the ground or other hard target.

Projectile, 40mm, CS, M651

This type of projectile is used for riot control, troop training, and battlefield simulation. Recovery of this item along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area.

The 40mm CS is fired from a grenade launcher and is especially effective when fired into an enclosed area. The projectiles will penetrate window glass or up to ¾-inch thick pine wood at 200 meters and release 2-chlorobenzylidene malononitrile (CS) after penetration. The projectiles will also function when used against earth, gravel, brush, and sandbag targets. Targets can be engaged at ranges up to 400 meters. It has a fuze arming distance of 10 meters to 30 meters. The M651 projectile is similar in appearance to other 40mm projectiles, but has a flat nose. Two ridges act as projectile rotating bands when the round is fired. The projectile contains 2 ounces of CS-pyrotechnic mixture that burns for approximately 25 seconds, creating a hissing sound and a cloud of dense white smoke. The CS-pyrotechnic mixture produces a non-persistent irritating effect. The M651 projectiles are not explosive rounds (Army, 1975).

Summary: There is a low likelihood that an unfired cartridge will function through casual contact because it is not armed. A fired 40mm CS projectile could function if kicked or stepped on. If it were caused to function, hot metal could potentially cause minor burns and the CS mixture would cause eye and throat irritation.

Simulator, flash, artillery, M110

The M110 simulator was used to effect battle conditions in artillery maneuvers and as a decoy in forward combat areas. Its flash closely resembles that of large munitions items.

The flash simulator consists of an inner container and an outer container, both of black plastic. The inner container, containing the pyrotechnic charge, is closed at one end and internally threaded at the base to receive the adapter holder. The outer container seats upon the shoulder of the inner container at the base and is internally threaded to accept a filling plug at the other end. Preparation for firing includes installation of a miniature explosive device known as a squib into the adapter holder, and pouring 70 cubic centimeters of gasoline through the filler hole into the space between the inner and outer containers. The simulator is electrically activated and discharged in a locally fabricated steel firing tube. A minimum current of 1/2 ampere is required for actuation of the squib; the current source may be a battery or a blasting machine. The electric squib ignites the pyrotechnic charge and the gasoline. The simulator flash lasts slightly longer than that of the actual weapon (Army, 1994a).

Summary: It is highly unlikely that a person would be able to cause an M110 flash artillery simulator to function through casual contact. If it were caused to function, it could result in burn injuries.

Signal, Illumination, Ground, Green Star, Parachute, M19 Series

This ground illuminating signal device was designed for signaling during military operations. It consists of a single green star illuminant candle with parachute and expelling charge in a cylindrical aluminum case (OP 1664, pg. 267; Navy, 1969). An aluminum fuze housing is crimped to the base of the cylinder. The fuze housing contains a smokeless powder propelling charge with a retaining disk, and a circular time train groove filled with black powder. The signals are fired using a rifle. Near the top of the trajectory, the black powder element ignites the expelling charge. The expelling charge blows the illuminant candle and parachute assembly out through the top of the container, and the illuminant candle is ignited. The parachute opens to lower the candle slowly. The signal produces a minimum of 5,000-candle power for 20 to 30 seconds (Army, 1994a).

Summary: These signals would be difficult to cause to function by incidental contact. They would require precise assembly to function and a flash through the stabilizer to ignite the propelling charge. If caused to function, the type of injury that could be sustained would be burns from the propelling charge.

Signal, illumination, ground, M125 Series

Ground illumination signals were used for signaling by ground units during troop training and battlefield simulation. The M125 series is a star cluster ground illumination signal used for daytime or nighttime signaling from a hand-held aluminum launching tube.

Star cluster signals consist of five-star illuminant assemblies and a rocket motor propulsion assembly contained in a handheld aluminum launching tube. The base of the launching tube contains a primer and an initiating charge. As shipped, the firing pin cap is assembled to the forward end and must be reversed for firing. The illuminant assembly is mounted on top of the propulsion assembly with a delay assembly and an expelling charge between them. When the firing cap is placed on the initiator end in preparation for firing the signal, the firing pin is aligned with the primer. Striking the primer with the firing pin fires the initiating charge to ignite the rocket propellant. As the rocket emerges from the launching tube, the fins extend for flight stability. Before rocket motor burnout at 200 feet above the ground, the black powder expelling charge is ignited performing the two-fold function of expelling and igniting the 5-star

illuminant assemblies. Burning time is 6 to 10 seconds with burnout occurring at 250 to 300 feet above the ground (Army, 1994a).

Summary: It is highly unlikely that a person would be able to cause an M125 ground illumination signal to function through casual contact if one were found at the site because the signal was designed function immediately after being fired and requires a deliberate act to function. If fired and unburned, they would require a flame/heat source to initiate burning. The M125 series star cluster ground illumination signal contains no explosives. If one were caused to function, it could result in burns or blindness.

Signal, illumination, ground, M126 Series

Ground illumination signals were used for signaling by ground units during troop training and battlefield simulation. M126 series ground illumination signals consist of a parachute-suspended illuminant assembly and a rocket motor propulsion assembly contained in a handheld aluminum launching tube. The base of the launching tube contains a primer and initiating charge. As shipped, the firing pin cap is assembled to the forward end and must be reversed for firing. The parachute illuminant assembly is mounted on top of the propulsion assembly with a delay assembly and an expelling charge between them. The parachute with suspension cords is packed on top of the illuminant, and the tube end is sealed with a cork disk (rocket barrel seal). Before rocket motor burnout at 200 feet above the ground, a delay charge ignites and burns for about 5 to 6 seconds, allowing the signal to reach an altitude of 700 to 750 feet. The expelling charge is ignited at delay burnout performing the two-fold function of expelling the illuminant/parachute assembly and igniting the first-fire composition of the illuminant assembly. Burning time is 60 seconds for the M126A1 (Army, 1994a).

Summary: It is highly unlikely that a person would be able to cause an M126 series ground illumination signal to function through casual contact if one were found at the site because the signal was designed to be functioned immediately after being fired.

The M126 series ground illumination signal contains no explosives. If one were caused to function, it could result in burns or blindness.

Simulator, projectile, air burst, M74 Series

An M74 series projectile simulator simulates artillery fire air bursts. They consist of a one-piece aluminum case with an extracting rim and resemble a large shotgun shell. The case contains a percussion primer mounted in the base, a black powder propelling charge, a delay fuze, and an inner case containing a flash charge. The simulator is fired from pyrotechnic pistol AN-M8. The firing pin of the pistol strikes the primer, igniting the propelling charge. The propelling charge expels the self-contained flash charge from the case, at the same time igniting the igniting charge. The igniting charge ignites the delay fuze, and the fuze in turn ignites the flash charge, producing a bright flash and a loud noise. The total delay from actuation of the firing pin to ignition of the flash charge is 2 to 3 seconds. If aimed at a 45-degree angle, the height of burst is about 100 feet (Army, 1977).

Summary: It is unlikely that a person could cause an M74 air burst projectile simulator to function through casual (inadvertent or unintentional) contact because it would require a hard, precise blow to the

primer to function. If an airburst projectile simulator is found at the site and subjected to an open flame (i.e., fire), it may function and could cause nonfatal burns and/or lacerations.

Simulator, projectile, ground burst: M115A2

The M115A2 ground burns simulator projectile was used to simulate battle noises and effects, such as shells in flight and ground explosions, during troop maneuvers. The body of a ground-burst projectile simulator consists of a cylindrical paper tube containing a photoflash charge and a whistle assembly. The whistle assembly, extending from one end of the photo-flash charge, is a paper tube containing a slow-burning whistle composition, and is joined to a fuze lighter by a length of safety fuze. The fuze lighter is the friction type M3A1 and is taped to the outside of the simulator. A safety clip (through the cap of the fuze lighter) prevents accidental detonation. A label lighter prevents accidental detonation. This simulator is a hand-thrown device. The pull cord-actuated igniter is of the friction type and ignites the safety fuze. The burning of the safety fuze provides a 6 to 10 second delay after igniting by jerking the pull cord and throwing the simulator. The safety fuze ignites the quickmatch in the whistle assembly, and the quickmatch ignites the whistle composition. Whistle time for this composition in the whistle assembly is 2 to 4 seconds. The final burning ignites the photoflash charge which explodes producing a flash and a loud report (Army, 1994a).

Summary: It is highly unlikely that a person would be able to cause an M115A2 ground-burst projectile simulator to function through casual contact and sustain a burn injury if one were found at the site because it was made from paper that would have been exposed to moisture, degradation, and weathering for many years, which could decrease its effectiveness.

3.5 Current and Future Land Use

Currently, BLM Area C is undeveloped. There are a few residual structures that were used to support training activities, but these structures have been abandoned. The Fort Ord Reuse Plan (FORA, 1997) identified the proposed future use to include habitat conservation and protection.

The property underlying BLM Area C is designated as NRMA under the *Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California* (HMP; USACE, 1997b). The East Garrison and Parker Flats Land Use Modification Assessment (Zander, 2002), and the Revised Attachment A – HMP map (April, 2005) present the revised boundaries of the habitat reserve areas. The HMP, as modified or updated, describes special land-use controls and habitat monitoring requirements for target species within the habitat reserve and development areas that apply to Army's environmental cleanup actions as well as land management under future uses. Post-disposal management guidelines outlined in the HMP for the NRMA that includes BLM Area C includes habitat restoration, enhancement and monitoring, access control, controlled burning and an allowance for development-oriented use in as much as 2% of the area. In 2012, current and future BLM lands at the former Fort Ord, including BLM Area C, were designated as the Fort Ord National Monument.

BLM Area C (portions of Parcels F1.2 and F1.1.1, [Figure 3](#)) was transferred to BLM in 1996. At the time of transfer, available information indicated that the property was safe for reuse as a habitat management area with recreational access. The Army and BLM have been and will continue to coordinate actions to

promote munitions safety on an ongoing basis (signs/notices, munitions incident reporting procedures, and munitions recognition and safety training). Reporting of suspected munitions items discovered on federal property is currently being implemented according to the procedure described in the *MRS Security Program* (Army, 2016).

4.0 Site Evaluation

The available data (e.g., archival and reconnaissance data) regarding BLM Area C were reviewed and evaluated according to procedures described in the *Final Plan for Evaluation of Previous Work* (HLA, 2000). The evaluation process is documented through the completion of a series of checklists. Copies of the site evaluation checklists are provided as [Appendix C](#). This section presents a summary of the results of the checklist evaluation. It is divided into five sections: an assessment of the literature review; an assessment of the site walks; an assessment of the sampling and removal performed at the site; a discussion of the sampling methods; and review of QA and QC.

4.1 Literature Review

4.1.1 Type of Training and Military Munitions Expected

Based on a review of Fort Ord facilities training maps, previous documents, and aerial photographs, BLM Area C has been used for general training and maneuvers, bivouac training, practice rifle grenade training, practice hand grenade training, aviation training, training using simulators, small arms and machine gun training, shoulder-launched projectile training, light vehicle and basic driving, tactical training, mechanic training, engineer training, combat range training, and a HUMRO test area since the Army acquired the property in 1917. Aviation training, small arms and machine gun training, light vehicle and basic driving, mechanic training, engineer training, and a HUMRO test area are not considered potential sources of MEC as the use of military munitions is not expected in these types of training activities. Training involving shoulder-launched projectiles, identified during interviews conducted as part of the Revised ASR, were not substantiated by site assessment and sampling conducted at the site. The types of munitions associated with general, bivouac, maneuver, practice grenade (hand and rifle) training, combat, and tactical training include blank cartridges, simulators, pyrotechnics, practice munitions, and smoke items.

According to interviews for the 1993 ASR, Site 14 was suspected of containing 7-inch and 8-inch naval gun projectiles that overshot the impact area (USACE, 1993); however, no evidence of 7- or 8-inch naval gun projectiles was found during sampling operations at the site (UXB, 1995a).

Additionally, MEC encountered during various investigations – but not reflective of normal use of the area or indicative of a pattern of training use of these items as defined by the literature review – include blasting caps, practice 40mm cartridges, and riot control items.

An M67 fragmentation hand grenade was identified in December 1992. According to the EOD incident report, an unexploded M67 fragmentation hand grenade was destroyed in an area described as Range N-1. The MMRP database indicated the item location to be within BLM Area C East. The location of the item was called into question as no Range N-1 has been identified. In a 2014 review of the EOD incident report, the M67 was considered to be associated with actions at Range 36 inside the Impact Area MRA. Therefore, this item was likely not found in BLM Area C and the location in the database is not reliable.

A note has been added to the MMRP database. No evidence of a high explosive hand grenade range has been found in BLM Area C.

4.1.2 Subsequent Use of the Area

The area has not been developed. It is maintained as an open space recreational area by BLM.

4.1.3 Establishment of Site Boundaries

The site boundaries for BLM Area C East are based on analysis conducted during the development of the Management Plan (MACTEC/Shaw, 2010). They were further refined during the RI/FS evaluation of BLM Area B. The eastern boundary of BLM Area C East is based on the property boundary at the time of acquisition of the property in 1917. The boundaries of the remaining areas are based on locations where similar types of training (similar use) are reported to have occurred. Rationale for the site boundaries for BLM Area C North was based on focused survey data (EM-61 and Schonstedt biased search and EM-61 transects) following the completion of the 2011 site assessment field activities.

4.1.4 Summary of Literature Review Analysis

Based on the literature review, the types of munitions associated with general, bivouac, maneuver, practice grenade (hand and rifle) training, combat, and tactical training include blank cartridges, simulators, pyrotechnics, practice munitions, and smoke items.

4.2 Site Walk Review

This section describes the items that were found during the site walks and how these items relate to historical information concerning past use of the site. Site boundaries are assessed in terms of the items found, as described in [Section 4.2.2](#) below. There is also a discussion regarding equipment used during site walks, where appropriate, as well as methods and QA/QC measures.

4.2.1 Site Walk Results (Items Found)

Site walks were completed within BLM Area C as part of the Revised ASR (USACE, 1997a), the surficial visual site inspection conducted by USACE (USACE, 1999), the 1999 USA investigation under direction of USACE (USA, 1999), the BRA (MACTEC/Shaw, 2012), and the 2011 site assessments (Shaw, 2012a and 2012b). During these site walks, several MD items were found, including smoke hand grenades, hand grenade safety levers, grenade fuzes, surface trip flare parts (safety levers, fuzes, arming pins, and a base), ground illumination signals, subcaliber practice projectiles, 60mm mortar projectile fragments, and a 75mm shrapnel projectile ([Tables 3A](#) and [3B](#)). MEC items found included trip flares and an artillery flash simulator ([Tables 2A](#) and [2B](#)). No MEC was found during the 2011 site assessments. Munitions items observed during site walks conducted as part of the site assessments and during previous site walks conducted as part of the 1999 USA site investigation, ASR, and BRA were generally of the type expected, based on the training identified during the review of historical documents and previous sampling and removal activities. Recovery of 60mm mortar projectile fragments and 75mm debris found at MRS-59, the 75mm shrapnel projectile found at MRS-57, and several 35mm subcaliber projectiles found during the site walk conducted by USA in 1999 do not indicate a pattern of training use

of these items in BLM Area C. The 35mm subcaliber projectiles were grouped together, suggesting that they were discarded in the area rather than fired. No 75mm related items were found in the vicinity of MRS-64 during site assessment (Shaw, 2012a).

4.2.2 Site Boundaries Review

Based on the results of the site walks, no change to the BLM Area C boundaries are suggested.

4.2.3 Quality Assurance/Quality Control

QA/QC associated with the four different phases of site walks is described below.

PA/SI Site Walks

The site walks conducted as part of the PA/SI reported in the 1997 Revised ASR (USACE, 1997a) were performed in accordance with USACE guidance. The site walks were conducted to look for evidence of past munitions use. Visible evidence found during the site walks provided information on the type, extent, and magnitude of the munitions present. Physical features that are expected to be present at a former site include impact craters caused by penetrating munitions, the presence of MEC or MD on the ground surface, and soil staining associated with the use of bulk explosives. Upon completion of the reconnaissance at each site, a Risk Assessment Code (RAC) worksheet was completed and submitted to the USACE Mandatory Center of Expertise and Design Center as required. The RAC worksheets were intended to aid in the prioritization of munitions response actions nationwide. The RAC worksheets are included as an attachment to the 1997 Revised ASR and were reviewed as part of that document.

USA 1999 Site Walks

The results of the site walks conducted by USA, under the direction of the USACE, were reported in the *Surface Walk About Letter Report* (USA, 1999). The site walks included a portion of BLM North (northern portion) and the portion of BLM East Pre-1940 that is immediately south of Eucalyptus Road and east of Barloy Canyon Road. The activities were conducted in accordance with the USACE *Memorandum to Fort Ord BRAC re: Surficial Visual Site Inspection* (USACE, 1999).

Basewide Range Assessment

Although not formally part of the MMRP, many of the Data Quality Objectives (DQOs) identified in the site reconnaissance phases of the BRA are the same DQOs established for the site assessment phase described in the Management Plan (MACTEC/Shaw, 2010). The DQOs for the BRA identify inputs to the decisions used to answer questions regarding historical site activities and to define historical boundaries of use areas. The DQOs for the BRA historical review identified similar sources of information, including review of interview records, historical maps, and aerial photographs. The BRA DQOs for the site reconnaissance phase include documenting features of former range use, accumulations of spent ammunition, and surface debris to determine whether a range/area requires further investigation (i.e., soil sampling and analysis) or can be proposed for no further investigation. The BRA site walks were conducted in accordance with the DQOs and procedures presented in the *Basewide Range Assessment Work Plan and Contractor Quality Control Plan, Small Arms and Multi-Use Ranges, Fort*

Ord, California (IT, 2001). The results of the BRA site reconnaissance are presented in the *Final Comprehensive Basewide Range Assessment Report* (MACTEC/Shaw, 2012).

Site Assessment

The site assessments conducted in 2011 included both technology-aided (Schonstedt GA-52Cx magnetometer and Geonics EM61) site walks and visual site walks. These included approximately 28 miles of random visual searches in BLM Area C North and technology-aided random and biased searches using a Schonstedt GA-52Cx. Focused characterization was conducted in the southwestern portion of and south of BLM Area C North to confirm that this area was not used as a target area. The focused characterization included approximately 17 miles of biased searches using both a Schonstedt GA-52Cx and a Geonics EM61. Search path spacing was established based on VSP analysis. Five Geonics EM61-aided meandering transects covered approximately 3 miles that were masticated to create paths in areas that were not accessible due to dense vegetation. The balance of search paths was limited to trails and areas of less dense vegetation (Shaw, 2012b). They were completed according to the DQOs presented in the Management Plan and site walk requirements specified in the Management Plan (MACTEC/Shaw, 2010). QA/QC activities for this project consisted of both instrument checks of magnetometers and GPS equipment completed on a daily basis and field QA/QC. These QA/QC activities are documented in the *Site Assessment Data Report BLM East/Pre-1940 (Northern and Southern Portions)* (Shaw, 2012a) and the *Site Assessment Data Report BLM North (Northern and Southern Portions)* (Shaw, 2012b).

Instrument checks included the following daily checks:

- Calibration and maintenance of instruments - the Schonstedt GA-52Cx, Geonics EM61, and personal digital assistant.
- Daily pre- and post-operation navigation equipment (GPS) testing to ensure navigational precision within manufacturer's specifications.

Other QA/QC procedures included field QA/QC inspections by the Contractor Quality Control System Manager, UXO Safety Officer, and the USACE OE Safety Specialist; field inspections and reviews of mapping activities were conducted on a daily basis by a representative from MACTEC. In addition, the UXO Safety Officer and USACE OE Safety Specialist were notified about mapped features that needed further investigation and they assisted with the confirmation and identification of site features and anomalies identified with the Schonstedt GA-52Cx. Field and data QA/QC inspections did not identify the need for corrective actions or process changes.

4.3 Sampling and Removal Action Review

This section describes the items that were found at the site during sampling and removal activities and how these items compare to historical information concerning past use of the site. Site boundaries are assessed in terms of the items found. There is also a discussion regarding sampling equipment, methods, and QC measures used during the munitions response sampling and removal actions.

4.3.1 Sampling and Removal Results (Items Found)

As summarized in [Section 2.4](#), sampling investigation and removal actions at MRSs within BLM Area C were performed by UXB, CMS, USA, Parsons, and Shaw (UXB, 1995a; CMS, 1997a; Parsons, 2002a and 2002b; Shaw, 2005). This work included 100% grid sampling of selected grids at MRS-14B and MRS-14E conducted by UXB and CMS, visual surface removals performed by Parsons within a portion of BLM North that is accessible to the public, and a visual surface reconnaissance by Shaw within a portion of BLM Area C East following an accidental fire. A listing of MEC and MD discovered during sampling and removal actions is provided in [Tables 2A, 2B, 3A, and 3B](#). A discussion of the MEC and MD items found during the sampling and removal actions at each MRS is provided below.

4.3.1.1 Sampling Results

MRS-14B: The MRS (including MRS-27V) was sampled by UXB in 1995. Six MD items – three ground signals, an empty training mine, a 3-inch MK1 practice Stokes mortar, and an item identified as “37mm HE (Model Unknown)” – were recovered within the area of MRS-14B located inside of BLM Area C. The 3-inch practice Stokes mortar projectile was found along a road in BLM Area C East. No evidence of 3-inch Stokes mortar projectiles were found in the sample grids surrounding the area where this item was found. The unknown model of the 37mm projectile was also the only one identified in the vicinity. Recovery of these items along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area. Two MEC items, an illumination pyrotechnic mixture and an M22 series smoke rifle grenade, were identified during the random sampling operations at the BLM Area C portion of MRS-14B by UXB.

Portions of MRS-27V were sampled as part of the investigation of adjacent sites MRS-14B and MRS-14E. No MEC items were found. Three MD items, two illumination signals and a practice mine, were found during sampling. No other sampling or removal operations have been conducted at MRS-27V.

MRS-14E: The MRS (including MRS-27T and MRS-27V) was sampled in 1995 and 1996 by CMS. MEC items removed as part of the investigation included two M49 series trip flares. MD removed included a 90mm illumination projectile (unknown model), three M125 series illumination signals, and an M18 smoke hand grenade. It should be noted that the “90mm illumination projectile” was identified as such in the original grid sheet generated during sampling; however no such item exists in the U.S. military inventory of type classified munitions. Therefore, the description of this item is suspect. In addition to the military munitions that were identified, several thousand small arms ammunition blank cartridges were also found.

One grid within MRS-27T was sampled as part of the sampling effort associated with adjacent site MRS-14E. One ISD item, 22mm subcaliber practice projectile was found during sampling.

4.3.1.2 Removal Results

Eucalyptus Fire Area (BLM portion): Surface reconnaissance was conducted by Shaw within the EFA in 2003. The survey and removal action within the EFA was conducted subsequent to an accidental wildfire that burned vegetation in the area. The burning of the vegetation provided substantially increased visibility and access to the area to allow the operations to take place effectively. The burned BLM

portion of the EFA included approximately 270 acres south of Eucalyptus Road, east of Barloy Canyon Road, and north of MRS-14D and MRS-14E. The burned area included MRS-27K and MRS-27O. The work plan allowed for the use of Schonstedt GA-52CX magnetometers to supplement visual inspection in areas where surface ordnance could be hidden by vegetation; however, no areas within the BLM property were identified that required the use of Schonstedt magnetometers. A total of 22 MEC items and 311 pounds of MD were removed from the BLM property. MEC items found within BLM Area C portion of the EFA, including MRS-27K and MRS-27O, included seven surface trip flares (UXO), two 40mm practice cartridges (DMM), two artillery flash simulators (UXO), one airburst simulator (UXO), three illumination ground signals (UXO), five hand grenades (smoke, riot control, and practice, all UXO), and one 40mm projectile (riot control, UXO) (Shaw, 2005). Munitions items recovered during surface reconnaissance were generally of the type expected with the exception of the practice 40mm practice cartridges and riot control items. The recovery of the two 40mm practice items along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area. Each of the riot control items are the only ones of their type identified, each outside of MRSs; therefore, they do not indicate training use of those types of items and are considered not reflective of normal use of the area.

Visual Surface Removal in Accessible Areas in BLM Area East of Parker Flats: To address the potential danger to the public posed by the proximity and accessibility of MEC on the ground surface in the BLM area to the east of Parker Flats, a visual surface removal was performed by Parsons over trails, paths, and accessible areas. The surface removal included the western portion of BLM Area C North, including portions of MRS-27D and MRS-57. No geophysical instruments were used as part of this surface removal. MEC items found included one M49 surface trip flare and six blasting caps (Parsons, 2002b). Electric blasting cap M6 is used to initiate HE with a blasting machine or other suitable source of electric power. Recovery of the six blasting caps found in BLM Area C North along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area. No evidence was identified to indicate the presence of a demolitions range or other use of these materials. The blasting caps were likely carried into the area for the purpose of training or demonstration and inadvertently discarded.

4.3.2 Site Boundaries Review

Results of the sampling and removals conducted at the site and review of historical documents do not indicate that the overall site boundaries require any changes.

4.3.3 Equipment Review

The equipment review evaluation presented in this section applies to both the sampling and removal discussion and the use of the Schonstedt GA-52CX and Geonics EM61 employed for the site walks.

Schonstedt Magnetometer

The Schonstedt Models GA-52/C or GA-72/Cv magnetometers were used by UXB prior to October 1994. Schonstedt Model GA-52CX was used by UXB after October 1994 and by USA and Shaw during site walks, sampling, and removal work in 1995, 1997, 1998, 2010, and 2011. The Schonstedt instruments

are passive dual flux-gate magnetometers that are highly sensitive magnetic locators that detect ferrous (iron) metal objects; however, they cannot detect non-ferrous metal objects (e.g., lead, brass, copper, and aluminum). Magnetometers make passive measurements of the earth's natural magnetic field; ferrous metal objects and rocks are detected because they produce localized distortions (anomalies) in the magnetic field. The Schonstedt magnetometers actually detect slight differences in the magnetic field (the "gradient") by means of two sensors mounted a fixed distance apart within the instruments' staffs. Because the magnetic response falls off (changes) greatly even over a short distance, a gradient magnetometer like the Schonstedt GA-52CX is especially sensitive to smaller, near-surface ferro-metal objects (Breiner, 1973).

The performance of the Schonstedt GA-52/C, GA-52CX, and GA-72/Cv magnetometers was evaluated as part of the Ordnance Detection and Discrimination Study (ODDS) (Parsons, 2002a). Studies were performed as part of ODDS to evaluate:

- Signatures of inert military munitions items suspended in air at varying orientations and distances from the geophysical sensor (static tests).
- The ability of various geophysical instruments to detect and discriminate between different military munitions items buried at various depths (seeded tests).
- Geophysical instrument performance at actual munitions response sites (field trial site testing).

The Schonstedt tools were not evaluated during the static tests; therefore, only the seeded test results and the field trial tests are discussed herein. It is recognized that the ODDS study areas may not represent the same field conditions as BLM Area C; therefore, differences in field conditions, if applicable, should be considered when using information from the ODDS. The majority of munitions potentially used for training at BLM Area C would be located at the surface or potentially buried just below ground surface. As part of the ODDS, non-penetrating items (signal flares and hand grenades [ODDS Type I]) were evaluated as were penetrating items (2.36-inch and 3.5-inch rockets, rifle grenades, and 14.5mm projectiles [ODDS Type II]). Therefore, the Type I and Type II seeded test results were used for comparison purposes in evaluating the performance of the geophysical equipment used at this site in identifying surface and buried munitions items.

During the seeded tests, the Schonstedt Model GA-52/C located between 56 (search radius of 1.6 feet and maximum lane width of 5 feet) and 59 (search radius of 3.3 feet and maximum lane width of 5 feet) percent of the Type I items buried at depths ranging from just below the ground surface to one foot bgs. The Schonstedt Model GA-72/Cv located between 63 (search radius of 1.6 feet and lane width of 5 feet) and 78 (search radius of 3.3 feet and lane width of 5 feet) percent of the Type I items. The detection rate for Type I items for the Schonstedt Model GA-52/CX ranged between 67 and 78 percent of Type I items. The detection rate for Type II items for the Schonstedt Model GA-52/C ranged from 44 (search radius of 1.6 feet and lane width of 5 feet) to 49 (search radius of 3.3 feet and lane width of 5 feet) percent. The detection rate for Type II items for the Schonstedt Model GA-72/Cv ranged from 41 (search radius of 1.6 feet and lane width of 5 feet) to 51 (search radius of 3.3 feet and lane width of 5 feet) percent. The detection rate for Type II items for the Schonstedt Model GA-52/CX ranged from 64 to 85 percent using the Schonstedt Model GA-52/CX.

The detection rate percentages presented in the ODDS varied according to the search radius which ranged from 1.6 feet to 3.3 feet and the search lane width which was 3 feet to 5 feet wide. A maximum 5-foot wide search lane was used during the munitions response sampling programs at the site. Results for the 3-foot wide search lanes were not included in the detection percentages presented above because 3-foot search lanes were not used during the site investigations. A standard search radius for investigation anomalies was not specified in work plans or reports; therefore, the detection range for the different search radii are presented above.

The seeded test detection rates are considered conservative because one foot was added to the item's calculated penetration depth to allow for soil deposition over time. Because the field conditions at the seeded test site and orientation of the subsurface item may not be comparable to BLM Area C conditions, the results should only be used as an indication that the equipment is capable of detecting the same types of items at depths that are the same as used in the seeded tests.

Results of the ODDS field trial sites were also reviewed for potential use in evaluating instrument performance at the site. Detection rates were calculated for four of the six test sites; the remaining sites did not have enough MEC or MEC-like MD detected to allow calculation of site statistics. The calculated detection rates for the combined sites ranged from 52 to 96 percent for the Schonstedt Model GA-52/C, 64 to 98 percent for the Schonstedt Model GA-72/Cv, and from 97 to 100 percent for the Schonstedt GA-52/CX, depending on the search radius used for the calculation. As previously discussed, results for the 3-foot wide search lanes were not included in the detection percentages presented above because 3-foot search lanes were not used during the site investigations. The lower detection rates were for a 1.6-foot search radius and the higher detection rates were for a 3.3-foot search radius. It should be noted that the ODDS field trial sites were selected to represent areas with high MEC or munitions debris density. In comparison, Track 1 sites, such as BLM Area C, are expected to have very low densities of munitions debris, if any. Therefore, the field trial results may not be applicable to this site.

Although not directly comparable to BLM Area C, the results of the ODDS indicate that the Schonstedt Models GA-52/C, GA-72/Cv, and GA-52/CX are capable of detecting ferrous surface and subsurface MEC if present in the surface or shallow subsurface at the site. In addition, the munitions potentially present are either non-penetrating or otherwise expected to be in the subsurface at shallow depths. The following bullets summarize the equipment review.

- The ODDS supports that the models of Schonstedt magnetometers used during sampling and removal actions are capable of detecting the types of munitions that can be expected at the site.
- The potentially present munitions types discussed in [Section 3.4](#) are either non-penetrating or otherwise expected to be in the subsurface at shallow depths where detection capabilities are best.
- Although detection capabilities appear to decrease with depth for smaller and more deeply buried items and the instrument is not effective at detecting non-ferrous items such as hand grenade fuzes; hand grenades have been detected at the site.
- Burial pits, which can contain multiple items, have been detected at the site using the Schonstedt magnetometers.

Digital Geophysical Equipment

Digital geophysical surveys using a Geonics EM61 were performed as part of focused characterization during the site assessment in and adjacent to BLM Area C North (Shaw, 2012b). The EM61 is capable of detecting both ferrous and non-ferrous metallic objects while being less sensitive to cultural features such as fences, buildings, and power lines. The instruments typically utilize a transceiver coil 1-meter square, but smaller versions are also available. The instrument is easy to use in open areas, but is difficult to use in areas of thick vegetation or steep terrain. The transects performed in the southwestern portion of BLM Area C North were conducted using a single EM61 MK2A unit.

A geophysical prove-out (GPO) was conducted at the Badger Flats ODDS site in 2006 by Shaw. The results of the GPO were published in a *Geophysical Prove-Out Report, Former Fort Ord, Monterey, California (GPO Report)* (Shaw, 2006) which discusses all aspects of the GPO and the findings resulting from the GPO.

The GPO work element used numerous ways of processing the data to finalize the most optimal approach. It was decided that an EM61-MK2 threshold value of 14 millivolts (mV) (sum of four channels) would be used for anomaly selection. This threshold focused on the smallest MEC item that would be encountered at MRS-16, which was a 37mm. This approach should be applicable at other MRS sites within the former Fort Ord facility.

Based on the results of the geophysical prove-out analysis, the instrument configurations, survey techniques and anomaly selection criteria developed by the MRS-16 GPO was subsequently used in geophysical investigations utilizing EM-61 at other MRSs at the former Fort Ord.

4.4 Sampling Methods Discussion

MEC sampling activities resulted in a high degree of certainty that the area was used for general maneuvers training, and bivouac. No evidence of training with high explosive munitions was identified. BLM Area C fits the definition of a Track 1 Category 3 area because the types of munitions expected are the types of MEC and MD found at the site.

UXB International, Inc. (UXB) – July 1994 through August 1995 (UXB, 1995a, c)

Investigation grids were 100 feet by 100 feet square and spaced so that no two grids were any closer than 200 feet to provide maximum dispersion of the sample grids throughout Site 14. Investigation grids were required to cover at least 10% of the total site area being sampled. As sub-areas of Site 14, 5% of MRS-14B was sampled whereas 15% of MRS-14E was sampled. Once the investigation grid locations were established, each grid was divided into five-foot wide search lanes. Each lane was investigated visually while simultaneously searching for subsurface anomalies with the magnetometer. Each anomaly was marked (flagged) and excavated by hand by the UXO technician. Grids with high concentrations of subsurface ferrous metals required a second sweep normally made at an angle of 90 degrees to the first sweep.

Excavation to a depth of up to four feet below ground surface bgs (three feet bgs prior to December 14, 1994) was required to identify or confirm the presence of MEC. According to the work plan, the depths for the MEC and MD found during the UXB investigation were to be recorded. However, the grid records did not indicate MEC depths were recorded. The Fort Ord MMRP database has assigned the depth of zero (on the surface) to MEC items recovered by UXB and a location at the center of the grid in which they were identified, because specific locations within the grids are not available.

QC checks were performed on each grid after all MEC operations were complete. UXB QC specialists checked a minimum of 10% of each grid to confirm that MEC removal was completed properly. After the QC check was performed, the OE Safety Specialist performed a QA check of the site prior to accepting the work as complete according to contractual specifications.

CMS Environmental, Inc./USA Environmental, Inc. (USA) – August 1995 to 2001 (CMS, 1995, 1997a, 1997b; USA, 1997, 1999, 2000a, 2001a, 2001b)

In 100% grid sampling and for removal actions, 100- by 100-foot grids were surveyed and investigated with a magnetometer along maximum 5-foot wide search lanes. Grid searches were accomplished using Schonstedt GA-52Cx magnetometers. Subsurface anomalies were excavated with hand tools. While digging, a magnetometer was used to check and verify the location of the anomaly (CMS, 1995). Subsurface anomalies were excavated to a designated removal depth.

Throughout operations, CMS/USA performed daily operational checks and QC inspections of its work. These inspections consisted of both informal inspections of operational activities and formal inspections of work-in-progress and work completed. The QC Specialist inspected at least 10% of each grid using a magnetometer for inspection.

Parsons Engineering Science, Inc. (Parsons) – July 2000 through July 2005 (Parsons, 2002b)

In 2001 and 2002, Parsons conducted a visual surface removal over the trails, paths, and accessible areas not covered by dense vegetation of BLM Area East of Parker Flats. This surface removal was not instrument-aided. The UXO teams removed, destroyed, and recorded any MEC items that were encountered. The UXO teams removed all MEC-like MD and recorded them by weight per grid (Parsons, 2002b).

After visual surface removal was completed, a visual QC inspection that covered at least 10% of the area cleared was performed (Parsons, 2002b).

Shaw Environmental, Inc. (Shaw) – 2003 through 2004 (Shaw, 2005)

The general procedure in the EFA was to sweep across the designated area with UXO technicians and sweepers (laborers) spread apart across a line, initially at 4 feet apart and later at 8 feet apart. The UXO team lead and GPS technician would follow behind the line and inspect and record the items found. The work plan allowed for the use of Schonstedt GA-52CX magnetometers to supplement visual inspection in areas where surface ordnance could be hidden by vegetation. No areas within the BLM property were identified that required the use of Schonstedt magnetometers.

The Shaw UXO QC Specialist performed a resurvey of each grid with coverage of 10 to 20% and, for heavily vegetated grids, 15 to 25% coverage. The USACE OE Safety Specialist conducted QA assessments in at least 10% of each grid. All grids passed QC and QA inspections (Shaw, 2005).

4.5 Quality Assurance/Quality Control

The QA/QC procedures used during specific sampling activities are described below.

4.5.1 Field Sampling QA/QC

UXB Sampling Actions: The report that documented UXB's sampling investigation (UXB, 1995a) indicated that QC checks were performed on each investigated grid after munitions sampling operations were completed. A minimum of 10% of each investigated grid was checked to verify that the grid had been surveyed and munitions-related items removed. If munitions-related items (other than small arms) were found during the QC sweep, the grid would be resampled. The work plan stated that after the QC check, the site would subsequently undergo a QA check by the USACE OE Safety Specialist.

CMS and USA Environmental Sampling and Removal Actions: The After Action Report (CMS, 1997a) for MRS-14E indicated that CMS performed operational checks and QC inspections, as specified in their work plan. The Work Plan specified that QC would consist of daily and periodic QC audits, as described below (CMS, 1997b).

- **Daily QC Audits.** According to the Work Plan, instruments and equipment requiring maintenance and/or calibration were checked prior to the start of each workday. Batteries were replaced as needed, and the instruments were checked against a known source. The QC Specialist was responsible for ensuring that personnel accomplished all operational checks and that the appropriate log entries were made. The QC Specialist performed random, unscheduled checks of the various sites to ensure that personnel followed procedures in the work plan and submitted a report of findings to the USA SUXOS.
- **Periodic QC Audits.** CMS's QC Specialist conducted a QC audit of completed sites within a reasonable time after the completion of the work. These audits consisted of a magnetometer inspection (using a Schonstedt Model GA-52CX magnetometer) of at least 10% of each search grid. The QC Specialist inspected each operating grid using a zigzag pattern that covered at least 10% of the entire grid and submitted a written report of their findings to the Project Manager (PM). The pass/fail criterion for these audits was zero munitions items. If the QC Specialist did not pass the grid, the PM would schedule the area for rework. In addition to the physical inspection of the site, the QC Specialist conducted an audit of written logs to ensure that proper entries were made. The PM and SUXOS analyzed all grid QC failures to determine required corrective action. According to QC and QA logs, no munitions items were found during the 10% QA/QC.

Shaw Eucalyptus Fire Area Surface Removal and Military Munitions Reconnaissance: The After Action Report (Shaw, 2005) indicated that the project was conducted in accordance with the Quality

Control Plan (QCP) included in the approved work plan. The QCP specified standard quality control procedures, quality control inspections and quality assurance inspections, as described below.

- **Standard Quality Control Procedures.** Standard operating procedures followed during the project included having the same UXO Quality Control Specialist (UXOQCS) for the duration of the project and onsite whenever project-related fieldwork was in progress, the UXOQCS established and maintained an onsite project file in accordance with contract requirements, the UXOQCS verified compliance with the QCP through the three-phase control process, the UXOQCS provided surveillance on project activities performed by subcontractors, records of calibration/maintenance activities were retained in the project files, and the UXOQCS submitted Daily QC reports.
- **Quality Control Inspections.** Continuous QC inspection was performed. The following process was executed by the UXOQCS:
 - Each grid was walked at least once with coverage of at least to 10 to 20%.
 - Some grids were walked twice if vegetation was thick, with coverage of 15 to 25%.
 - Field activities were observed to verify conformance with required procedures.
 - Field documents were reviewed.
 - Project data from the GIS was reviewed and verified versus field conditions.

Almost all grids (greater than 99%) passed on initial QC inspection. Three grids were re-swept based on QC inspection, and then passed QC. QA inspection was provided by the USACE. Inspection included walking each grid at least once with coverage of at least 10%. All grids passed QA inspection.

Parsons Surface Removal, BLM Area East of Parker Flats: The Technical Information Paper (Parsons, 2002b) described the QC process. The QC process included a visual inspection covering at least 10% of the cleared areas. No QC issues were identified in the Technical Information Paper.

4.5.2 Data Management QA/QC

The requirements of the Data Management QA/QC data review are described in the Standard Operating Procedures provided in the *Final Track 1 Ordnance and Explosives Remedial Investigation/Feasibility Study, Former Fort Ord, California* (MACTEC, 2004). The purpose of the data review was to complete a 100% check of all available grid records to identify discrepancies between the reports that document the locations of field activities and the grid records. Discrepancies were then researched and corrections made, if appropriate, prior to loading the data into the project database. MEC and MD removed by UXB were assigned location coordinates that correspond to the center of the grid in which the item was found as part of the QC review. Information concerning the depth of MEC and MD was not collected by UXB. As a result, the MMRP database has assigned the depth of zero (on the surface) to these items. The QA review included a comparison of the MEC dataset with the dataset reported in the AAR. The USACE implemented QA review of 10% of the data reviewed by Parsons. The MD dataset was not reviewed at the same level.

In a 2014 review of the EOD incident report, the M67 was considered to be associated with actions at Range 36 inside the Impact Area MRA. Therefore, this item was likely not found in BLM Area C and the location in the database is not reliable. A note has been added to the MMRP database.

4.5.3 Data Quality Conclusions

The following conclusions can be made regarding the quality of the data:

- Schonstedt magnetometers were used for selected site walks, and sampling and removal actions. The Schonstedt magnetometers are capable of detecting the types of munitions items potentially present at BLM Area C.
- The EM61 used during the site assessments was also effective at identifying surface and shallow subsurface munitions items based on the results of the QA/QC conducted.
- All work passed contractor QC and USACE QA inspections.
- Although sampling investigations did not provide 100% site coverage, the quantity and quality of the available information is sufficient to make an informed decision regarding the sites. The sampling data are sufficient to confirm the types of military munitions used at the sites.
- Although site reconnaissance performed in EFA and site walks by Parsons did not provide 100% site coverage, the quantity and quality of the available information is sufficient to make an informed decision regarding the sites. The removal data are sufficient to confirm the types of military munitions used at the sites.
- Location coordinate data were collected for MEC and some MD items found at the site, except for some items located during the USACE site walks conducted in 1995. Locations of MEC items identified by UXB are assigned at the center of the grid in which they were found.

5.0 *Conclusions and Recommendations*

This section presents conclusions and recommendations for BLM Area C that are based on a review of historical information and field investigation.

5.1 *Conclusions*

Currently, BLM Area C is undeveloped land that was transferred to BLM in 1996. At the time of transfer, available information indicated that the property was safe for reuse as a habitat management area with recreational access. The property underlying BLM Area C is designated as NRMA under the HMP. In 2012, current and future BLM lands at the former Fort Ord, including BLM Area C, were designated as the Fort Ord National Monument.

Based on the literature review, site assessment, and site sampling and removal results, the site appears to have been used historically for general training and maneuvers, bivouac training, practice rifle grenade training, practice hand grenade training, aviation training, training using simulators, small arms and machine gun training, light vehicle and basic driving, tactical training, mechanic training, engineer training, combat range training, and a HUMRO test area since the Army acquired the property in 1917 until base closure in 1994. Aviation training, small arms and machine gun training, light vehicle and basic driving, mechanic training, engineer training, and a HUMRO test area are not considered potential sources of MEC as the use of military munitions is not expected in these types of training activities. Training involving shoulder-launched projectiles identified during interviews conducted as part of the Revised ASR were not substantiated by site assessment and sampling conducted at the site. The types of munitions associated with general, bivouac, maneuver, practice grenade (hand and rifle) training, combat, and tactical training include blank cartridges, simulators, pyrotechnics, practice munitions, and smoke items.

According to interviews for the 1993 ASR, Site 14 was suspected of containing 7-inch and 8-inch naval gun projectiles that overshot the impact area (USACE, 1993); however, no evidence of 7- or 8-inch naval gun projectiles was found during sampling operations at the site (UXB, 1995a).

Some MEC encountered during various investigations do not reflect the historical use of the area or indicate a pattern of training use of these items as indicated by the literature review or the rest of the MEC and MD encountered. These items include blasting caps, practice 40mm cartridges, and riot control items.

An M67 fragmentation hand grenade was identified in December 1992. According to the EOD incident report, an unexploded M67 fragmentation hand grenade was destroyed in an area described as Range N-1. The MMRP database indicated the item location to be within BLM Area C East. The location of the item was called into question as no Range N-1 has been identified. In a 2014 review of the EOD incident report, the M67 was considered to be associated with actions at Range 36 inside the Impact Area MRA. Therefore, this item was likely not found in BLM Area C and the location in the database is not reliable.

A note has been added to the MMRP database. No evidence of high explosive hand grenade range has been found in BLM Area C.

Most of the MD and MEC items discovered at the site were on the ground surface or just below the ground surface, including during subsurface sampling. BLM Area C has been transferred to BLM and is currently open to public access, for recreational uses such as hiking, bicycling, and horseback riding. These uses have been supported safely with past and current measures including munitions responses in known and suspected sites; providing munitions recognition and safety training to BLM; and implementation of munitions incident reporting system. Roads and trails have been subjected to munitions responses, including surface MEC removal. Subsurface investigations have taken place in some locations. Munitions items found during these actions are mostly consistent with the expected training in BLM Areas C. Incident reporting procedures for suspected munitions items have been implemented for over ten years. Based on the current understanding of the site, it is not likely that people traversing on the roads and trails (those that are authorized for public use) would encounter a MEC item. If any MEC (or item that resembles MEC) is discovered in the future, the munitions incident reporting system is in place to address the item. The following munitions items, if present at the site, and, if encountered, are considered to pose an acceptable risk for the following reasons:

Cap, blasting, electric, M6: Electric blasting cap M6 is used to initiate HEs with a blasting machine or other suitable source of electric power. Recovery of these items along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area. No evidence was identified to indicate the presence of a demolitions range or other use of these materials. The blasting caps were likely carried into the area for the purpose of training or demonstration and inadvertently discarded.

It is unlikely that a person could cause an intact M6 electric blasting cap to function through casual contact. Blasting caps are sensitive to static electricity, heat, and shock (e.g., being dropped on a hard surface); however, degradation, weathering, and especially moisture can make blasting caps less sensitive.

Cartridge, 40mm, practice, M382: Recovery of these items along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area.

It is not likely that a person could function a cartridge, 40mm, practice, M382 through casual contact. The cartridge is initiated when the percussion primer is struck by the weapon firing pin. If the cartridge functioned while not in the firing tube of a weapon system, the projectile would separate from the cartridge but would not arm the projectile. The fuze in the projectile requires both setback and rotation to become armed. Exposure to moisture and weathering does not increase the risk associated with this cartridge.

Cartridge, 40mm, practice, M781: Recovery of this item along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area.

It is not likely that a person could function a cartridge, 40mm, practice, M781 through casual contact. The cartridge is initiated when the .38 caliber blank cartridge is struck by the weapon firing pin. If the

cartridge functioned while not in the firing tube of a weapon system, the projectile would separate from the cartridge but would not arm the projectile. Exposure to moisture and weathering does not increase the risk associated with this cartridge.

Flare, surface, trip, M49 series: It is not likely that a person could cause an M49 flare with safety pin in place to function with casual contact. However, in the unlikely event one remained in a “prepared to function” condition (e.g., attached to a trip wire or other triggering mechanism) or fixed position (e.g., attached to a tree), it is possible that a person could cause it to function through casual (inadvertent or unintentional) contact. Serious injury beyond burns would not be expected because the flare is designed to burn “in place” where it was placed or mounted.

Grenade, hand, riot, CN1, ABC-M25A1: This type of hand grenade is used for riot control and simulating mass casualties. Recovery of this item along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area.

There is a low likelihood that a person would be able to cause a CN1 riot hand grenade with pin in place to function through casual (inadvertent or unintentional) contact if one were found at the site. If it were caused to function, it would produce eye and ear irritation and possibly minor cuts due to the shattering of the grenade body.

Grenade, hand, fragmentation, M67: An M67 fragmentation hand grenade was identified in December 1992. According to the EOD incident report, an unexploded M67 fragmentation hand grenade was destroyed in an area described as Range N-1. The MMRP database indicated the item location to be within BLM Area C East. The location of the item was called into question as no Range N-1 has been identified. In a 2014 review of the EOD incident report, the M67 was considered to be associated with actions at Range 36 inside the Impact Area MRA. Therefore, this item was likely not found in BLM Area C and the location in the database is not reliable. A note has been added to the MMRP database. No evidence of high explosive hand grenade range has been found in BLM Area C.

It is not likely that a person could cause an M67 with safety pin in place to function with casual contact. In the unlikely event one were caused to function, it could result in significant injuries or death. However, this item was likely not found in BLM Area C. No evidence of high explosive hand grenade range has been found in BLM Area C.

Grenade, hand, practice, M69: The M69 practice hand grenade is used as training version of the M67 fragmentation hand grenade. It is unlikely that a person would be able to cause a practice grenade with pin in place to function through casual (inadvertent or unintentional) contact if one were found at the site. In the unlikely event that a practice grenade were caused to function, it could cause minor burns or lacerations from metal fragments from the ignitor housed within the grenade; the practice grenade itself would not fragment. However, the grenade would have to contain a live fuze and functioning ignitor.

Grenade, hand, smoke, M48 series: There is a low likelihood that a person would be able to cause a an M48 smoke hand grenade with pin in place to function through casual (inadvertent or unintentional)

contact if one were found at the site. If it were initiated, it would produce red smoke and hot gases that could cause minor burn injuries.

Grenade, hand, smoke M18 series: The M18 is a colored-smoke hand grenade used for ground-to-air or ground-to-ground signaling. An M18 smoke grenade with safety pin in place is unlikely to function due to casual contact. If an M18 smoke grenade without its safety pin were discovered, it is possible that a person could inadvertently cause it to function resulting in burns from the smoke composition. Given that these items have been exposed to the elements for many years, moisture can penetrate and degrade the pressure sensitive tape, the smoke composition, and the condition of the sheet metal case of the grenade reducing the integrity of the components that cause it to function.

Grenade, rifle, smoke, M22 series: The grenade, rifle, smoke M22 series (green, red, violet, and yellow) was designed for signaling and laying smoke screens during troop training and battlefield simulation. It is highly unlikely that a person could function an M22, Smoke Rifle Grenade through casual contact, because the grenade was designed to be functioned by a hard nose-on impact with the ground or other hard target. If caused to function, the type of injuries that could be sustained would be burns from the burning smoke charge.

Projectile, 22mm, subcaliber, practice: One ISD item, a 22mm subcaliber practice projectile was found in MRS-27T. Recovery of this item does not indicate a pattern of training or use and does not reflect normal use of the area.

It is highly unlikely that a person could function a 22mm subcaliber practice projectile through casual contact because the projectile was designed to be functioned by a hard impact with the ground.

Projectile, 40mm, CS, M651: This type of projectile is used for riot control, troop training, and battlefield simulation. Recovery of this item along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area.

There is a low likelihood that an unfired cartridge will function through casual contact because it is not armed. A fired 40mm CS projectile could function if kicked or stepped on. If it were caused to function, hot metal could potentially cause minor burns and the CS mixture would cause eye and throat irritation.

Simulator, flash, artillery, M110: The M110 simulator was used to effect battle conditions in artillery maneuvers and as a decoy in forward combat areas. Its flash closely resembles that of large munitions items.

It is highly unlikely that a person would be able to cause an M110 flash artillery simulator to function through casual contact. If it were caused to function, it could result in burn injuries.

Signal, illumination, Ground, Green Star, Parachute, M19 series: This ground illuminating signal device was designed for signaling during military operations. These signals would be difficult to cause to function by incidental contact. They would require precise assembly to function and a flash through the

stabilizer to ignite the propelling charge. If caused to function, the type of injury that could be sustained would be burns from the propelling charge.

Signal, illumination, ground, clusters, M125 series: Ground illumination signals were used for signaling by ground units during troop training and battlefield simulation. It is highly unlikely that a person would be able to cause an M125 ground illumination signal to function through casual contact if one were found at the site because the signal was designed to function immediately after being fired and requires a deliberate act to function. If fired and unburned, they would require a flame/heat source to initiate burning. The M125 series star cluster ground illumination signal contains no explosives. If it were caused to function, it could result in burn injuries.

Signal, illumination, ground, M126 Series: Ground illumination signals were used for signaling by ground units during troop training and battlefield simulation. It is highly unlikely that a person would be able to cause an M126 series ground illumination signal to function through casual contact if one were found at the site because the signal was designed to function.

The M125 series ground illumination signal contains no explosives. If it were caused to function, it could result in burn injuries.

Simulator, projectile, airburst, M74 Series: An M74 series projectile simulator simulates artillery fire air bursts. It is unlikely that a person could cause an M74 air burst projectile simulator to function through casual (inadvertent or unintentional) contact if one were found at the site, because it would require a hard, precise blow to the primer to function. If an airburst projectile simulator is found at the site and subjected to an open flame (i.e., fire), it may function and could cause nonfatal burns and/or lacerations.

Simulator, projectile, ground burst, M115A2: The M115A2 ground burns simulator projectile was used to simulate battle noises and effects, such as shells in flight and ground explosions, during troop maneuvers. It is highly unlikely that a person would be able to cause an M115A2 ground-burst projectile simulator to function through casual contact and sustain a burn injury if one were found at the site because it was made from paper that would have been exposed to moisture, degradation, and weathering for many years, which could decrease its effectiveness.

5.2 *Sampling and Removal Adequacy and Data Quality*

The following provides conclusions regarding data adequacy and quality.

- MEC and MD items found at the site were types that were expected based on historical uses and that would be expected on the surface, if present.
- Schonstedt GA-52/C, GA-52CX, and GA-72/Cv magnetometers were used during investigations and removal actions and instrument-aided site walks. These instruments were evaluated as part of the ODDS, and are capable of detecting ferrous munitions items at the depths expected at this site.

- Digital geophysical surveys using a Geonics EM61 were performed in the southwestern portion of BLM Area C North as part of 2011 site assessments. The EM61 performance was evaluated against the DQOs and site walk requirements presented in the Management Plan (MACTEC/Shaw, 2010). No need for corrective actions or process changes was identified in QA/QC inspections.
- The investigations included BRA site walks, USACE PA/SI site walks, USA site walks, visual surface reconnaissance in the BLM portion of the EFA and the visual surface removal in the area between BLM Area East of Parker Flats, and MEC sampling at MRS-14B and MRS-14E.
- The site walks, surface reconnaissance, sampling, and removal data indicate that simulators, pyrotechnics, practice munitions, and smoke items were used at the site. The types of items identified are consistent with the types of training identified on historical training maps.
- Because the military munitions items found during field investigations at the site are considered to pose an acceptable risk (see [Section 3.4](#)), additional MEC sampling at the site would not add significantly to the understanding of the site or change the conclusions of this report.

5.3 Recommendations

Based on review of existing information and historical documentation, NFA related to MEC is recommended for this site. BLM Area C meets the Track 1, Category 3 criteria. Historical information and field investigations indicate that the site was used for training with military munitions, but the military munitions that potentially remain as a result of that training do not pose an actionable risk based on site-specific evaluations conducted in this Approval Memorandum.

The military munitions items recovered during site walks, sampling, and surface removal actions confirm that the types of military munitions found, and those that potentially remain in the sites, are simulators, pyrotechnics, practice munitions, and smoke items that are not designed to cause injury. In the unlikely event that a MEC item is found consistent with MEC items previously found within BLM Area C, it is not expected that it would function through casual contact (i.e., inadvertent and unintentional contact). The munitions items that may remain and may be found at BLM Area C would have been exposed to moisture, degradation, and weathering for many years which would likely decrease the effectiveness of the components that cause a MEC item to function.

While no actionable risk was identified through the remedial investigation process, in the interest of safety, reasonable and prudent precautions should be taken when conducting intrusive operations at this site. As a basewide effort to promote safety and because of Fort Ord's history as a military base, the Army provides munitions recognition and safety training to anyone who requests it. Personnel involved in intrusive operations at the former Fort Ord are encouraged, where not required, to attend the Army's munitions recognition and safety training (which is consistent with the Army's 3Rs of explosive safety) to increase their awareness of, and ability to recognize, munitions items. Section 1.3.1 (Description of the Remedy) of the Track 1 ROD (Army, 2005b) describes the scope of the safety training. In accordance with the Track 1 ROD, trained personnel will contact an appropriate local law enforcement agency if a potential MEC item is encountered. Local law enforcement will request appropriate explosives or munitions emergency response from the EOD unit or local bomb squad with equivalent training.

In the future, should any military munitions-related item be found at BLM Area C, the Army will take an appropriate immediate action (i.e., removing the found item, recording the incident), and within 90 days of the discovery, submit a plan for appropriate follow-on action to EPA and DTSC for consultation, pursuant to Section 7.7(b) of the Fort Ord FFA.

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Tables

Table 1A		
BLM Area C North Acreage		
Location	Total Area	Area In BLM Area C North
MRS-27D	41.6	41.6
MRS-57	39.7	18.8
MRS-67 and MRS-27D	9.4	9.4
MRS-59	174.3	169.6
Outside MRS Boundaries	N/A	216.6
Total Area In BLM Area C North		456.0

Table 1B		
BLM Area C East Acreage		
Location	Total Area	Area In BLM Area C East
MRS-14B	282.8	32.3
MRS-14E	70.5	62.2
MRS-14E:MRS-27T	4.6	4.6
MRS-14E: MRS-27V	8.2	7.8
MRS-27K	22.9	22.9
MRS-27L	62.8	62.8
MRS-27M	43.5	43.5
MRS-27O	22.7	21.7
MRS-27P	41.1	41.1
MRS-27P: MRS-27T	0.4	0.4
MRS-27Q	14.7	11.4
MRS-27T	31.3	6.7
MRS-27V	42.6	6.2
MRS-27W	23.0	6.5
MRS-60	45.0	45.0
MRS-64	156.5	62.3
MRS-64: MRS-27M	5.7	5.7
MRS-65	47.2	47.2
MRS-65: MRS-27M	18.5	18.5
Outside MRS Boundaries	N/A	1205.7
Total Area In BLM Area C East		1714.4

Total BLM Area C	2170.4
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Table 2A: BLM Area C North MEC Items Identified

Site	Grid_ID	Model_Description	MM Type	Quantity	Depth (in.)	Date	Contractor
MRS-57	LC3-MI08-SA07	Signal, illumination, ground, M126 series	ISD	1	0	2/10/1999	BLM
Outside MRS Boundary	LC3-MG09	Flare, surface, trip, M49 series	UXO	1	0	12/20/2001	Parsons
Outside MRS Boundary	LC3-MG06	Cap, blasting, electric, M6	UXO	6	0	1/24/2002	Parsons
Outside MRS Boundary	LC3-MF10-SI07	Ash, pyrotechnic	ISD	1*	0	**	Range Control
Outside MRS Boundary	C3F5H9	Signal, illumination, ground parachute, M126 series	MPPEH***	1	0	9/26/2018	KEMRON
Outside MRS Boundary	C3F6F5	Projectile, 37mm, LE, MK I	MPPEH***	1	0	9/25/2018	KEMRON
Outside MRS Boundary	C3F7D4	Projectile, 37mm, LE, MK I	MPPEH***	1	0	9/13/2018	KEMRON

Notes:

* one pound of pyrotechnic ash was reported.

** a date was not provided in the database for this report.

*** items were found in containment line for BLM Area B prescribed burn, MM Type will be revised after confirmed by detonation

ISD = Insufficient Data

UXO = Unexploded Ordnance

MPPEH = Material Potentially Presenting an Explosive Hazard

in. = inches below ground surface

Table 2B: BLM Area C East MEC Items Identified

Site	Grid_ID	Model_Description	MM Type	Quantity	Depth (in.)	Date	Contractor
MRS-14B	MRS-14A_5 E	Grenade, rifle, smoke, M22 series	ISD	1	0	8/18/1994	UXB
MRS-14B	MRS-14A_8 D	Pyrotechnic mixture, illumination	UXO	**	0	8/18/1994	UXB
MRS-14E	LB4-MC03-SG10	RIFLE, GRENADE (Model Unknown)*	ISD	1	0	7/23/1993	EOD
MRS-14E	LB4-ME03-SD05	Flare, surface, trip, M49 series	ISD	2	0	10/18/1995	CMS
MRS-14E	MRS-14E_68 N	Flare, surface, trip, M49 series	UXO	2	0	10/18/1995	CMS
MRS-14E:MRS-27T	LB4-ME04-SC06	Projectile, 22mm, subcaliber, practice, M744	ISD	1	***	9/26/1995	CMS
MRS-27K	LC4-MA04-SA09	Cartridge, 40mm, practice, M382	DMM	1	0	10/21/2003	SHAW
MRS-27O	LB4-MJ02-SC03	Flare, surface, trip, M49 series	UXO	1	0	10/5/1999	USACE
MRS-27O	LB4-MJ02-SG06	Simulator, flash artillery, M110	UXO	1	0	9/26/2001	BLM
MRS-27O	LB4-MJ02-SE04	Flare, surface, trip, M49 series	UXO	1	0	10/17/2003	SHAW
Outside MRS Boundary	LB4-MI02-SB07	Grenade, hand, fragmentation, M67	UXO	1	0	12/4/1992	EOD
Outside MRS Boundary	LC4-MB06-SC08	Simulator, projectile, ground burst, M115A2	ISD	1	0	7/7/1997	BLM
Outside MRS Boundary	LC4-MC04-SJ07	PROJECTILES, 40MM (Model Unknown)*	ISD	2	0	9/29/1997	BLM
Outside MRS Boundary	LC4-MB03-SI07	Grenade, hand, smoke, M18 series	ISD	1	0	11/18/1997	BLM
Outside MRS Boundary	LC4-MB03-SI07	OTHER (Model Unknown)*	ISD	1	0	11/18/1997	BLM
Outside MRS Boundary	LC4-MC04-SC06	Signal, illumination, ground, M125 series	ISD	1	0	4/6/1999	BLM
Outside MRS Boundary	LB4-MF01-SJ09	Simulator, flash artillery, M110	UXO	1	0	10/15/2003	SHAW
Outside MRS Boundary	LB4-MI01-SB10	Grenade, hand, riot, CN1, ABC-M25A1	UXO	1	0	10/16/2003	SHAW
Outside MRS Boundary	LB4-MH02-SJ01	Grenade, hand, smoke, M18 series	UXO	1	0	10/16/2003	SHAW
Outside MRS Boundary	LB4-MI02-SE02	Signal, illumination, ground, M125 series	UXO	1	0	10/16/2003	SHAW
Outside MRS Boundary	LC4-MA05-SB06	Simulator, projectile, airburst, M74 series	UXO	1	0	10/16/2003	SHAW
Outside MRS Boundary	LB4-MJ04-SI04	Grenade, hand, practice, M69	UXO	1	0	10/17/2003	SHAW
Outside MRS Boundary	LC4-MA04-SA03	Cartridge, 40mm, practice, M382	DMM	1	0	10/20/2003	SHAW
Outside MRS Boundary	LB4-MF02-SD03	Simulator, flash artillery, M110	UXO	1	0	10/20/2003	SHAW
Outside MRS Boundary	LB4-MF02-SF10	Signal, illumination, ground, M125 series	UXO	1	0	10/21/2003	SHAW
Outside MRS Boundary	LB4-MG02-SC05	Flare, surface, trip, M49 series	UXO	1	0	10/22/2003	SHAW
Outside MRS Boundary	LB4-MJ03-SE10	Projectile, 40mm, CS, M651	UXO	1	0	10/22/2003	SHAW
Outside MRS Boundary	LB4-MG02-SB01	Signal, illumination, ground, parachute, M19 series	UXO	1	0	10/22/2003	SHAW
Outside MRS Boundary	LB4-MJ03-SC10	Flare, surface, trip, M49 series	UXO	1	0	10/23/2003	SHAW
Outside MRS Boundary	LB4-MJ03-SC10	Flare, surface, trip, M49 series	UXO	1	0	10/23/2003	SHAW
Outside MRS Boundary	LB4-MJ03-SC10	Flare, surface, trip, M49 series	UXO	1	0	10/23/2003	SHAW
Outside MRS Boundary	LB4-MJ03-SC10	Flare, surface, trip, M49 series	UXO	1	0	10/23/2003	SHAW
Outside MRS Boundary	LB4-MJ03-SB10	Flare, surface, trip, M49 series	UXO	1	0	10/23/2003	SHAW
Outside MRS Boundary	LB4-MJ03-SA04	Grenade, hand, smoke, M18 series	UXO	1	0	10/23/2003	SHAW
Outside MRS Boundary	LB4-MI02-SD05	Grenade, hand, practice, M69	UXO	1	0	10/28/2003	SHAW
Outside MRS Boundary	LB4-MI07-SG09	Cartridge, 40mm, practice, M781	DMM	1	0	2/8/2012	BLM

Notes:

* in the Model Description Field indicates there is no equivalent Master Pick list nomenclature available for the item; therefore, the description from the original grid sheet was used.

** one pound of Pyrotechnic mixture, illumination was reported

*** the depth of the item was not collected

ISD = Insufficient Data

UXO = Unexploded Ordnance

in. = inches below ground surface

Table 3A: BLM Area C North MD Identified

Site	Grid	Model Description	MM Type	Quantity	Depth (in.)	Date	Contractor
MRS-27D	LC3-MG09-SD09	GRENADe, SPOONS (Model Unknown)*	MD	5	0	10/6/1999	USA
MRS-27D	LC3-MG09-SD09	Flare, surface, trip, M49 series	MD	1	0	10/6/1999	USA
MRS-27D	LC3-MF09-SJ07	grenade spoon*	MD	1	0	9/17/2001	SHAW
MRS-57	MRS-57_01 K	PYROTECHNIC ITEM (Model Unknown)*	MD	1	0	1/6/1996	USACE
MRS-57	MRS-57_01 K	Projectile, 75mm, shrapnel, MK I	MD	1	0	1/6/1996	USACE
MRS-57	MRS-57_01 K	SIGNAL (Model Unknown)*	MD	1	0	1/6/1996	USACE
MRS-57	MRS-57_01 K	Signal, illumination, ground, M125 series	MD	1	0	1/6/1996	USACE
MRS-57	MRS-57_11 K	SIGNAL (Model Unknown)*	MD	1	0	1/7/1996	USACE
MRS-57	MRS-57_11 K	Signal, illumination, ground, M125 series	MD	1	0	1/7/1996	USACE
MRS-57	LC3-MH08-SB02	Grenade, hand, smoke, M18 series	MD	1	0	10/6/1999	USACE
MRS-57	LC3-MH07-SE05	Grenade, hand, smoke, M48	MD	1	0	9/30/1999	USA
MRS-57	LC3-MH07-SE05	Signal, illumination, ground, M125 series	MD	1	0	9/30/1999	USA
MRS-57:MRS-27D	LC3-MH08-SC07	Signal Flare*	MD	1	0	8/30/2001	SHAW
MRS-57:MRS-27D	BLM4	Assorted MD Components	MD	1	6	5/11/2011	SHAW
MRS-59	MRS-59	60MM MORTAR FRAGMENTS (Model Unknown)*	MD	**	0	2/26/1996	USACE
MRS-59	LC4-MF02-SI01	Grenade, hand, smoke, M18 series	MD	1	0	6/28/2000	BLM
MRS-59	LC4-MI01-SA06	Grenade, hand, smoke, M18 series	MD	1	0	7/11/2001	BLM
MRS-59	LC4-MH02-SI05	Simulator, projectile, airburst, M74 series	MD	1	0	1/10/2005	BLM
MRS-59	BLM4	Assorted MD Components	MD	1	0	3/14/2011	SHAW
MRS-59	BLM4	Assorted MD Components	MD	3	0	3/24/2011	SHAW
MRS-59	BLM4	Assorted MD Components	MD	1	6	5/11/2011	SHAW
Outside MRS boundary	LC3-MG06-SJ10	Grenade, hand, smoke, M48	MD	1	0	9/30/1999	USA
Outside MRS boundary	LC3-MG06-SJ10	Signal, illumination, ground, M125 series	MD	1	0	9/30/1999	USA
Outside MRS boundary	LC4-MF01-SA03	Simulator, projectile, airburst, M74 series	MD	1	0	10/4/1999	USA
Outside MRS boundary	LC4-MF01-SD03	Fuze, grenade, hand, practice, M228	MD	1	0	10/4/1999	USA
Outside MRS boundary	LC4-MF01-SD03	Fuze, grenade, hand, practice, M228	MD	1	0	10/4/1999	USA
Outside MRS boundary	LC4-MF01-SD03	Flare, surface, trip, M49 series	MD	1	0	10/4/1999	USA
Outside MRS boundary	LC4-MF01-SE03	Fuze, grenade, hand, practice, M228	MD	1	0	10/4/1999	USA
Outside MRS boundary	LC4-MF01-SE03	Fuze, grenade, hand, practice, M228	MD	1	0	10/4/1999	USA
Outside MRS boundary	LC4-MF01-SH04	FLARE CONTAINER, EMPTY (Model Unknown)*	MD	1	0	10/4/1999	USA
Outside MRS boundary	LC4-MF01-SH06	Signal, illumination, ground, M125 series	MD	1	0	10/4/1999	USA
Outside MRS boundary	LC3-MG08-SA08	TAIL SECTION OF A SLAP FLARE (Model Unknown)*	MD	1	0	10/6/1999	USA
Outside MRS boundary	LC3-MG09-SI08	Fuze, grenade, hand, practice, M228	MD	1	0	10/6/1999	USA
Outside MRS boundary	LC3-MG10-SH08	Grenade, hand, smoke, M18 series	MD	1	0	10/6/1999	USA
Outside MRS boundary	LC3-MH09-SB10	SAFE AND ARMING PIN, M49A1 (Model Unknown)*	MD	1	0	10/6/1999	USA
Outside MRS boundary	LC3-MH09-SF04	Simulator, explosive boobytrap, illumination, M118	MD	1	0	10/6/1999	USA
Outside MRS boundary	LC3-MH09-SF05	BASE, M49A1*	MD	1	0	10/6/1999	USA
Outside MRS boundary	LC3-MH09-SF05	SPOON, M49A1 (Model Unknown)*	MD	1	0	10/6/1999	USA

Site	Grid	Model Description	MM Type	Quantity	Depth (in.)	Date	Contractor
Outside MRS boundary	LC4-MF01-SA10	Grenade, hand, smoke, M18 series	MD	1	0	10/6/1999	USA
Outside MRS boundary	LC3-MG08-SF06	Simulator, projectile, airburst, M74 series	MD	1	0	1/9/2001	BLM
Outside MRS boundary	LC3-MG08-SG02	Grenade, rifle, smoke (Model Unknown)*	MD	1	0	1/17/2008	BLM
Outside MRS boundary	BLM4	Assorted MD Components	MD	2	0	3/10/2011	SHAW
Outside MRS boundary	BLM4	Assorted MD Components	MD	1	0	3/10/2011	SHAW
Outside MRS boundary	BLM4	Assorted MD Components	MD	1	0	3/10/2011	SHAW
Outside MRS boundary	BLM4	Assorted MD Components	MD	1	0	3/10/2011	SHAW
Outside MRS boundary	BLM4	Assorted MD Components	MD	1	0	3/10/2011	SHAW
Outside MRS boundary	BLM4	Assorted MD Components	MD	1	0	3/14/2011	SHAW
Outside MRS boundary	BLM4	Assorted MD Components	MD	1	0	3/24/2011	SHAW
Outside MRS boundary	BLM4	Assorted MD Components	MD	1	4	6/7/2011	SHAW
Outside MRS boundary	BLM4	Assorted MD Components	MD	1	2	6/7/2011	SHAW
Outside MRS boundary	BLM4	Assorted MD Components	MD	1	1	6/7/2011	SHAW
Outside MRS boundary	BLM4	Assorted MD Components	MD	1	4	6/7/2011	SHAW
Outside MRS boundary	BLM4	Assorted MD Components	MD	1	6	6/8/2011	SHAW
Outside MRS boundary	LC4-MF01-SC05	Signal, illumination, ground, M126 series	MD	1	0	9/26/2011	BLM
Outside MRS boundary	LC4-MF01-SE10	Signal, illumination, ground, M126 series	MD	1	0	7/16/2012	BLM
Outside MRS boundary	LC4-MF01-SE04	Grenade, hand, practice, M69	MD	1	0	7/17/2012	BLM
Outside MRS boundary	LC3-MH10-SF02	Signal, illumination, ground, parachute, M19 series	MD	1	0	10/8/2014	BLM
Outside MRS boundary	LC3-MG10-SE09	Signal, ground, rifle, parachute, M17 series	MD	1	0	7/27/2015	BLM

Notes:

* in the Model Description Field indicates there is no equivalent Master Pick list nomenclature available for the item; therefore, the description from the original grid sheet was used.

** a quantity was not reported

MD = Munitions Debris

in. = inches below ground surface

Table 3B: BLM Area C East MD Identified

Site	Grid	Model Description	MM Type	Quantity	Depth	Date	Contractor
MRS-14B	MRS-14A_5 E	MINE, AT, TRAINING, EMPTY (OE Scrap)	MD	1	0	8/18/1994	UXB
MRS-14B	MRS-14A_5 E	Signal, illumination, ground, M125 series	MD	1	0	8/18/1994	UXB
MRS-14B	MRS-14A_1 D	37mm HE (Model Unknown)*	MD		0	8/18/1994	UXB
MRS-14B	MRS-14B_28 X	Projectile, 3inch, Stokes mortar, prac, MK I	MD	1	0	8/9/1995	UXB
MRS-14B	MRS-14B_40 O	Signal, illumination, ground, M125 series	MD	3	0	8/15/1995	UXB
MRS-14B	LB4-MB03-SD02	Signal Flare*	MD	1	0	9/11/2001	SHAW
MRS-14E	MRS-14B_46 P	Grenade, hand, smoke, M18 series	MD	1	0	8/15/1995	UXB
MRS-14E	MRS-14E_55 J	90mm, ILLUM, PROJO (Model Unknown)	MD	1	0	9/6/1995	CMS
MRS-14E	MRS-14E_55 M	Signal, illumination, ground, M125 series	MD	3	0	9/7/1995	CMS
MRS-14E	BLM3	Assorted MD Components	MD	1	0	2/28/2011	SHAW
MRS-14E:MRS-27V	MRS-14B_46 G	Signal, illumination, ground, M125 series	MD	1	0	8/16/1995	UXB
MRS-14E:MRS-27V	MRS-14E_49 H	Signal, illumination, ground, M125 series	MD	1	0	8/30/1995	CMS
MRS-14E:MRS-27V	MRS-14E_49 H	Mine, antipersonnel, practice, M8 series	MD	1	0	8/30/1995	CMS
MRS-27K	MRS-27K	PYROTECHNIC ITEMS (Model Unknown)*	MD	**	0	3/5/1996	USACE
MRS-27K	LB4-MI04-SG06	Signal Flare*	MD	1	0	8/9/2001	SHAW
MRS-27K	LB4-MI04-SH06	Signal Flare*	MD	1	0	8/9/2001	SHAW
MRS-27K	LB4-MI04-SI06	booby trap-training*	MD	1	0	8/9/2001	SHAW
MRS-27K	LB4-MI04-SJ06	Signal Flare*	MD	1	0	8/9/2001	SHAW
MRS-27L	LC4-MB07-SG09	Grenade, hand, smoke, M18 series	MD	1	0	10/28/1999	BLM
MRS-27L	LC4-MC09-SI02	Signal Flare*	MD	1	0	1/14/2002	SHAW
MRS-27L	BLM3	Assorted MD Components	MD	1	0	2/22/2011	SHAW
MRS-27L	BLM3	Assorted MD Components	MD	1	0	2/22/2011	SHAW
MRS-27M	MRS-27M	PYROTECHNIC ITEMS (Model Unknown)*	MD	**	0	2/28/1996	USACE
MRS-27M	LC4-MA09-SF06	Fuze, grenade (model unknown)*	MD	1	0	9/26/2001	SHAW
MRS-27O	MRS-27O	PYROTECHNIC ITEMS (Model Unknown)*	MD	**	0	3/4/1996	USACE
MRS-27O	LB4-MJ02-SG06	Signal Flare*	MD	1	0	10/18/2004	SHAW
MRS-27O	LB4-MJ02-SG06	Cartridge Case, 40mm (projectile removed/case intact)	MD	1	0	10/18/2004	SHAW
MRS-27O	LB4-MJ02-SA03	booby trap signal ground illumination*	MD	1	0	11/10/2004	SHAW
MRS-27Q	MRS-27Q	Fuze, grenade, igniting, M201	MD	1	0	****	UXB
MRS-27V	MRS-14B_43 K	Signal, illumination, ground, M125 series	MD	2	0	8/14/1995	UXB
MRS-60	MRS-60	EXPENDED FLARES AND SIGNALS (Model Unknown)*	MD	***	0	12/4/1995	USACE
MRS-60	BLM3	Assorted MD Components	MD	1	0	2/25/2011	SHAW
MRS-64	LB4-MJ08-SD09	Projectile, 75mm, shrapnel, MK I	MD	1	0	6/2/1997	BLM
MRS-64	BLM3	Assorted MD Components	MD	1	0	3/3/2011	SHAW
MRS-65	MRS-65_AB	Signal, illumination, ground, M125 series	MD	1	0	11/21/1995	USACE
MRS-65	BLM3	Assorted MD Components	MD	1	0	2/2/2011	SHAW
MRS-65	LB4-MJ05-SG06	Simulator, projectile, airburst, M74 series	MD	1	0	6/1/2011	BLM
Outside MRS boundary	LB4-MI06-SF04	Signal, ground, rifle, parachute, M17 series	MD	1	0	6/3/1997	BLM
Outside MRS boundary	LC4-MB03-SI07	Signal, illumination, ground, M125 series	MD	10	0	11/18/1997	BLM

Site	Grid	Model Description	MM Type	Quantity	Depth	Date	Contractor
Outside MRS boundary	LB4-MA02-SG03	Grenade, rifle, smoke, M22 series	MD	1	12	1/22/1998	CMS
Outside MRS boundary	LC5-MB01-SB01	Grenade, hand, smoke, M18 series	MD	1	0	1/26/1999	BLM
Outside MRS boundary	LC4-MD05-SB03	Grenade, hand, fragmentation, MK II	MD	1	0	7/14/1999	SHAW
Outside MRS boundary	LC4-MD05-SB05	Grenade, hand, fragmentation, MK II	MD	1	0	7/14/1999	SHAW
Outside MRS boundary	LB4-MH04-SE09	Ordnance components	MD	1	0	9/30/1999	USA
Outside MRS boundary	LB4-ME02-SJ10	Rocket, 35mm, subcaliber, practice, M73	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-ME02-SI10	Rocket, 35mm, subcaliber, practice, M73	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-ME02-SJ10	Rocket, 35mm, subcaliber, practice, M73	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-ME02-SJ10	Rocket, 35mm, subcaliber, practice, M73	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-ME02-SJ10	Rocket, 35mm, subcaliber, practice, M73	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-ME02-SJ10	Rocket, 35mm, subcaliber, practice, M73	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-ME02-SI10	Rocket, 35mm, subcaliber, practice, M73	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-ME02-SJ10	Rocket, 35mm, subcaliber, practice, M73	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-ME02-SI10	Rocket, 35mm, subcaliber, practice, M73	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-ME02-SI10	Rocket, 35mm, subcaliber, practice, M73	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-ME02-SI10	Rocket, 35mm, subcaliber, practice, M73	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-ME02-SI10	Rocket, 35mm, subcaliber, practice, M73	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-ME02-SJ10	FRAGMENT, UNKNOWN SOURCE (Model Unknown)*	MD	**	0	10/5/1999	USA
Outside MRS boundary	LB4-MI02-SH01	Fuze, grenade, hand, practice, M228	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-MI01-SF10	Fuze, grenade, hand, practice, M228	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-MI02-SH01	PART OF GRENADE FUZE (Model Unknown)*	MD	1	0	10/5/1999	USA
Outside MRS boundary	LB4-ME02-SI10	Rocket, 35mm, subcaliber, practice, M73	MD	1	0	10/5/1999	USA
Outside MRS boundary	LC4-MC04-SD02	Grenade, hand, smoke, M18 series	MD	1	0	10/18/1999	BLM
Outside MRS boundary	LC4-MC05-SB03	Rocket motor, 3.5inch	MD	2	0	6/18/2001	BLM
Outside MRS boundary	LB4-MI05-SD10	Signal Flare*	MD	1	0	8/8/2001	SHAW
Outside MRS boundary	LB4-MI04-SG06	Grenade, hand, smoke, commercial (model unknown) (civilian)	MD	1	0	8/9/2001	SHAW
Outside MRS boundary	LB4-MJ02-SJ07	CIVILIAN, TEAR GAS, GRENADE (Model Unknown)*	MD	1	0	9/5/2001	BLM
Outside MRS boundary	LC4-MA06-SI07	Grenade, hand, smoke, M18 series	MD	1	0	9/20/2001	BLM
Outside MRS boundary	LC4-MC06-SB04	Rocket, 3.5inch, practice, M29 series	MD	1	0	10/30/2002	BLM
Outside MRS boundary	LB4-MH06-SD05	Grenade, hand, smoke, M18 series	MD	1	0	9/9/2003	BLM
Outside MRS boundary	LB4-MH02-SA03	Simulator, projectile, airburst, M74 series	MD	1	0	9/14/2004	BLM
Outside MRS boundary	LB4-MF03-SC01	Grenade, rifle, antitank, practice, M29	MD	1	0	10/7/2004	BLM
Outside MRS boundary	LB4-MH03-SF07	Signal Flare*	MD	1	0	11/30/2004	SHAW
Outside MRS boundary	LB4-MJ02-SE10	Fuze, grenade, hand, practice, M228	MD	1	1	12/7/2005	BLM
Outside MRS boundary	LB4-MF01-SF06	Signal, illumination, ground, M126 series	MD	1	0	5/15/2006	BLM
Outside MRS boundary	LB4-MG04-SH09	Projectile, 40mm, practice, M918	MD	1	0	9/11/2007	SHAW
Outside MRS boundary	LB4-MH06-SI08	Projectile, 81mm, mortar, illumination, M301 series	MD	1	0	9/20/2007	SHAW
Outside MRS boundary	LB4-MH05-SA02	Grenade, rifle, smoke, M22 series	MD	2	0	10/2/2007	SHAW
Outside MRS boundary	LB4-MI07-SF02	Signal, illumination, ground, M126 series	MD	1	0	5/13/2010	BLM
Outside MRS boundary	BLM3	Assorted MD Components	MD	1	0	1/12/2011	SHAW
Outside MRS boundary	BLM3	Assorted MD Components	MD	1	0	1/18/2011	SHAW
Outside MRS boundary	BLM3	Assorted MD Components	MD	1	0	1/18/2011	SHAW

Site	Grid	Model Description	MM Type	Quantity	Depth	Date	Contractor
Outside MRS boundary	BLM3	Assorted MD Components	MD	1	0	1/18/2011	SHAW
Outside MRS boundary	BLM3	Assorted MD Components	MD	1	0	1/27/2011	SHAW
Outside MRS boundary	BLM3	Assorted MD Components	MD	1	0	2/16/2011	SHAW
Outside MRS boundary	BLM3	Assorted MD Components	MD	1	0	2/17/2011	SHAW
Outside MRS boundary	BLM3	Assorted MD Components	MD	1	0	2/17/2011	SHAW
Outside MRS boundary	BLM3	Assorted MD Components	MD	1	0	2/17/2011	SHAW
Outside MRS boundary	BLM3	Assorted MD Components	MD	1	0	2/22/2011	SHAW
Outside MRS boundary	BLM3	Assorted MD Components	MD	1	0	2/24/2011	SHAW
Outside MRS boundary	BLM3	Assorted MD Components	MD	1	0	2/25/2011	SHAW
Outside MRS boundary	LC5-MD01-SD04	Signal, illumination, ground (Model Unknown)	MD	1	0	5/11/2011	BLM
Outside MRS boundary	LC4-MC03-SA08	Fuze, grenade, hand, practice, M205 series	MD	3	0	3/21/2012	BLM
Outside MRS boundary	LB4-MG05-SI01	Projectile, 40mm, practice (Model Unknown)	MD	1	0	6/15/2013	Bureau of Land Management
Outside MRS boundary	LB4-MI07-SE10	Signal, illumination, ground (Model Unknown)	MD	1	0	9/26/2017	BLM LAW ENFORCEMENT
Outside MRS	LB4-MF01-SG07	Signal, illumination, ground, M126 series	MD	1	0	****	BLM

Notes:

* in the Model Description Field indicates there is no equivalent Master Pick list nomenclature available for the item; therefore, the description from the original grid sheet was used.

** one pound of MD was reported

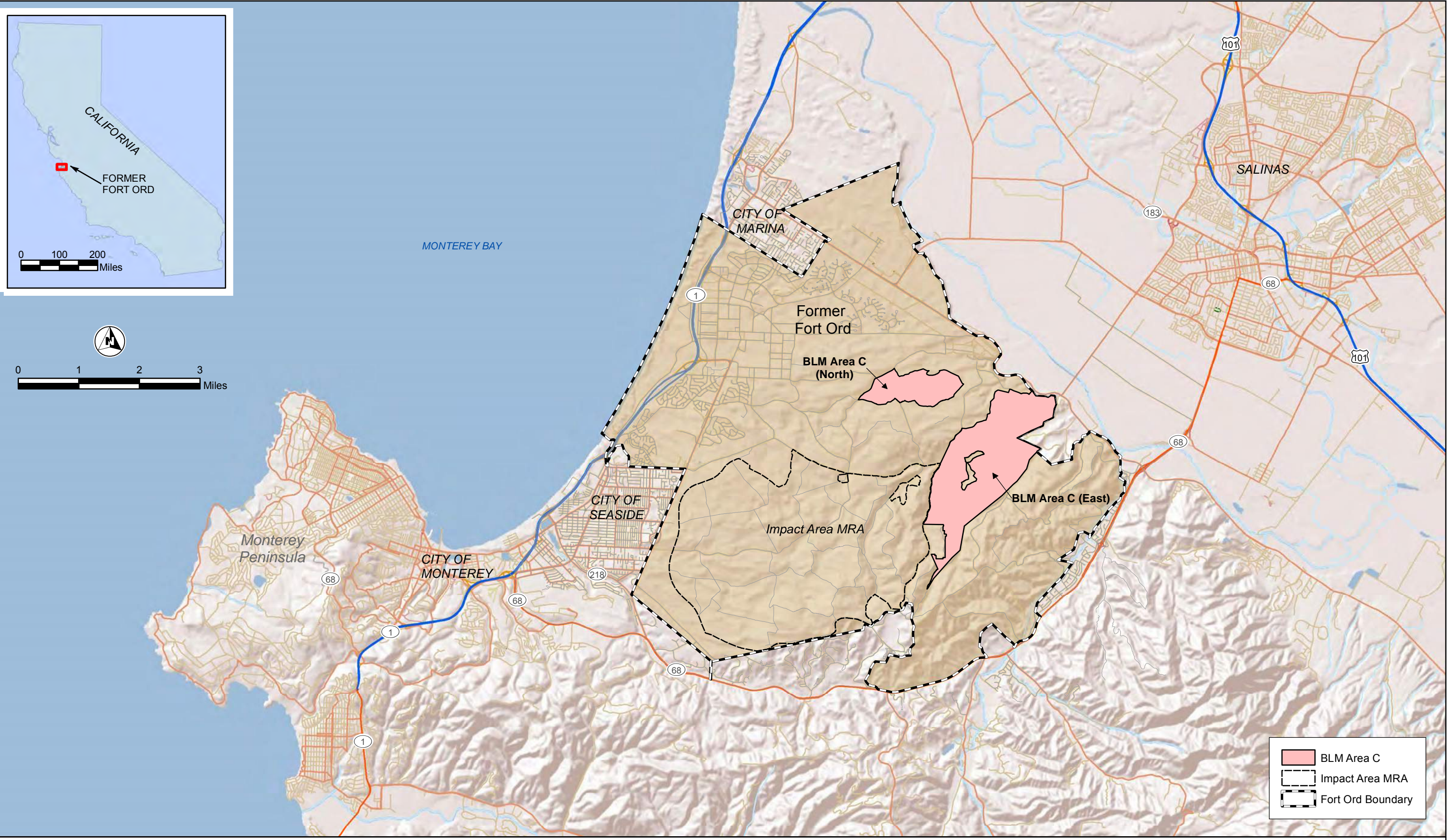
*** a quantity was not reported

**** a date was not reported

MD = Munitions Debris

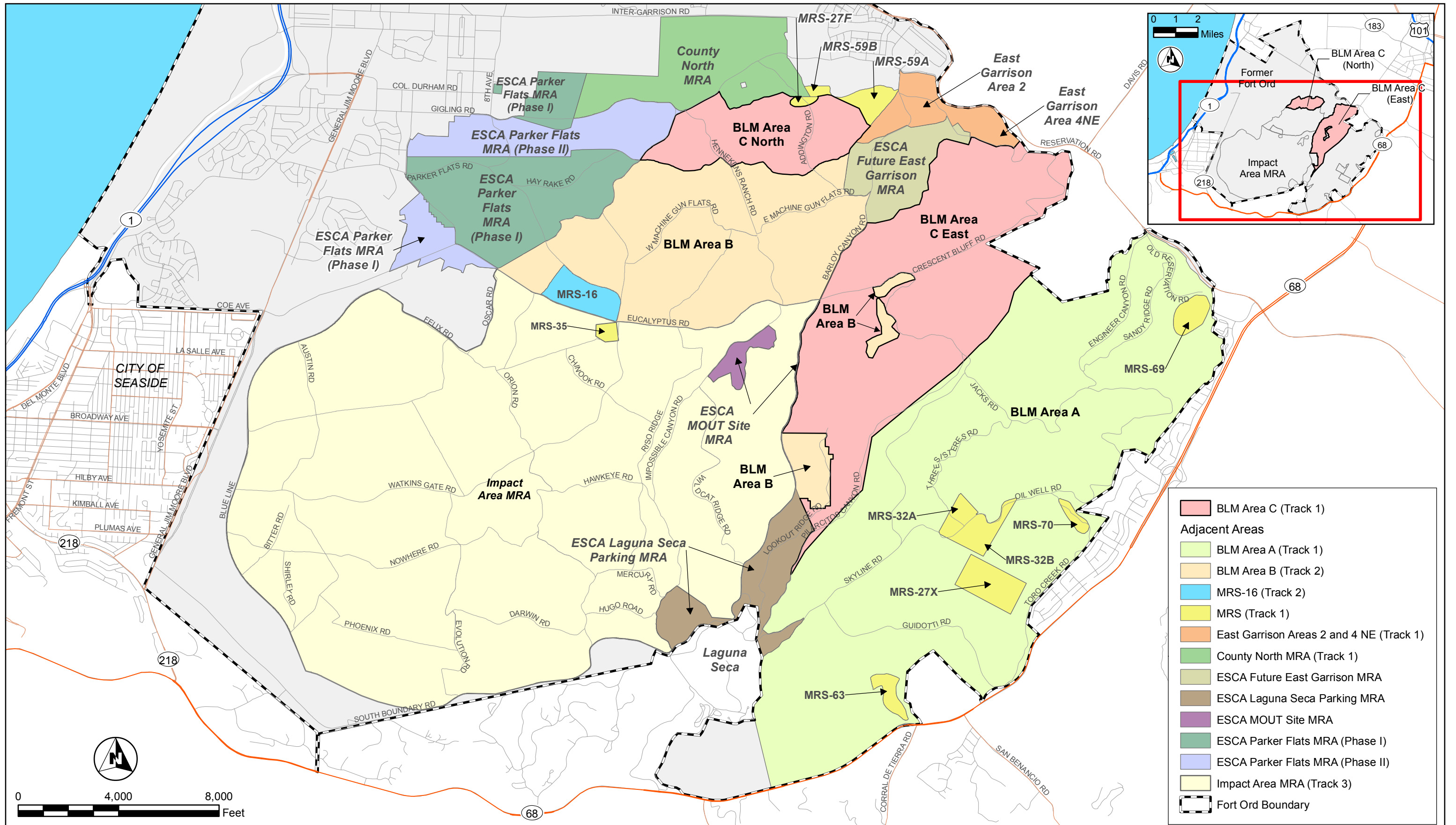
in. = inches below ground surface

Figures



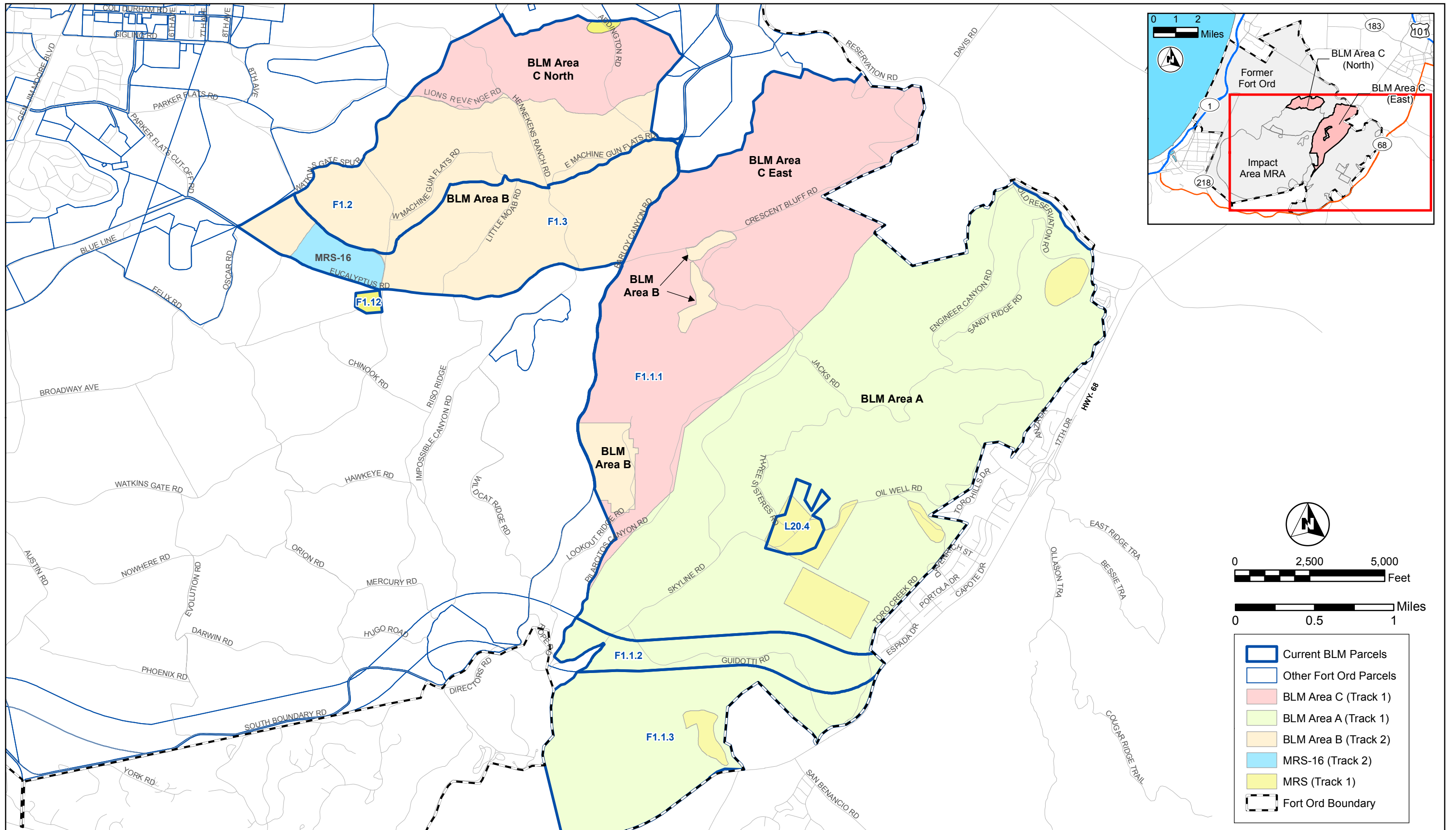
Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

Figure 1
Regional Location Map



Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

Figure 2
BLM Area C
Location Map

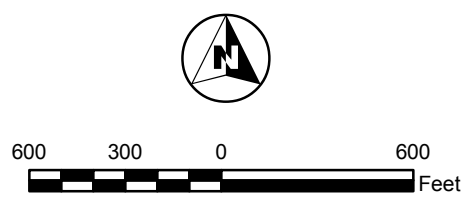
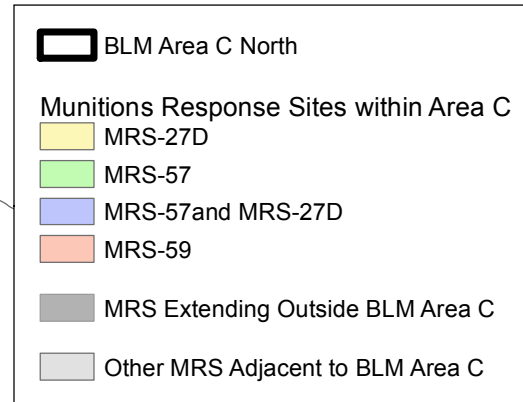
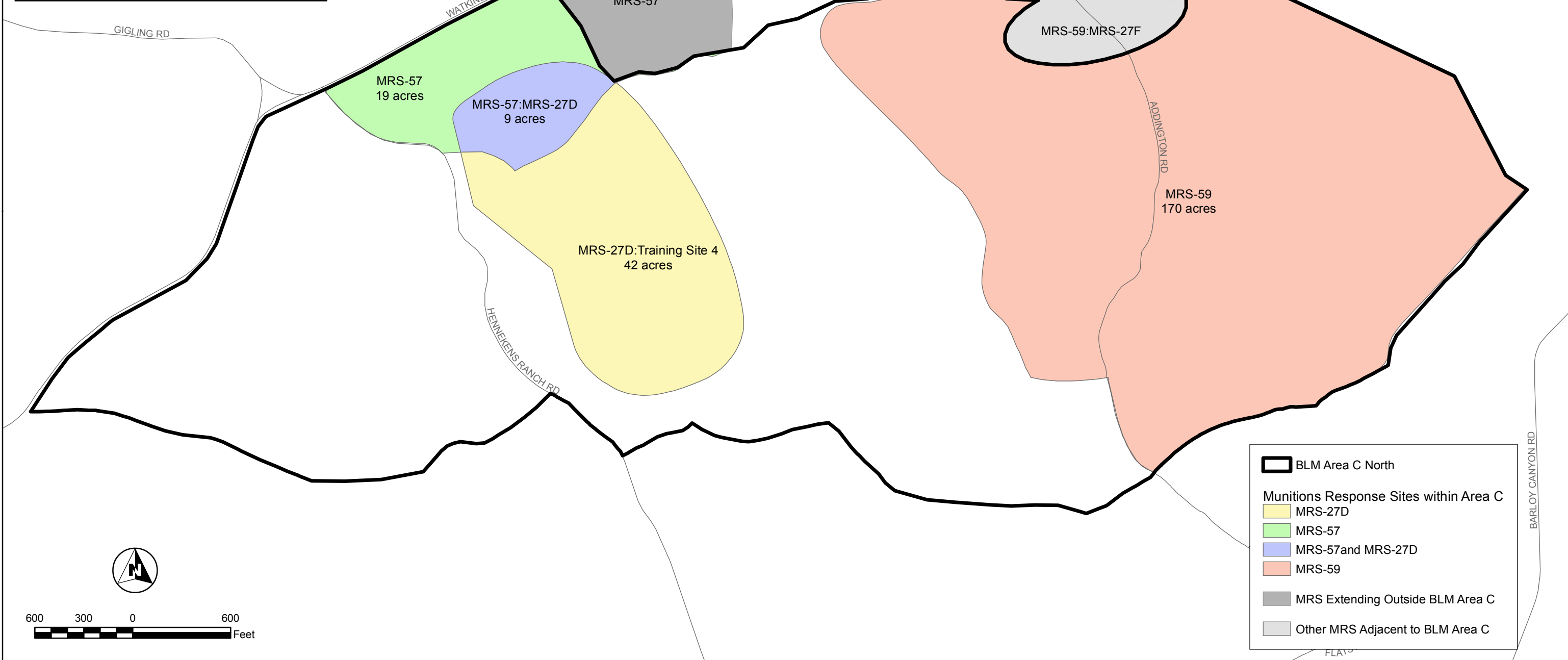
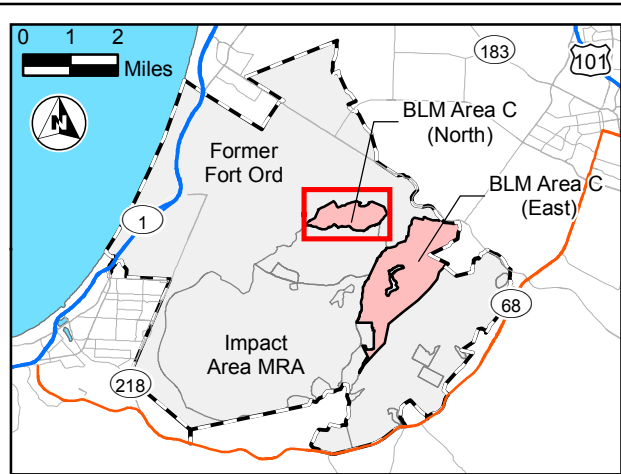


Track 1 Plug-In Approval Memorandum BLM Area C

Former Fort Ord, California

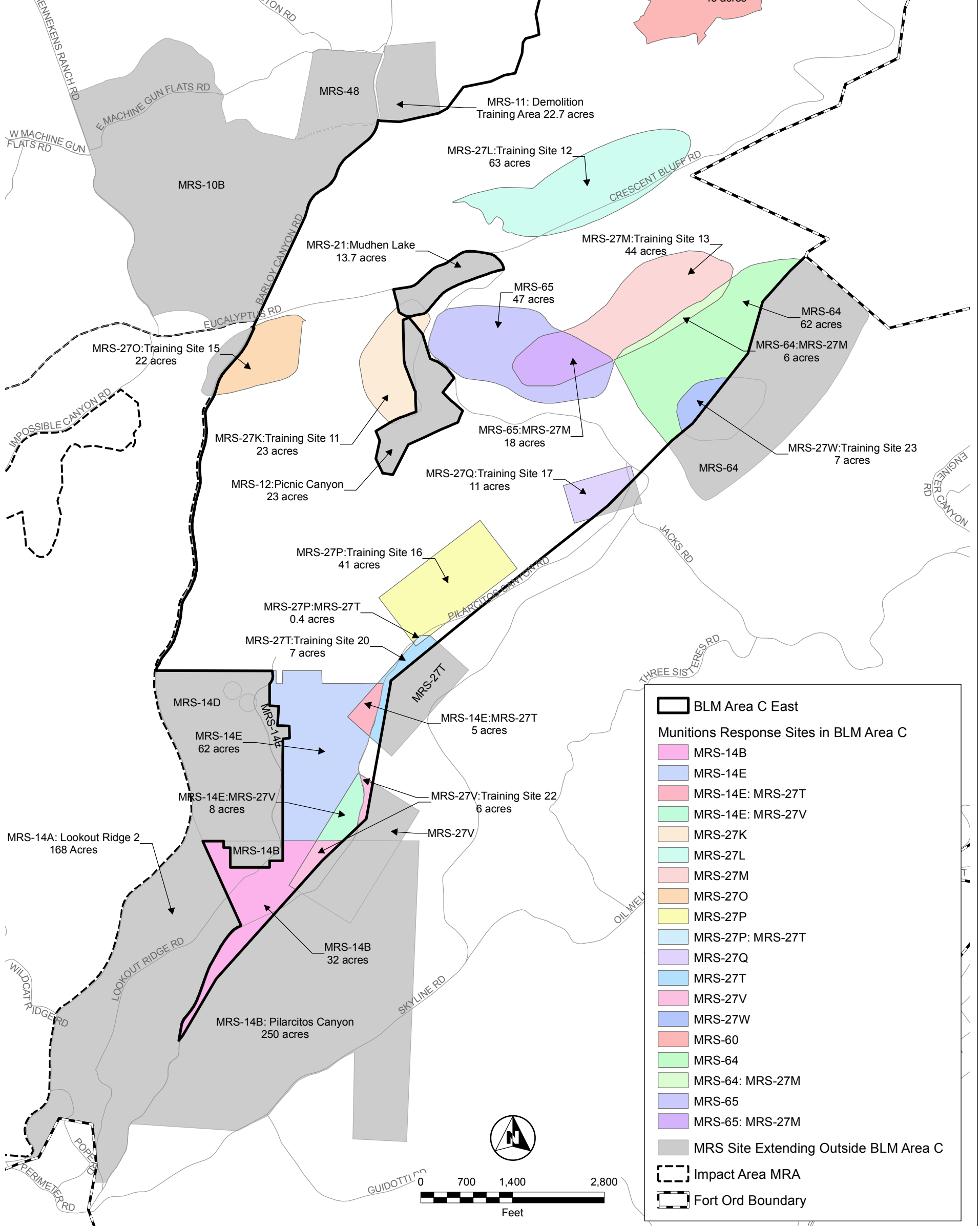
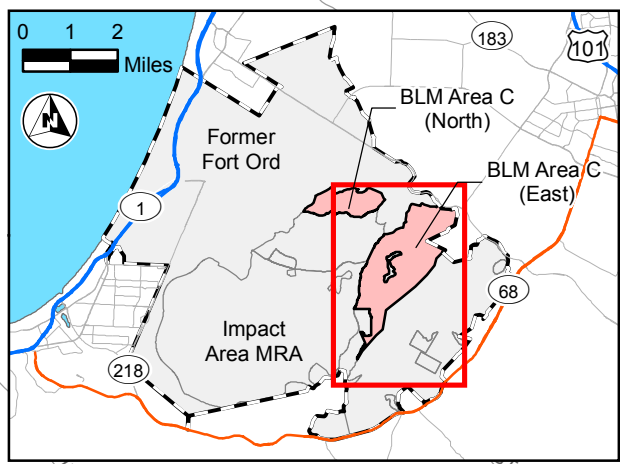
Figure 3

Parcel Map



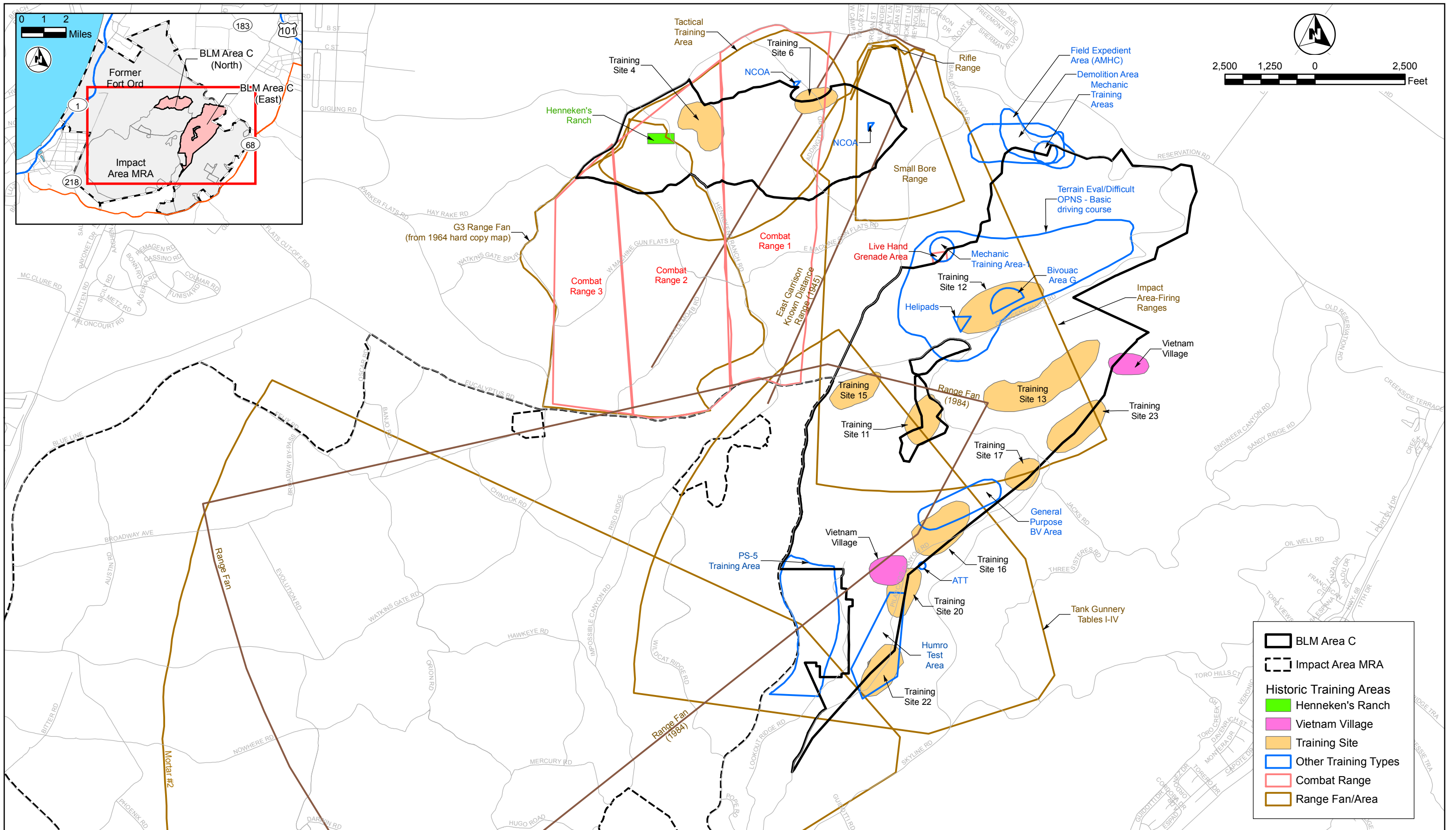
Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

Figure 4
BLM Area C North
Munitions Response Sites



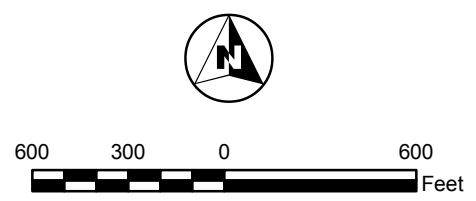
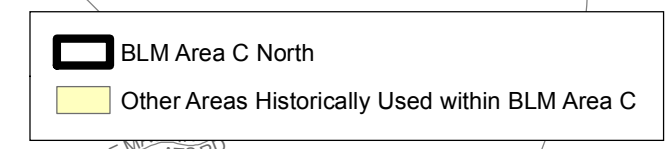
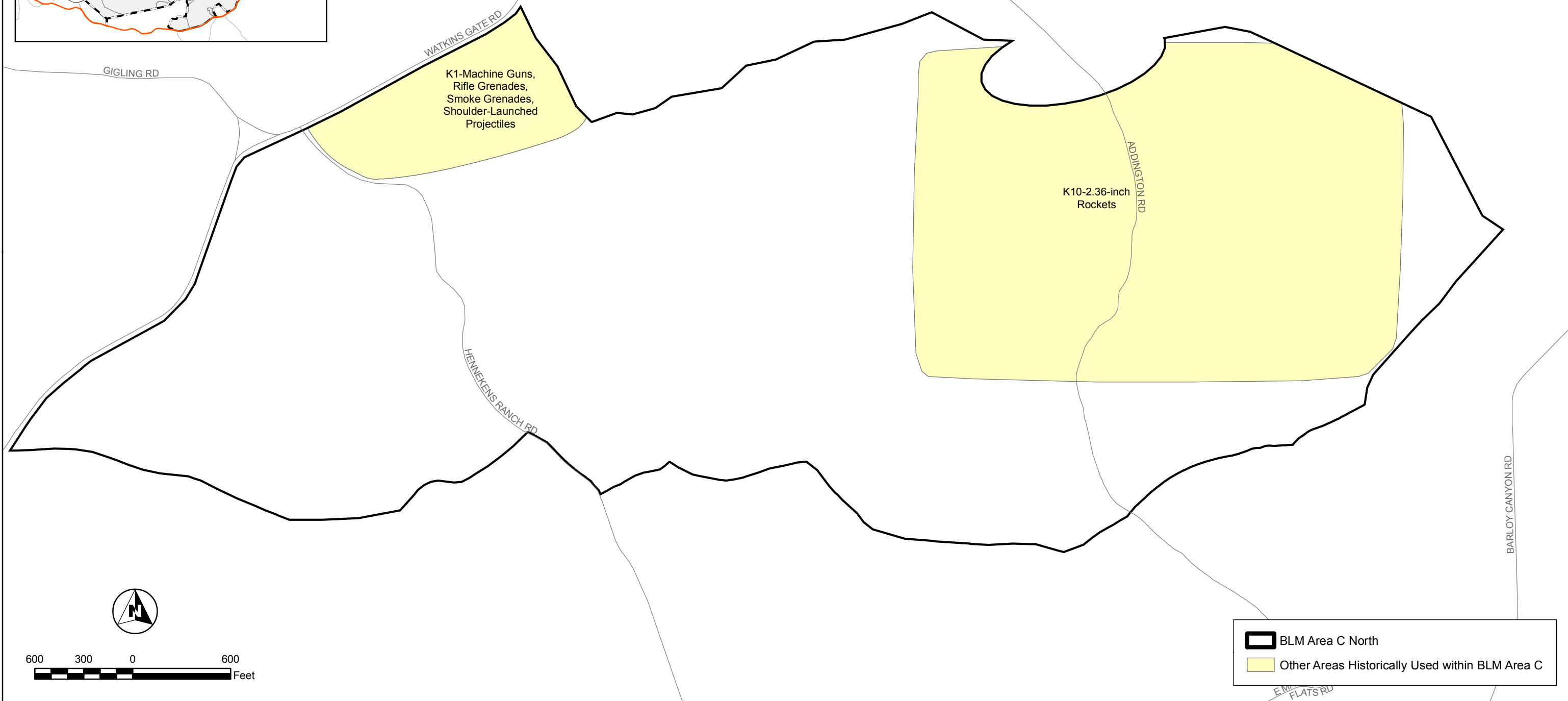
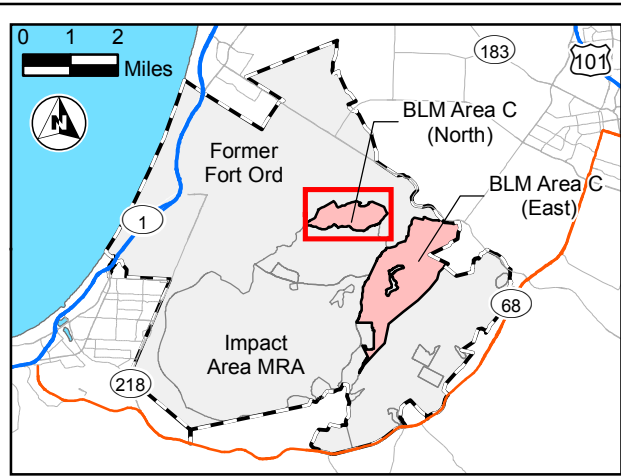
Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

Figure 5
BLM Area C East
Munitions Response Sites



Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

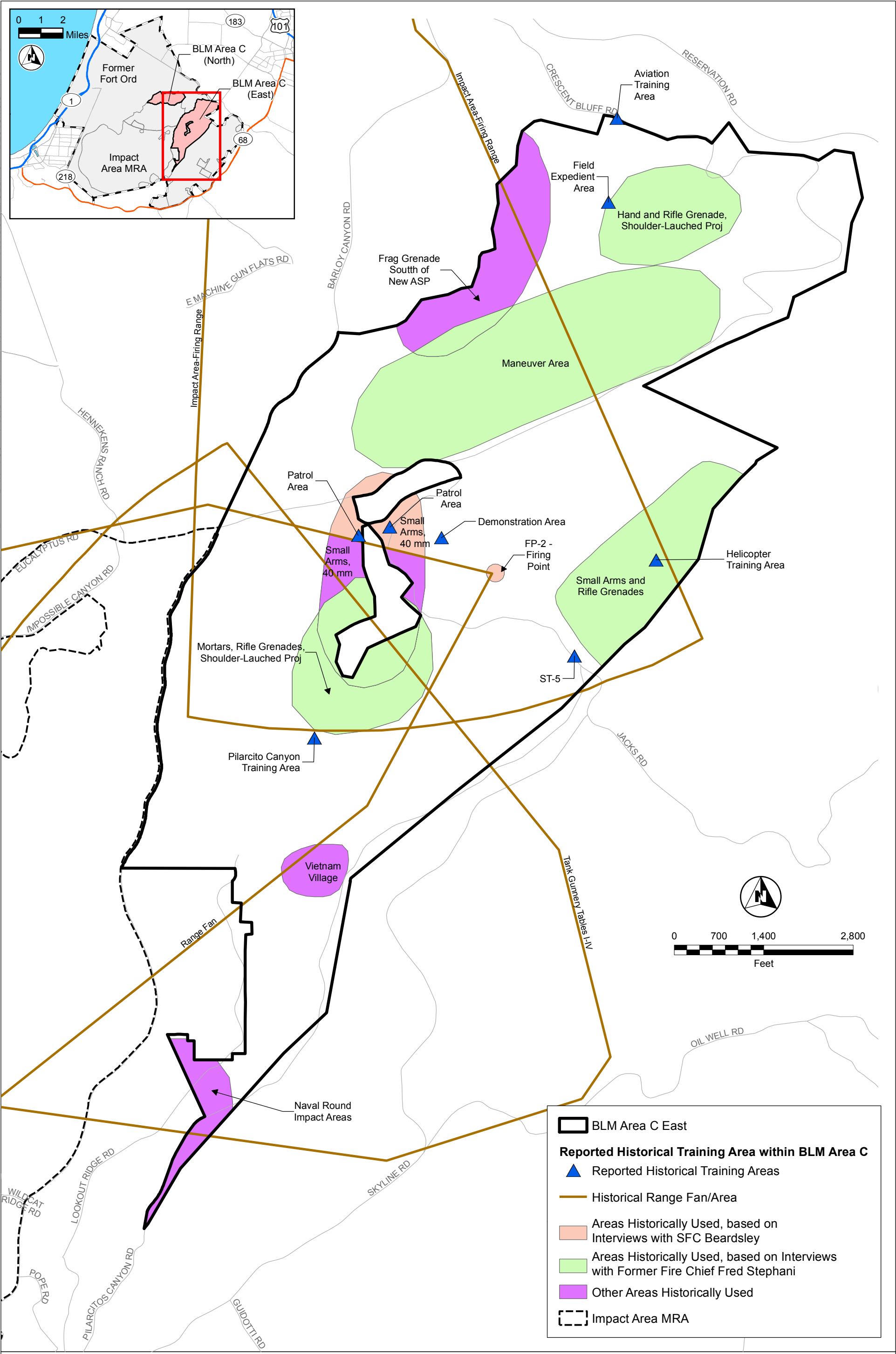
Figure 6
BLM Area C
Historical Training Areas



Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

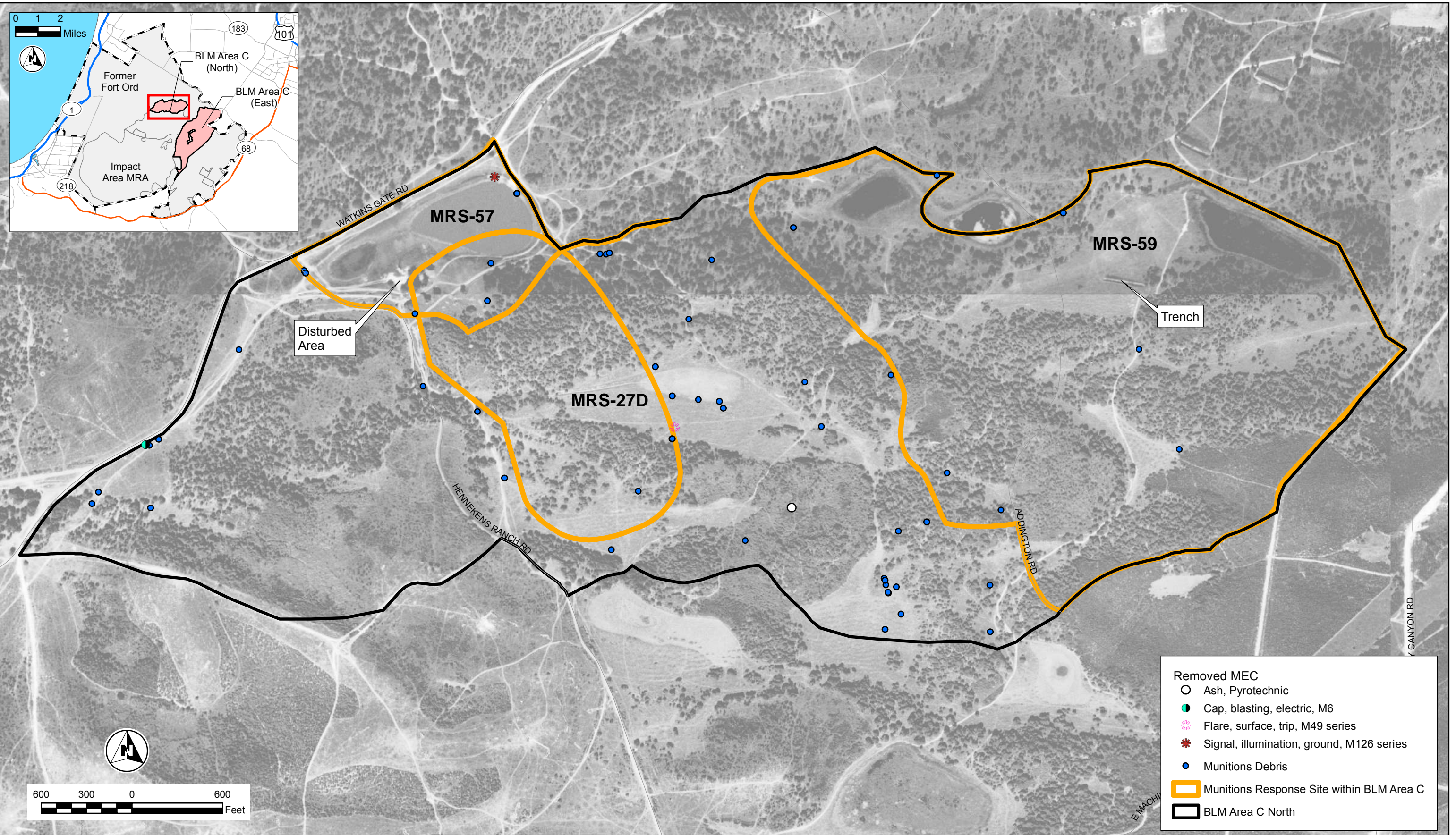
Figure 7
BLM Area C North
Reported Historical Training Areas

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Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

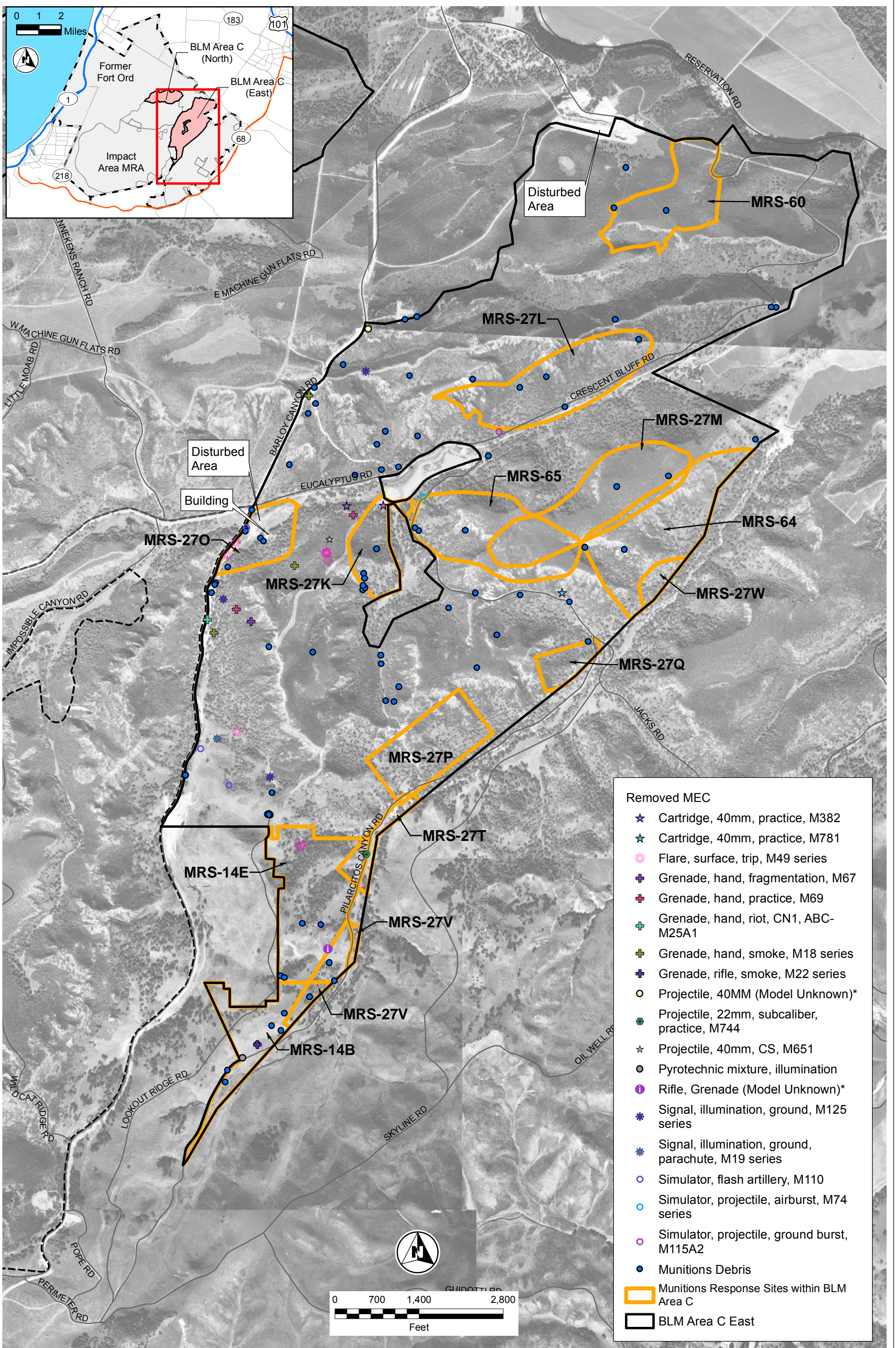
Figure 8
BLM Area C East
Reported Historical Training Areas



- Removed MEC
- Ash, Pyrotechnic
 - Cap, blasting, electric, M6
 - ★ Flare, surface, trip, M49 series
 - ★ Signal, illumination, ground, M126 series
 - Munitions Debris
 - ▭ Munitions Response Site within BLM Area C
 - ▭ BLM Area C North

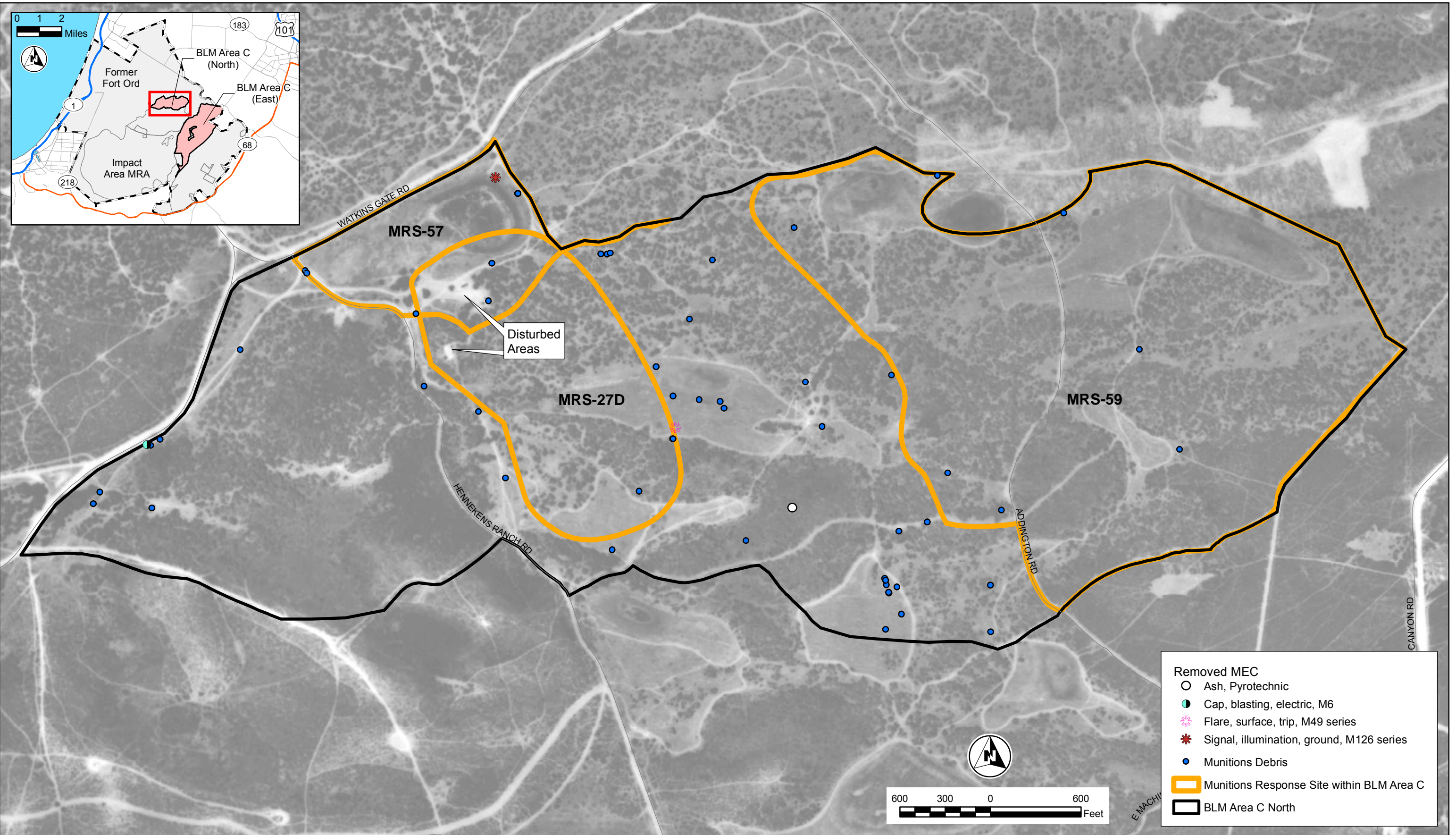
Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

Figure 9
BLM Area C North
1941 Aerial Photograph



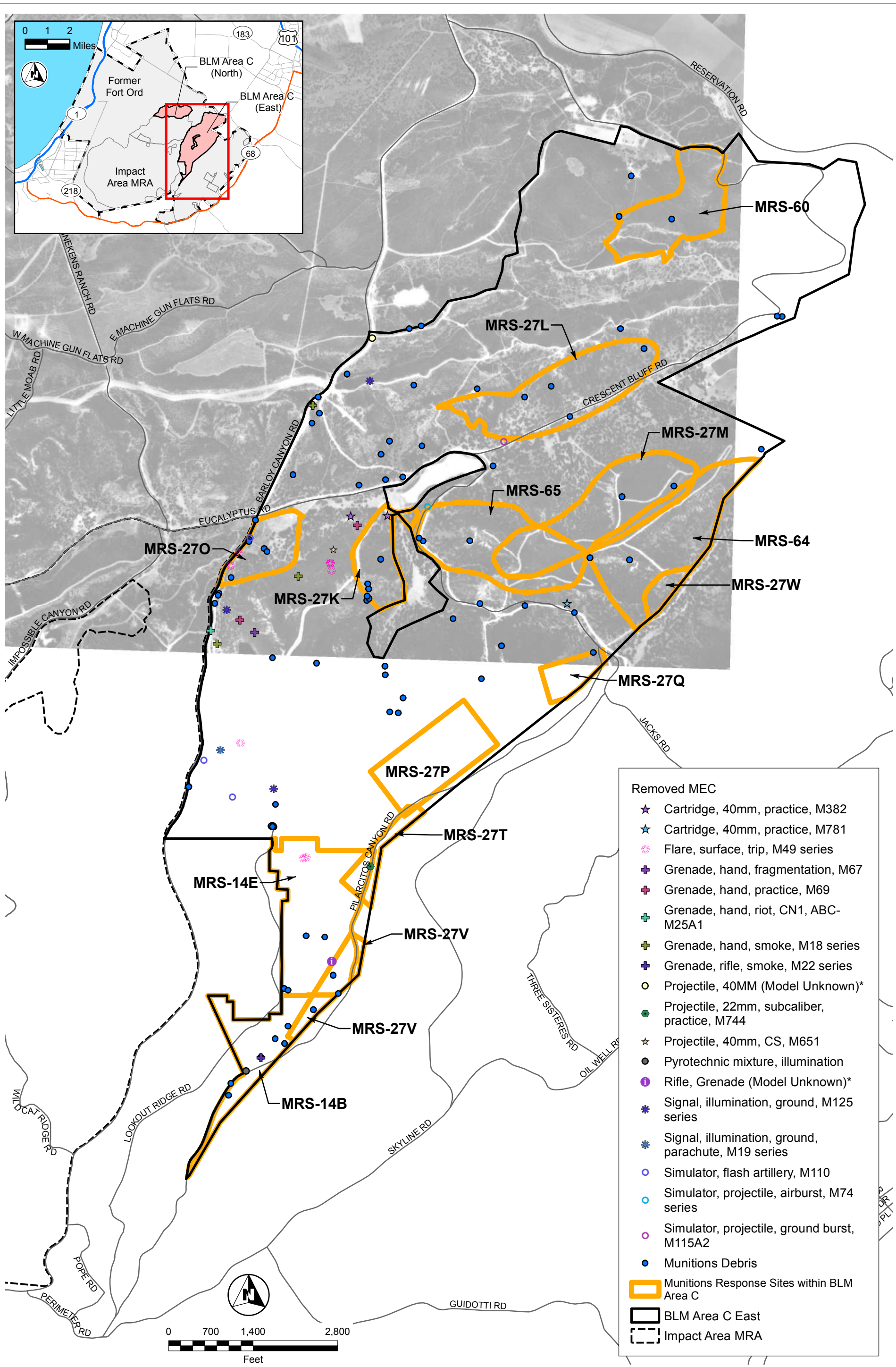
Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

Figure 10
BLM Area C East
1941 Aerial Photograph



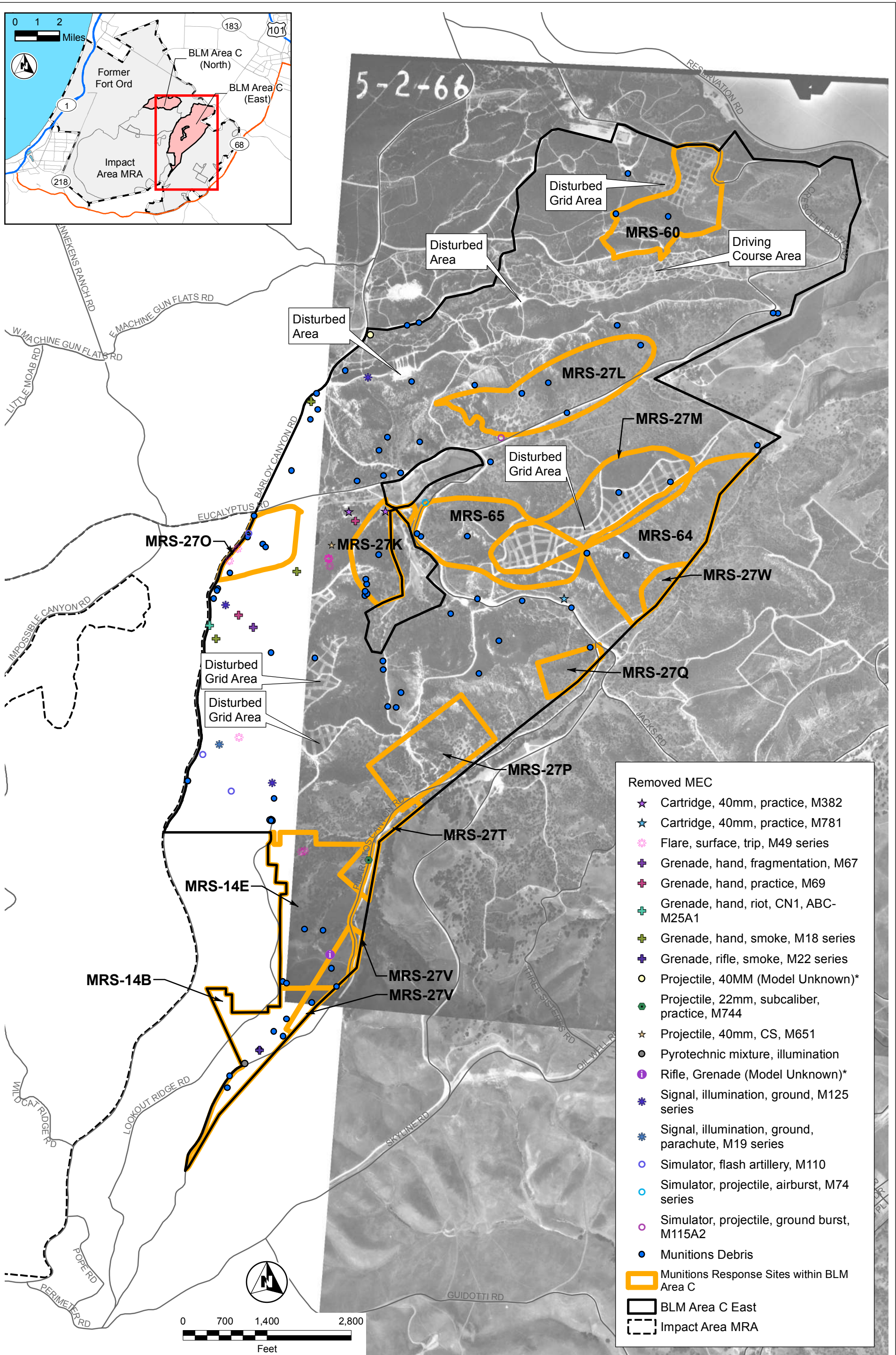
Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

Figure 11
BLM Area C North
1956 Aerial Photograph



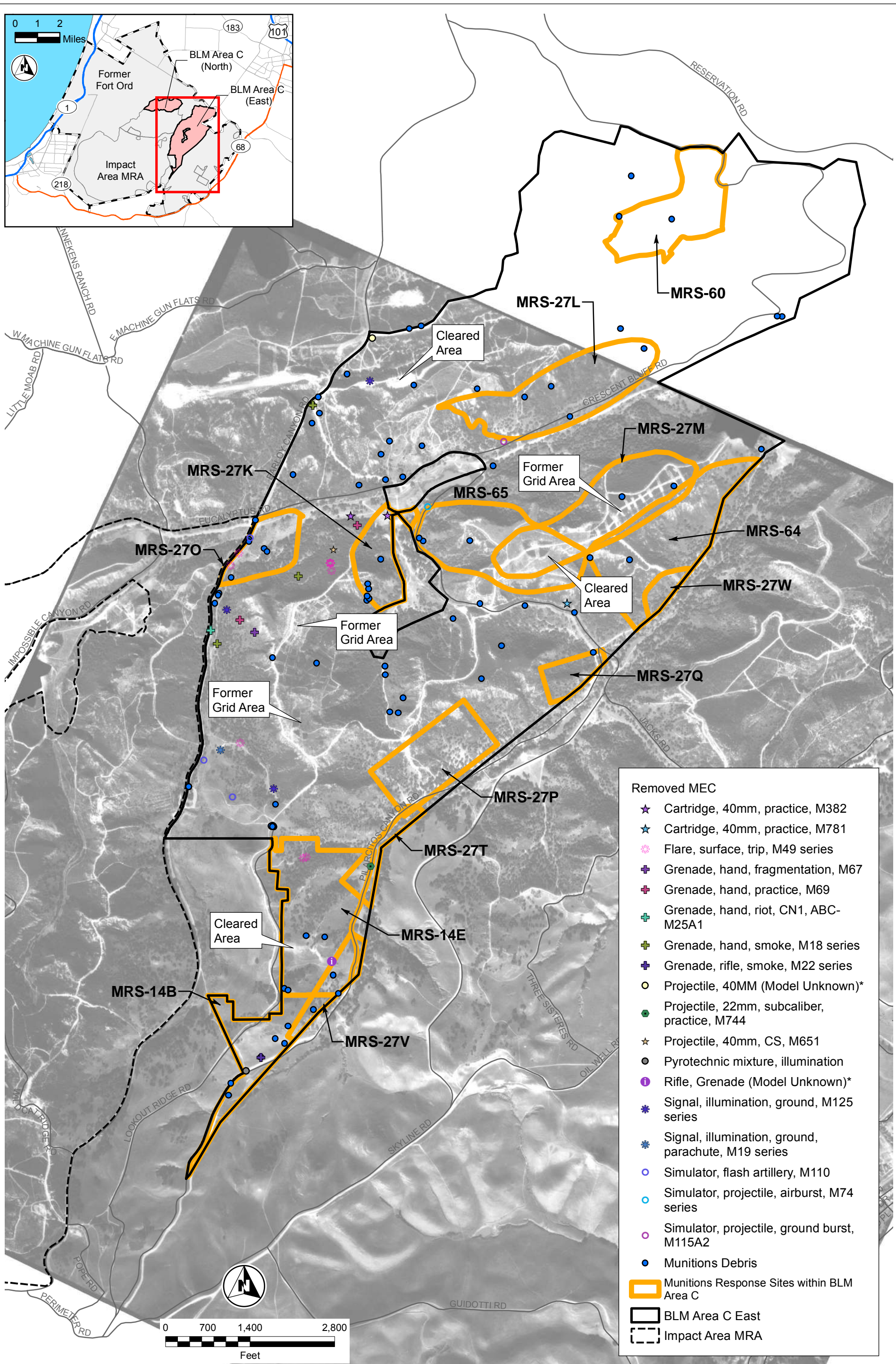
Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

Figure 12
BLM Area C East
1956 Aerial Photograph



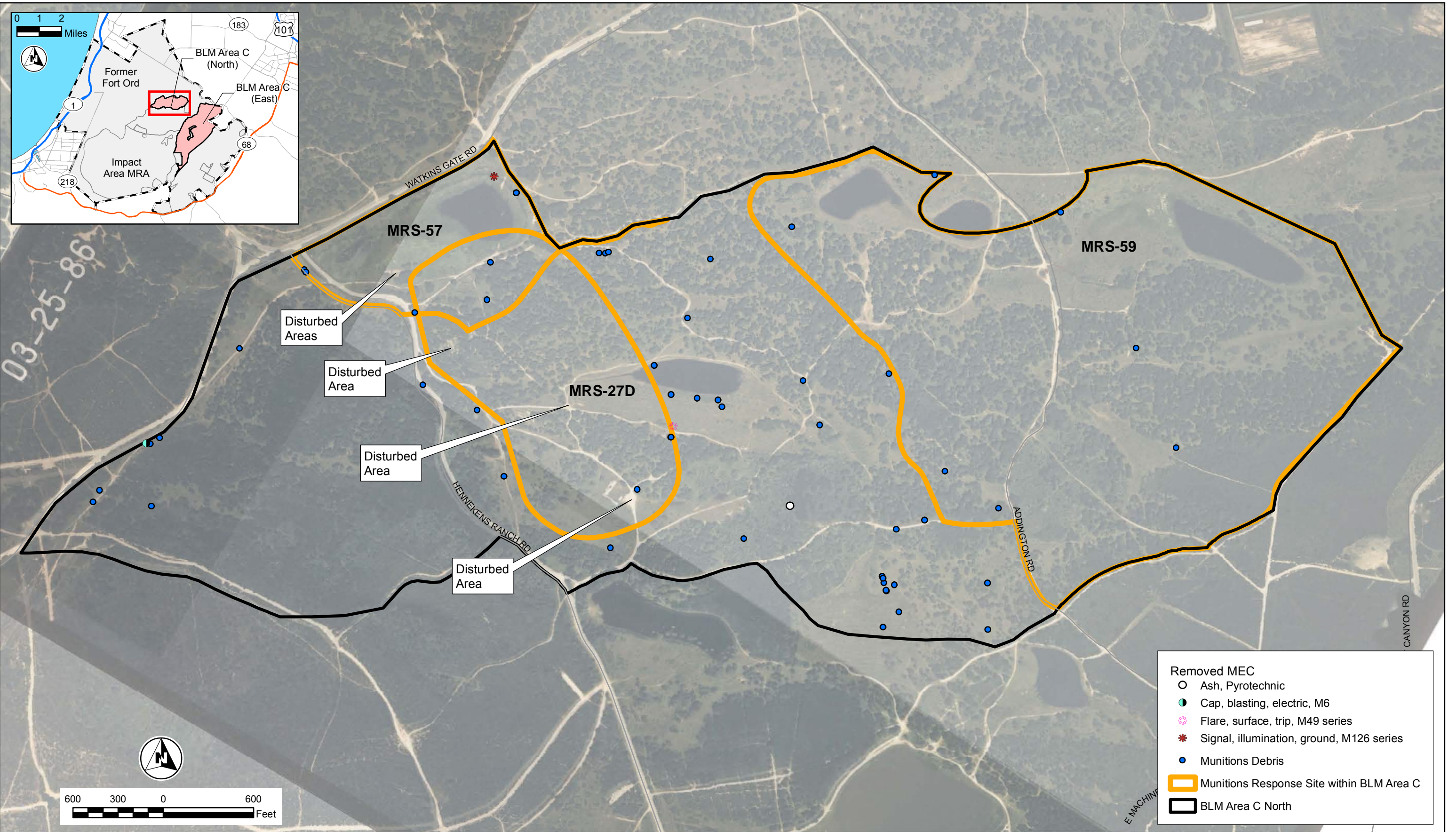
Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

Figure 13
BLM Area C East
1966 Aerial Photograph



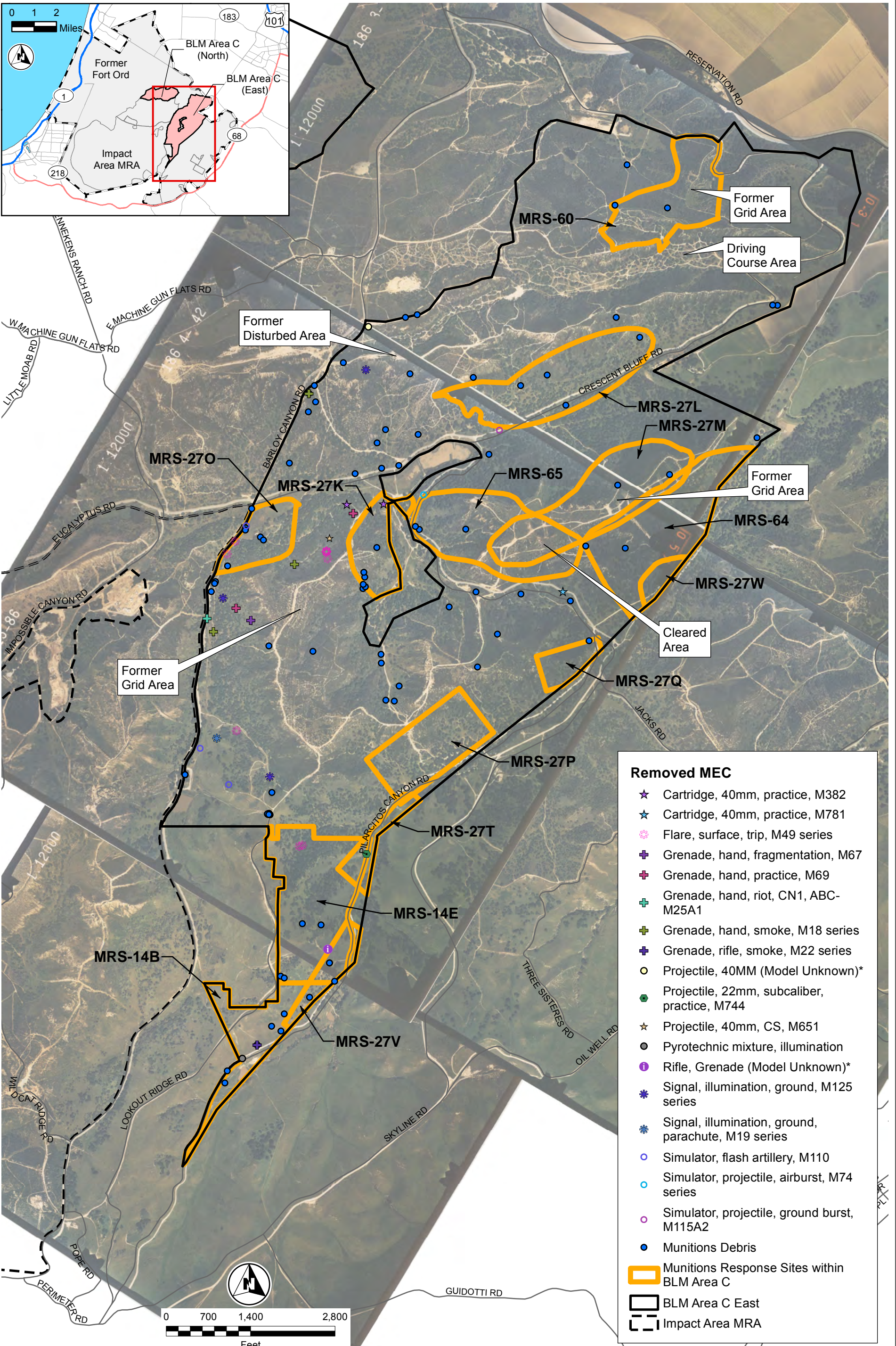
Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

Figure 14
BLM Area C East
1975 Aerial Photograph



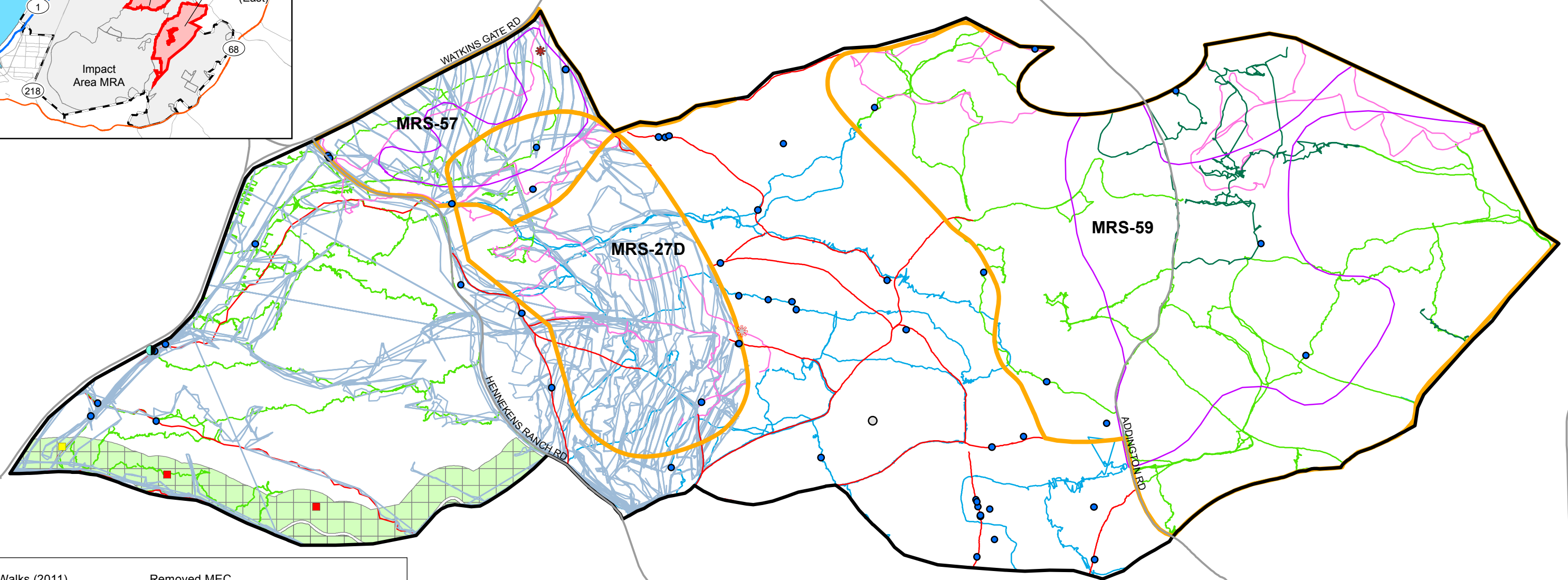
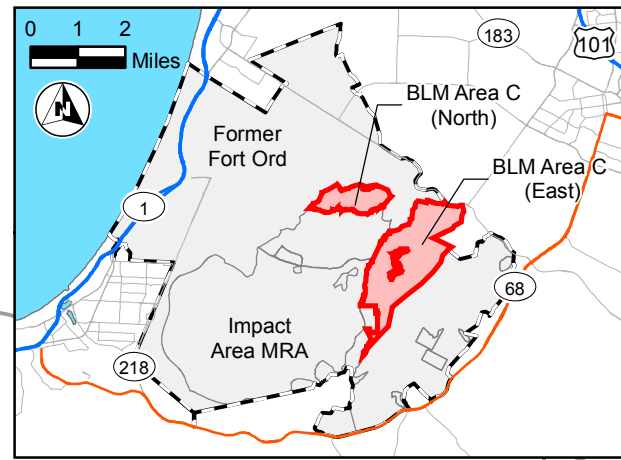
Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

Figure 15
BLM Area C North
1986 Aerial Photograph



Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

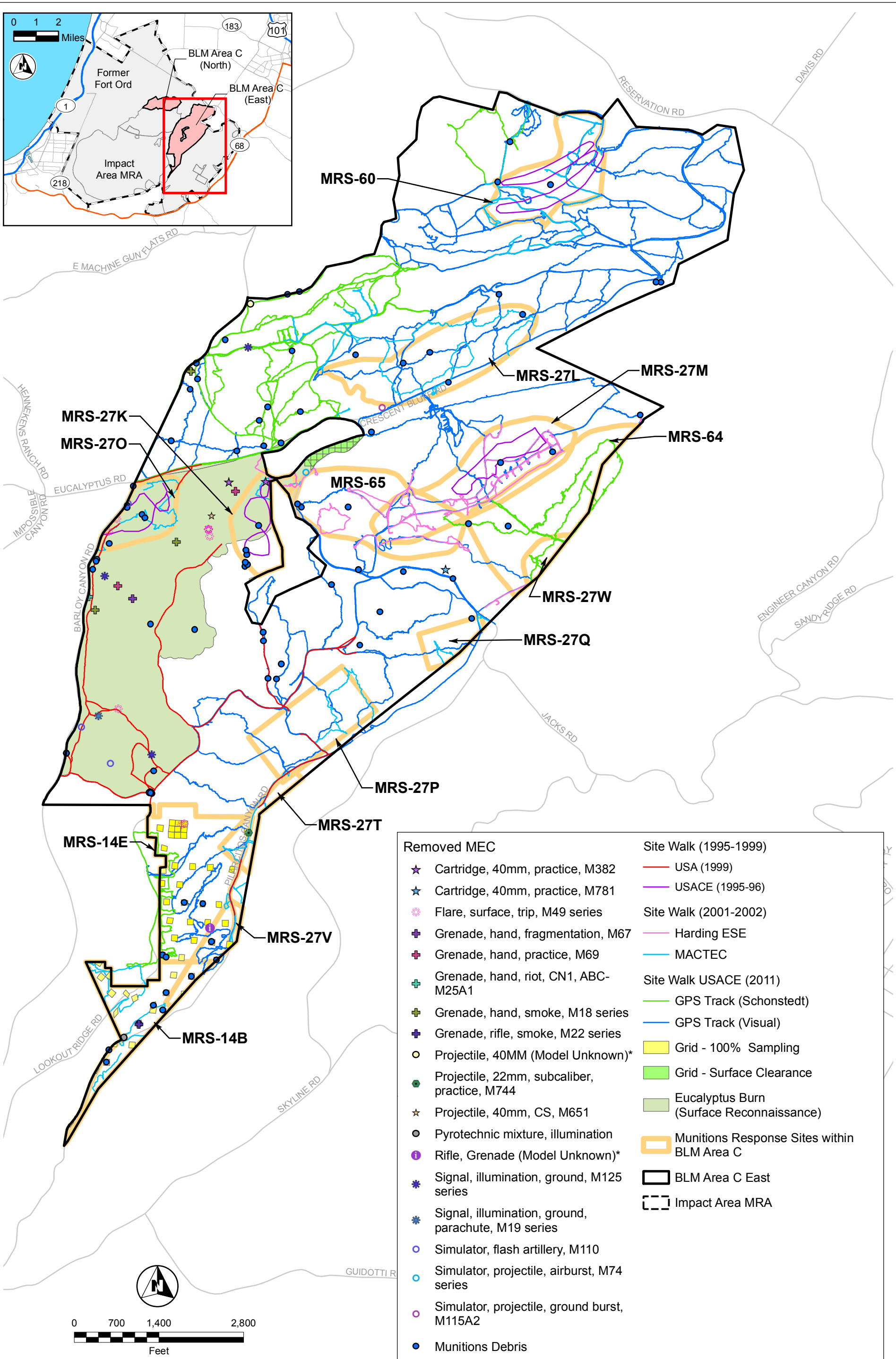
Figure 16
BLM Area C East
1986 Aerial Photograph



- | | |
|--------------------------------|--|
| Site Walks (2011) | Removed MEC |
| — EM61 Assisted Sitewalk | ○ Ash, pyrotechnic |
| — GPS Track (Visual) | ● Cap, blasting, electric, M6 |
| — Schonstedt Assisted Sitewalk | ✱ Flare, surface, trip, M49 series |
| Site Walks (2001-2002) | ✱ Signal, illumination, ground, M126 series |
| — Harding ESE | Removed MPPEH |
| — MACTEC | ■ Projectile, 37mm, LE, MK I |
| — Parsons | ■ Signal, illum, ground parachute, M126 series |
| Site Walks (1996-1999) | Removed MD |
| — USA (1999) | ● Munitions Debris |
| — USACE (1996) | ■ Surface MEC Removal Grid |
| | ■ Munitions Response Site in BLM Area C |
| | ■ BLM Area C North |

Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

Figure 17
BLM Area C North
Investigation Results



Track 1 Plug-In Approval Memorandum BLM Area C
Former Fort Ord, California

Figure 18
BLM Area C East
Investigation Results

Appendix A
Glossary

GLOSSARY

Construction Support: Assistance provided by DoD, explosive ordnance disposal (EOD), or UXO-qualified personnel and/or by personnel trained and qualified for operations involving chemical agent (CA), 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 CA, regardless of configuration, to ensure the safety of personnel or resources from any potential explosive hazards. Source: (6).

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 unexploded ordnance, 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)). For the purposes of the Basewide Munitions Response Program being conducted at the former Fort Ord, DMM does not include small arms ammunition.

Engineering Control (EC): The management of facility operations using engineering principles (e.g. facility design, operation sequencing, equipment selection, or process limitations). Source: (6).

Explosive Ordnance Disposal (EOD) Personnel: Military personnel who have graduated from the Naval School, Explosive Ordnance Disposal; are assigned to a military unit with a Service-defined EOD mission; and meet Service and assigned unit requirements to perform EOD duties. EOD personnel have received specialized training to address explosive and certain CA hazards during both peacetime and wartime. EOD personnel are trained and equipped to perform Render Safe Procedures (RSP) on nuclear, biological, chemical, and conventional munitions, and on improvised explosive devices. Source: (6).

Expended: The state of munitions debris in which the main charge has been expended leaving the inert carrier. Source: (1).

Feasibility Study (FS): A study undertaken to develop and evaluate alternatives for remedial action. Source: (3).

Impact Area: The impact area consists of approximately 8,000 acres in the southwestern portion of former Fort Ord, bordered by Eucalyptus Road to the north, Barloy Canyon Road to the east, South Boundary Road to the south, and General Jim Moore Boulevard to the west. Source: (1).

Institutional Control (IC): (a) Non-engineered instruments such as administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use; (b) are generally to be used in conjunction with, rather than in lieu of, engineering measures such as waste treatment or containment; (c) can be used during all stages of the cleanup process to accomplish various cleanup-related objectives; and (d) should be “layered” (i.e., use multiple ICs) or implemented in a series to provide overlapping assurances of protection from contamination. Source: (5).

Land Use Controls: Physical, legal, or administrative mechanisms that restrict the use of, or limit access to, real property, to manage risk to human health and the environment. Physical mechanisms encompass a variety of engineered remedies to contain or reduce contamination, or physical barriers to limit access to real property, such as fences or signs. Source: (6)

Magnetometer: An instrument used to detect ferromagnetic (iron-containing) objects. Total field magnetometers measuring the strength of the earth's natural magnetic field at the magnetic sensor location. Gradient magnetometers, sensitive to smaller near-surface metal objects, use two sensors to measure the difference in magnetic field strength between the two sensor locations. Vertical or horizontal gradients can be measured. Source: (4).

Military Munitions Response Program (MMRP): The MMRP is a program under which munitions responses are conducted. Source: (1).

Military Munitions: Military munitions means 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 DoD, 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, or 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)).

Mortar: Mortars typically range from approximately 1 inch to 11 inches in diameter or larger, and can be filled with explosives, toxic chemicals, white phosphorus or illumination flares.

Mortars generally have thinner metal casing than projectiles but use the same types of fuzing and stabilization. Source: (2).

Material Potentially Presenting an Explosive Hazard (MPPEH): Material that, prior to determination of its explosives safety status, potentially contains explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or potentially contains 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 with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within the DoD 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. Source: (6).

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: Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarizations, or disposal. Source: (6).

Munitions and Explosives of Concern (MEC): A term distinguishing specific categories of military munitions that may pose unique explosives safety risks: UXO, as defined in 10 U.S.C. 101 (e) (5); DMM, as defined in 10 U.S.C. 2710 (e) (2); or munitions constituents (e.g., TNT, Cyclotrimethylene trinitramine [RDX]), as defined in 10 U.S.C. 2710 (e) (3), present in high enough concentrations to pose an explosive hazard. Source: (6). For the purposes of the Military Munitions Response Program being conducted for the former Fort Ord, MEC does not include small arms ammunition.

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. An MRA comprises one or more munitions response sites. Source: (6).

Munitions Response Site (MRS): A discrete location within a MRA that is known to require a munitions response. Source: (6).

MEC Sampling: Performing MEC searches within a site to determine the presence of MEC. Source: (1).

Operating Grids: Typically, 100-foot by 100-foot parcels of land as determined by survey and recorded by GPS, marked at each corner with wooden stakes. Sites are divided into operating grids prior to the commencement of work by brush removal or MEC sweep teams. A single grid may be occupied by only one team at any time, and the grid system facilitates the maintenance of safe distances between teams. They are identified sequentially using an alphanumeric system (e.g., E-5). Source: (1).

Projectile: An object projected by an applied force and continuing in motion by its own inertia, such as a bullet, bomb, shell, or grenade. Also applied to rockets and to guided missiles. Source: (2).

Range-Related Debris: Debris, other than munitions debris, collected from operational ranges or from former ranges (e.g., target debris, military munitions packaging and crating material). Source: (6).

Remedial Investigation (RI): Process undertaken to determine the nature and extent of the problem presented by a release which emphasizes data collection and site characterization. The RI is generally performed concurrently and in an interdependent fashion with the feasibility study. Source: (3).

Removal Depth: The depth below ground surface to which all ordnance and other detected items are removed. Source: (1).

Small arms: Small arms ammunition are defined as ammunition, without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller, or for shotguns (6).

Surface Removal: Removal of MEC from the ground surface by UXO teams using visual identification sometimes aided by magnetometers. Source: (1).

Track 0 Areas: Areas of the former Fort Ord that contain no evidence of MEC and have never been suspected of having been used for military munitions-related activities of any kind. This definition has been clarified in the Explanation of Significant Differences, Final Record of Decision, No Action Regarding Ordnance-related Investigations (Track 0 ROD), former Fort Ord, California (March 2005) to include areas not suspected as having been used for military munitions-related activities of any kind, but where incidental military munitions have been discovered. Source: (1).

Track 1 Sites: Sites at the former Fort Ord where military munitions were suspected to have been used, but based on the results of the Munitions Response Remedial Investigation/Feasibility Study (MR RI/FS) each site falls into one of the following three categories: Category 1: There is no evidence to indicate military munitions were used at the site (i.e., suspected training did not occur); or Category 2: The site was used for training, but the military munitions items used do not pose an explosive hazard (i.e., training did not involve explosive items); or Category 3: The site was used for training with military munitions, but military munitions items that potentially remain as a result of that training do not pose an

unacceptable risk based on site-specific evaluations conducted in the Track 1 OE RI/FS. Field investigations identified evidence of past training involving military munitions, but training at these sites involved only the use of practice and/or pyrotechnic items that are not designed to cause injury. In the unlikely event that a live item of the type previously observed at the site is found, it is not expected that the item would function by casual contact (i.e., inadvertent and unintentional contact). Source: (1).

Track 2 Sites: Sites at the former Fort Ord where MEC items were present, and MEC removal has been conducted. These areas are evaluated in area-specific RI/FSs to assess whether they are in a protective state based on their reasonably anticipated future land uses. Possible outcomes of a Track 2 RI/FS and ROD could include no further action, land use controls, and/or additional MEC removal. Source: (1).

Track 3 Sites: Track 3 Sites are those areas where MEC is suspected or known to exist, but investigations are not yet complete or need to be initiated, or any area identified in the future. Source: (1).

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, installations, personnel, or materials; and (C) Remain unexploded, whether by malfunction, design, or any other cause. (10 U.S.C. 101 (e) (5)). For the purpose of the Basewide Munitions Response Program being conducted for the former Fort Ord, UXO does not include small arms ammunition.

UXO-Qualified Personnel: Personnel who have performed successfully in military EOD positions, or are qualified to perform in the following Department of Labor, Service Contract Act, Directory of Operations contractor positions: UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, or Senior UXO Supervisor. Source: (6).

UXO Technician: Personnel who are qualified for and filing Department of Labor, Service Contract Act, and Directorate of Operations contractor positions of UXO Technician I, UXO Technician II, and UXO Technician III. Source: (6).

Sources of the Above Definitions:

- (1) Non-standard definition developed to describe Fort Ord-specific items, conditions, procedures, principles, etc. as they apply to issues related to the MEC cleanup.
- (2) “Unexploded Ordnance (UXO): An Overview,” October 1996. DENIX.
- (3) USACE, 2015, Environmental Quality – Technical Guidance in Military Munitions Response Actions, EM 200-1-15, Washington, D.C.
- (4) Survey of Munitions Response Technologies, June 2006. ITRC (Interstate Technology and Regulatory Council) with ESTCP (Environmental Security and Technology Certification Program) and SERDP (Strategic Environmental Research and Development Program).
- (5) Institutional Controls: A Site Managers’ Guide to Identifying, Evaluating, and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups. US EPA Office of Solid Waste and Emergency Response (OSWER) 9355.0-74FS-P, EPA 540-F-00-005.
- (6) Department of Defense Manual Number 6055.09-M, Volume 8, February 29, 2008, Administratively Reissued August 4, 2010; incorporating Change 2, January 24, 2018.

Appendix B

Geographical Areas from Remaining RI/FS Areas Management Plan and Associated Decision Documents

Table B-1. Geographical Areas from Remaining RI/FS Areas Management Plan and Associated Decision Documents

Geographic Unit	Identified MRSs	Decision Document
BLM East/Pre 1940 (Northern Portion)	MRS-12, MRS-21	<i>Final Record of Decision, Track 2 Bureau of Land Management Area B and Munitions Response Site 16, Former Fort Ord, California (Army, 2017)</i>
	MRS-27K, MRS-27L, MRS-27M, MRS-27O (portion), MRS-27P, MRS-27Q (portion), MRS-27W (portion), MRS-60, MRS-64 (portion), MRS-65, Eucalyptus Fire Area	<i>Track 1, Plug-In Approval Memorandum, BLM Area C, Former Fort Ord, California</i>
BLM East/Pre 1940 (Southern Portion)	MRS-14B (portion), MRS-14E (portion), MRS-27T (portion), MRS-27V (portion)	<i>Track 1, Plug-In Approval Memorandum, BLM Area C, Former Fort Ord, California</i>
	MRS-14B (portion), MRS-14D, MRS-25 and MRS-26, MRS-14E (portion)	<i>Final Record of Decision, Track 2 Bureau of Land Management Area B and Munitions Response Site 16, Former Fort Ord, California (Army, 2017)</i>
BLM East/Post 1940 (Northern Portion)	MRS-27N, MRS-27Q (portion), MRS-27R, MRS-27T (portion), MRS-27U, MRS-27W (portion), MRS-61, MRS-64 (portion), MRS-67, MRS-68	<i>Track 1, Plug-In Approval Memorandum, BLM Area A, Former Fort Ord, California (ITSI, 2014)</i>
BLM East/Post 1940 (Southern Portion)	MRS-14B (portion), MRS-14C, MRS-17, MRS-27S, MRS-27T (portion), MRS-27V (portion), MRS-32C	<i>Track 1, Plug-In Approval Memorandum, BLM Area A, Former Fort Ord, California (ITSI, 2014)</i>
BLM North (Northern Portion)	MRS-27D, MRS-57 (portion), MRS-59	<i>Track 1, Plug-In Approval Memorandum, BLM Area C, Former Fort Ord, California</i>
BLM North (Northern Portion)	Outside MRS boundaries	<i>Final Record of Decision, Track 2 Bureau of Land Management Area B and Munitions Response Site 16, Former Fort Ord, California (Army, 2017)</i>
BLM North (Southern Portion)	Outside MRS boundaries	<i>Track 1, Plug-In Approval Memorandum, BLM Area C, Former Fort Ord, California</i>
BLM North (Southern Portion)	MRS-9, MRS-10A, MRS-10B, MRS-19, MRS-27I (portion), MRS-27J, MRS-41, MRS-48, MRS-53BLM, MRS-54BLM, MRS-56, MRS-58, MRS-27G (portion), MRS-27H (portion)	<i>Final Record of Decision, Track 2 Bureau of Land Management Area B and Munitions Response Site 16, Former Fort Ord, California (Army, 2017)</i>

Geographic Unit	Identified MRSs	Decision Document
Range Control/BLM Headquarters	MRS-35	<i>Track 1 Plug-In Approval Memorandum, BLM-Headquarters and MRS-35, Former Fort Ord, California (Shaw, 2011a)</i>
Garrison South	MRS-24A, MRS-24C, E20c.1	<i>Final Track 1 Plug-In Approval Memorandum, MRS-24A, MRS-24C, and Parcel E20c.1, Former Fort Ord, California (Shaw, 2011b)</i>
Rocket Range FAAF	MRS-34	<i>Final Record of Decision Track 2 Munitions Response Site 34 Former Fritzsche Army Airfield Area Former Fort Ord, California (Army, 2015)</i>

Appendix C

Site Evaluation Checklists

ATTACHMENT 1
EVALUATION OF PREVIOUS WORK: BLM AREA C
EVALUATION CHECKLIST PART 1: LITERATURE REVIEW

TYPE OF TRAINING AND MILITARY MUNITIONS EXPECTED

	Yes	No	Inconclusive
1. Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades and other launched military munitions)?			Inconclusive

Sources reviewed and comments

Based on interviews provided in the 1997 ASR, several areas in the BLM Area C East included locations reportedly used as target areas for firing rifle grenades and shoulder launched projectiles including MRS-27L, MRS-60, MRS-64 and MRS-65. Pilarcitos Canyon (MRS-14B and MRS-14E) was suspected of containing 7- and 8-inch naval gun projectiles that overshot the impact area; however, no evidence of this training is visible on aerial photographs, or training maps.

In the BLM Area C North, interview records also identified MRS-27D and locations within MRS-57 (intersections of Hennekens Ranch Road and Watkins Gate Road and Watkins Gate Road and Parker Flats Road) as being used as firing points for rifle grenades and shoulder launched projectiles. Rifle grenade and projectile training are not documented on historical training maps.

References:

USACE, 1997 (ASR); Army, 1954; 1956; 1957; 1958; 1964; 1967; 1972; 1975; 1976; 1977; 1987; USACE 1984; HLA, 2000.

	Yes	No	Inconclusive
2. Is there historical evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?		No	

Sources reviewed and comments

With the exception of the training identified above during interviews, the types of training identified in other historical documents (i.e., historical training maps), do not indicate that HE or LE items would have been used for training.

References:

USACE, 1997; Army, 1956; 1957; 1958; 1965; 1967a; 1967b; 1972; 1977; 1980; 1984; 1987.

	Yes	No	Inconclusive
3. Is there evidence that training involved use of pyrotechnic and/or smoke producing items (e.g., simulators, flares, smoke grenades) but not explosives?	Yes		

Sources reviewed and comments

Review of training maps, historical documents, and items found at the site, indicates that training did involve use of pyrotechnic and smoke producing items including simulators, flares, illumination signals, and smoke grenades. The items found are consistent with the types of training designated on the historical training maps. Types of training identified on historical training maps included bivouac, maneuver and tactical training areas, light vehicle driving, Vietnam village training area, aviation and helicopter training, HUMRO Test area, demolition training, combat firing range, and firing points.

References:

USACE, 1997; 1956; 1957; 1958; 1965; 1967a; 1967b; 1972; 1977; 1980; 1984; 1987; CMS, 1997; MACTEC/Shaw 2011a, 2011b.

DEVELOPMENT AND USE OF THE SURROUNDING AREA

4. Does subsequent development or use of the area indicate that military munitions would have been used at the site?

Yes	No	Inconclusive
		Inconclusive

Sources reviewed and comments

The area has not been developed. It is maintained as an open space recreational area by BLM. During reuse of the property as a recreational and habitat management area, MEC and MD items have been found by BLM staff. Additionally, site walks performed by USACE UXO personnel have resulted in the finding of military munitions items. In general the items found are consistent with use of the area for general training and maneuver areas using pyrotechnic, smoke producing, and practice munitions.

References:

USACE, 1997; MACTEC/Shaw 2011a, 2011b.

5. Does use of area surrounding the site indicate that military munitions would have been used at the site?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

MRS-14D located on the west side of the southern portion of BLM Area C East was an impact area for subcaliber practice mortars (Subcaliber Range P-5). There is no indication that the use of military munitions in the impact area resulted in military munitions being used in any of the areas that make up BLM Area C. According to historical documents, and training maps, areas to the east of the northern and southern portions of the BLM Area C East were used for general training and maneuvers, and for bivouac. The southern portion of the site is bordered by MRS-14A, and portions of MRS-14B, and MRS-27V. Review of data from removal actions and sampling at these sites, indicated that the sites were used for general maneuvers and training and for bivouac. MRS-14A is within areas purchased by the government in 1917. Based on review conducted as part of the ESCA Group 3 Remedial Investigation "MRS-14A appears to have been used for basic maneuvers with occasional impact by various projectiles. There does not appear to be a pattern of use as an impact area for MRS-14A."

BLM Area C East is bounded to the west by the Impact Area MRA, BLM Area B North, the ESCA MOUT Site MRA, and the ESCA Laguna Seca Parking MRA. BLM Area C East is bounded to the east by BLM Area A (a Track 1 site). Sites to the north of BLM Area C North were used for general training, maneuvering and for bivouac and are completed Track 1 sites (MRS-27F, MRS-59A, County North MRA, and East Garrison Areas 2 and 4NE) or ESCA sites (Parker Flats and Future East Garrison MRAs). BLM Area C North is bounded on the south side by BLM Area B North. MEC and MD items found in the northern portion of BLM Area B North immediately adjacent to BLM Area C consists primarily of pyrotechnic and smoke producing items which supports use of the area as a general training and maneuver area.

One 4.2-in. smoke mortar projectile (UXO) was recovered in BLM Area B approximately 500 feet west of BLM Area C East. The item was subsequently confirmed to contain a smoke filler. Although the 4.2-inch smoke projectile is a munition type that has the potential to be used for delivery of chemical warfare agent, there has been no evidence to indicate that chemical weapons were ever used at Fort Ord. This item was found in MRS-48 where several pieces of MD from 4.2-in. smoke projectiles were recovered during a 1998 sampling investigation. In the sampling grid closest to BLM Area C East, no MEC or MD related to 4.2-in. smoke projectiles was found. In MRS-10B, south of MRS-48 and adjacent to BLM Area C East, no indication of 4.2-in. smoke projectiles or

debris was found during munitions responses. Based on the information, it is not expected that a 4.2-in. smoke mortar impact area occurred within BLM Area C East.

References:

USACE, 1997; Army, 2005, 2006; FORA ESCA RP, 2017a; FORA ESCA RP, 2017b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; Former Fort Ord Military Munitions Response Program Database; FORA ESCA RP, 2012; Gilbane, 2015.

ESTABLISHMENT OF SITE BOUNDARIES

6. Is there evidence of training areas on aerial photographs that could be used to establish boundaries?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

The boundaries of BLM Area C initially were based on analysis conducted during the development of the Remaining RI/FS Areas Management Plan. Evaluations completed to date have moved some areas to Track 2 under BLM Area B. The aerial photographs also show disturbed areas that were investigated as part of the site assessment.

References:

Aerial photographs dated 1966, 1975, 1978, 1986, 1989, and 2009, MACTEC/Shaw, 2010; MACTEC/Shaw 2011a, MACTEC/Shaw 2011b; Gilbane, 2016.

7. Is there evidence of training on historical training maps that could be used to establish boundaries?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

The boundaries of BLM Area C initially were based on analysis conducted during the development of the Remaining RI/FS Areas Management Plan. Evaluations completed to date have moved some areas to Track 2 under BLM Area B. Training areas within BLM Area C are shown on available training maps. MRSs were identified in the ASRs based on available information including historical training maps.

References:

Aerial photographs dated 1966, 1975, 1978, 1986, 1989, and 2009, MACTEC/Shaw, 2010; MACTEC/Shaw 2011a, MACTEC/Shaw 2011b; Gilbane, 2016.

8. Should current boundaries be revised?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

Based on review of the available aerial photographs and training maps there is no evidence that training with HE occurred within the site boundaries. Based on the literature review, the boundaries of BLM Area C Track 1 area are appropriate.

References:

See above for questions 6 and 7.

RESULTS OF LITERATURE REVIEW

Does the literature review provide sufficient evidence to warrant further investigation?

Yes	No	Inconclusive
	No	

Comments

The interview records, aerial photographs, and historical training maps indicated that training with practice military munitions, smoke producing and pyrotechnic military munitions likely occurred within the BLM Area C footprint.

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ATTACHMENT 1
EVALUATION OF PREVIOUS WORK: BLM AREA C
EVALUATION CHECKLIST PART 2: SITE WALK EVALUATION

	Yes	No	Inconclusive
1. Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades or other launched ordnance)?		No	

Sources reviewed and comments

Interviews conducted in support of the Archives Search identified several locations within BLM Area C as potential target areas for shoulder-launched projectiles and rifle grenades. Site walks were performed by the USACE OE Safety Specialist within these and other areas identified as training areas and munitions response sites, to verify the type of training activities that were reported to have occurred. Site walks were also performed in support of the Basewide Range Assessment (BRA), by USA Environmental in 1999, and during the site assessment conducted in 2011. MD found during the site reconnaissance supports use of BLM Area C as a training and maneuver area using pyrotechnic and smoke producing military munitions and the use of practice and training military munitions. MEC items found and removed during site reconnaissance were consistent with identified site use. All were practice, pyrotechnic and smoke producing items and were destroyed. The types of features identified during the site assessment fieldwork performed by Shaw and the types of MD found during the fieldwork support the identification of BLM Area C East as a primarily bivouac and maneuver training area involving the use of practice items. The MD found in BLM Area C North included flares, simulators, signals, and smoke grenades that were generally used for maneuvers and general training.

References:

USACE, 1997; USA, 1999; MACTEC/Shaw, 2012; Shaw, 2012,

	Yes	No	Inconclusive
2. Is there evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?		No	

Sources reviewed and comments

No HE or LE MEC items, described below, were found during site reconnaissance in BLM Area C. The MEC found at the site, indicates that training did involve use of pyrotechnic, and smoke producing items, and practice and training items. The items found are consistent with the types of training designated on the historical training maps.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw, 2012b; MACTEC/Shaw, 2012.

	Yes	No	Inconclusive
3. Is there evidence that training involved use of pyrotechnic and/or smoke producing items (e.g., simulators, flares, smoke grenades) but not explosives?	Yes		

Sources reviewed and comments

MEC and MD found at the site indicate that training did involve use of pyrotechnic, smoke producing items, and practice and training items. The items found are consistent with the types of training designated on the historical training maps.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw, 2012b; MACTEC/Shaw, 2012.

4. Does subsequent development or use of the area indicate potential that military munitions would have been used at the site?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

The area has not been developed. It is maintained as an open space recreational area by BLM. During reuse of the property as a recreational and habitat management area, MEC and MD items have been found by BLM staff. Additionally, munitions items were recovered in the four site walks addressed in this checklist. In general the items found are consistent with use of the area for general training and maneuver areas using pyrotechnic, smoke producing and practice munitions.

References:

USACE, 1997; MACTEC/Shaw 2012.

5. Does use of area surrounding the site indicate that military munitions would have been used at the site?

Yes	No	Inconclusive
		Inconclusive

Sources reviewed and comments

MRS-14D located west of the southern portion of BLM Area C East was an impact area for practice mortars (Subcaliber Range P-5). MEC and MD items were removed from MRS-14B and MRS-14E as part of the intrusive investigation of MRS-14D. The grids in MRS-14B and MRS-14E associated with the intrusive investigation of MRS-14D in which the MEC and MD were found were removed from BLM Area C and moved to Track 2. The area to the west includes the Impact Area MRA which supported numerous live firing ranges; however, there is no indication that the use of military munitions in the Impact Area resulted in impacting military munitions in BLM Area C. According to historical documents, and training maps, areas to the east of the northern and southern portions of the BLM Area C East were used for general training and maneuvers, and for bivouac. The southern portion of the site is bordered by MRS-14A, and portions of MRS-14B, and MRS-27V. Review of data from removal actions and sampling at these sites, indicated that the sites were used for general maneuvers and training and for bivouac. MRS-14A is within areas purchased by the government in 1917. Based on review conducted as part of the ESCA Group 3 Remedial Investigation, "MRS-14A appears to have been used for basic maneuvers with occasional impact by various projectiles. There does not appear to be a pattern of use as an impact area for MRS-14A."

BLM Area C East is bounded to the west by the Impact Area MRA, the ESCA MOUT Site MRA, and the ESCA Laguna Seca Parking MRA. BLM Area C East is bounded to the east by BLM Area A (a Track 1 site). Sites to the north of BLM Area C North were used for general training, maneuvering and for bivouac and are completed Track 1 sites (MRS-27F, MRS-59A, County North MRA, and East Garrison Areas 2 and 4NE) or ESCA sites (Parker Flats and Future East Garrison MRAs). BLM Area C North is bounded on the south side by BLM Area B North. MEC and MD items found in the northern portion of BLM Area B North immediately adjacent to BLM Area C consists primarily of pyrotechnic and smoke producing items which supports use of the area as a general training and maneuver area.

One 4.2-in. smoke mortar projectile (UXO) was recovered in BLM Area B approximately 500 feet west of BLM Area C East. The item was subsequently confirmed to contain a smoke filler. Although the 4.2-inch smoke projectile is a munition type that has the potential to be used for delivery of chemical warfare agent, there has been no evidence to indicate that chemical weapons were ever used at Fort Ord. This item was found in MRS-48 where several pieces of MD from 4.2-in. smoke projectiles were recovered during a 1998 sampling investigation. In the sampling grid closest to BLM Area C East, no MEC or MD related to 4.2-in. smoke projectiles was found. In MRS-10B, south of MRS-48 and adjacent to BLM Area C East, no indication of 4.2-in. smoke projectiles or

debris was found during munitions responses. Based on the information, it is not expected that a 4.2-in. smoke mortar impact area occurred within BLM Area C East.

References:

USACE, 1997; Army, 2005, 2006; FORA ESCA RP, 2017a; FORA ESCA RP, 2017b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; Former Fort Ord Military Munitions Response Program Database; FORA ESCA RP, 2012; Gilbane, 2015.

6. Is there evidence of training areas on aerial photographs that could be used to establish site boundaries?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

The boundaries of BLM Area C initially were based on analysis conducted during the development of the Remaining RI/FS Areas Management Plan. Evaluations completed to date have moved some areas to Track 2 under BLM Area B. The aerial photographs also show disturbed areas that were investigated as part of the site assessment.

References:

Aerial photographs dated 1966, 1975, and 1978, 1986, Shaw, 2012a; Shaw, 2012b; MACTEC/Shaw, 2010a; MACTEC/Shaw 2010b; Gilbane, 2015.

7. Is there evidence of training on historical training maps that could be used to establish boundaries?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

The boundaries of BLM Area C initially were based on analysis conducted during the development of the Remaining RI/FS Areas Management Plan. Evaluations completed to date have moved some areas to Track 2 under BLM Area B. Training areas within BLM Area C are shown on available training maps. MRSs were identified in the ASRs based on available information including historical training maps.

References:

Army, "After 1953"; 1956; 1957; 1958; 1965; 1967a; 1967b; 1972; 1977; 1980; 1984; Gilbane, 2015.

8. Was the site walk performed within appropriate area?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Four phases of site walks were conducted within BLM Area C. The site walks included 1995 and 1996 site walks conducted by USACE and reported in the ASR, site walks conducted as part of the Basewide Range Assessment, site walks conducted by USA Environmental in 1999, and site assessment walks conducted in 2011. The USACE site walks were part of the Preliminary Assessment for munitions response sites at Fort Ord and were focused on known and suspected areas where training was conducted with military munitions. The BRA site reconnaissance was conducted to assess the former training sites for chemical contamination and occurred in the areas previously identified by USACE. USA Environmental site walks were performed to address the possible threat to the public posed by the potential presence of MEC on the ground surface, trails, and roads. The Shaw site assessment walks were designed to provide information on areas not previously investigated, primarily in between designated MRSs, and in areas where review of historical aerial photographs and training maps indicated that training with military munitions might have occurred. The site walks were performed in the appropriate area to provide sufficient data for the Track 1 analysis.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw 2012b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; MACTEC/Shaw 2012.

9. Does reconnaissance (site walk) indicate MEC and/or munitions debris are present at the site?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Both MEC and MD were found and removed during the site walks. The types of items found during the site walks generally were consistent with use of these areas as general training and maneuver areas and as bivouac areas.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw 2012b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; MACTEC/Shaw 2012.

10. Were the type(s) of items found consistent with the type of training identified for the site?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

The types of items found during the site walks generally are consistent with general training and maneuver areas and bivouac training.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw 2012b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; MACTEC/Shaw 2012.

11. Were the type(s) of items found consistent with the era(s) in which training was identified?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

The types of items were consistent with training that took place after 1940 until the 1980s.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw 2012b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; MACTEC/Shaw 2012.

12. Was HE fragmentation found?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

No HE fragmentation was found during the site walks.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw 2012b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; MACTEC/Shaw 2012.

Yes	No	Inconclusive
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13. Was HE found?

	No	
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Sources reviewed and comments

HE was not found during the site walks.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw 2012b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; MACTEC/Shaw 2012.

Yes	No	Inconclusive
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14. Was LE found?

	No	
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Sources reviewed and comments

No LE was found during site walks.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw 2012b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; MACTEC/Shaw 2012.

Yes	No	Inconclusive
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15. Were pyrotechnics found?

Yes		
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Sources reviewed and comments

Pyrotechnics were found during the site walks. Pyrotechnics found during the site walks included trip flares and illumination signals, simulators and other pyrotechnic materials.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw 2012b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; MACTEC/Shaw 2012.

Yes	No	Inconclusive
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16. Were smoke-producing items found?

Yes		
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Sources reviewed and comments

Smoke-producing items were found during the site walks. Smoke hand grenades were found during the site walks.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw 2012b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; MACTEC/Shaw 2012.

Yes	No	Inconclusive
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17. Were explosive items found (e.g., rocket motors with explosive components, fuzes with explosive components)?

Yes		
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Sources reviewed and comments

Items found at BLM Area C included ground illumination signals, practice grenades, smoke grenades, and simulators. These items were consistent with the types of training identified for this area. Both MEC and MD were found.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw 2012b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; MACTEC/Shaw 2012.

18. Do items found in the area indicate training would have included use of training items with energetic components?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Items found at BLM Area C included ground illumination signals, practice grenades and smoke grenades, and simulators. These items were consistent with the types of training identified for this area. During the site walks, several MD items were found, including smoke hand grenades, hand grenade safety levers, grenade fuzes, surface trip flare parts (safety levers, fuzes, arming pins, and a base), ground illumination signals, subcaliber practice projectiles, 60mm mortar projectile fragments, and a 75mm shrapnel projectile. Recovery of these items do not indicate training with these munitions occurred in BLM Area C. MEC items found included trip flares and an artillery flash simulator.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw 2012b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; MACTEC/Shaw 2012.

19. Were items found in a localized area (possibly the remnants of a cleanup action)?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

Items found during the site walks were scattered, except for several 35mm subcaliber projectiles (MD) grouped together, suggesting that they were discarded in the area rather than fired.

References:

USACE, 1997 (ASR); USA, 1999; Shaw, 2012a; Shaw 2012b; MACTEC/Shaw 2011a; MACTEC/Shaw 2011b; MACTEC/Shaw 2012.

20. Is it appropriate to divide the site into sectors to focus on areas of common usage, similar topography and vegetation, and/or unique site features?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

BLM Area C is divided geographically between North and East, and includes areas of common/similar types of training.

21. Should site boundaries be revised?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

The boundaries of BLM Area C would not need to be revised based on the results of site walks. The site boundaries for the BLM Area C East are based on analysis conducted during the development of the Management Plan. The eastern boundary of BLM Area C East is based on the property boundary at the time of acquisition of the property in 1917. The boundaries of the remaining areas are based on locations where similar types of training (similar use) are reported to have occurred.

The site boundaries for the BLM Area C North were established during the BLM North Site Assessment Data Report. Evaluations completed to date have moved some areas to Track 2 under BLM Area B.

References:

Shaw 2012b; MACTEC/Shaw 2010b; Gilbane, 2015.

22. Has the field data been collected and managed in accordance with quality control standards established for the project?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

The site walks were conducted according to general practices and according to USACE guidelines, the Remaining RI/FS Areas Management Plan and Technical Memoranda, and the Basewide Range Assessment Work Plan (IT), and CMS (USA) Site Specific Work Plan.

References:

MACTEC/Shaw, 2010; MACTEC/Shaw, 2011a; MACTEC/Shaw, 2012b; IT, 2001; CMS,1995.

RESULT OF SITE WALK EVALUATION

Does the site walk evaluation provide sufficient evidence to warrant further investigation?

Yes	No	Inconclusive
	No	

Comments

The results of the site walks within BLM Area C indicated that the site was used for training with military munitions. The type and amount of military munitions encountered was consistent with general maneuver training. If military munitions remain as a result of that training, they are likely to be practice or pyrotechnic items that are not designed to cause injury. Evaluations completed to date have moved some areas to Track 2 under BLM Area B.

References

CMS Environmental, Inc. (CMS) 1995. Site Specific Work Plan, July. (AR# OE-0130)

IT, 2001. Basewide Range Assessment Work Plan. (AR# BW-2085A)

USACE, 1997. Revised Archives Search Report, Former Fort Ord, California, Monterey County, California. Prepared by US Army Corps of Engineers, St. Louis District. (AR# OE-0022)

FORA ESCA RP, 2012. Final Group 3 Remedial Investigation / Feasibility Study, Volume 1: Remedial Investigation Del Rey Oaks / Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain Site Munitions Response Areas, Former Fort Ord, Monterey County, California. (AR# ESCA-0249B)

_____, 2017a. Final Group 4 Remedial Investigation/Feasibility Study, Future East Garrison Munitions Response Area, Former Fort Ord, Monterey County, California. June. (AR# ESCA-0322B)

_____, 2017b. *Final Group 1 Remedial Investigation/Feasibility Study, Seaside and Parker Flats (Phase II) Munitions Response Areas, Former Fort Ord, Monterey County, California.* May. (AR# ESCA-0318B)

Harding Lawson Associates, 2000. Draft Final Plan for Evaluation of Previous Work Ordnance and Explosives Remedial Investigation/Feasibility Study. September. (AR# OE-0283G)

Gilbane, 2015. Final, Revision 2, Track 2 Remedial Investigation/Feasibility Study, BLM Area B and MRS-16, Former Fort Ord, California. May. (AR# OE-0802D)

MACTEC/Shaw, 2010. Final Remaining Remedial Investigation/Feasibility Study Areas Management Plan, Former Fort Ord, California. February. (AR# OE-0687E)

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- _____, 2012. Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2. January. (AR# BW-2300L)
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- U. S. Department of the Army (Army), 1945. Training Facilities, Fort Ord and Vicinity, California. Revised August 1945.
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- _____, 1958. Map of Fort Ord Training Areas & Facilities. Enclosure 1 to Appendix 1 to Annex "H". Revised: 10 January 1958.
- _____, 1965. Fort Ord, California, Aerial Mosaic, Location of Ranges. May.
- _____, 1967a. Field Training Areas & Range Map, Appendix 2, Annex O. April 27.
- _____, 1967b. Back Country Roads. January.
- _____, 1972. Master Plan Basic Information Maps, Reservation Map. March.
- _____, 1977. Fort Ord Reservation Plan, Master Plan, Future Development Plans. June.
- _____, 1980. Master Plan Basic Information, Maps Training Facilities Maps.
- _____, 1984. Training Facilities Map. June.

ATTACHMENT 1

EVALUATION OF PREVIOUS WORK: BLM AREA C

EVALUATION CHECKLIST PART 3: SAMPLING EVALUATION, MRS-14B, MRS-14E, AND MRS-27T

	Yes	No	Inconclusive
1. Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades and other launched military munitions)?			Inconclusive

Sources reviewed and comments

MRS-14D located on the west side of the southern portion of BLM Area C East, and addressed in BLM Area B, was an impact area for practice mortars (Subcaliber Range P-5). MEC and MD items were removed from MRS-14B and MRS-14E as part of the intrusive investigation of MRS-14D. The grids in MRS-14B and MRS-14E associated with the intrusive investigation of MRS-14D in which the MEC and MD were found were incorporated into Track 2 BLM Area B. The area to the west included the Impact Area MRA which supported numerous live firing ranges; however, there is no indication that the use of military munitions in the Impact Area MRA resulted in use of impacting military munitions in BLM Area C. No areas within BLM Area C appear to have been impact areas. One 37mm HE projectile (model unknown) (MD) was found in MRS-14B and was the only one found in the vicinity. A 22mm subcaliber practice projectile (ISD) was found in MRS-27T and was the only one found in the vicinity. Recovery of these items along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area.

References:

CMS, 1997; USA, 2001.

	Yes	No	Inconclusive
2. Is there evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?		No	

Sources reviewed and comments

No HE or LE MEC items were found during sampling in BLM Area C. MEC and MD found at the site, indicates that training did involve use of pyrotechnic, smoke producing items, and practice and training items. The items found are consistent with the types of training designated on the historical training maps.

References:

CMS, 1997; UXB, 1995.

	Yes	No	Inconclusive
3. Is there evidence that training involved use of pyrotechnic and/or smoke producing items (e.g., simulators, flares, smoke grenades) but not explosives?	Yes		

Sources reviewed and comments

Contractor sampling reports indicate that training involved use of pyrotechnic signals, flares, and simulators consistent with the types of training identified at the sites sampled.

References:

CMS, 1997; UXB, 1995.

4. Was sampling and/or reconnaissance performed within the appropriate area?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Sampling was conducted in Site 14 because according to interviews for the 1997 Revised ASR, MRS-14B was suspected of containing 7-inch and 8-inch naval gun projectiles that overshot the Impact Area MRA. No evidence of 7- or 8-inch naval gun projectiles was found during sampling operations at the site. MRS-14B was included in a sampling of Site 14 by UXB. MRS-14E was included in a sampling of Site 14 by CMS. Following the split of Site 14, MRS-14D was identified as Range P-5 on 1972 through 1987 ranges and training maps. The grids in MRS-14B and MRS-14E associated with the intrusive investigation of MRS-14D in which the MEC and MD were found were incorporated into Track 2 BLM Area B.

References:

USACE, 1997; MACTEC/Shaw, 2011; CMS, 1997; UXB, 1995; Gilbane, 2015.

5. Does sampling indicate MEC and/or munitions debris are present at the site?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Six MD items – three ground signals, an empty training mine, a 3-inch MK1 practice Stokes mortar, and an item identified as “37mm HE (Model Unknown)” – were recovered within the area of MRS-14B located inside of BLM Area C. No other 3-inch practice Stokes mortar projectiles or 37mm projectiles were identified in the vicinity of MRS-14B. Recovery of these items along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area.. Two MEC items, an illumination pyrotechnic mixture and a M22 series smoke rifle grenade, were identified during the random sampling operations at the BLM Area C portion of MRS-14B by UXB.

Portions of MRS-27V were sampled as part of the investigation of adjacent sites MRS-14B and MRS-14E. No MEC items were found. Three MD items, two illumination signals and a practice mine, were found during sampling. No other sampling or removal operations have been conducted at MRS 27V.

MRS-14E (including MRS-27T and MRS-27V) was sampled in 1995 and 1996 by CMS. MEC items removed as part of the investigation included two M49 series trip flares. MD removed included a 90mm illumination projectile (unknown model), three M125 series illumination signals, and an M18 smoke hand grenade. It should be noted that the “90mm illumination projectile” was identified as such in the original grid sheet generated during sampling; however no such item exists in the U.S. military inventory of type classified munitions. Therefore, the description of this item is suspect.

One grid within MRS-27T was sampled as part of the sampling effort associated with adjacent site MRS-14E. No MEC items were found. One ISD item, 22mm subcaliber practice projectile was found during sampling.

References:

CMS, 1997; UXB, 1995.

6. Were the type(s) of items found consistent with the type of training identified for the site?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

The MEC and MD found were consistent with the types of training identified on historical training maps with the exception of a practice mortar, and a 37mm HE projectile (model unknown) identified at MRS-14B and a 22mm

subcaliber practice projectile found at MRS-27T. Recovery of these items along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area. Mortar training was not identified on available historical training maps at this site; however, mortar training did occur at adjacent site MRS-14D.

References:

CMS, 1997; UXB, 1995.

7. Were the type(s) of items found consistent with the era(s) in which training was identified?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Items found were consistent with the Army ownership of the property (Pre-1940 until base closure in 1994).

References:

USAEDH, 1997; MACTEC/Shaw, 2011.

8. Was HE fragmentation found?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

One MD item, a 37mm HE projectile (model unknown), was found during sampling in BLM Area C. No other 37mm projectiles were found and there was no evidence of an impact area in the vicinity.

References:

CMS, 1997; UXB, 1995.

9. Was HE found?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

No HE was found during sampling in BLM Area C.

References:

CMS, 1997; UXB, 1995.

10. Were LE found?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

No LE was found during sampling in BLM Area C.

References:

CMS, 1997; UXB, 1995.

11. Were pyrotechnics found?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Illumination signals, and trip flares (MEC and MD) were found during sampling in BLM Area C.

References:

CMS, 1997; UXB, 1995.

12. Were smoke producing items found?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Smoke hand grenades and smoke rifle grenades (MD) were found during sampling.

References:

CMS, 1997; UXB, 1995.

13. Were explosive items found (e.g. rocket motors with explosive components, fuzes with explosive components)?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

No explosive items were found during sampling.

References:

CMS, 1997; UXB, 1995.

14. Do items found in the area indicate training would have included use of training items with energetic components?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

MEC items found at the site contained energetic components (illumination signals, trip flares, and smoke grenades) items were consistent with the types of training identified for this area.

References:

CMS, 1997; UXB, 1995.

15. Were items found in a localized area (possibly the remnants of a cleanup action)?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

No items were found in a localized area during sampling.

References:

CMS, 1997; UXB, 1995.

16. Has the site been divided into sectors to focus on areas of common usage, similar topography and vegetation, and/other unique site features?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Site 14 was split into five areas based on areas of similar types of use.

References:

USACE, 1997.

17. Should current site boundaries be revised?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

Site boundaries should not be revised. The sampling grids in MRS-14B and MRS-14E associated with the investigation at adjacent MRS-14D in which subcaliber training mortars were located incorporated into Track 2 BLM Area B.

References:

CMS, 1997; UXB, 1995; Gilbane, 2015.

18. Was equipment used capable of detecting items suspected at the site at the maximum expected depth?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Results of the ODDS study indicate that the Schonstedt GA-52/C, GA-52CX, and GA-72/Cv models are capable of detecting ferrous MEC or MD items that may be expected as a result of military training in BLM Area C. The potential and discovered MEC and MD at BLM Area C are primarily non-penetrating and are expected to be located in the near subsurface where the Schonstedt is most effective.

References:

Parsons, 2002.

19. Was equipment used capable of detecting the types of items (e.g., non-ferrous) suspected at the site?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

The equipment used was capable of detecting munitions with ferrous components. It would be less effective in detecting items with only small amounts of ferrous material (grenade fuzes). However, grenade fuzes would likely be found at or near the ground surface.

References:

Parsons, 2002; Fort Ord Military Munitions Response Program Data Base.

20. Do the results of the ODDS indicate that items suspected at the site would have been detected by the instrument used at the time of investigation?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

The calculated detection rates for the combined sites ranged from 52 to 96 percent for the Schonstedt Model GA-52/C, 64 to 98 percent for the Schonstedt Model GA-72/Cv, and from 97 to 100 percent for the Schonstedt GA-52/CX, depending on the search radius. The results of the ODDS seeded test indicate that the types of items suspected or detected at the site were, with the exception of some hand grenade fuzes, detectable in the top 6 inches using these Schonstedt models. The types of items expected at the site are primarily surface related items (Category I and II).

References:

Parsons, 2002.

21. Do results of the investigation indicate that suspected items could be detected with a high level of confidence at observed and expected depth ranges?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

The equipment used was capable of detecting munitions with ferrous components that would be expected to be present at or near the ground surface. It would be less effective in detecting items with only small amounts of ferrous material (grenade fuzes). However, grenade fuzes would likely be found at or near the ground surface.

References:

Parsons, 2002.

22. Were all the instruments used to evaluate the site maintained and calibrated in accordance with associated work plan and manufacturer's specifications?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

During work performed by UXB, the UXO Quality Control Specialist calibrated and recorded the operational condition of the equipment on a daily basis. Equipment was calibrated at a frequency recommended by the manufacturer. Prior to geophysical searches source material was utilized to verify the accuracy of the equipment. During work performed by USA/CMS, instruments and equipment requiring maintenance and/or calibration were checked prior to the start of each workday. Batteries were replaced as needed and the instruments were checked against a known source. QA of 10% of the grids was performed by the USACE.

References:

UXB, 1995; CMS, 1997.

23. Based on the anticipated target density (MEC items per acre) has the minimal amount of sampling acreage been completed in accordance with the scope of work or contractor work plan?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

There is no anticipated density of items for this area; no target areas were identified or suspected based on historical data. Sampling was performed in accordance with the scope of work and work plans.

References:

UXB, 1995; CMS, 1997.

24. Based on sampling procedure (e.g., grids, transects, and/or random walks) was a percentage of the site completed to provide 95% confidence in a MEC density estimate, and if so, provide total area investigated and the MEC density estimate.

Total area investigated:	Approximately 37 acres
MEC Density:	Not calculated

Sources reviewed and comments

The site was investigated through 100% grid sampling (MRS-14B and MRS-14E). Selected 100x100-foot grids were investigated at MRS-14B and at MRS-14E. One sample grid associated with the investigation of MRS-14B

and MRS-14E was located within MRS-27T. Sample grids covered approximately 37 acres. All anomalies were investigated. A MEC density was not calculated due to the limited recovery of MEC during the sampling.

References:

UXB, 1995; CMS, 1997.

25. What percentage of the anomalies were intrusively investigated?

Total % of anomalies investigated:	100
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Sources reviewed and comments

100 percent of the anomalies identified during sampling were intrusively investigated.

References:

UXB, 1995; CMS, 1997.

26. Was the appropriate data processing scheme used for the site, how was the data processed?

Not Applicable

Sources reviewed and comments

Data were collected using Schonstedt magnetometers. Schonstedt magnetometers are analog so no digital data was collected for processing.

References:

UXB, 1995; CMS, 1997.

27. Has the field data been collected and managed in accordance with quality control standards established for the project?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Contractors working at the site followed work plans and quality assurance plans. The field data was collected and managed in accordance with the quality control standards established for the project.

References:

UXB, 1995; CMS, 1997.

RESULT OF SAMPLING EVALUATION

Does the sampling evaluation provide sufficient evidence to warrant further investigation?

Yes	No	Inconclusive
	No	

Comments

No evidence of training with high explosive munitions was identified. The quantity of munitions discovered and the types of MEC and MD found during the sampling indicate that the area was used for general maneuvers and training, and bivouac. No further investigation is warranted in this portion of BLM Area C East.

References

CMS Environmental, Inc., 1997. After Action Sampling/Removal Report, Ordnance and Explosives, Site 14 East, Former fort Ord, California. February 12. (AR# OE-0129)

MACTEC/Shaw, 2011. Final Technical Memorandum Site Assessment Approach BLM East/Pre-1940 (Northern and Southern Portions) Remaining RI/FS Areas Former Fort Ord, California. May. (AR# OE-0725A)

Parsons, 2002. Final Ordnance Detection and Discrimination Study (ODDS), Former Fort Ord, Monterey, California. January. (AR# OE-0310F)

USACE, 1997. Revised Archives Search Report, Former Fort Ord, California, Monterey County, California. Prepared by US Army Corps of Engineers, St. Louis District. (AR# OE-0022)

USA, 2001. Final OE Sampling and Removal After Action Report, Inland Range Contract, Former Fort Ord, California, Site OE-14D. (AR# OE-0301A)

UXB, 1995. Final Report for Ordnance and Explosives Removal Action, Fort Ord, California, Site 14. November 1. (AR# OE-0116)

ATTACHMENT 1

EVALUATION OF PREVIOUS WORK: BLM AREA C

EVALUATION CHECKLIST PART 4: REMOVAL EVALUATION, EUCALYPTUS FIRE AREA AND PORTION OF BLM NORTH (NORTHERN PORTION)

	Yes	No	Inconclusive
1. Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades and other launched military munitions)?		No	

Sources reviewed and comments

A visual surface reconnaissance was performed following the Eucalyptus Fire (EFA). The visual surface reconnaissance within the EFA was conducted within the burned acreage along the western boundary of BLM Area C East. 21 MEC items were found and removed from the EFA within BLM Area C East including seven surface trip flares (UXO), two 40mm practice cartridges (DMM), two artillery flash simulators (UXO), one airburst simulator (UXO), three illumination ground signals (UXO), five hand grenades (smoke, riot control, and practice, all UXO), and one 40mm projectile (riot control, UXO).

A MEC visual surface removal within the BLM Area East of Parker Flats was performed within the portion of BLM Area C North on trails and open areas accessible to the public. MEC items found included one M49 surface trip flare (UXO) and six blasting caps (UXO). There is no evidence to support the use of these areas as impact areas.

In June 2018, a dirt road was constructed to support the prescribed burn of the northern portion of BLM Area B. The new road, Lion's Revenge Road, connects Watkins Gate Road and Hennekens Ranch Road and crosses into both BLM Area B and BLM Area C (Figure 3). Vegetation removal and surface removal have been performed in burn containment areas north and south of the newly constructed road. Within the 200-ft wide area north of the road (within BLM Area C), one signal, illumination, ground parachute, M126 series and two projectile, 37mm, LE, MK1 (MPPEH, awaiting detonation) were discovered. Within the 316-ft wide area south of the new road (within BLM Area B), one flare, surface, trip, M49 series (UXO) was recovered. Another flare, surface, trip, M49 series (UXO) was recovered in a burn containment area along Hennekens Ranch Road (within BLM Area B). There is no evidence to support the use of these areas as impact areas.

References:

Shaw, 2005; Fort Ord Military Munitions Response Program Database; Parsons, 2002; KEMRON, 2017

	Yes	No	Inconclusive
2. Is there evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?		No	

Sources reviewed and comments

No HE items were found during the visual surface reconnaissance performed in the BLM Area C East portion of the EFA and the visual surface removal performed in BLM Area C North. MEC items found were consistent with the use of these areas as general training, maneuver and bivouac areas.

References:

Shaw, 2005; Parsons, 2002.

3. Is there evidence that training involved use of pyrotechnic and/or smoke producing items (e.g., simulators, flares, smoke grenades) but not explosives?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Simulators, flares, signals and other smoke producing items were found during the visual reconnaissance and visual surface removal action. MEC removed is provided in answer to question 1.

References:

Shaw, 2005; Parsons, 2002.

4. Was removal performed within the appropriate area?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Visual surface reconnaissance was performed within the burned areas of the EFA in BLM Area C East. Visual surface removal was performed in open/accessible areas in BLM Area C North as intended.

References:

Shaw, 2005; Parsons, 2002.

5. Did removal indicate MEC and/or munitions debris are present at the site?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Both MEC and MD were found and removed during the surface removal and visual reconnaissance. MEC removed is provided in answer to question 1. MD was recorded by weight for each activity.

References:

Shaw, 2005; Parsons, 2002.

6. Were the type(s) of items found consistent with the type of training identified for the site?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Simulators, flares, signals and other smoke producing items were found during the removal actions and are consistent with use of these areas for general training, maneuver, and bivouac areas. Recovery of 40mm practice cartridges, riot control items, and blasting caps, along with the historical information, does not indicate a pattern of training use of these items and does not reflect normal use of the area.

References:

Shaw, 2005; Parsons, 2002.

7. Were the type(s) of items found consistent with the era(s) in which training was identified?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Items found are consistent with training from the 1940s and into the 1990s.

References:

Shaw, 2005; Parsons, 2002.

8. Was HE fragmentation found?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

HE fragmentation was not found during the removal actions.

References:

Shaw, 2005; Parsons, 2002.

9. Was HE found?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

No HE was found during the removal actions. Six blasting caps were located in BLM Area C East. Electric blasting cap M6 is used to initiate HEs with a blasting machine or other suitable source of electric power. Recovery of these items along with the historical information does not indicate a pattern of training use of these items and does not reflect normal use of the area.

References:

Shaw, 2005; Parsons, 2002.

10. Were LE found?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

No LE was found during the removal actions.

References:

Shaw, 2005; Parsons, 2002.

11. Were pyrotechnics found?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Pyrotechnic items found and removed from the EFA within BLM Area C East included seven surface trip flares (UXO), two artillery flash simulators (UXO), one airburst simulator (UXO), and three illumination ground signals (UXO).

Pyrotechnic items found and removed from BLM Area C North included one M49 surface trip flare (UXO).

References:

Shaw, 2005; Parsons, 2002.

12. Were smoke producing items found?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

Smoke producing items were found and removed from the EFA within BLM Area C East included three hand grenades (smoke, riot control, all UXO), and one 40mm projectile (riot control, UXO).

No smoke producing items were found in the BLM Area East of Parker Flats within BLM Area C North.

References:

Shaw, 2005; Parsons, 2002.

13. Were explosive items found (e.g. rocket motors with explosive components, fuzes with explosive components)?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

Two M69 practice hand grenades were found and removed from the EFA within BLM Area C East. The M69 contains the M228 pyrotechnic delay-igniting fuze.

References:

Shaw, 2005; Parsons, 2002.

14. Do items found in the area indicate training would have included use of training items with energetic components?

Yes	No	Inconclusive
Yes		

Sources reviewed and comments

MEC found included simulators, trip flares, illumination signals, practice grenades, smoke grenades, and 40mm practice cartridge. See question 1 for listing.

References:

Shaw, 2005; Parsons, 2002.

15. Were items found in a localized area (possibly the remnants of a cleanup action)?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

Four trip flares were found in close proximity to each other in BLM Area C East, however, there was no indication that this was as a result of a cleanup action.

References:

Shaw, 2005; Parsons, 2002.

16. Has the site been divided into sectors to focus on areas of common usage, similar topography and vegetation, and/other unique site features?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

The areas that underwent visual surface removal and visual surface reconnaissance have not been subdivided.

References:

Shaw, 2005; Parsons, 2002.

17. Should current site boundaries be revised?

Yes	No	Inconclusive
	No	

Sources reviewed and comments

No indication that boundaries in the visual surface removal areas should be revised.

References:

Shaw, 2005; Parsons, 2002.

18. Was equipment used capable of detecting items suspected at the site at the maximum expected depth?

Yes	No	Inconclusive
N/A		

Sources reviewed and comments

Although instruments were available to be used during the visual surface reconnaissance in the EFA, for the portion of the EFA in BLM Area C East, no instrumentation was used.

No instrumentation was used for the visual surface removal in BLM Area C North.

References:

Shaw, 2005; Parsons, 2002.

19. Was equipment used capable of detecting the types of items (e.g., non-ferrous) suspected at the site?

Yes	No	Inconclusive
N/A		

Sources reviewed and comments

Not applicable.

References:

Shaw, 2005; Parsons, 2002.

20. Do the results of the ODDS indicate that items suspected at the site would have been detected by the instrument used at the time of investigation?

Yes	No	Inconclusive
N/A		

Sources reviewed and comments

Not applicable.

References:

Shaw, 2005; Parsons, 2002.

21. Do results of the investigation indicate that suspected items could be detected with a high level of confidence at observed and expected depth ranges?

Yes	No	Inconclusive
N/A		

Sources reviewed and comments

Not applicable.

References:

Shaw, 2005; Parsons, 2002.

22. Were all the instruments used to evaluate the site maintained and calibrated in accordance with associated work plan and manufacturer's specifications?

Yes	No	Inconclusive
N/A		

Sources reviewed and comments

Not applicable.

References:

Shaw, 2005; Parsons, 2002.

23. Was the appropriate data processing scheme used for the site, how was the data processed?

Yes	No	Inconclusive
N/A		

Sources reviewed and comments

Not applicable.

References:

Shaw, 2005; Parsons, 2002.

24. Has the field data been collected and managed in accordance with quality control standards established for the project?

Yes	No	Inconclusive
N/A		

Sources reviewed and comments

The field data was collected and managed in accordance with the quality control standards established for the projects.

References:

Shaw, 2005; Parsons, 2002.

RESULT OF REMOVAL EVALUATION

25. Does the removal evaluation provide sufficient evidence to warrant further investigation?

Yes	No	Inconclusive
	No	

Comments

No HE items were found during the visual surface reconnaissance performed in the EFA portion within BLM Area C East. MEC items found were consistent with use of these areas as general training, maneuver and bivouac areas and included the use of simulators, flares and smoke producing signals and grenades. No evidence was found to warrant further investigation.

No HE items were found during the visual surface removal performed in BLM Area C North. MEC items found were consistent with use of these areas as general training, maneuver and bivouac areas and included the use of flares and signals. No evidence was found to warrant further investigation.

References

- Parsons, 2002. Final Technical Information Paper, Surface Removal, BLM Area East of Parker Flats, Former Fort Ord, Monterey, California, Ordnance and Explosives (OE) Cleanup. April. (AR #OE-0532)
- Shaw, 2005. Final After Action Report, Time Critical Removal Action And Military Munitions Reconnaissance, Eucalyptus Fire Area, Former Fort Ord, California, Revision 0. January. (AR #OE-0499G)
- KEMRON Environmental Services, Inc. (KEMRON), 2017. Final Site-Specific Work Plan, Munitions and Explosives of Concern Remedial Action BLM Area B, Former Fort Ord, California. December. (AR# OE-0900B)